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HACK4Society: Digital Hackathon Training Events in theService of E-Learning Solutions for the post Covid-19 Society

A SYNTHESIS OF STATE-OF-THE-ART REPORTS REGARDING THE IDENTIFICATION OF RECENT GAPS IN THE LEARNING EXPERIENCES IN THE DELIVERY OF E-LEARNING DUE TO COVID-19

LEADING ORGANIZATION: INNOVATION HIVE

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1. Introduction

The Covid-19 pandemic had as a result the abrupt shift of the educational process to a digital way of transmitting. Having identified the gaps in both teachers and students regarding digital literacy, it is now important to make a state-of-the-art analysis in a more theoretical way of the opportunities and deficiencies of each partner country.

The most important topics that have to be covered, in order to acquire a centralized overview of each country's system and status, is a view and general introduction to each country's educational system, in order to track the differences and deduct our conclusions ad hoc and a familiarization with the way the VET system operates in each country.

Furthermore, in order to obtain a clear view in each country's deficiencies and opportunities, it is vital to obtain knowledge regarding the existing legal framework, the policies implemented, the legal differentiations concerning education in general, and VET in particular.

For someone to identify the existing gaps and question the existing system, it is necessary to be aware of the educational offers and opportunities available in the pre-Covid era, and their level of exploitation. Additionally, a general overview of each county's digital literacy grade before Covid will be demonstrated, accompanied by the status of digitization in the VET system. The available certifications in each country will be provided, and the digital transformation steps that were taken to respond to the urgent changes. Similarly, a crucial point is the identification of the challenges that had to be faced, the responses to these challenges, especially from the state, and the level of adaptation of teachers and students to the new reality. Following, the measured impact so far will be demonstrated and the changes in policy-making processes.

Lastly, it is important to present the methodology that each partner country followed in order to reach to that level of understanding, and of course, the suggestions as possible answers that could be applied in each country, accompanied by conclusions, after having gathered all the necessary information.

2. Cyprus

Introduction:

Education in Cyprus is offered from the pre-primary stage up to the postgraduate level. Specifically, the education system of Cyprus consists of four stages and it is compulsory between the ages of 5-15. Between 1-5/6 years old, pre-primary and between the ages of 5/6-11/12 primary schooling (grades one to six) is compulsory. Children at the age of 6 enter the primary school lasting for six years, receiving a receive a certificate of attendance when graduating. Following the primary school and the completion of Primary Education, lower secondary levels (grades seven to nine) are also compulsory, moving on to the Secondary Education. Children at the age of 12 join the Middle school (Gymnasium), for three years of compulsory education. Up until that point of their education is compulsory, until the student reaches the age of 15 years old.

Once completed the middle school at the age of 15 and the completion of the compulsory education, they can further continue the Secondary Education that takes two forms; Lyceum and Vocational schools (industrial training). In Lyceum the curriculum remains academic, where successful students canfurther qualify to move to Tertiary Education; universities that lasts for another three years. Tertiary Education, including postgraduate courses, in Cyprus is further divided to private and state universities, including three public universities and various private collages and institutions that provide courses at the post-secondary non-university level (European Centre for The Development of Vocational Training (Cedefop), 2012).

VET education:

VET is available from the upper secondary level at the technical school, including evening technical schools. VET in tertiary level is also available to employees, unemployed and vulnerable adults via

private or public institutions such as colleges, training institutions, consultancy firms and enterprises. VET at upper school level is provided through a range of initial training programmes to adults and gymnasium leavers:

1. Formal mainstream upper secondary initial technical and vocational education:

   Education programmes are offered free of charge in both practical and theoretical pathways and the duration of the courses offered are three years.

2. Second chance formal initial vocational education:

   a. Evening technical schools;

      The duration of these studies varies from one to four years, depending on the educational background of the student.

   b. Three-year programmes of afternoon and evening classes at technical schools;

      Such programmes are provided during afternoon and evening classes with the aim to provide formal initial education and training to adults and respond to the demands of the labor market

   c. VET at tertiary level:

      VET at tertiary level is provided by public institutions and private institutions, offering tertiary education;

      i. Public institutions of tertiary education:

         In order to be eligible to participate in public tertiary education after the completion of compulsory 12 years of primary and secondary education. The selection to enter depends on the results of common final examinations. A successful completion of a programme comes after 2-3 years of studying, where a diploma is awarded by the institution.

      ii. Private institutions of tertiary education:

         A range of academic and vocational programmes at different levels is offered (one- or two-year diploma, three-year higher diploma, four-year bachelor's degree and one-or two-year master's degree) (Cedefop; Human Resource Development Authority of Cyprus, 2019).

VET education is also offered through VET New Modern Apprenticeship system (NMA), co-funded by the European Social Fund (ESF) and the government of Cyprus, accepts students who do not wish to continue formal education past the third grade of Gymnasium. Apprenticeship system offers a two-year VET programme including practical and theoretical training to the ones who have not successfully completed the compulsory education and want to be trained and employed in technical occupations.

Thus, this programme is eligible to young people aged between 14 and 21. Such participation in NMA is not part of the compulsory education of Cyprus and it is free of charge (European Centre for The Development of Vocational Training (Cedefop), 2012).

Overall, the Human Resource Development Authority in Cyprus (HRDA) is responsible for the ongoing vocational training taking place in the island, by both setting standards as well as presenting courses. Secondary schools award a variety of certificates. The Lyceum and Vocational schools (formal) certificate with an Apolotyrion, that is their ticket forward to join Tertiary education/VET tertiary education and continue their academic studies by becoming experts on a field. Students graduate from secondary education at the age of 18 (Ministry of Education and Culture, 2022).

Education System in Cyprus

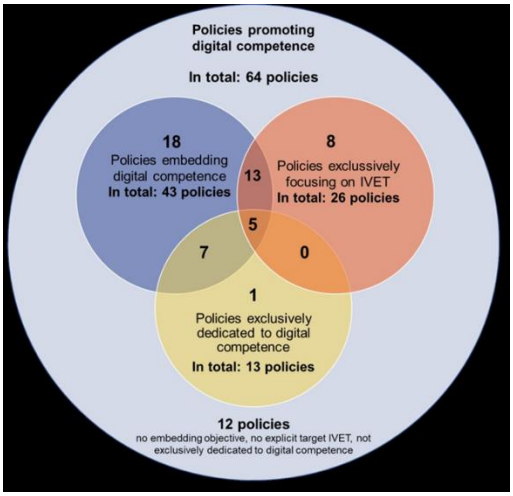
Education	School/Level	Grades	Age	Years	Notes
Primary	Primary Education	1-6	6-12	6	Primary School Leaving Certificate - Greek-Cypriot System
Primary	Primary Education	1-5	6-11	5	Turkish-Cypriot System
Middle	Gymnasio	7-9	12-15	3	Lower Secondary Education - Greek-Cypriot System
Secondary	Lower Secondary Education	6-8	12-14	3	Turkish-Cypriot System
Secondary	Eniaio Lykeio	10-12	16-18	3	Eniaio Lykeio - Ενιαίο Λύκειο Certificate/diploma granted: Apolytirion - Greek-Cypriot System
Secondary	Lise	9-12	14-18	4	Turkish-Cypriot System
Vocational	Technical School	10-12	15-18	3	Certificate/diploma awarded: Apolytirion
Tertiary	pre-primary and primary/basic school teachers				All teachers in the public sector must have a University of Cyprus degree (Ptychio) or equivalent degree in Pedagogical Studies.
Tertiary	Tertiary				
Tertiary	Bachelor			4	leads to the award of a Ptychio (240 ECTS)
Tertiary	Master; Post-graduate Degree			2	University of Cyprus confers a Master's Degree eighteen months after the Bachelor's Degree in most fields

Source: (Ministry of Education and Culture, 2022)

Legal Framework:

On an EU level, since 2006 the key digital competence in VET for lifelong learning European policy have underlined them as a priority in strategies and targeted initiatives. For example, the 'Strategic framework for education and training' (ET 2020) shows that the use of ICT tools and teacher training should be a priority (The Council of the European Union, 2009). Also, the Digital Agenda of 2018 also promoted digital literacy and skills, including three priorities related to digital competence: 1. Better use of digital technology for teaching and learning, 2. Digital skills development and competences relevant for digital transformation, 3. Education improvement through better data analysis and foresight (European Commission, 2018).

The 'Key competences in initial vocational education and training: digital, multilingual and literacy' study identified 64 policies promoting digital competence in EU focusing on VET, where 26 focused on VET; most of them targeted the secondary education sector as well as partially covering the higher education, primary and preschool sectors. Zooming in to policy-focus areas, the promotion of digital competence is done in different ways through interrelated areas; 1. Programme delivery, 2. Reference documents (education and occupational standards), 3. Teacher/trainer competences (a. training teaching staff, b. development of supportive material), 4. Revising assessment standards (Cedefop, 2020).



Source: (Cedefop, 2020).

Focusing on Cyprus and VET learners, digital competence training is provided as a stand-alone subject; an introductory ICT course is compulsory in the first-year of studies, where digital skills are developed taught basic course in the first year of VET programmes, building the basic foundations for the following years. An optional ICT courses are offered to all specializations to the rest of the years. Also, stand-alone assessment of digital competence is carried out for technology studies; its assessment is continuing and consists of tests and final examinations (Cedefop, 2020).

For VET educators, a continuing professional development of teachers/trainers is offered by the Cyprus Pedagogical Institute (CPI), as the official department of the education ministry running teachers' professional learning. A variety of free-of-charge training is offered (compulsory and repeated) all according to the teachers' current needs and the school context. For instance, compulsory courses are provided to newly appointed VET head teachers, offered once a week, during a school year. For VET trainers, the Human Resource Development Authority (HRDA) offers training programmes for further enhancement their training in various subjects. Between 2015-2017 school-based professional learning was given; schools and technical schools, based on their needs (including further enhancement on digital skills), organized training programmes for teachers (European Centre for The Development of Vocational Training (Cedefop), 2012).

Covid-19 and digital literacy:

In Cyprus, adult education is overall promoted through several initiatives and institutional arrangements, as well as the establishment and the operation of the Human Resource Development Authority, as shown above. The promotion insisted of significant push to trainings of employees, unemployed people and any vulnerable adult. Following this promotion to adult education and new initiatives, the whole education system was forced to be adopted to the needs of Covid-19 that gradually resulted to new strategies and action plans to be applied for a holistic digital transformation.

On a post-covid 19-era, on EU level, the Recovery and Resilience Facility ('RRF') aims to mitigate the social and economic impact of the pandemic, by making European societies and economies more suitable and better prepared for the opportunities and challenges of the green and digital transitions (European Commission, 2022).

On a national level, Cyprus' the first that required improvement was the quality, efficiency and labour market relevance of education and training, contributing and ensuring a fast-labour recovery. The European Commission noted that, it is important to equip citizens with the right and developed skills. It was also noted that low-digital skill levels in Cyprus became visible during the restrictions imposed during the pandemic. The low-level digital skills had a negative impact during the activities that had to be completed during lockdowns (distance learning, teleworking). Equal access to internet should be guaranteed, as it is a key element in quality digital distance learning while no child is left behind (Delivorias, 2022).

Therefore, the National Recovery and Resilience Plan (NRRP) 2021-2026 is developed around 5 policy axes:

1. Green transition
2. Digital transformation
3. Smart, sustainable and inclusive growth
4. Health and economic, social and institutional resilience
5. Social and territorial cohesion

In detail, under point number 5 'Social and territorial cohesion', 'educational system modernization, upskilling and retraining' is referred as Component 5.1. The main objectives of Component 5.1 are that Cyprus's educational system is aiming modernized pedagogical policies, focusing on an improved quality of education and marketing connections within the school and the labor market. Educational reforms promoting the improvement of students' outcomes include:

1. The addressing of skills mismatch between education and the labor market [Reform 1: Addressing skills mismatch between education and labor market].
2. The establishment of a new system for teacher and school evaluation [Reform 2: A new teacher and school evaluation system].
3. The labor market and the extension of free compulsory preschool education. [Reform 3: Extension of free compulsory pre-primary education from the age of four].
4. The digitalization of education [Reform 4: Digital transformation of school units with the aim of enhancing digital skills and skills related to STEM education].
5. The modernization of the curricula of primary and secondary education [Reform 5: e-skills Action Plan – Implementation of specific actions].

At the same time, the pandemic has brought even greater challenges, speeding up the need of digital transformation of schools, while making sure that no child is left behind. Digital transformation will further enhance a greener, more inclusive, sustainable economies and stronger and more resilient societies.

Regarding VET and digital literacy, our attention should be drawn on Reform 1; it is further divided to higher education and secondary education. Specifically focusing on secondary education, its implementation consists of a well-rounded series of actions and activities (that will be translated into an action plan), whereas for higher education emphasis on tracking the graduates in order to establish cooperation with other relevant stakeholders is the overall aim.

The implementations of secondary education will form the backbone of reforms to the education system and the labor market in the coming years. The activities are as follows:

i. Enhancement of the Career Counselling and Educational Services (CCES) of the Ministry of Education, Culture, Sports and Youth (MOECSY).

ii. Reform and modernization of the secondary schools' educational programmes and curriculum to improve, among else, digital literacy, emotional intelligence and soft skills, entrepreneurship skills, etc.

iii. Introduction of two additional programmes of study offered by the Department of Secondary General Education and two additional programmes of study offered by the Department of Secondary Vocational Education and Training that will be tailored to labor market needs.

iv. Introduction of an in-job shadowing programme for the pupils of the Department of Secondary General Education.

v. Provision of high-quality professional training to Secondary education teaching staff in close collaboration with labor market experts.

vi. Upgrading of teaching rooms and laboratories in schools so that teaching staff and students have access to the latest technology and equipment relevant to their studies.

Reform 4 'Digital transformation of school units with the aim of enhancing digital skills and skills related to STEM education' should be also highlighted when referring to VET and digital literacy, where its implementation will take place according to the following steps:

i. Identify the current needs regarding hardware for the creation of e-class (school classrooms); Assess the current hardware; Equip school classrooms.

ii. Hardware: Laptop, projector and peripherals.

iii. Equip students with hardware (laptop/tablets); Based on eligibility criteria students from third grade of primary school and second grade of secondary school.

iv. Transform curriculum and produce educational material towards enhancing digital skills (cross-curricular) and STEAM methodology.

v. Train in-service teachers to develop students' digital skills.

The actions referred to above, as well as the whole of actions proposed under component 5.1, will further develop digital skills that will ensure a transformation to a digital era that will further modernize the national economy and ensure employability to youth, tackling rising unemployment, especially after covid-19 (Republic of Cyprus, 2021a).

Similarly, the 'Republic of Cyprus Second Voluntary National Review', under the Sustainable Development Goals-6, and specifically under Goal 4: Quality Education. Goal 4 refers to the importance of educational reformation, especially as Covid response revealed, in order to reach a better more developed educational system. In greater detail;

i. Investment should be made in the training and professional development of teachers at all levels of education.
ii. Efforts should be made to increase awareness on technical and vocational education programmes (and break any associated gender stereotypes).
iii. Digital transformation of school units with the aim to enhancing digital skills ad skills related to STEM education (Republic of Cyprus, 2021b).

