



Up-skilling the VET sector to Cloud Computing

KA220-VET - Cooperation partnerships in vocational education and training

Duration: September 2022 - August 2024

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Introduction

Up-skilling the VET sector to Cloud Computing is a 24 months partnership project which brings together stakeholders from the VET sector. Project partners are;

Afridat UG- Germany

Umbria Training Center- Italy

European Career Evolution- Ireland

NGO NEST- Germany

NATSIKAS K & SIA EE COMPUTER GR'- Greece

Nicea Kültür ve Eğitim Derneği- Türkiye

Project aims at;

-Promoting the use of cloud computing curriculum as a new teaching opportunity and training offer within the VET sector.

-Fostering the skills of VET learners (16-25 years old) in the digitalization era by providing them knowledge and specific skills in the cloud computing sector and its applicability in the labour market.

-Creating and matching synergies between the VET sector and the needs of the ICT sector to facilitate the access to the job market.

The project's expected results are;

-Research Report : The report will include a state-of-art of the publications, reports and data found regarding the use of cloud computing.

-Training scheme and assessment model : The result will integrate a set of qualifications and skills in the cloud computing field, with the European lifelong learning instruments (EQF).

-MOOC: A MOOC addressing aspects of cloud computing for VET providers, regarding practical applications of cloud computing technology for labour market guidance.





Methodology

This report is the initial output of the collaboration. It summarises the state of publications, reports and data found on cloud computing usage in the partner countries. The report of the consortium consists of three parts: the desk research, the survey and the focus group research and the implications and conclusions. Objectives of the research;

1- To define and understand the state of the art of the specific sector of cloud computing in the partner countries, analysing the specific needs and gaps in the sector.

2- To assess the professional skills needed in the labour market for a VET provider, designed in accordance with the European tools for lifelong learning (EQF).

Desk research brings together good practices that address; Adapting VET to labour market needs; Addressing digital transformation by developing digital readiness, resilience and capacity; Teaching cloud computing; ICT skills for VET providers; Cloud computing skills and competences. Each partner provided 4 good practices from their national context in the desk research part.

The second part of the report is field research in the form of a survey and focus group study. The survey is a multiple choice questionnaire with two different parts, one for VET providers and one for VET learners. Each partner completed the survey with a minimum of 20 participants, both VET providers and VET learners. The results of the surveys were analysed and reported by the partners in the national reports. The focus group focused on the situation of VET in the labour market and the existing training opportunities in the cloud computing sector, as well as the challenges/obstacles that VET learners face in establishing a career in ICT and cloud computing related professions.

The final part of the report presents a comparative analysis of the national reports and the implications of the research.





Research Report – Germany

Best practices

Best practice n. 1

Topic	An open source cloud based solution for schools across Germany.
Best practice Title	dBildungscloud
Keywords	Cloud computing, educational infrastructure.
Best practice	
<p>dBildungscloud (Dataport Bildungscloud) is being developed as an open source cloud based solution across various strands. This platform acts as a versatile working tool for teachers and provides a future oriented learning environment for the students. The platform offers state specific variants for the states of Niedersächsische Bildungscloud, Schulcloud Brandenburg, and the Thuringen Schulcloud. The solution is offered as a state centric solution which includes all the schools across various states of Germany.</p> <p>The platform was introduced as HPI Schul Cloud in September 2016. The platform was developed as a collaboration between the Federal Ministry of Education and Research and the Hasso Plattner Institute. It began as a pilot project together with the MINT-EC, the national excellence school network. The project consisted of a 5 month concept phase in 2016, followed by a pilot phase in May 2017. As a part of the pilot phase 27 schools participated in the alpha testing phase. By the year 2021, the platform had been successfully incorporated in the schooling environment of the Niedersächsische Bildungscloud, Schulcloud Brandenburg, and the Thuringen Schulcloud regions of Germany.</p> <p>Later as a part of the BMBF research project, a development of the platform took place. This included a transfer to the Dataport AÖR server. The service provider is familiar with the public administration structures which boost the integration of platforms in schools across Germany.</p> <p>The Niedersächsische Bildungscloud, Schulcloud Brandenburg, and the Thuringen Schulcloud regions of Germany have successfully organised themselves into the school cloud network. They have taken to develop the platform further for schools and VET administrators.</p> <p>Objectives:</p> <ol style="list-style-type: none"> 1. To meet the data protection requirements of various federal states of Germany. 2. To assist schools in adapting the platform as per their respective states' data protection regulations. 	