Additionally, as digitalization is a main element that will allow education reformation, it is worth noting the National Digital Strategy 2020-2025, that has as a main objective the promotion of the digital transformation to both the public and private sector (Theocharous, 2020). The four defined strategic objectives include:

i. A vibrant, sustainable and resilient economy.
ii. An open, democratic and inclusive society.
iii. Technology that works for people.
iv. A green, digital transition for Cyprus; following Component 5.1 that NRRP refers to, as presented above (Deputy Ministry of Research, Innovation and Digital Policy, 2020).

Overall, digital transformation will allow education reformation that will enhance VET schooling, teaching and training that will further allow future employability.

Main goals and methodology:

The main goals of this study include the identification the present conditions in Cyprus in regards to theonline teaching all pedagogical centers had to adopt during the pandemic-19 and as imposed by the Cyprus Republic. This adaptation further exposed the gaps in the online lessons deliveries as well as the educational options VET teachers, trainers and learners could use and take advantage of. Also, the learning and teaching methods used and facilitated existing and used during the online lessons is another element that was greatly uncovered during online-schooling as well as the existing equipment and the need for special requirements from the VET teacher's and students' perspective regarding theirdigital skills. Focusing on the importance of digital skills during online teaching and learning, necessary, required and pre-required digital skills were in need for the delivery and participation of online courses in Cyprus. Through such experience there were some overall challenges in order to deliver an efficient and effective lesson as well as being able to acquire the knowledge passed through digital devices, further exposing current challenges of VET educators and learners, emerging from the transition to the e-learning environment.

The overall aims and goals of this study were greatly addressed, identified and presented in this report through the use primary research and more specifically the conduction of focus groups to both Vet educators and VET learners as well as through the dissemination of two different online questionnaires/surveys to VET educators and learners. The online surveys and focus groups included questions that would help us draw conclusions to the goals and aims of the project mentioned above. Specifically, the focus groups consisted of questions that would allow the build-up of discussions as well as further provision of explanations for opinions and experiences shared. The online surveys included both multiple choice and open-ended questions, covering three main sections; teaching and learning methods, identification of digital skills, challenges in students'/teachers' engagement. The primary research done, helped to identify and categorize the main challenges and themes arising from the results collected and analyzed as presented in the rest of the report.

Also, desk-based research was done in order to identify VET offers and curriculums for digital literacy.

This was achieved through searches in European websites regarding VET education and Covid19. Also,examples of completed projects focusing on digital literacy in order to allocate and identify VET curriculums, commonalities between them, material proposed and material published were also identified. Also, the websites of relevant NGOs, universities and VET collages and technical schools in Cyprus were searched, in order to identify local or European project with the main focus being VET education and digital literacy. All VET curriculums identified were applied locally but strive to tackle globally important issues relevant to VET education and the digital skills development of VET teachers.

Educational offers:

1. Skill-Pics: Using Interactive Infographics to Promote Problem Based Learning for the Development of Key Transversal Skills	
1. Activity owner/basic details	
Type of VET offer-VET trainings (formal, informal), national or international project	Formal training EU project and national project
Responsible organisation/institution in Cyprus	INNOVADE LI LTD, Cyprus.
Countries involved	Cyprus, Spain, Portugal, Czech Republic Germany
Website/source link for more info about the initiative	http://skillpics.eu/
2. Overview of activity	
Title of the activity	Skill-Pics: Using Interactive Infographics to Promote Problem Based Learning for the Development of Key Transversal Skills
Duration	September 2022-August 2022
Description of and aims	Skill-Pics provides a range of learning materials aiming to address young employees, to develop their workplace skills in order to increase their future employment and career opportunities. Aim: to teach the required skills to those looking for employment after the completion of their formal education and to those in employment upskill
Target audience	VET tutors, business support workers, employee relations professionals and young employees
Curriculum/Educational contents	Interactive Infographics: Digital Learning Materials through the completion of challenge-based learning activities; explainer video, digital breakout challenge, article, quiz, puzzle, WebQuest challenge in order to apply what learned. All developed learning material will be presented and available an online platform; MOOC (Massive Open Online Courseware), where the target group will be able to access.
Topics covered	The project addresses the key transversal skills required by young employees
Methods-methodological approach	Work and train VET tutors to develop their own resources; in-service training programme will support VET tutors to use the Interactive Infographics through their teaching as well as develop their own challenge-based learning sources to be used for young learners and employees.

Learning materials developed	• IO1: Skill-Pics Compendium of Interactive Infographic Transversal Skills Resources • IO2: Skill-Pics In-service training programme • IO3: Skill-Pics MOOC

2. PROMOVET: Improving VET training for young low-skilled learners	
1. Activity owner/basic details	
Type of VET offer-VET trainings (formal, informal), national or international project	Formal training EU project
Responsible organisation/institution in Cyprus	CARDET
Countries involved	Austria, Ireland, Cyprus, Finland, Italy, Spain
Website/source link for more info about the initiative	https://promovet-project.eu/index.php/en/index.html
2. Overview of activity	
Title of the activity	PROMOVET: Improving VET training for young low-skilled learners
Duration	2017-2019
Description and aims	PROMVET provides to VET trainers competences to make full use of young learners' communication tools and embed them in VET didactics and training plans Aim: make VET trainers aware of popular smart communication channels used by young people and provide them methods and tools in order to include these channels into their teaching.
Target audience	VET trainers, young low-skilled learners, labour market authorities, social partners, VET policy makers
Curriculum/Educational contents	Database with popular smart communication channels, used by young people, and provide examples for their use in VET
Topics covered	Development of ICT skills to VET trainers, in order to use ICT-based tools through their teaching
Methods-methodological approach	Conduct research with VET trainers, training experts and low-skilled learner. Develop a web-based compendium of tools for VET trainers and develop a training programme for VET trainers in order to be trained on ICT tools and the potential impact they can cause in VET didactics for low-skilled young learners. Support the general improvement of the quality and professionalisation in VET training through the use of ICT and teaching the VET trainers to use the ICT-based tools in a learning environment.
Learning materials developed	• IO1: Investigation Study • IO2: Web-based Compendium of Communication Tools • IO3: PROMOVET Training Programme

3. CASINO-The VET-ification of Online Gaming through innovative challenge-based learning	
1. Activity owner/basic details	
Type of VET offer-VET trainings (formal, informal), national or international project	Formal training EU project
Responsible organisation/institution in Cyprus	CARDET
Countries involved	Croatia, Cyprus, France, Germany, Ireland, Lithuania, Portugal, Spain
Website/source link for more info about the initiative	http://casino-project.eu/#about%20us
2. Overview of activity	
Title of the activity	CASINO-The VET-ification of Online Gaming through innovative challenge-based learning
Duration	2020-2022
Description of VET offers and aims	The CASINO project proposes the development of a compendium of innovative challenge-based learning games to be used on smartphones and tabled that will increase their engagement, raise self-esteem, build self-confidence and motivate them to begin a non-stop vocational education and training. Aim: the project aims to motivate NEETs (Not in Employment, Education or Training) to get involved in VET through the development of a compendium of Digital Breakouts to develop key transversal skills (literacy, numeracy, critical and creative thinking, initiative taking, learning to learn through information retention and digital literacy). As an end result, this will grow their development in learning and personal development.
Target audience	NEETs, VET trainers, tutors, counsellors and guidance experts
Curriculum/Educational contents	Addressing the problems to be addressed and thus attract NEETs back to education and training, provision of workshops and training focused on digital media skills and online learning, access to digital breakout resources
Topics covered	e-learning, digital literacy, digital skill development
Methods-methodological approach	Identification and addressing of problems, in-service training of: 50 hours of learning broken down into 15 hours of workshop-based training emphasized on the development of digital media skills and 25 hours of self-directed online learning all completed in online environments.
Learning materials developed	• IO1: compendium of Digital Breakouts • IO2: In-service training for VET tutors, counsellors and guide experts • IO3: Online Game CASINO-MOOC

4. "Online Schooling"	
1. Activity owner/basic details	
Type of VET offer-VET trainings (formal, informal), national or international project	Formal training EU project
Responsible organisation/institution in Cyprus	KES Collage
Country	Cyprus, Czech Republic, Turkey, Norway, Estonia
Website/source link for more info about the initiative	https://onlineschooling134834085.wordpress.com/
2. Overview of activity	
Title of the activity	"Online Schooling"
Duration	1st March 2021 – 28th February 2022
Description of VET offers and aims	The project introduces a process of professional development to teachers while integrating online teaching and assessment successfully. Learners will enhance their digital skills, become active participants and engagers, that will help them to be successful in future employment. Aim: to promote professional development and provide high quality online tools that will offer teachers and learners the skills to teach and learn digitally/online.
Target audience	VET teaches, VET students
Curriculum/Educational contents	Development of online courses and open educational sources, use of web and digital tools for teaching and learning.
Topics covered	Technological development, digital skills development, enhancement of internet usage and other digital tools for teaching and learning
Methods-methodological approach	Development of online courses that will enhance high quality of teaching and learning
Learning materials developed	• IO1: Creation of Manual for teachers • IO2: Written guide for assessment • IO3: Development of Digital tools for online teaching

6.*DigitALAD - Digital Adult Educators: Preparing Adult Educators for a Digital World	
1. Activity owner/basic details	
Type of VET offer-VET trainings (formal, informal), national or international project	Formal training EU project
Responsible organisation/institution in Cyprus	CARDET
Countries involved	Belgium, Cyprus, Greece, Ireland, Latvia, Spain
Website/source link for more info about the initiative	https://digitaladproject.eu/en/
2. Overview of activity	
Title of the activity	DigitALAD - Digital Adult Educators: Preparing Adult Educators for a Digital World
Duration	2019-2021
Description of VET offers and aims	The project will provide the necessary knowledge and skills around digitalisation in order to use them on their daily basis while helping adult learners to be empowered in regards to future employability. Aim: the project aims to build the capacity of adult educators in order to improve their digital literacy skills, with the use of innovative learning resources and promoting awareness of the importance of digital skills in adults.
Target audience	Adult educators, trainers, adult learners
Curriculum/Educational contents	Training programme, gamified environment with pedagogical material, OERs to use for future employability
Objectives	• Build the capacity of adult educators to become digitally literate in their teaching practices • Build the competencies of adults to use digital tools for employability • Develop innovative quality resources for adult educators/ trainers and adults • Promote awareness on the importance of digital skills for adults in Europe
Topics covered	Digital literacy skills, e-learning, online learning
Methods-methodological approach	training for adult educators, e-learning space and gamified learning modules (OERs)

Learning materials developed	• IO1: DigitALAD Training Programme for adult educators • IO2: E-learning space and gamified online learning modules • IO3: Impact assessment study and practice recommendations • IO4: Policy Recommendations Report

7. **EDUCABILITY-** Building the Capacity of Educators & Librarians in Information Literacy 1. Activity owner/basic details	
Type of VET offer-VET trainings (formal, informal), national or international project	Formal training Eu project
Responsible organisation/institution in Cyprus	CSI
Countries involved	Spain, Greece, Serbia, Cyprus
Website/source link for more info about the initiative	https://educability.cut.ac.cy/
2. Overview of activity	
Title of the activity	EDUCABILITY- Building the Capacity of Educators & Librarians in Information Literacy
Duration	2020-2022
Description of VET offers and aims	EDUCABILITY is a project that offers technological and educational development in answering specific urgent demands of the current Information and Knowledge Society Aim: convergence in culture, strategy expertise and infrastructure in Information Literacy Initiatives
Target audience	VET for librarians, teachers, trainers, mentors in school & work-based settings
Curriculum/Educational contents	Development of an available information literacy training package-ILTP, with the development of 6 complete curriculum: 1.Critical Literacy (focused on inequalities), 2. Digital Literacy, 3. Mobile Literacy. 4.Media Literacy, 5. Data Literacy,6. Sustainable Literacy The Curriculum development will be based on structural support of Information Literacy known models by converting each curriculum's content into 6 e-learning modules and by integrating them into an open-access Virtual Learning Environment (VLE), by enhancing each e-learning module content with open educational resources (OPR), e-content, materials, documents and media.
Topics covered	Digital skills, digital literacy
Methods-methodological approach	Information mapping, development of learning modules curriculum, web portal and virtual learning environments.
Learning materials developed	• IO1: Transnational Information Literacy Ecosystem Mapping (TILEM) • IO2: Six Information Literacy Learning Modules Curriculum Development (SILLMCD) • IO3: Virtual Learning Environment & Web Portal for the Information Literacy Training Package (ILTP)

	• IO4: Transnational Memorandum of Cooperation, Sustainability and Transferability. •

8. REACT Digital- **Ready, Active, Digital** 1. Activity owner/basic details	
Type of VET offer-VET trainings (formal, informal), national or international project	Formal training Eu project
Responsible organisation/institution in Cyprus	CSI
Countries involved	Denmark, Cyprus, Croatia, Bosnia and Herzegovina, Greece, Italy, Portugal
Website/source link for more info about the initiative	https://react-digital.eu/
2. Overview of activity	
Title of the activity	REACT Digital- Ready, Active, Digital
Duration	2020-2022
Description of VET offers and aims	The project builds capacity to implement online blended and distance teaching, and learning to develop digital competences of educators, trainers dan teachers, allowing them to deliver high quality inclusive digital education with the use of high-quality digital content, like online resources and tools. Aim: To give support to teachers and trainers in non-formal education by providing free online resources and teacher training for developing digital education materials.
Target audience	VET teachers, trainers, employees, non-formal education teachers and trainers, employees of economy departments, members of NGOs, SMEs
Curriculum/Educational contents	ICT tools and programmes, activities for blended learning, development of materials for the specific target group, module development, development of e-platform, course materials and repositories for the platform, implementation of the blended learning courses
Topics covered	e-courses, digital skills development, use of online learning
Methods-methodological approach	Training to 16 trainers in the development and implementation of comprehensive training programme, 120 new trainers will be trained in 8 teacher-training workshops.
Learning materials developed	• IO1: Need analysis (train the trainer) • IO2: Development of materials for courses in entrepreneurial skills and Project Management for NGOs, SMEs and public administration

9. ***DIMA 2.0 - Developing Strategies for Adult Education Providers and Adult Educators**	
1. Activity owner/basic details	
Type of VET offer-VET trainings (formal, informal), national or international project	Formal training EU project
Responsible organisation/institution in Cyprus	CARDET
Countries involved	Belgium, Cyprus, Ireland, Spain, Switzerland
Website/source link for more info about the initiative	https://dima-project.eu/en/
2. Overview of activity	
Title of the activity	DIMA 2.0 - Developing Strategies for Adult Education Providers and Adult Educators
Duration	2019-2021
Description of VET offers and aims	The project supports the professional development of adult education providers to improve and extend the supply of high quality learning opportunities designed to the needs of low-skilled and low qualified individuals. Aim: To improve the quality of adult education provided across Europe and raise the participation rates and to better monitor effectiveness of adult learning policies and strategies.
Target audience	Adult education providers, VET professionals, adult educators working with low-skilled/low qualified adult learner, adult learners.
Curriculum/Educational contents	4 Modules: 1. Outlining the Strategy in adult education, 2. Mapping the strategy to target groups, 3. Designing and implementing the strategy, 4. Digitalising the strategy
Objectives	1. Support adult education providers to design, implement, and monitor effective strategies for reaching out to low skilled adults and facilitate their access to upskilling pathways 2. Building the competences of adult education providers and adult educators to design more effective programs for low-skilled or low-qualified adults. 3. Improve the supply of high-quality learning opportunities tailored to the needs of low-skilled or low qualified adults. 4. Improve the digital competencies of adult educators to better serve adult learners. 5. Enhance synergies and complementarities among adult education providers, public authorities and the labour market.
Topics covered	Digital skills, adult education
Methods-methodological approach	Development of toolkit and training modules, creation of online courses and e-learning space with online tools; online modules, digital resources, training material and guidelines.
Learning materials developed	• IO1: Toolkit for developing and monitoring strategies for adult education providers

	• IO2: Training modules for adult education providers and educators • IO3: e-learning space and OERs

10.* vWBL -Virtual Work-Based Learning to stimulate real experience in VET digital training	
3. Activity owner/basic details	
Type of VET offer-VET trainings (formal, informal), national or international project	Formal training EU project
Responsible organisation/institution in Cyprus	Eurosuccess Consulting (EUROSC)
Countries involved	Portugal, Cyprus, Estonia, Italy, Bulgaria, Poland
Website/source link for more info about the initiative	https://www.vwbl.eu/
4. Overview of activity	
Title of the activity	vWBL -Virtual Work-Based Learning to stimulate real experience in VET digital training
Duration	1st September 2020-31st August 2022
Description of VET offers and aims	The project provides an effective virtual work-based learning to empower VET on supporting students' employability and entrepreneurship. It will provide alternative virtual experience to overcome the obstacle to the work-based learning in online VET teaching Aim: The project aims to provide an innovative contribution to the issues for VET teaching that has been identified during the social distancing imposed by governments due to the pandemic.
Target audience	Vet teachers, educators
Curriculum/Educational contents	training to VET teachers on virtual Work-Based Learning to be aware of the potential effectiveness of the virtual vWBL and to create their own impacting simulations of WBL, training all necessary support to inform the VET teachers about the issue of creating vWBL that will be usable also by students having poor digital connection or device.
Objectives	1. Virtual situations allowing to transfer alternative experience to practice (in the period that there will be obstacles to the real WBL). 2. Focusing on the: competences of the VET teachers to be aware of the potential effectiveness of the vWBL. 3. Develop teachers' competences in creating their own impacting simulations of WBL. 4. By the end, the project is going to propose training to VET teachers on virtual vWBL.
Topics covered	Virtual learning, digital skills, digital integration
Methods-methodological approach	Survey development and conduction among VET teachers, development of guide for VET teachers, OER training for teachers implemented through piloting
Learning materials developed	• IO1: Awareness raising methodologies on virtual Work-Based Learning

	• IO2: Innovative and learner-cantered pedagogical approaches enhancing the digital integration of virtual WBL in digital learning and teaching • IO3: Promotion of access to and through Open Educational Resources (OER) in order for VET teachers to undertake the proposed training on vWBL

11. V-UPGRATeS- Validating and Upgrading VET Trainers' and Teachers' Digital Skills 5. Activity owner/basic details	
Type of VET offer-VET trainings (formal, informal), national or international project	Formal training EU project
Responsible organisation/institution in Cyprus	Emphasys Interactive Solutions, Cyprus Computer Society
Countries involved	Germany, Cyprus, Romania, Spain, Greece
Website/source link for more info about the initiative	https://ccs.org.cy/en/projects/v-upgrates-10/ https://emphasyscentre.com/research/vet-sector/v-upgrates/ https://erasmus-plus.ec.europa.eu/projects/search/details/2015-1-DE02-KA202-002412
6. Overview of activity	
Title of the activity	V-UPGRATeS- Validating and Upgrading VET Trainers' and Teachers' Digital Skills
Duration	2015-2017
Description of VET offers and aims	Aim: to strengthen the digital skills of VET trainers and teachers, increase the capacity of professional development and thus achieving a systemic impact on the quality of teaching and students' learning outcomes.
Target audience	VET teachers, VET trainers
Curriculum/Educational contents	self-regulated training process; Quizzes covered topics on: Internet security, Virtual learning platforms, Online communication tools, Media editing, Web publishing, Interactive technologies in the classroom. These topics are the results of a V-UPGRATES survey (IO1) among VET teachers. The platform was developed for teachers in order to individually upgrade their digital skills to meet the needs of the current trends and it was designed to function as a transparent, multi-regulated, multi-assessed but self-directed process.
Topics covered	Internet usage, digital skills, online communication tools, interactive technologies
Methods-methodological approach	Surveys, development of framework, development of e-tool, interactive platform, development of autonomous learning process through multiple choice quizzes, online courses, evaluate with hands -on online tasks
Learning materials developed	• IO1: V-UPGRATES benchmark survey on the needs of labour market in the digital field • IO2: Design benchmarks and indicators for the VET trainers' and teachers' digital competence reference framework • IO3: Skills audit e-tool • IO4: V-UPGRATES Digital VET trainers' and teachers' interactive platforms • IO5: Digital profiles' portfolio and evaluation report • IO6: Design of blueprint strategy kit

Identifying gaps:

The main results of the fieldwork conducted from both focus groups and online questionnaires commonly identify the theme of the familiarization of VET trainers with the technology as well as the need of self-learning and self-teaching during Covid-19. This is overall understood from the common responses of both VET teachers and students, reflecting on the need of digital skills in vocational courses. The results exposed further challenges and gaps, showing the further need in computer and data knowledge and teachers not being able to transition the educational material to an online format. Specifically, both target groups referred to the skills of computer and data knowledge and the creation of digital content. Similarly, both target groups agreed in the need of specific digital skills in order to make a lesson efficient and effective. They all referred to the idea creativity; creation and visualization of content, the technologies of presentation and multimedia and competences of learning simulations as important skills in order to make a lesson more efficient and effective.

The common educational contents from all good practices identified and presented refer to the development of training programs, web-based tools and overall gamified and e-learning earning modules. Also, manual/handbooks and guidelines to teachers as well as Open Educational Resources (OERs) are offered from some programs completed. Specifically, one of the learning outcomes developed by the programs Skill-Pics, PROMOVET, CASINO,DigitALAD, REACT Digital, DIMA was the development of (in-service) trainings/ training modules for VET teachers, tutors, counsellors and guide experts on digital skills. Also, the project PROMOVET developed we-based tools and the project DigitALAD developed an e-learning space and gamified online learning modules, similarly to the EDUCABILITY project, as it developed 6 e-learning modules. Furthermore, the national project called 'Online Schooling' developed a manual for teachers similarly to the EU project of GLAD, that developed handbook and guidelines for VET educators. Similarly, the DIMA project developed a toolkit and the vWBL project developed guidelines and Open Educational Resources.

Overall, most of the good practices used the idea of autonomous learning process in order to help VET educators develop their digital skills. Self-learning was also something that was adopted in Cyprus during

Covid-19, however, without the provision of any educational or training material beforehand that played a vital role in the overall experience of online learning to both VET educators and VET students. Thus, the common educational contents identified in the good practices are extremely important for improving the enhancement of digital knowledge and technology familiarization to VET teachers in Cyprus.

Therefore, the educational material presented in the good practices identified are relevant and can beof use regarding the objectives of the project that include; the proposal of e-learning modules, the development of training methodologies through hackathon events and the preparation of Open Educational Resources (OERs).

Focusing on the national legal framework identified and presented above, it can be understood that the main focus of the NRRP (National Recovery and Resilience Plan) 2021-2026 is on the reformation of curriculums to improve digital skills, upgrading teaching rooms in order to have access to the latest technology, the creation of e-class and access to hardware, to enhance digital skills by transforming the curriculum and to train the teachers in order to develop students' digital skills. Comparing the specific educational reforms with the overall results of the information collected from the online surveys and focus groups conducted to both VET educators and VET students we can understand that there is an overall gap in enhancing training on the development of specific digital skills, as the Reform 4, refers to the in-service training of teachers in order to develop students' digital skills, without aiming the development of teachers' digital skills as well as the development of targeted digital skills, such as the creation and visualization of digital content, technologies of presentation and multimedia, competences of learning simulations, as identified from the online surveys and focus groups.

Taking it a step further and comparing the legal framework to the best practices identified, the gap revealed is that the legal framework does not focus on the implementation of a manual/guidebook/handbook as part of any trainings to teachers as well as the implementation of e-learning modules as good-practices refer to. The great focus of the legal framework is to ensure the development on hardware; to equip school classrooms with the latest technological development without further training the digital skills of the teachers in order to be able to successfully and fully use the technological equipment, as referred to.

The gaps identified focus on: the development of teachers' digital skills and certain digital skills, the promotion of guidelines and toolkits that will help to teachers' digital skills development as well as the overall trainings to the teachers in order to help them use these toolkits that will further benefit in the development of their digital skills.

Overall, the gaps Hack4Society project needs to fulfil regards the: development of digital skills and specific digital skills, that will help in the training of VET educators on overall usage of technology that this will be accomplished through the development of 15 e-learning training modules, one of the main objectives of the project. Also, the development of hackathon Events and the preparation of the Open Educational Resources (OREs) will also contribute to the development of digital skills and specific digital skills of VET teachers, that is the overall gap identified from the findings. Taking into consideration the best practices identified, analysis of data collected has demonstrated a few important guiding principles that have to be taken into consideration by the Hack4Society project, while developing and delivering the project outputs.

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3. Germany

Introduction/General information about the national educational system

Germany is one of the EU's most powerful economies. It has a strong industrial base, especially in the car business, where many German companies are among the best in the world. The health and social care industries are also very important. The success of the German economy is tied to how well its workers are trained, and the dual system of vocational education and training is seen as a key part of Germany's ability to compete.

Recent performance on the German labor market has been encouraging, characterized by a high employment rate and significant expansion in work prospects. It is projected that future employment growth will be moderate, with most job opportunities being filled by retiree replacements. Through 2030, employment growth is predicted to be greatest in industries such as lodging and food services, transport and storage, and energy supply services. The bulk of in-demand jobs, such as legal and social associate professionals and clerks, will require qualifications at the intermediate level. (Cedefop, 2021).

Germany is implementing a variety of policy changes and adjustments to meet existing and anticipated difficulties in education, training, and skill development (Eurydice, 2021). The federal and regional governments of Germany collaborate to develop digital plans and make substantial investments in digital education, infrastructure, and teacher training. Even though students have above-average ICT abilities, instructors and institutions still lack adequate digital infrastructure. In Germany, where about one-third of the working-age population is 50 or older, the problem of an aging teaching staff becomes an additional obstacle. (European Commission, 2020).

Education is a shared duty between the Federation and the Federal States (Lander). The Federal Ministry of Education and Research (BMBF) is responsible for VET-related matters, whilst the Federal States are in responsibility of general education in schools, resulting in variances in programme names, length, and curriculum throughout the Federal States.

Starting at age six and continuing for a total of nine years (except in five Federal States where they have 10 years), all pupils are required to participate in full-time general education (except in five Federal States where they have 10 years). Students must then choose between general education and vocational education.

The levels of education in Germany are as follows:

1) Elementary education comprising grades 1 through 4 or 6 (ISCED level 1)
2) lower secondary education which starts from grade 9 or 10 (ISCED level 2)
3) upper secondary education which starts from grade 12 or 13 (ISCED level 3)
4) post-secondary and non-tertiary education (ISCED level 4-5)
5) tertiary education (ISCED level 5-8).

With its well-known dual system (apprenticeship), Germany's vocational education and training (VET) becomes a successful model that produces market-respected, high-quality vocational credentials. Apprenticeship promotes the transition from education to job and contributes to a decrease in youth unemployment. In general, approximately fifty percent of students from upper secondary schools participate in a VET program, with seventy percent participating in apprenticeships. In the meantime, the proportion of apprentices with a college admission credential is increasing.

National training standards and rules for in-company as well as in-school components assure the success of the dual system. These regulations, which were developed together by the federal and state governments, labor organizations, and businesses, ensure that corporations deliver high-quality training programs. On the one hand, these regulations give flexibility for firms and apprentices to arrange training schedules, while on the other, they ensure that learning in vocational schools for all approved training occupations is based on curricula that comply with these standards.

There is another unique feature of the VET system in German, which is called the “vocational action competence” – It allows students to develop independent skills and vocational competences within the VET contrasts based on the European Qualifications Framework (EQF) in a holistic and integrated manner.

The general conclusion on the peculiarity of VET in Germany is as follows:

1) As a result of the dual system, the proportion of people with postsecondary or higher education qualifications exceeds the EU average (57.9% vs 46.1%).
2) An important component of vocational education and training (VET) in Germany is the dual system at EQF 4 (upper secondary), which leads to a smooth transition from education to job and greatly reduces the youth unemployment rate.
3) The government, trade unions, and businesses collaborate closely on the development and enhancement of the VET system.
4) A key component for the rise of interest in VET in Germany is the level of EQF 6-7 (tertiary), which is the advanced VET through which the students can achieve qualifications such as technicians or specialists.

Although the number of VET learners climbed by 0.9% in 2019, the number of new apprenticeship contracts decreased by 1.2%. Therefore, Germany opted to update its VET system to ensure that it meets its future needs. Following this, several new laws went into force in 2020. For instance, the new Vocational Training Act, which introduced a minimum wage for apprenticeship trainings and addressed the importance of equivalence between vocational and academic qualifications, and the act on promoting continuing vocational training in the time of structural change, which provided funding for assistance in vocational training, were enacted to prepare individuals for future challenges by investing in upskilling and reskilling. (European Commission, 2020).

Legal framework

The German Qualifications Framework for Lifetime Learning is an eight-level national qualifications framework (NQF) based on learning outcomes that is applied to lifelong learning. It encompasses all official education and training levels and types in Germany. This framework was formally established and put into operation in May 2013.

The foundation of VET in Germany is a strong collaboration between the government, business, and society. The Federal Ministry of Education and Research is responsible for the general VET policies and the coordination of training occupations. The cooperation between the Federal Ministry of Education and Research and the Federal Institute for Vocational Education and Training (BIBB) is very close. The Federal Institute for Vocational Education and Training (BIBB) conducts research and plays a crucial advisory role for VET policies. Furthermore, it helps to limit the development of training regulations.

On several levels, social partners also play a significant role. Employer organizations and labor unions have a substantial influence on the content and structure of IVET and CVET, as vocational training must be responsive to labor market demands. On the national level of VET, they have a seat on the BIBB board and participate in its vocational training committees. Chambers play an essential role at the regional level. Additionally, the impulse to alter or create new occupational profiles stems mostly from them.

Three main forms of VET are provided in Germany: Upper secondary VET, Tertiary VET and Continuing VET.

Upper secondary VET

Apprenticeship (dual system) serves as the cornerstone of upper secondary VET. It encompasses 325 types of professions and is typically offered at EQF level 4. Typically, these three-year programs are offered in a combination of two learning environments, including corporations and vocational institutions. Work-based learning comprises around 75% of a program's total time. The firms sponsor the training sessions and pay the students. After passing the chambers' final examination, the students will become certified professionals.