3. To protect the personal rights and privacy of the students.
4. To meet the didactic and pedagogical requirements of digitally supported teaching.
5. To enable teachers and students in collaborating and designing networked learning as per their individual needs.
6. To encourage digitization of German schools.
7. Help teachers and vocational educational trainers upskill themselves.

Target Group: Teachers, students and VET across Germany, teachers and students part of the MINT-EC excellence network.

Activities and Methodology:

1. To recruit 27 schools for participating in the alpha testing phase to recognise the digital requirements of German schools.
2. To switch to Dataport AöR. It is an information and communication service provider. Their servers are located in Germany and are operated by German providers. This means a strict adherence to the German Data Protection Regulations and is GDPR compliant. It also ensures data storage on German servers.
3. A blog section: This section represents information regarding development of the platform. Not only limited to that it also represents various developments in the sector of cloud computing teaching.
4. Satisfy the didactic and pedagogical requirements of the digitally supported teaching community
5. Collaborate with 300 professional partners as a part of the MINT-EC excellence network for developing the platform further.
6. Introduce Lern.cloud, which is a learning platform in cooperation with dBildungscloud. This provides learners access to online courses with valid certification and lifelong access to course material.
7. Two different choices for lesson structure: Simultaneous lessons which encourage collaboration among student groups during the course, video conferences and chat rooms across school or classroom. Staggered lessons: The teaching content and the work material are stored. The teachers can create time limited tasks and assign them to the students.
8. The ability for the parents to track the progress of their child. They can also use their email to receive updates regarding the tasks allotted by the teacher, their remarks and any additional comments.
9. Development of a training course for school administrations to get familiar with the interface of the platform.
10. The code for their platform is present on the Github platform which makes it open source and accessible to anyone across the internet.

Quantitative outcomes: A few years after the launch of the platform, all the schools across the Niedersächsische Bildungscloud, Schulcloud Brandenburg, and the Thuringen Schulcloud regions of Germany. The platforms observed a registration of 350 schools across Germany. During the COVID-19 pandemic The BMBF provided funds to the platform to foster the registration of schools across Germany. This expedited the rollout of the platform. This led to 3500 schools across Germany using the platform. When the platform was transformed from HPI Schul Cloud to dBildungscloud, the platform observed a registration of 4000 schools across Germany with over 1.4 million teachers and students.

Qualitative outcomes: The administration has the opportunity to register the whole school on the platform. They can make the learning material centrally available to all the students. This promotes efficient and effective collaboration among students and teachers. It offers two different types of students with 2 different types of





<p>lesions choices. The parents of the students can be updated about assignments, results, and teacher remarks etc. It provides teachers with the opportunity to plan lessons as per the needs of the students. The platform also encourages the development of learning and teaching processes on a digital platform. The extended reach of the platform during the COVID-19 pandemic. It has encouraged more and more schools across Germany to adopt the platform for their school environment. Due to the digitised platform, the teacher and students will be able to collaborate even though they are sick. The teachers can upload the material according to their health conditions. Moreover, if students feel sick and cannot attend the school physically they have the opportunity to catch up on the learning material from the comfort of their homes.</p> <p>Impact:</p> <ol style="list-style-type: none"> 1. Digitization of the German schooling and VET system 2. Development of an e-learning platform. 3. Increased engagement with digital learning platform. 4. Decreases users worry regarding the aspect of data protection. 5. Opportunity for teachers to learn new dissemination techniques. 	
Reference Link (if any)	<p>https://dbildungscloud.de/</p> <p>https://hpi.de/open-campus/hpi-initiativen/hpi-schul-cloud.html</p>
Provided By	<p>- Name of the Institution/Partner that implemented the practice: Hasso Plattner Institute and Federal Ministry of Education and Research</p> <p>- Contact of the Institution/Partner (name, email, telephone): Dataport Bildungscloud dBildungscloud Dataport AÖR</p> <p>Altenholzer Straße 10-14, 24161 Altenholz</p> <p>Telefon: +49 (431) 3295-0</p> <p>E-Mail: poststelle@dataport.de</p> <p>De-Mail: poststelle@dataport.de-mail.de</p> <p>- Name of the Strategy/Programme: <i>dbildungscloud</i></p> <p>- Other useful information (if any):</p>
Language	ENGLISH, DEUTSCH