Tertiary VET

Those with occupational qualifications and professional experience can obtain advanced vocational qualifications at EQF levels 5 to 7 at the tertiary level. At EQF level 6 (bachelor professional, for example Meister), the qualifications allow graduates to practice a trade, recruit and train apprentices, and enroll in academic bachelor programs. Graduates can continue at EQF level 7 (master professional). These certifications facilitate the attainment of middle- and upper-level managerial roles in corporations. Chambers and schools provide preparation programs.

At EQF level 5-7, students with vocational qualifications as well as work experiences can obtain an advanced vocational qualification at the tertiary level. At EQF 6, graduates with these credentials can participate in apprenticeships in trade, recruitment, or education, or pursue a bachelor's degree.

At the tertiary level, those with occupational credentials and professional experience can earn advanced vocational certifications at EQF levels 5 to 7. The qualifications of EQF level 6 enable graduates to perform a trade, recruit and instruct apprentices, and enroll in bachelor's degree programs. Graduates may continue at EQF level 7. These credentials enable the accomplishment of managerial positions at the medium and upper levels in businesses. Schools and chambers offer preparing programs.

At the EQF 6 level, 1.5 to 4 year-long advanced vocational programs are available. In order to qualify for admission, you must have a specific vocational certification and job experience. They lead to an advanced degree (such as technician or educator) and provide entry to the appropriate field of study.

Different higher education institutions offer dual study programmes at EQF levels 6 and 7. They provide a combination of academic and vocational training, with an emphasis on in-company training (at least 40 to 50 percent). Companies cover the costs of company-based training and compensate learners.

Continuing VET

Continuing training has a growing role in enhancing employability through upskilling and reskilling in accordance with the digital and ecological transformation. It is characterized by a large number of training providers and minimal state control. There are state incentives in place to boost participation in CVET.

Main goals and methodology

The purpose of this study is to investigate the current condition of the VET system in Germany, to learn from the best practices and to identify existing gaps in the VET system to identify potential improvement strategies. The current legal framework in VET, as well as the educational offerings at all levels of VET – upper secondary, tertiary, transitional, specialized, etc. – are thoroughly examined.

The overall aims and goals of this study were greatly addressed, identified, and presented in this report through the use of primary research and more specifically the conduction of focus groups to both Vet educators and VET learners as well as through the dissemination of two different online questionnaires/surveys to VET educators and learners.

The online surveys and focus groups included questions that helped us develop conclusions regarding the objectives and goals of the study. Specifically, the focus group questions allowed for the development of debates and the supply of additional explanations for ideas and experiences expressed.

The online surveys featured both multiple-choice and open-ended questions pertaining to three major sections: teaching and learning methods, identification of digital skills, and problems in student/teacher involvement.

The primary study conducted aided in identifying and categorizing the key difficulties and themes that emerged from the results collected and analyzed as described in the remainder of the report.

Additionally, desk research was conducted to identify VET programs and curriculums for digital literacy. This was accomplished by searching European websites for information on VET education and Covid19.

Educational Offers

The overarching initiative VET 4.0 to address digitalization, the BBNE funding program on sustainable development in VET, the Alliance for initial and further training, and the Educational Chains initiative to address early leaving, inclusiveness, and mismatch in apprenticeship were launched in 2015 to 2016. Since 2017, the government strategy "Pact for VET" has unified these broad policy measures, which have implemented several financial priorities and sustainable programs.

At the upper secondary level, students may choose between school-based and work-based learning (WBL)-focused VET programs. There are postsecondary and tertiary VET programs. Furthermore, additional credentials assist students in adapting to labor market shifts.

Upper secondary VET

At the upper secondary level, numerous initial vocational education and training (IVET) programmes are available; some are taught in full-time schools, while others are gained primarily through WBL. The apprenticeship program has been offered within the dual system for decades and is the foundation of the German VET system. Transition programs provide preparatory training that facilitates entry into VET programs leading to a credential. In 2019, nearly half of students entering upper secondary education enrolled in a VET program: 12.9% entered a transition program and 36.8% chose a vocational education preparing them for the labor market, of which 67.4% enrolled in apprenticeship (BIBB, 2020, p. 83). VET is a compelling concept for arranging the transition from school to the workforce. It is the primary choice for graduates with the lower secondary school certificate (Hauptschulabschluss) and the intermediate secondary school certificate (Mittlerer Schulabschluss, after grade 10). Recently it has increasingly been chosen also by graduates with the upper secondary school leaving certificate (Abitur) who enroll mainly in apprenticeship (BIBB, 2019).

Some initial VET programs for upper-level secondary students are taught in full-time schools, whereas others are primarily taught in WBL. The apprenticeship program of the dual system has been the backbone of German VET for decades. The purpose of transition programs is to prepare students for vocational education. In 2019, 12.9% of upper secondary students attended a transition program, 36.8% entered a vocational program, and 67.4% entered an apprenticeship program (BIBB, 2020). VET makes the transition from education to employment appealing. It is the most popular option for graduates with the Lower Secondary School Certificate (Hauptschulabschluss after grade 9) and the Intermediate Secondary School Certificate (Mittlerer Schulabschluss, after grade 10). It is also popular among Abitur graduates who pursue apprenticeships (BIBB, 2019).

However, the overall attractiveness of upper secondary VET has fallen in recent years and learners tend to follow general higher education programmes. Several strategies, initiatives and incentives are in place to counteract this development, targeting learners and training providers, with a special focus on SMEs.

Transition programmes

Various transition programmes leading to qualifications at European qualifications framework (EQF) levels 1-2 (ISCED level 252) are in place for learners who have difficulty entering VET programs that qualify them for the labor market:

- **pre-vocational training year** (Berufsvorbereitungsjahr, BVJ): a one-year (often full-time) training program offered by vocational schools to prepare young people for the challenges of vocational training and to give them the opportunity to obtain the lower secondary school leaving certificate.
- **basic vocational training year** (Berufsgrundbildungsjahr, BGJ): A one-year program that can be completed at a vocational school full-time or in conjunction with an enterprise. Learners obtain a foundational education in a particular occupational field. Completion is equivalent to the initial year of vocational training in the same field.
- **introductory training** (Einstiegsqualifizierung, EQ): a 6-to-12-month internship in an enterprise mixed with vocational school instruction. Learners can become acquainted with the specific occupation, and businesses can become acquainted with these individuals. It has helped around 70% of learners gain admission to apprenticeships (Hippach-Schneider and Huismann, 2019). This program's completion can count as a qualifying time for a later apprenticeship.

General education programmes with vocational orientation

- **Full-time vocational schools offer general education courses with a vocational focus (ISCED level 344, EQF level 4, duration two to three years) (berufliches Gymnasium):**

Learners can receive a qualification for entry into higher education, the length of which is dependent on the program. Graduates can then enroll in specific university programs related to their area of expertise. The general education curriculum emphasizes several subjects, such as agricultural economy,

technology, and economics. The entry criteria are a certificate from an intermediate level school. Short internships in businesses are desirable but not required.

- **School-based VET programmes (ISCED level 354, EQF level 4, duration one to three years):**

Full-time programs at vocational schools (Berufsfachschule) prepare students for a variety of jobs. The duration varies according to occupational field and certification level. Work-based learning is provided in schools and/or through traineeships. If these programs do not provide a full vocational qualification, attendance might be included as the first year of dual system training. Full certifications can be obtained in sectors such as home and caregiving, commerce, and health care (for example physiotherapist, speech therapist). The minimum entry criteria is a lower or intermediate secondary school diploma. In addition to the vocational qualification, learners can attain the higher education entry qualification under specified conditions (double qualification).

- **Dual VET (apprenticeship) (ISCED level 354, EQF level 3-4, duration two to three and a half years)**:

They occur in at least two learning environments: businesses and vocational institutions. Entry prerequisite is completion of obligatory schooling; nonetheless, without a high school diploma, young people have a poor chance of finding a training organization (in 2018, just 3.5% of new apprentices lacked a high school diploma). High school graduates can cut training time to approximately one year, making it an attractive option to college (Deutscher Bundestag, 2016). From 2009 to 2018, this proportion of apprentices climbed by 9.6 percentage points to 29.6%. (BIBB, 2020). Enterprises and government agencies offer apprenticeships and enter into contracts with apprentices. They cover the costs of on-the-job training and pay the apprentice's compensation, which grows with each year of training and varies by occupation. Due to the large number of small and medium-sized enterprises (SMEs), they play a crucial role as providers of vocational training. However, SMEs face numerous challenges in this function since they frequently lack modern infrastructure and qualified trainers. Multiple measures aid SMEs in overcoming these hurdles. Apprentices attend vocational school one or two days per week or in blocks, such as one week per month, in addition to their training at an enterprise; at school, they receive primarily theoretical and practical knowledge linked to their chosen occupation in school labs or workshops. In both contexts, dual VET adheres to the same criteria. To ensure a uniform standard, learning is concluded with final examinations that are governed by legislation and administered by chambers. Learners must exhibit a variety of skills and complete practical activities (Vocational Training Act, Berufsbildungsgesetz, BBiG).

After completing an apprenticeship, graduates receive a vocational qualification that grants them entrance to the labor market as skilled workers; these qualifications are highly valued by employers.

Post-secondary and tertiary VET

At the postsecondary and tertiary levels, VET offers enticing employment and training opportunities. The system is extremely permeable and provides multiple pathways for learners to advance from secondary VET to postsecondary or tertiary VET.

Specialized programmes

Various specialized programmes are available at post-secondary level (ISCED level 444, 453, 454, EQF level 4-5, duration one to three years): these are regulated by federal state legislation. Admission to such programs needs a certificate of completion from an intermediate secondary school or an equivalent qualification; in some cases, a vocational qualification or a specified number of years of practical experience may also be necessary. Many of these programmes offer the opportunity to obtain both a vocational and general education qualification at the upper secondary level, so providing admission to higher education (some programmes only to subjects-specific higher education entrance qualification fachgebundene Hochschulreife). Certain programs involve an internship with a company, such as the program offered by the Fachoberschule (specialised upper secondary school). Other schools offering these specialised programmes are Berufsoberschule (senior vocational school), Berufsfachschule (full-time vocational school), and Fachgymnasium (specialised grammar school). The curriculum includes instruction in technical skills, business, agronomy, nutrition, and home economics, as well as social affairs and design. School-based vocational programs in the health sector (ISCED 453, two to three years in length) are among the specialized programs with the largest enrolment. Healthcare schools (Schulen des Gesundheitswesens) offer training for non-academic careers in the healthcare industry, including nursing and pediatric nursing, midwifery, therapeutic massage, occupational therapy, and social work. Many of these institutions are affiliated with hospitals and offer both theoretical and practical instruction. These programs provide a vocational credential but do not provide access to higher education. Due to demographic shifts and the aging of the population, a significant demand for these graduates is anticipated. Several initiatives have already been implemented to enhance the attractiveness of these programs.

Advanced vocational qualifications

Advanced vocational qualifications at the tertiary level are nationally acknowledged vocational qualifications at EQF levels 5 to 7; they can be obtained through examinations and are equivalent to academic qualifications:

a) professional specialist (Geprüfte Berufsspezialist) (EQF level 5, ISCED level 554);
b) bachelor professional: master craftsperson, specialist (EQF level 6, ISCED level 554, 665);
c) master professional: management and expert (EQF level 7).

If no federal training regulations have been established for a particular occupational training certification, the competent bodies (chambers of industry and commerce, chambers of skilled crafts) may impose training examination regulations (Vocational Training Act and the Trade and Crafts Code, HwO). The board of the Federal Institute for Vocational Education and Training (BIBB) provides recommendations for the execution of the "Vocational Training Act – BbiG", particularly regarding the responsible entities. However, implementation, testing, and oversight are solely the responsibility of the issuing chamber's district (BMBF, 2012).

Access to master professional qualifications (EQF level 7) requires completion of a bachelor professional qualification (EQF level 6); however, completion of a professional specialty certification for the bachelor's degree is not necessary (EQF level 5). Upon completion of an IVET qualification allowing entry to a recognized occupation, a candidate can begin preparing for the test while concurrently working in the relevant occupation; this allows the candidate to gain professional experience prior to sitting for the examination. The advanced vocational qualification of a master craftsperson (Meister) permits the holder to run their own business, hire and train apprentices, or advance within an organization. Moreover, it provides access to courses offered by craft academies, universities of applied sciences (UASs, Fachhochschulen), and universities (Hippach-Schneider, 2019).

Advanced vocational programmes

Advanced vocational programmes (ISCED level 655; EQF level 6, duration one and a half to four years) are provided in vocational schools (Fachschulen) that are governed by federal state law. Entrance requirements include:

- either a qualification in a recognized training occupation pertinent to the area of study or one year of relevant work experience
- or a degree from a full-time vocational school or five years of related job experience.

Students perform managerial duties in the workplace. Part-time and full-time advanced vocational programs are available in the following occupational fields: (a) agricultural; (b) design; (c) technology; (d) business; and (e) social care.

Some programmes also lead to a formal entrance qualification for universities of applied sciences, where prior education may be recognized and influence programme length (KMK, 2019).

Dual study programmes

Dual study programmes leading to a bachelor's degree and a master's degree include on-the-job training and classroom instruction (ISCED level 645, EQF level 6, duration three to four years, and ISCED level 747, EQF level 7, duration one to two years). Enterprises pay for on-the-job training and the trainee's payment for training, which often includes theoretical instruction at a higher vocational school (30). The following three routes are established:

a) **Dual study program with an integrated vocational training component** (Ausbildungsintegrierender dualer Studiengang) combines academic studies with vocational training in a recognized occupation. This is the most popular dual study programme in which graduates earn an academic degree and a certified IVET qualification. However, students must also attend vocational school in addition to industrial training and university studies. Admission requires a higher education entrance qualification (Allgemeine Hochschulreife or Fachhochschulreife) and an employment contract.

b) **Dual study programmes with a work experience component** (Praxisintegrierender, kooperativer dualer Studiengang) combine academic studies with systematic, organized, and extended practical placements in the form of an internship or a job. Students receive a bachelor's degree but no occupational certification. Access requirement is a qualification for admittance into higher education (Allgemeine Hochschulreife or Fachhochschulreife).

c) **Dual work-study programme with an integrated career component** (Berufsintegrierender dualer Studiengang). These continuing vocational education and training (CVET) programmes are designed to foster professional development in the sector. There are no entry criteria for higher education. The study curriculum is concurrent with professional practise. The employer is made aware of the employee's studies and either agrees to reduce the employee's overall working hours or offers the employee the opportunity to take special leave. If the programme is in addition to a full-time job, classes are often held in the evening or through distance learning.

With an emphasis on economics, engineering, and computer science, these degrees are offered in a range of fields. Dual study programmes in the domains of welfare, education, health, and care have become more accessible in recent years. Both public and private schools offer dual bachelor's and master's degree programmes.

- **The main providers are: universities of applied sciences; dual university Baden-Württemberg (Duale Hochschulen); universities; universities of cooperative education (Berufsakademien) (BIBB, 2019).**

In recent years, the popularity of these programmes has rapidly increased. From 2004 to 2016, the number of study courses more than tripled, the number of learners more than doubled (from 40,982 to 100,739), and the number of firms that participated climbed from 47,500 to over 100,000. (BIBB, 2019).

Identifying gaps

Current status of VET in Germany

The COVID 19 pandemic accelerated the need to adapt to these new demands in the professional development of trainers and teachers, by developing and acquiring digital skills as well as skills on sustainability and inclusiveness, in light of issues that have emerged over the past decade, such as the digitalization of the workplace, the growing diversity as a result of immigration, and the environmental crisis.

Once they join the group aged 65+, the ageing of the current high proportion of middle-aged population cohorts will produce significant changes to the age structure. In 2021, 13.8% of the population was under 14 years old, 64.2% was between the ages of 15 and 65, and 22.0% was 65 years of age or older. 14.4% of the population will be under 14 years old in 2070, while only 57.2% will be of working age (15-64) The proportion of those aged 65 and above will increase to 28.4%. In 2070, the proportion of elderly dependents will increase from 34.2% in 2021 to 49.7%. This statistic represents the ratio between the number of adults aged 65 and older (the average age of economic inactivity) and the number of individuals aged 15 to 64.

The Qualification and occupation projections (QuBe project) is a labor market forecast for Germany until 2040. Due to constantly shifting framework conditions, the projection's data foundation and modelling procedure are routinely amended. The QuBe data portal illustrates prospective labor supply and demand growth paths. Due to the ageing of the population, the labor force will decline by nearly 1.8 million people between 2020 and 2040. This forecast anticipates an average annual increase in migration of around 240 000 individuals.

Despite the fact that students have above-average ICT abilities, the digital infrastructure of instructors and institutions remains deficient. A further issue is the ageing faculty (European Commission, 2020).

In recent years, the number of apprentices has declined due to demographic trends and the rising attractiveness of academic education. National policy will continue to prioritize enhancing the appeal of VET in order to ensure a future skilled workforce. Modernizing IVET and CVET to adapt to digital and

ecological transformations, as well as providing help and coaching to minimize matching challenges and enhance inclusive VET, are currently also leading political objectives.

In recent years, there has been a mismatch between the demand for and supply of learners in vocational education and training (VET) programmes; companies cannot find enough apprentices to fill training positions, despite the fact that there are still many potential learners in the country, including refugees and migrants.

Additionally, there are inequalities between areas, sectors, and occupations. Providing counselling to kids and adults and aid to businesses, especially SMEs, will continue to be a primary concern. Employment agencies play a vital role in connecting businesses (especially SMEs) with applicants through databases, advertising, and support measures.

The Alliance for Initial and Continuing Education has committed to integrating all interested learners into a VET programme; pre-VET measures and training support are provided to migrants, refugees, and other disadvantaged groups to maximize their potential and facilitate their transition to VET and successful completion.

Current status of VET teachers' competence areas

i. Communication and Collaboration via digital devices and tools

Educators that employ more conventional methods of instruction encounter a variety of hurdles while utilizing internet resources. In this circumstance, it was challenging to collaborate with and connect with the students.

ii. Selection and use of fitting digital resources

Educational institutions, notably VET institutions, have increasingly turned to digital resources to accommodate the digital transition into their instructional frameworks since the Covid19 Pandemic. Teachers can pick and utilize user-friendly presentation forms, as well as provide students with access to relevant bibliographies.

iii. Guiding students in teaching and learning scenarios via digital technologies

Their instructors and trainers can only instruct students on the most essential features of internet tools and resources. In order to strengthen their instructional approaches, it is vital for them to enhance their digital skills.

iv. Evaluation and feedback within digital learning and teaching scenarios

Educators and VET centers each utilize their own individualized questionnaires to assess students' overall progress. They are capable of creating online forms and utilizing a number of internet technologies.

v. Creation of individual, tailored and engaging learning processes

Educators have access to only a subset of the numerous online tools and platforms currently available. There is an increasing demand for educational alternatives, such as webinars and online trainings, that can assist individuals in enhancing their skills.

vi. Facilitation of students' digital competences

Educators who are still teaching their students using more traditional methods should, as a first step, improve their own digital competence so they can assist their students with the transition to the new educational system and, as a second step, instruct their students in the required digital competencies.

Mapping of Digital Competence Needs related to modern technologies

i. Presentation & Multimedia technologies

To develop more interesting lessons for their students, educators and teachers should utilize readily accessible digital materials into their existing classroom procedures. It might have been possible to incorporate the technology into the instruction of the manual handling course in a more efficient manner. When students have higher digital skills than their professors, the more traditional instructional methods

might be somewhat monotonous. The instructor must be able to organize course information into presentations and use creative elements.

Regarding the employment of computers and other digital technologies, educators, including teachers, trainers, and educators in general, should possess fundamental understanding.

ii. Personalized curriculum and learning

One of the key benefits of personalized learning is the ability to provide learners with individualized feedback, remediation, and reinforcement assignments that they can complete to get the required level of mastery. The students and teachers have the option to define their own goals, determine the milestones along the way, and determine the most effective learning path and technique for them.

iii. Virtual collaboration and co-creation

The one prerequisite that was indispensable for the growth of the digital education industry. Virtual collaboration between students and educators in vocational education and training (VET) is crucial. Due to the limits imposed by the online environment, both educators and students had difficulty connecting with one another and developing new types of online collaboration during the epidemic and lockdown.

iv. Mobile programming

All of the students are eager to learn more about this game-changing approach to schooling so that they can discover new educational opportunities. Teachers and students alike can now read e-books on their smartphones, record classroom lectures, and text in real-time. The instructor of vocational education and training must be able to utilize all available technology and Internet resources, as well as modify and update their instructional strategies.

v. Cloud technologies

Computing in the cloud is one of the most fascinating breakthroughs in the field of information technology that has occurred in the 21st century. Because of the beneficial technology that is integrated into the classroom, there will be enhanced levels of engagement and improved outcomes for all parties involved, including the instructors and the students. The utilization of cloud computing gives rise to a number of opportunities for innovation in addition to a multitude of benefits in the classroom that are both risk-free and cost-effective.

vi. Digital evaluation and analytics

It is of the utmost importance for educators to devise some sort of digital evaluation for the pupils or learners in order to determine the extent to which these individuals are knowledgeable about the topic at hand. In addition to this, they should be able to both write the report of the evaluation and conduct an analysis of the responses. On the other hand, it is absolutely necessary for educators to examine and appraise the levels of competence they currently possess.

vii. Gamification on education

Games contain numerous characteristics that make them effective vehicles for human education. Typically, they are constructed such that players must solve a problem, a crucial ability for today and future. Several games encourage conversation, cooperation, and even competition between players. Some of the most engaging games contain a narrative that inspires players' ingenuity and imagination. Depending on their design, games can both instruct and assess their players. They are exceptional teaching, learning, and assessment packages that teachers must understand and implement.

viii. Virtual Reality (VR) and Augmented Reality (AR)

The most innovative application for usage in VET institutions. Through the use of virtual reality, students will have the ability to participate in a realistic scenario-based environment. Is an innovative strategy that can be implemented with VET students

ix. Artificial Intelligence (AI)

By employing artificial intelligence, educators are able to liberate students from tedious learning processes, hence generating better levels of creativity in their students.

x. Video based learning & social media

The recent use of digital technology into educational practices is crucial. Therefore, trainers and teachers could design fresh implementation strategies for their courses.

xi. Online safety: Personal data privacy & digital identity

It is essential that educators understand how to protect their personal information. There are numerous online seminars and trainings available for this topic, some of which teach more essential and foundational knowledge, while others provide more specialized and professional skills.

xii. Screen addiction management

"Screen addiction" refers to the compulsive and occasionally destructive use of electronic media. Those between the ages of 16 and 24 have the highest rate of use, placing adolescents and college students at the greatest risk for developing a dependency. Educators should be prepared to lead students through the challenge of screen addiction, which students encounter in both online and traditional classrooms.

xiii. Workload and stress management

The instructors must be able to overcome any hurdles that may develop during the implementation of the courses, and they must be prepared to support the students.

When a teacher is under a great deal of stress, it can negatively affect their performance in a variety of areas, including their capacity to be creative and use effective instructional approaches. It is difficult to determine precisely which and to what extent a certain combination of events will cause each individual to experience a high level of stress.

Conclusions and other information

Helping to digitize education in Germany can be accomplished in a variety of ways, some of which are short-term and some of which are long-term.

Beginning with credentials, the expansion of informatics training programmes included stress management seminars, initiatives for lifelong learning, and commercial and government assistance for various pieces of equipment.

The most important practical improvements include retraining educators in the use of new technologies, digitizing educational content and material, installing digital infrastructure in all classrooms to facilitate interactive digital learning, and upgrading laboratory equipment. Other important improvements include providing students with vouchers to purchase digital tools, robotics, STEM tools and equipment for all organizations, digital and technological tools for students with disabilities and special learning needs, and providing these tools.

The modernization of the educational system, the enhancement of vocational education and training (VET), the supply of laboratory equipment for VET training units, and digitization of the educational process are some of the key measures that could be implemented. Other potential improvements include the improvement of skills.

The pandemic has changed the conditions and context of education, and as a result, governments need to reconsider their approach to strategic planning in order to account for these changes. Indicatively, in the age that came after the pandemic, the educational system needs to reevaluate what should be taught and what subjects are absolutely necessary for students to be familiar with. In addition, it is of the utmost importance that every decision be made bearing in mind the fact that the schooling system has already made the shift into the digital age. Students, in this same environment, need to learn abilities that will enable them to make use of digital media and avoid the dangers of a world that is "primarily in front of a screen." These skills can be developed through the use of digital media. Although the Internet plays a significant part in education, it is the responsibility of the students themselves to acquire the skills that will allow them to make effective use of the Internet.

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4. Greece

Introduction/General information regarding the Greek educational system

Based on the Greek Constitution, the state education system in Greece should be provided for free, at any level of education, and the system should be centralized. The country's educational representatives come from the completion of higher education studies, hence, the steps one needs to follow in order to become a primary school teacher, is to attend a 4-year HE pedagogical program, and obtain the relevant degree. Regarding secondary schools, most teachers follow a four or five-year subject-based degree at a teacher education faculty. The Greek law has already set the duration of the compulsory education to 11 years, meaning from the age of 4 to 15. The stages of the Greek education are mainly 3, and they are the following:

Primary education

The main stages of primary education are the pre-primary, and primary schools. Pre-primary school in Greece has become compulsory for all 4-year-old children, since school year 2018/19. School year 2020/21 foresees the integration of the two-year compulsory pre-primary school in the few remaining municipalities. Infant centers, infant/child centers and child centers represent early childhood care. They are under the responsibility of the municipal authorities, and enroll children from the tender age of 2 months, up to the start of compulsory education.

The pre-primary education is followed by primary, and its duration in Greece is 6 years. It concerns children in the age range of 6-12 years. Since school year 2016/17, there is a single type of school with a new revised daily timetable. Within this framework, all pre-primary and primary schools provide an optional all-day program.

Secondary education

In secondary education one can meet two cycles of study:

● Secondary School (Gymnasio)

The first one is compulsory and corresponds to Gymnasio (lower secondary school).

Its duration is 3 years, providing general education and covering ages 12-15, it is a prerequisite for enrolling at general or vocational upper secondary schools, and attendance starts at the age of 14.

● High School (Lykeio)

The second one is the optional general or vocational upper secondary school. It lasts 3 years, and students enroll at the age of 15. Regarding high school, two types could be mentioned:

● General High School

It lasts 3 years and includes both common core subjects and optional subjects of specialization

● Vocational High School

Regarding digital competencies and skills, one could find relevant courses even at the stage of the primary school. Starting from primary school, we can find special topics in Informatics, where students study the intersection of people, information, and technology systems, and at the secondary level, these topics are narrowed down in more to-the-point, and complex concepts.

An interesting information that should be highlighted is that the digital skills and computer science relevant courses in high school, are non-compulsory ones, as sub-subjects of the existing curricula. These subjects are called Applications of Informatics, Applications of Computer Sciences, Technology of Computer Systems, Multimedia and Networks, Software Applications and they stand out for the Applications Development in a Programming environment, available for the 3rd grade of the High School students, as a core subject for their admission to the tertiary education level.

Tertiary education

Higher education in Greece embodies the last stage of our educational system, and includes the directions of university, and Technological sectors. The University sector includes Universities, Technical Universities, and the School of Fine Arts. The Technological sector included the Technological Education Institutions (TEIs), which were merged in 2019 into the Universities and from then on share the same rights regarding validity of degrees and employability, and the School of Pedagogical and Technological Education (ASPETE). Higher education institutions are fully self-administered legal entities of public law. Collective bodies that are established and act in compliance with special legislation administer each institution. According to article 16 of the Greek Constitution, higher education is public and exclusively provided by Higher Education Institutions, which are Legal Entities under Public Law, enjoying full self-administration and academic freedom, while they are subject to state supervision and financed by the government and particularly from the Minister of Education and Religious Affairs that carries out state supervision.

Lifelong learning

Lifelong learning policy in Greece is part of a wider development plan. The General Secretariat for Vocational Education, Training and Lifelong Learning plans the public policy of LLL and youth. Non-formal education can lead to certifications recognized at national level and is provided at:

- Second chance schools – SDE
- Vocational training institutes – IEK
- Lifelong learning centers
- Colleges

In an attempt to connect VET education with the project's main thematic, one could state that VET education offers the most optimal possibilities for lifelong learning, because its curricula and duration could be custom-made, and personalized based on the trainees' needs and capabilities. Also, VET educations combine multiple forms of training delivery, respects the fact that the trainees could be employed or have a heavy schedule and have minimum time to provide during the day.

General information regarding the VET system in Greece

Lifelong learning policy in Greece is part of a wider development plan. The General Secretariat for Vocational Education, Training and Lifelong Learning plans the public policy of LLL and youth. Non-formal education can lead to certifications recognized at national level and is provided at:

- Second chance schools - SDE
- Vocational training institutes-VET - IEK
- Lifelong learning centers
- Colleges

Vocational education and training policy in Greece play a major role in empowering learners and enterprises to be competitive. The 2013 the Ministry of Education decide to promote the model of the VET education and strengthen the work-based learning. The action plan for youth employment intends to better link education with work, upgrade VET, boost apprenticeship and broaden career guidance offered to young people. This comes at a time when addressing high youth unemployment and other labor market imbalances is more urgent than ever.

Since 2000, four laws – on the national system linking VET with employment (Law 3191/2003), systematizing lifelong learning (Law 3369/2005), developing lifelong learning (Law 3879/2010), and restructuring secondary education (Law 4186/2013) – and numerous amendments have been enacted in an attempt to regulate the domain of VET and lifelong learning. This legislative activity is mainly due to the EU's post-2000 emphasis on creating a competitive Europe that is capable of meeting the new challenges of the knowledge-based society.

But the Greek state also recognizes the positive impact that developing lifelong learning would have on the country's economic life and on social cohesion. International surveys show that close links between vocational education and the requirements of the job market and economy are an essential precondition for an efficient, high-quality system that would make it easier to move from school to active life (McCoschan et al., 2008; Wolf, 2011; Cedefop, 2012b).