Best practice n. 2

Topic	A nationwide strategy to boost the journey of digital transformation.
Best practice Title	Digital Strategy 2025
Keywords	Digital Transformation, Education Infrastructure
Best practice	<p>The German Government realised how digitization changes the working process. Old profiles and Qualification will be replaced by new ones. In the year 2014, The EU job market was looking for 509.000 data experts. They had estimated the need for analysts would reach 3.5 million by 2020.</p> <p>They realised that to meet this demand, they should encourage digital education. As it would become an important prerequisite for the future job market. They realised that to accompany this demand new possibilities in the categories (i.e. new teaching and knowledge distribution methods, interactive learning methods, providing expanded access to knowledge etc) must be explored.</p> <p>The German Government decided to launch the Digital Strategy 2025 in collaboration with the Federal Ministry of Economic Affairs and Energy. The aim of the strategy is to help develop digital capabilities, promote the use of digital tools to enhance the country's digitization process. The strategy was adopted in the year 2016 considering a period of 10 years. The strategy aims to enable the German economy to tackle new digital challenges and ensure they hold the leading position in quality and technology sectors.</p> <p>The companies across the nation have recognised the need for transforming the educational, training and VET sectors and align them with the increasing digitization. According to the following statistics:</p> <ol style="list-style-type: none"> 1. Data analyst skills: 45% 2. Social media competence skills: 35% 3. Data protection and security skills: 25% <p>The digital strategy is structured on the following 10 pillars essential for digital transformation to be established by 2025:</p> <ol style="list-style-type: none"> 1. Creating a gigabit optical fibre network. 2. Launching the new Start up era. 3. Creating a regulatory framework for investment and innovation. 4. Encouraging "Smart Networks:" in key commercial infrastructure areas of the economy. 5. Strengthening data security and developing informational autonomy. 6. Enabling new business models for SMEs, the skilled craft sector and services.





7. Utilising Industry 4.0 to modernise Germany as a production location.
8. Creating excellence in digital technology research, development, and innovation.
9. Introducing digital education to all phases of life.
10. Creating a Digital Agency as a modern centre of excellence.

The 9 pillar focuses extensively on encouraging and promoting the adoption of ICT skills. The strategy includes all educational institutions such as day-care facilities, universities, schools, continuing education institutions, VET sector, and non-formal and informal educational centres.

Objectives:

1. Every school pupil will have basic information science, algorithmic functions and programming knowledge.
2. Leaders in the digital infrastructure of the education sector.
3. To make the workplace the best place to acquire new ICT skills.
4. To snake teaching material avail;abale across all publicly financed schools.