The new law on the restructuring of secondary – including vocational – education (Law 4186/2013), which came into effect in September 2013, opens the VET system to the economy and the job market and attempts to regulate the field from the perspective of lifelong learning. Nevertheless, the major issues facing the Greek VET system persist: closer links with the job market and economy, more vigorous involvement of the social partners, sense of social responsibility and consensus on vocational training matters, decentralization and greater school autonomy, attracting more young people into vocational training, improving the quality of initial vocational training and linking it more closely to continued vocational training (Ioannidou and Stavrou, 2013).

Legal framework

Policies on educational standards and qualifications

Greece has developed a National Qualifications Framework (NQF) for lifelong learning, the Hellenic Qualifications Framework (HQF) responding to the Recommendation of the European Parliament and of the Council of the 23rd April 2008 (2008/C111/01) on the establishment of the European Qualifications Framework for lifelong learning. According to the aforementioned Recommendation, it was proposed that Member States designate national coordination points in order to support:

• The interlinking of all the competent national authorities and bodies for national qualifications systems and

• The referencing of these national qualifications systems to the European Qualifications Framework, in line with quality and transparency.

HQF's development started in 2010 and it is implemented in line with the provisions of law 3879/2010 and law 4115/2013, as amended and in force. During the planning of the HQF, the current needs of the country as well as the relevant European and international developments were taken into consideration. Working groups were formed under the supervision of the ministry of education to draft the "Qualification Types" of the formal educational system and the initial vocational training system, and to suggest their allocation to the eight levels of the HQF.

The Ministry of Education is the competent authority, responsible for coordinating and monitoring the HQF. The National Organization for the Certification of Qualifications and Vocational Guidance (EOPPEP) was set up in 2011 to:

• Develop and put the HQF into practice

• Link the HQF to EQF

• Put the HQF and the procedures for validation of learning outcomes into practice and

• Assure quality in lifelong learning.

An advisory committee, comprising representatives from public administration, the education and academic community, social partners and external consultants, was established to support EOPPEP. EOPPEP operates as the national coordination point (NCP) for EQF and is the awarding body of the vocational training diploma, level 5 of HQF[1].

The referencing of HQF to EQF was completed with a presentation made by the Greek delegation during the 33rd Meeting of the European Qualifications Framework Advisory Group in Berlin on 2 December 2015.

The 2016 National strategic framework for the upgrade of VET and apprenticeship introduced broad provisions on requirements and training of enterprise staff that will become in-company trainers, linked to a future goal of accreditation of companies that participate in apprenticeships. The strategy foresees that in-company trainers (at least one per company) will attend a short and flexible training program, focusing on pedagogical knowledge and competences as well as on adult training techniques. Participation by professional associations and chambers is encouraged. In-company trainers should attend a training program designed jointly by the national employment service, chambers and education institutions. Greek authorities are aiming at creating a register of certified in-company trainers.

General overview on digital literacy in Greece before Covid-19

2.2.1 Digital skills needed in the VET sector

The framework of the digital skills in the VET sector:

- Problem solving
- Online communicating
- Being safe and legal online
- Online tools

[1] https://www.eoppep.gr/index.php/el/

- Cybersecurity skills
- Handling information and content
- Creation of digital content
- Facilitating Learners' Digital Competence

Status of digitization on VET in Greece

In recent years, the Ministry of Education and VET centers are trying to define the new action plan. This plan has the aim to improve the previous procedures, including new educational methods, new technological tools & other services, new pedagogy for teachers and trainers, new learning environments & organizational developments, Modern digital learning technologies.

Before the pandemic period, trainers and teachers used the traditional methods during their courses and sometimes some presentations. The last year, teacher, trainers and all the educators challenged to the adaption of new innovative methods by using of online tools.

The spread of the COVID-19 pandemic affected all sectors of social life, including education. Globally, many countries have moved to temporarily close schools or to local bans on schools and universities. According to UNESCO estimates that some 1.5 billion pupils and students have affected by school closures that have deepened the educational inequalities and has particularly affected vulnerable groups (UNESCO 2020, UNESCO 2000a).

In an attempt to mitigate the effects of the pandemic crisis in most countries have opted as an emergency solution to the pandemic crisis in the education system digital education with the extensive use of modern educational tools and information and communication technology systems. This adaptation was made abruptly without there being time for a long-term educational planning that would have helped to methodically integrate e-learning practices into the distance learning practices in educational establishments that have been providing learning services in the classroom with physical presence faculty and students.

In Greece, the current aim is to fill the gaps that students have in key chapters of the previous grade's curriculum. Depending on the specifics of each department or each course the teachers could

choose the method of contemporary or asynchronous teaching or a combination of both. In the case of synchronous the lessons were conducted by videoconferencing and the use of special services, such as Zoom, Webex, Big Blue Button and Microsoft Team in the context of the current timetable, i.e., on a weekly basis and within the timeframe set for physical teaching, and within the presence. In the case of asynchronous training, the conducted lessons were posted on an e-learning system.

Specifically, in Greece, during the last school year schools were closed for 37 weeks, much less than the 54 weeks in North Macedonia, but much more than the 10 weeks in Croatia.

Greece "keeps pace" with other European countries, such as Italy and Germany, where schools were closed for 38 weeks, and Austria, with closed schools and tele-education for 39 weeks. After North Macedonia, the top three countries with the most weeks of distance education are Turkey (49 weeks) and Azerbaijan (48 weeks). At the other end of the scale, after Croatia, schools in Armenia, France and Uzbekistan lost 12 weeks of distance learning[2].

Today, schools have now returned to face-to-face mode, with governments trying to help students regain lost ground by filling the gaps in the curriculum, but also to cope with the stress left by prolonged distance learning and quarantine[3].

Skills recognition path

Regarding the skills recognition path, in Greece the National System for the Certification of Qualifications aims at:

- certifying those qualifications for which a state interest is attested and those which reinforce employment,

- assuring the certified qualification corresponds to the specifications set in the respective accredited occupational profile and the accreditation/certification process is in compliance with set standards and criteria

[2] https://projects.worldbank.org/en/projects-operations/projects-summary?mjsectorcode_exact=EX
[3] www.kathimerini.gr

● providing equity and open access to qualifications, irrespective of the learning pathway and regardless of the way learning outcomes have been acquired.

Certification of the teaching qualification of Trainers for Adults of non-formal education

Trainers for adults are required to possess a teaching qualification awarded upon accreditation in order to fulfill eligibility conditions for public funded non-formal education program, pursuant to Law 3879, article 19.3 (GOG 163/A/21.09.2010) on “Development of Lifelong Learning”.

Developing and implementing a comprehensive and innovative accreditation system for the teaching qualification of "Trainers for Adults of non-formal education", including the unification of registers in operation, responds to new social, economic and educational needs:

● gearing the education system to learning outcomes,

● linking education content to labor market & reinforcing social partners’ role in human resources development,

● expanding trainers’ field of activity into initial & continuing vocational training as well as non-formal education, including adult education,

● updating knowledge, skills and competencies of trainers for adults.

Educational competence is a "horizontal skill". Those interested do not certify their specialty (economist, graphic designer, agronomist, etc.), but through the procedure followed it is certified that they have the necessary knowledge, skills and abilities to teach in groups of adults, in structures of non-formal education (VET), etc.). At the same time, with the evaluation of the data that make up the Individual Qualifications Portfolio of each instructor, the STEP Codes (classification system of professions of the Hellenic Statistical Authority) that correspond to educator’s specialty / specialization are assigned to him/her.

The platform that trainers are able to examine their knowledge is in the following link: https://trainers.eoppep.gr/.

Digital transformation in Greece due to Covid-19

Challenges for VET trainers and educators related to COVID

A day before the first lockdown announced in March 2020 the Greek Ministry of Digital Governance launched a government platform that allows citizens to access over 500 services, ranging from residence certificates to medical prescriptions.

The pace of Greece's digital transformation may indeed be remarkable, but it has not been an opportunistic endeavor. The government's pre-election campaign pledged for an innovative, green, and digital economy as well as for a less expensive state through e-government.

Regarding education, the COVID-19 pandemic has presented unique challenges to all types and levels of learning including vocational education and training (VET). An entire generation of VET learners have seen their education and training being interrupted.

The educators were not ready to transfer their educational programs through the online tools and e-learning methods. During the first days of the pandemic, VET centers and schools are closed because they were not able to implement the courses face-to-face.

Some trainers are using the traditional educational methods and they are not familiar with the new technologies and the digitalization. The difficulty was about the learning activities and the courses that educators should present and teach the learners through e-learning by using new digital techniques and tools.

Government responses to COVID related challenges in VET

In Greece, the political leadership sees an opportunity during the pandemic to grant educators more autonomy, promote public-private partnerships and teach them not only the necessary technical

and pedagogical skills to integrate digital devices in instruction but also soft skills, such as flexibility, adaptability, social empathy and responsibility.

According to the Greece's Minister of Digital Governance, Kyriakos Pierrakakis openly admits that the pandemic has proved a catalyst, saying "the need to fight against the spread of the virus has enabled us to change the mindset" under which people resisted giving up their belief in "the natural order of certain processes and interactions."

The minister of education said that the vast majority of students and teachers "responded earnestly and embraced the whole project," with the virtual assistance of support groups for schools and help desks for less tech-savvy teachers.

"During Greece's decade of recession there was very little hiring of teachers, which means many staff are elderly. Computer training was only on a voluntary basis so many teachers don't have adequate technical knowledge," said the head of the union, Theodoros Tsouchlos. His group is also opposed to state schools using the online platforms donated by private companies, he said, without offering an explanation. Kerameus said her ministry is open to dialogue with those who remain skeptical but that extraordinary circumstances require flexibility to ensure that students don't get behind, and the education system should "use every tool available to support the education of our children."

Greek school and university students, as well as many teachers, aren't waiting for the union's permission, and have leapt at the opportunity to carry on learning in lockdown via tools provided for free by tech companies including Cisco, Google and Microsoft.

VET teachers' adaptations to these changes

VET teachers and trainers the first weeks of lockdown faced some unprecedented different situations:

- VET centers were closed and teachers/ trainers were not able to continue the academic period
- Apprenticeships have stopped because companies, enterprises, etc. were closed during the national lockdown

● Teachers and students/learners they had to familiarize with new digital tools and digital educational methods

● The Ministry of Education and Governance have noticed some deficiencies in number of teachers during the new academic months and decided to appoint VET teachers in public education

● In the midst of a pandemic with closed schools, the Parliament passed the bill that provides for the tightening and intensification of the school, with the increase of the examined courses in the Gymnasium and the Lyceum, but also the restoration of the Themes Bank in the Lyceum. In this way, the Ministry wants to ensure that any educator will share/ teach/ present any course of the exams.

● For the VET teachers and general for the educators who are facing difficulties that related on the use of digital platforms and tools, e-learning and the platform that the Ministry of education has launched for the schools, VET centers and every educational organization, through the website of the Ministry every stakeholder is able to watch some training videos.

According to a specific annex to the European Semester reporting package from PISA, teachers in Greece have a high level of education, but they do not have the opportunity to develop their pedagogical skills. Education is highly valued in Greece, but this is poorly reflected in teacher education. Measures are being taken to improve the quality of school education by giving teachers some autonomy and evaluating their performance.

"Settling the large number of temporary teachers with contracts that reward performance and offer career prospects will boost teacher morale and increase the quality of teaching," he says. Teachers are an ageing workforce in Greece, with more than half of Greek teachers due to retire within the current decade, it said[4].

[4] https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester/european-semester-timeline/2022-european-semester-cycle_el

Impact and permanent (policy) changes in VET Education

VET education has been affected from the pandemic period. The first months and during the lockdown, the situation was very difficult for the teachers and the students because they had to organize the courses into new Innovative pedagogy.

The next years VET centers will continue to use the new pedagogy methods and the online tools that they have adopted. Furthermore, in this way educators and learns will be more familiar with the digital transformation and improve their digital skills.

Although the progress of science and technology aims first of all to enrich the content of education, some claim that the use of technologies as it is applied today, comes in the context of an overall degradation.

Main goals and methology

The main sources of the qualitative and quantitative information indicated in this report were a result of an extended bibliographic and literature review. During the project's research phase, Innovation Hive completed a mapping document to provide:

- A contextual status report for each national digital literacy system (including the Legal Framework)
- Information regarding existing digital literacy training materials for education delivery, including opportunities in informal learning as well as information on the didactic methods used
- Examples of good practices in National level
- A national and European picture of the state of the art in digital literacy

The prompts were designed to illicit qualitative desk-research driven responses. The template and guidelines were created by the Innovation Hive and distributed to other partners in April, 2022. These were returned in August, 2022. The report reflects a snapshot of the national and European digital literacy mindset landscape. Existing reports and studies of informal and non-formal learning are consulted and documented. Information is collectively analyzed and compared, where possible and constitutes a 'state of the art', although differences in policy priority necessarily led to some variation within the national reporting.

In particular, concerning the Legal Framework most of the information and data provided emerged through extensive desk research at the Greek Ministry of Education, OECD and EOPPEP reports, the National Organization for the Certification of Qualifications and Vocational Guidance. Regarding the Educational Offers, the main source of information was the Greek Ministry of Education as well as the OECD and CEDEFOP official websites.

The verification of the exported data (including the statistics) and cases was carried out through qualitative and quantitative research, with the help of anonymous questionnaires, directly addressed to our project's primary target group. The questionnaires included closed-ended and open-ended questions

in order to identify the main gaps regarding digital literacy, the delivery of classes online in VET education, the importance of digital education who led to a smoother adapting to the sudden requirements of the COVID-19 era. In addition to the digital literacy scope of the conducted research, existed the cause of tracking the thematic areas in which VET educators need to be trained.

Educational offers

Use of digital resources in VET education

Curriculum courses and resources in different digital formats

- http://photodentro.edu.gr/aggregator/
- http://aesop.iep.edu.gr/
- https://eclass.iekmesol.sch.gr/
- http://iek-patras.ach.sch.gr/openeclass/openeclass/
- http://ebooks.edu.gr/ebooks/
- https://www.coursera.org/
- http://elearning.schools.ac.cy/index.php/el/elearning/endeiktiko-yliko
- https://kahoot.com/
- https://moodle.org/
- https://www.microsoft.com/en-us/education/products/teams
- https://www.sqlearn.gr/platforma-sygxronis-ekpaideysis/
- http://elearning.openmellon.gr/login/index.php
- https://e-school.omiros.gr/el/static/omiros

Techniques and educational (digital) methods

VET centers are implementing the educational programs through the following methods:

- Lectures.
- Seminars and laboratories.
- Supervision of laboratory, tutorial, or clinical exercises.
- Supervision and guidance on writing papers and conducting research in specific subject areas.
- Invitation to other academic and/or research staff both from Greek and foreign Higher Education Institutions.

During the pandemic trainers and educators tried to implement the above activities through the online tools and the e-learning platform provided by the Ministry of Education.

Distance learning online platforms

Due to the Coronavirus pandemic, schools, universities and VET centers have been closed. The Ministry of Education, in order to continue the education program and offer to the students the opportunity to be updated with the educational process, replace face to face learning in a digital platform and tool. The Ministry's distance learning platform is a digital tool, which includes synchronous learning that is online education and happens in real time. Furthermore, learners have the opportunity to participate in the real time courses and in an interactive lesson, and teachers/trainers are able to give the learners the floor to pose questions.

In addition, learners and teachers can use the existing digital tools and platforms already offered by the Ministry of Education such as the Interactive School Books, the Digital Educational Material ("Fotodentro")- http://ebooks.edu.gr/ebooks/ and the Advanced Electronic Scenarios ("Aesop")- http://aesop.iep.edu.gr/ organized by educational level, course etc. E-learning videos will also be uploaded to the platforms so as the students can follow the e-courses any time of the day. According to the Ministry's results, until March 2020, the total number of the registered learners was 631.269.

It is the first year that the Greek Ministry of Education has collaborated with three companies as CISCO, Google and Microsoft and include distance learning in the educational program. The aim is to improve it for the next academic periods and include tools that are more useful for the teachers and trainers.

Methods of digital transformation of the lesson delivery

The elements that differentiate the various methods in asynchronous learning are the means of the means of transmitting the information and therefore of providing knowledge to the learner. The medium has enough potential to support one or more teaching objectives models (personalized teaching, group teaching, etc.) The distinguishing difference between the methods is the form and structure of the educational material, as well as the relationship that the learner develops with the educational material (Passive learning, interactive). Also, the cost and the elements that shape it make a difference to the methods.

In a less demanding method, the knowledge provided is presented as a whole of printed manuals. The model for which this paper is intended is a personalized teaching model which may include periodic meetings or seminars involving learners following the same course of study. A more sophisticated form of the previous method is one where there is a use of media (radio, television, video).

This is the case with group teaching models. The supervisory element is introduced due to the combination of images and sound. There is here the possibility of recording and and reuse of the material. Then we have the evolution of computers which enrich the remote methods.

The simplest computer-based training programs [Computer Based Training (CBT)] use CD-ROMs because they have a large capacity. In order to achieve the objectives of asynchronous, the appropriate facilities must be created, which, if properly configured, will provide the possibility of an optimal image and sound. Particular attention should be paid to lighting, acoustics and soundproofing of the space to avoid problems with the quality of the transmitted images and sound. The appropriate equipment should have a workstation, camera, graphics card, sound card, microphones, sound system.

The technologies to be used will be the electronic data transmission service and the mail service, the news service which is a set of electronic bulletin boards where each user can post his own news and information, announcements and read the announcements of others, the WWW, a real-time conference call service with text messages, a collaboration service from which is part of the videoconferencing service and the service itself. When we are on a network, we give impetus to programs that base their training on it (Web Based Training - WBT). In that case, the participants are increased and the effectiveness of the

programs is called into question. The transfer of the asynchronous programs to the network environment provides a social dimension to the e-learning programs, allowing those following the same program to interact with each other but also work in groups.

The development of networks has led to the transmission of sound and images so that courses can be virtual classrooms (tele classes), i.e., the participants can communicate with each other in real time as in a conventional classroom. The methods of e-learning are structured around telematics technologies and allow for the transmission of video and audio data, sharing of multimedia applications but also close supervision of the process by an organizer of the program are referred to as tele-education (Apostolakis, 2004).

Synchronous and asynchronous learning

Synchronous (real-time) e-learning

Real-time education has many similarities with conventional education. The teaching is carried out in the same way as traditional classroom teaching. The instructor and trainees connected by a network, participate in a classroom (tele classroom) despite the physical distance between them. The learners can ask the instructor questions and receive answers at the same time as they ask them as if they were in the same room.

As in a conventional classroom, the instructor can adapt the course according to the needs of the students and it is therefore the teacher who will determine the flow of the lesson and the way in which it is to take place. The advantage of this method is that students with common interests can acquire knowledge regardless of their geographical distance. The real-time distance learning takes place within a collaborative networked environment.

Such collaborative tools are available on the market and depending on the complexity they may allow the user to register online, to allow learners to view the instructor, allow them to take the floor and participate in discussions with each other as well as in discussion with the trainer. The tools may allow

group members who are in different locations to be able to work simultaneously on an application (e.g., Excel). Also, the majority of the tools provided allow the trainer to present a series of slides in PowerPoint and write notes in real time. There are tools with the help of which the trainer can ask the trainees to answer directly to a question by selecting from a given list of answers. It is often possible for the trainee, in order to ask a question, to use the "hand-holding" icon, the instructor can navigate on the Internet, to enable learners to communicate privately with other learners, to enable the students to communicate with other students or the instructor. The tools have evolved so that the instructor can test the learners in order to check their progress.

Asynchronous e-learning

Asynchronous learning occurs when both the course and the individual parts of the explanations are given in non-real time, but at the time chosen by each participant. This method is preferred when there are difficulties for learners to deal with, such as time constraints (odd working hours, shift work, time constraints, time limits, commitments related to family life etc.) (Apostolakis, 2004).

Cooperation is limited in this case, and learning takes place through studying texts, listening to tapes or watching videos. However, the exchange of views both with the trainer and with the other learners is possible. Communication is carried out by means of network tables (whiteboard), e-mail, etc. Since communication does not take place in real-time, collaborative tools are not necessary, but some digital tools are necessary to enable a person to subscribe to the network, enable the instructor to control the number of participants and the number of participants, the duration of each visit, the modules visited within a certain period of time, the students' performance in tests, etc.

The use of certain tools allows certain environments containing forums to pose questions to an expert who can answer them in a very short time. Asynchronous learning can be divided into semi-autonomous and collaborative learning. In the first case, the learner works on the basis of the educational material collected by himself but communicates frequently with the instructor. In the second case, the learners follow a common learning pathway program with others which has been defined by the trainer as well as the training material.

Another classification has been made on the basis of the mode of interaction between participants in a program. We therefore have:

1) One-to-one i.e., self-learning

2) One-to-one i.e., personalized teaching

3) One-to-many i.e., one trainer and many learners

4) Many to many when we have many trainers and trainees; and

the program is carried out in group work.

Identifying gaps

Current status of VET teachers' competence areas

Communication and Collaboration via digital devices and tools

The educators who are using the traditional education methods are faced some difficulties on the usability of the online tools. In this case, it was difficult to communicate and collaborate with the learners. The Ministry of Education managed to provide the necessary guidelines in order to support them to continue the online classrooms. According to the Ministry's action plan, the goal is to provide to the educators the necessary digital knowledge.

Selection and use of fitting digital resources

During the last years, schools and VET centers are using digital resources in order to include the digital transformation on their academic structures. Educators are able to select and use simple forms of presentations and present the relevant bibliography to the learners.

Guiding students in teaching and learning scenarios via digital technologies

Teachers and Trainers are able to guide the students only for the basic features of the online tools and resources. In order to enrich their pedagogical methodologies is important to improve their digital skills.

Evaluation and feedback within digital learning and teaching scenarios

Educators and VET centers have developed their own assessments forms in order to evaluate the learners' progress. They are able to create online forms and use variety on online tools.

Creation of individual, tailored and engaging learning processes

Unfortunately, the educators are able to use only some features of the available online tools and platforms. There is the need to improve their skills by online trainings and webinars.

Facilitation of students' digital competences

The first step for the educators, who are using the traditional methods though their courses, is to improve their digital skills in order to be able to facilitate the students with the new educational process and as next phase to educate the learners the digital skills.

Mapping of Digital Competence Needs related to modern technologies

Presentation & Multimedia technologies

Teachers and educators should use the available digital tools into their pedagogical methods in order to develop more interesting courses for their classrooms. The technology could have been more effectively integrated into the delivery of the course in manual handling. Sometimes the traditional educational methods are very ''boring'' for the students who have more digital skills from the educators in some cases. The trainer should be able to prepare the course into presentations and by using innovative elements.

Fundamental knowledge should exist to teachers, trainers and educators in general when it comes to the use of computers and digital tools. An interesting program, offering that core knowledge is the training program provided by the Center of Training and Lifelong learning of the University of Patras 'Basic Informatics Skills', containing all necessary IT knowledge, at least at its fundamental form, preparing the trainees for certification exams, in order for them to obtain an Informatics diploma[5].

Personalized curriculum and learning

The key benefits of the personalized learning are the ability to offer specific feedback, remediation, and reinforcement that learners can work on and move up to the required level of mastery. The educators in collaboration with the learners have the opportunity to set their own goals, set the milestones, and select the most appropriate learning path and method.

[5] https://kedivim.upatras.gr/courses/ict-certification/

Virtual collaboration and co-creation

The most important need that related to the digital education sector. It is necessary for the VET teachers and the students to ensure the fruitful virtual collaboration. During the pandemic period and the lockdown, teachers and learners faced the difficulty on the communication and to start the new online collaboration though the online environment.

Mobile programming

It is a new learning method which all learners are interested to explore it more and discover the new educational opportunities. Through the mobile apps in education sector learners and teachers are able to re-read the e-books, participate in the recorder classes, to communicate with others through the real time messaging. The VET educator should be able to use all the technological and online tools and change/update their pedagogical methods.

Cloud technologies

Cloud computing is perhaps the most flamboyant technological innovation of the 21st century. By incorporating meaningful technology into the classroom, both students and teachers will see improved outcomes and increased engagement. Cloud computing offers opportunities for innovation and benefits in the classroom that are both safe and cost-effective.

Digital evaluation and analytics

The digital educational methods are part of the courses the last year. For this reason, is very important for the educators to create a digital evaluation for the students/learners in order to test their

competencies. Furthermore, they should be able to analyze the responses and prepare the evaluation report.

From the other side, it's important for the educators to test and check their competences. For this reason, the Ministry needs to update or develop from the beginning a new more innovative way for the teachers/trainers to check their skills and competences through online exams.

Gamification on education

Educators should be able to connect the topic of each course with the available gamified platforms and/or digital game & digital board games. In this way, learners will improve their digital skills, and will learn in a new way more interesting and innovative.

Virtual Reality (VR) and Augmented Reality (AR)

The most innovative tool for the VET centers. Through the virtual reality learners will be able to participate in an environment where will implement realistic scenarios. Is an innovative and enjoyable method for the VET students.

Artificial Intelligence (AI)

Using artificial intelligence educators can remove "boring" learning activities for learners and free them up to be increasingly creative.

Video based learning & social media

The last years, the adoption of the digitalization on the educational methods is very important. Therefore, the trainers and teachers could prepare new methodologies for the implementation of their courses.

Online safety: Personal data privacy & digital identity

It is important for the educators to know how they can protect their personal data. There are various seminars and online trainings concerning that topic, others providing more basic and fundamental knowledge, and others providing more specific knowledge and professional skills.

A great example could be the training provided by the Centre of Training and Lifelong learning of the Aristotle University of Thessaloniki, named as 'Training of Data Protection Officers'.

The purpose of this program is to train Data Protection Officers (DPOs) on the General Data Protection Regulation 2016/679/EU and the new national implementing law (Law 4624/2019)[6].

Screen addiction management

Educators should be able to guide the students about the screen addiction, an issue that they are facing during the online courses and classrooms.

Screen addiction refers to the uncontrolled and harmful use of electronic media. The most vulnerable groups to developing pathological use are adolescents and students, as the 16-24 age group has the highest rate of use.

Workload and stress management

[6] https://www.diaviou.auth.gr/programs/ekpedefsi-ypefthynon-prostasias-dedomenon/

Maybe the stress management is one of the most important aspects. Educators should be able to face any difficulty that related to the implementation of the courses and support the learners.

Aspects of teacher performance, such as creativity and the application of teaching techniques, are affected when the teacher experiences intense stress. It is difficult to determine exactly which factors and to what extent combination will result in the creation of a high degree of stress in each individual.

Moving towards finding feasible ways to deal with the workload and stress management, one could opt for the training program provided by the Center of Training and Lifelong learning ''Hellenic Mediterranean University'', under the name 'Stress management and mental health in schools.'

The training program concerns the development of modern skills for teachers in order to modernize their applied knowledge and update their practical skills, so that they can meet the increased demands of the modern school environment and the educational challenges of the future[7].

7 https://kedivim.hmu.gr/content/%CE%B4%CE%B9%CE%B1%CF%87%CE%B5%CE%AF%CF%81%CE%B9%CF%83%CE%B7-%CF%83%CF%84%CF%81%CE%B5%CF%82-%CE%BA%CE%B1%CE%B9-%CF%88%CF%85%CF%87%CE%B9%CE%BA%CE%AE-%CF%85%CE%B3%CE%B5%CE%AF%CE%B1-%CF%83%CE%B5-%CF%83%CF%87%CE%BF%CE%BB%CE%B9%CE%BA%CE%AD%CF%82-%CE%BC%CE%BF%CE%BD%CE%AC%CE%B4%CE%B5%CF%82

Conclusions and other information

As a final conclusion, deriving from the thorough development and explanation of the state-of-the-art report, Greece is only at its first steps towards the digitization of its educational field.

The Coronavirus pandemic, even at these circumstances, transformed the opportunity of using digital tools for the delivery of lessons/trainings to a necessity, but given the means actually used, the funding that was provided, and the engagement of both teachers/trainers and students/trainees, has been characterized as insufficient.

A vast variety of solutions and recommendations could be provided towards the fulfillment of the cause of the partial, at least digitization of education in Greece, some more short-term, and others more permanent. Starting from the beginning, several initiatives could be found in the field of Informatics training programs, most of them offering certifications, and moving to stress management seminars, lifelong learning programs and private and governmental funding for obtaining, or enhancing the relevant equipment. The core practical improvements are the digitization of educational material and content, the digital infrastructure in all classrooms for interactive digital learning and corresponding upgraded equipment in laboratories, vouchers for the acquisition of digital tools for students, robotics, STEM tools and equipment for all organizations, digital and technological tools for students with disabilities and special learning needs, retraining of teachers in new technologies and tools integrated in education and career guidance with digital tools.

Some of the key measures that could be implemented focus on improving the education system, improving skills, digitization of education, upgrading vocational education and training (VET) and the supply of laboratory equipment for VET training units.

The pandemic has changed the conditions and context of education and should therefore redefine countries' strategic planning. Indicatively, in the post-pandemic era education needs to rethink what is worth teaching and what students should necessarily know. And of course, all decisions should be made in the light of the fact that education has moved into the digital age. In the same context, as the Internet plays an important role in education, students themselves need to develop skills that will enable them to make use of digital media and avoid the pitfalls of a world 'mostly in front of a screen'.

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- https://kedivim.hmu.gr/content/%CE%B4%CE%B9%CE%B1%CF%87%CE%B5%CE%AF%CF%81%CE%B9%CF%83%CE%B7-%CF%83%CF%84%CF%81%CE%B5%CF%82-%CE%BA%CE%B1%CE%B9-%CF%88%CF%85%CF%87%CE%B9%CE%BA%CE%AE-%CF%85%CE%B3%CE%B5%CE%AF%CE%B1-%CF%83%CE%B5-%CF%83%CF%87%CE%BF%CE%BB%CE%B9%CE%BA%CE%AD%CF%82-%CE%BC%CE%BF%CE%BD%CE%AC%CE%B4%CE%B5%CF%82

5. Italy

Introduction

The Italian education and training system include ECEC (0-3 and 3-6), primary, secondary, post-secondary and higher education. Vocational Educational Training is available for students within the second cycle of education which starts at the age of 14. At this stage, students can choose from the upper secondary school education or the regional vocational training system (IFP).