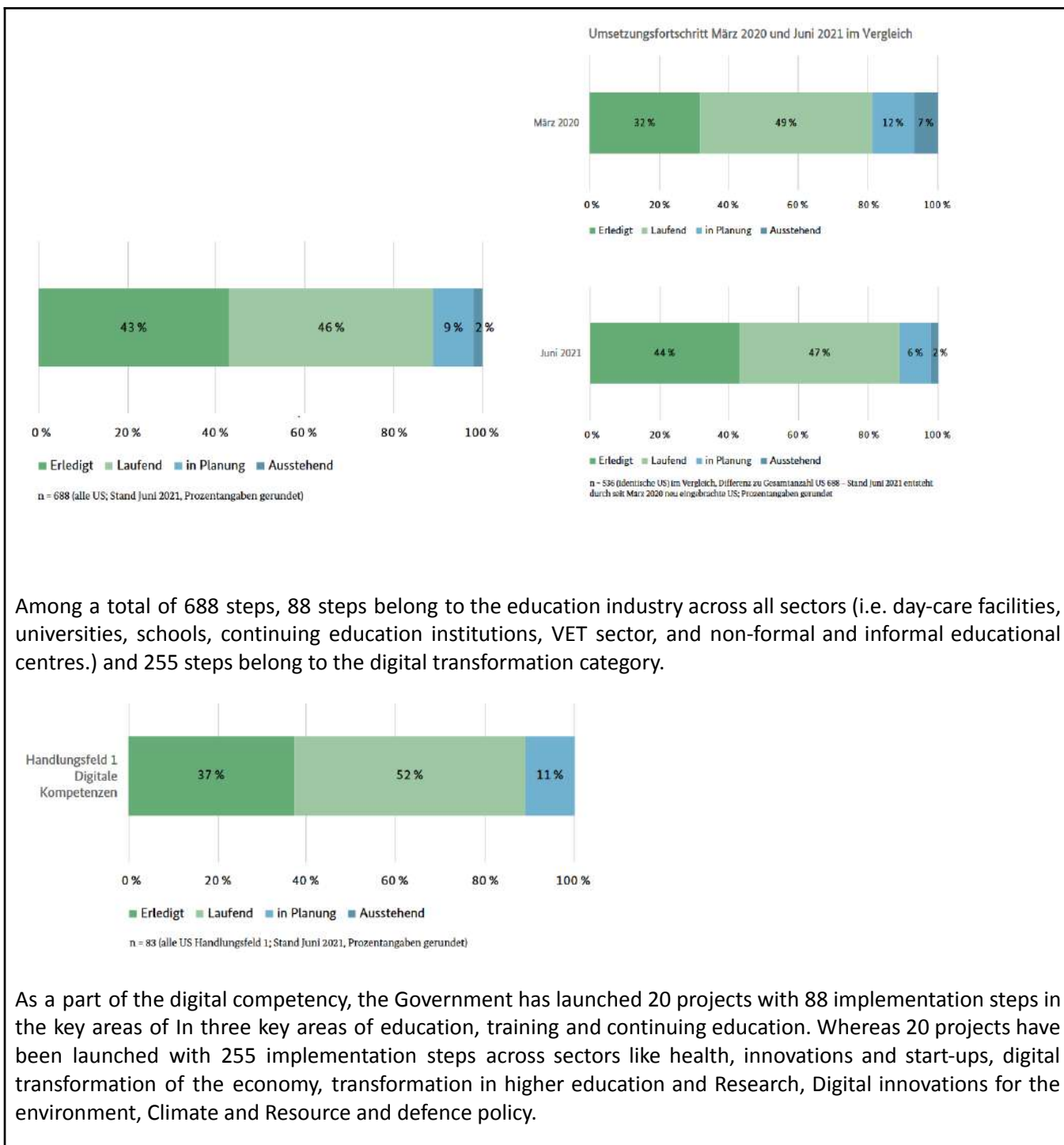
Target Group: Labour force, ICT professionals, schools, VET sectors.

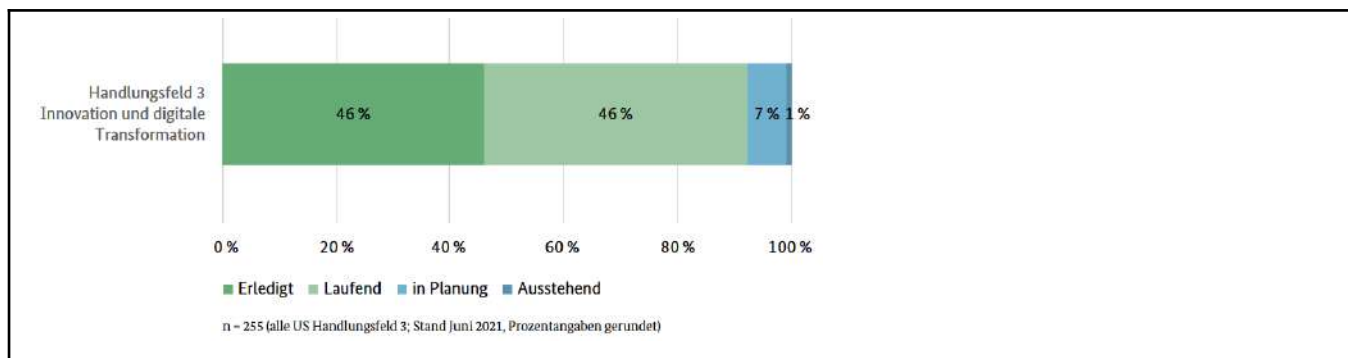
Activities and Methodology:

1. Initiatives such as Girls Day it YouCodeGirl to overcome gender stereotypes.
2. Digital Pact to encourage digital transformation of schools.
3. Launch the STEM Action 2.0 Plan to spark interest in vocational education in the cloud computing sector.
4. To promote networking, skill building and strategy development of higher digital education with the help of German Forum for Higher Education.
5. To support skill building artificial intelligence and develop AI Campuses.
6. To regularly monitor digital literacy skills in the population.
7. Strengthen the culture for continuing education as a part of the National Skills Strategy.