The first two years of the second cycle of education are compulsory. Then, in one hand, the upper secondary school education (*scuola secondaria di II grado*) offers both general (liceo) and vocational (technical and vocational) programmes. Courses last 5 years. At the end of the upper secondary school education, students who successfully pass the final exam, receive a certificate that gives them access to higher education.

On the other hand, in Italy, there are two types of VET: initial vocational training for young people who approach the world of work for the first time; and continuing vocational training for adults who wish to acquire new qualifications and skills. VET schools are of two levels: first level, accessible after the secondary school of first grade, providing for a two-year period and a three-year period of education according to the chosen field of study, and the Regional Vocational Training; second level, IFTS– Higher Technical Education and Training Institutes courses, and ITS – Higher Technical Institutes.

According to the Italian recent reform of VET, there has been a shift from six to eleven fields of study in vocational schools. In addition, the reform provided for an increase in the percentage of time devoted to school and laboratory education up to 40% in the first two years and up to 50% in the last three years. In Italy, training is also provided and financed by the private sector. There is also tertiary training provided by free universities, voluntary associations and NGOs.

Legal framework

The digital and green transition requires action for greater resilience to emergencies and adequate digital preparation of VET institutions and trainers and students, ensuring that VET curricula match the needs of the green and digital economy. The EU has been cooperating with state educational systems since 2002 and the Copenhagen process. It has been further enhanced over the years, for example by the Bruges Communiqué and the Riga Conclusions. The Italian government, following the EU recommendations and common objectives, began to take actions to modify and update the educational system.

In August 2020 the "Decreto Ministeriale 89 – Adozione delle linee guida sulla Didattica digitale integrata" states that teacher training represents a fundamental lever for the improvement and innovation of the Italian education system, especially to deal with the new challenges brought by COVID emergency. This "Decreto Ministeriale" introduces the main topics in which teachers, but also other school staff, should be trained. Training in digital matters includes: a) Informatics with focus on educational platforms and considering the DigCompEdu framework; b) Inclusive models for integrated digital education and interdisciplinary teaching; c) Privacy and security in digital education; d) Update of technical assistance staff skills.

At European level, the Ministers in charge of VET of the Member States signed in November 2020 "The Osnabrück Declaration". In the document, VET is considered an enabler of innovation and an essential foundation for green, digital and sustainable growth. Ministers express their determination to exploit the potential of digital learning and artificial intelligence to support learners in the lifelong learning process. They consider the importance of building the digital competences of teachers and trainers and support the development of digital infrastructure with educational purposes in VET institutions.

Recently, with conversion into law of the PNRR 2 decree (Decree-Law No. 36 of 30 April 2022, converted with amendments by Law No. 79 of 29 June 2022), and following the objectives established in the "Recovery Plan Italy", the MiuR (*Ministero dell'Istruzione*) is introducing reforms in the Italian educational system that will have an impact on teachers and trainers' digital competences.

On one hand, the process of recruiting new teachers has been reformed. The process consists on completing a specific, tertiary level course; passing a public competition; and overcoming a trial period of one year. This new recruiting process puts more focus on the needs of the green and digital transition by including in the obligatory course training in "high digital competences" as well as instruction in technologies with educational purposes. However, being only in its early phase, it isn't clear yet what kind of specific skills, competences and topics will be addressed.

On the other hand, teachers will have the opportunity to update their methods and knowledge through educational activities and courses aimed at improving teachers' competences. A new organism called "La Scuola", supported by INVALSI and INDIRE, will decide the main topics to be addressed in these voluntarily courses as well as those obligatory considering current European standards including

DigiComp. The training courses will begin in the academic year 2023/2024, and teachers will voluntarily choose to follow them. In order to offer incentives for participation, teachers will receive an economic compensation if they pass the necessary evaluations and meet the expected results.

Finally, training in digital skills and the critical and responsible use of digital tools will be part of the already compulsory training for all teachers and will take place during working hours.

Best practices of educational offers

Apart from the National Levels initiatives, in Italy there are several projects aiming to increase the digital competences of teachers and trainers. We have selected two projects, both funded by the European Union, that can be taken as good practices and inspiration for the actions to come.

2.1-Project IDiVET

Organization name: SCUOLA CENTRALE FORMAZIONE

Website: https://scformazione.org/

Address: Corso del Popolo 146/C 30172 Mestre-Venezia

Project Title: IDiVET – Improving Digital in VET

Summary: The Covid-19 pandemic has made the need to develop innovative digital practices in education and training even more urgent. This is particularly true for vocational education and training (VET) which, due to its strong 'manual' component, has been less 'digitized' than other sectors.

Restrictions to counter the spread of the virus have multiplied worldwide and VET actors have had to find quick solutions to maintain training provision. Very often this meant deploying digital tools and practices with which they were unfamiliar, without taking the time to analyze the underlying pedagogical approaches and principles.

The pandemic can thus be seen not only as a great challenge, but also as a real opportunity. For some VET teachers and trainers, the health crisis was a catalyst that accelerated the introduction of new digital practices and unleashed their creative and innovative potential.

Implementation period: 1 June 2021 to 30 November 2022 (18 months)

Funding channel: Erasmus+ KA2 - Digital Education Readiness Partnership - Vocational Education and Training 2020

Project objectives

IDiVET or Improving Digital Learning in VET aims to support the adoption of innovative pedagogical approaches and the use of digital in VET.

As a first step, the project will develop a grid to analyse the digital practices developed by teachers and trainers in the 4 countries since the beginning of the pandemic in order to ensure pedagogical continuity. A list of concrete examples of good practices will emerge.

Secondly, the project will use the results of this analysis to formulate recommendations on the educational principles inherent in a quality digital and distance learning system. These recommendations will be the subject of a training course for VET teachers and trainers which will be tested within the project in the form of a transnational training action.

IDiVET will build on national and European initiatives and projects, such as SELFIE and DigCompEdu, as well as on the complementary experience of the project partners reflecting the diversity of VET in Europe. Although the focus will be on educational support for teachers and trainers who have to cope with the rapid and forced spread of digital and distance learning, the project will also highlight external factors facilitating the emergence of innovative digital approaches.

IDiVET aims in the short and medium term to help and support VET actors in their adaptation to the digital transformation we are currently experiencing. This will be based, inter alia, on capitalising on the experience gained since March 2020 to develop innovative training methods and promote the development of the competences of VET professionals in the implementation of quality hybrid training

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3.2 – BIM4PLACEMENT Project

Organization name: CENTOFORM Centre (FE)

Website: https://centoform.it/

Address: Via Nino Bixio 11 44042 Cento (FE) - Italy

Project Title: BIM4PLACEMENT - KA2 Erasmus+ Strategic Partnerships 2016 2016-1-IT01-KA202-005399

Summary: The project BIM4PLACEMENT, coordinated by CENTOFORM, is a good practice Strategic Partnership funded in Erasmus+ in 2016, whose main objective was to deepen the knowledge of Building Information Modeling (BIM) to develop skills that increase employability, to update the existing training tools and vocational qualifications and to create a network to promote work-based learning with a focus on apprenticeship. BIM can be defined as a process involving the generation and management of digital representations of physical and functional physical and functional characteristics of places. BIM software is used to plan, design, construct, manage and maintain many types of buildings and infrastructure. In Europe, BIM is becoming increasingly studied in vocational education and training, VET and university courses and applied in companies.

This process is becoming a new specialisation with a high rate of employability. In Italy this methodology is not sufficiently known and widespread, unlike in other EU countries. Considering the lack of homogeneous tools validated at European level for training in BIM, this project aimed to build a bridge between Northern Europe and Southern Europe, to create an innovative tool for the training of beginners in BIM in a wide range of training environments training: high school, vocational training centre, universities and companies. The results of the project are:

- a comparative research, on knowledge of BIM implementation and related training measures at European level;

- the development of the BIM professional qualification to be included, among others, in the regional catalogue of professional qualifications of the professional qualifications of the Emilia-Romagna Region;

- BIM training programmes for students, unemployed people, employees in the building and construction sector;

- a New Training Tool, consisting of a serious game to learn basic concepts and main features of BIM.

Detailed description of the training program

In Italy, Centoform and Emilia-Romagna Region decided to work on a training program addressed to non-university tertiary education students.

The reason for this choice was related, first, to the decision of implementing a new qualification (Ouput 2 of Bim4Placement project), related to BIM in Emilia-Romagna qualification repertory (SRQ - https://formazionelavoro.regione.emilia-romagna.it/qualifiche/schede).

Secondly, it was in the interest of the Region and of Centoform to implement a new module within the ITS paths proposed by the ITS Territory –Energy- Construction Foundation, the only one in Emilia-Romagna to realise ITS courses in construction, of which Centoform is a founding member.

In relation to these aims Centoform and Emilia-Romagna Region decided to define a training program for vocational post high school education (EQF 5).

The result is a training program of 500 hours (302 hours of lectures and assisted project work and 188 hours of internship in companies). This program will be adopted by Centoform in the realisation of courses related to the new regional qualification (EQF 5) and will be also adopted by ITS TEC Foundation for the implementation of the new module on BIM inside the ITS courses Superior Technician for building energy efficiency and Superior Technician for the innovation and the quality of homes (EQF 5).

ITS course duration is 2.000 hours, and the BIM module will be a part of the full program, connecting all other modules through a practical experience of building requalification with BIM.

Identifying gaps

As a result of the activities and researchers done at the local level in Italy, we found out that the main consequence of the pandemic in the VET field was obviously related to the change of the delivery methods, which had to switch almost 100% online.

Regarding the gaps & needs identified that the project Hack4Society should try to fulfil we can stress:

- lack of preparation and competences by the teachers to lead and prepare contents to be used for the online lectures that could be effective, interesting and catchy.

- Most of the learners stated that they would have preferred a method which could have included more diversified tools like games, group activities, interactive methods in order to facilitate a high level of attention of the learners.

- Some participants noted that the online delivery brought some advantages and at the same time some disadvantages 1. It somehow facilitated the participation of people facing geographical obstacles, since they could attend without moving from their places. 2. At the same point it also created some barriers to the participation of those people who could not count on an effective internet connection or the required tools like laptop, tablet or other devices.

Regarding the preference of the methods to deliver the lessons, it seems clear that learners would prefer to have a mixed approach having the opportunity to attend/lead both online and face-to face lessons. Among the types of activities mentioned it should be stressed the importance of including non-formal education methods like serious games and group interactive sessions.

In regard to the possibility to record the lessons when delivered online, it emerged that it could facilitate the learning process since it would give the possibility to revise the materials even when the lesson is concluded.

Concerning the necessary skills to attend a professional course we could mention:

-Specific Knowledge on the creation of digital contents

-Knowledge of the computer or other required digital tools (tablet, phone, etc.)

-Knowledge of all the functionalities of the programmes used for the delivery of the lessons, to maximize the impact (i.e. zoom, mentimeter, wordwall, padlet, kahoot, skirball, storyboard, etc.).

According to our findings, the majority of the teachers think that the most effective methodology for the delivery of a VET training course should include a hybrid process which foresees online and face-to-face activities. Majority of the learners noted that the most relevant thing is not related to the fact that the lesson is delivered online or physically, but it concerns the quality of the activities chosen which should guarantee the interaction and the active participation of the learners.

Annex

1-Detailed program of the BIM Module

- MODULE 1: The digitization of the building process
- MODULE 2: Architectural BIM Authoring
- MODULE 3: BIM collaboration and federated models
- MODULE 4: The dimensions of the BIM beyond the three-dimensional model
- MODULE 5: Project work

module	topic	hours	teaching methods
MODULE 1: The digitisation of the building process	The digitization of the building process: opportunities, limits and applications of BIM tools.	8	lecture
	Analysis of requirements by law: the New National Code for Public Procurements	8	lecture
	BIM Guides, BIM Execution Plan and the configuration of an IT environment for building design.	16	lecture + project work
MODULE 2: Architectural BIM Authoring	From the integrated 3D survey to BIM	16	lecture + lab
	Architectural BIM authoring – how to model basic components, manage (architectural) levels and graphical standards.	40	lab + project work
	How to model complex geometries and detail elements, both in the new construction and in the existing building. Integration of information according to BIM-based standards.	36	lab + project work
MODULE 3: BIM collaboration and federated models	Structural BIM Authoring – data authoring, management and interoperability.	12	lab
	MEP BIM Authoring – data authoring, management and interoperability.	12	lab

	Code and model checking and conflict analysis	16	lecture + lab
	Advanced model checking: the qualitative evaluation of a project	12	lab
MODULE 4: The dimensions of the BIM beyond the three-dimensional model	Managing data through the project: scheduling, cost analysis and performance certifications	16	lecture
	Scheduling the building site activities through the use of BIM tools (BIM 4D)	12	lab
	Cost analysis and cost-related information use (BIM 5D)	8	lab
	How to use BIM for Facility Management: from CAFM standard to BIM-FM	4	lecture
MODULE 5: Project work	Project presentation and methodology for case study analysis	4	lecture
	Stakeholders definition. Analysis of needs, requirements and regulations.	8	Project work
	Design workflow, activities scheduling and groups.	4	Project work
	BIM modeling of the design topic (existing building).	16	Project work
	Preliminary definition of design solutions based on the performed analysis (design layout and building typology)	12	Project work
	Preliminary definition of design solutions based on the performed analysis (technical and structural solutions)	12	Project work
	Preliminary definition of design solutions based on the performed analysis (renewable energy sources and envelope design)	2	Project work
	BIM modeling of design choices	24	Project work

	Meeting with the client and project presentation	4	Project work
	TOTAL	302	

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6. Final conclusions

As a final conclusion, we are only at the beginning of the process of digitizing the educational sector, as evidenced by the full development and explanation of the state-of-the-art reports.

Even under these conditions, the coronavirus pandemic made the use of digital tools mandatory and urgent for the delivery of lessons and trainings; however, the methods actually employed, the funding that was made available, and the level of participation on the part of both teachers and trainees have all been deemed insufficient.

A form of response to the deficiencies and the lack of readiness for that change, could be the fruitful restructure of the educational system. A vast majority of seminars, training programs and lectures are available both physically and online, for the development or enhancement of digital skills, in which both teachers and students should be retrained. The content of the lesson transmitted should be redefined, in terms of being able to adapt in a digital form, using interactive tools, presentations, exercises and quizzes, to skip the plain lecture or text manner of transmitting the information, which could be insufficient for the digital world. Classrooms of all kinds should be provided with digital infrastructure, equipment able to host and simplify the e-lessons, vouchers or other opportunities for training and obtaining of equipment should be provided to both teachers and students, and last but not least, come up with ways, which already exist at some point, to enhance the inclusion of people with special needs to the online educational environment.

The goal is set clear, and the means exist, and the most vital part is to upgrade, upscale, not being afraid to question what is applied until now, not in a way of canceling it, but adapting it to the immersive needs that our developed reality commands.

The pandemic has altered the environment and context of education, which requires a reevaluation of national strategic planning. It is clear that education needs to reconsider what is important to be taught and what all students need to know in the post-pandemic period. The fact that education has shifted into the digital age should, of course, be taken into account when making any judgments. In the same way that the Internet is crucial to education, students themselves must learn how to use digital tools and stay safe in a society where people spend most of their time in front of screens.