Quantitative outcomes: The various initiatives launched as a part of the strategy. The latest implementation interim report was released in June 2021. A total of 688 implementation steps have been recognised. As of June 2021, 43% steps have been successfully implemented, 46% steps are currently being implemented with 9% in the planning phase and 2% outstanding. As compared to March 2020 the outstanding steps accounted for 7% with only 32% steps implemented.







Qualitative outcomes:

1. Designed Digital Pact and approved Digital Pact 2.0 for schools.
2. Expansion of the STEM education opportunities for children and young people.
3. YouCodeGirl has supported a wide range of female learners in acquiring coding and IT skills.
4. Targeted training scheme for digitally disadvantaged groups.
5. Interoperable education ecosystem accessible to people from all phases of life.
6. STEM Campus to support stakeholders in obtaining professional digital qualifications.
7. Updated training and continuing education programmes for dual system of Vocational Training.

Impact:

1. Improvement in adoption of digital skills among the population.
2. Incorporation of non-discriminatory practices across various digital education institutions.
3. Increased number of females in the ICT and cloud computing sector workforce.
4. Increased readability of the future employees of the cloud computing sector..
5. Strict orientation of the practical skills for IT jobs in the VET sector.
6. Increased hiring of graduates from alternative programmes.

Reference Link (if any)	https://bmdv.bund.de/SharedDocs/EN/Documents/Press/pm-063-en-long-version.pdf?__blob=publicationFile https://www.de.digital/DIGITAL/Redaktion/EN/Publikation/digital-strategy-2025.pdf?__blob=publicationFile&v=9 https://digital-skills-jobs.europa.eu/en/actions/national-initiatives/national-strategies/germany-digital-strategy-2025 https://www.bundesregierung.de/resource/blob/975292/1925502/fce255b120b6063d7b088cd08712ff92/digitalisierung-gestalten-executive-summary-06-2021-download-bpa-data.pdf
Provided By	- Name of the Institution/Partner that implemented the practice: Federal Ministry of Economic Affairs and Energy, German





	<p><i>Government</i></p> <p><i>- Contact of the Institution/Partner (name, email, telephone): Federal Ministry for Economic Affairs and Climate Action</i></p> <p><i>Division for Social Media/Online-Communication</i></p> <p><i>Scharnhorststraße 34-37</i></p> <p><i>10115 Berlin</i></p> <p><i>Postal address: 11019 Berlin</i></p> <p><i>Phone: +49 (0) 30-18 615-0</i></p> <p><i>Fax: +49 (0) 30-18 615-5208</i></p> <p><i>Email: info@bmwk.bund.de</i></p> <p><i>- Name of the Strategy/Programme: Digital Strategy 2025</i></p> <p><i>- Other useful information (if any):</i></p>
Language	ENGLISH, DEUTSCH

Best practice n. 3

Topic	VOCATIONAL EDUCATION AND TRAINING FOR THE FUTURE OF WORK CEDEFOP REFERNET THEMATIC PERSPECTIVES GERMANY
Best practice Title	VET 4.0 initiative
Keywords	cloud computing skills for VET providers germany
Best practice	
<p>VET 4.0 initiative</p> <p>The BMBF and the BIBB want to contribute to the implementation of the Digital Agenda with a joint initiative</p>	





"Vocational Education and Training 4.0".

Since digital innovation affects manufacturing processes and work organisation, it will also affect qualification profiles. In a joint initiative 'VET 4.0', which started in 2016, BMBF and BIBB addressed issues in research and development, related to the digital transformation of the world of work and vocational education and training. VET 4.0 contributes to the implementation of the digital agenda through exchange of information on an ongoing basis between academia, policy-making and practice. The initiative brought together a wide range of projects. These included projects already under way such as the preliminary examination for the potential modernisation of IT occupations and the joint VW-BIBB project on operational maintenance 4. The umbrella initiative VET 4.0 has three main pillars:

1. Pillar 1: occupation and sector screening. The focus is on the analysis of selected training occupations, advanced training regulations, and sectors that are already partially or fully affected by digital transformation. The goal is to formulate recommendations for the restructuring of IVET and CVET, as well as adapting the systemic framework conditions. In the case of occupation and sector screening, the focus is on the analysis of selected training occupations, advanced training regulations and sectors which are already partially or fully affected by digital transformation. The goal is to create recommendations for the next steps in the organisation of initial and continuing education and training and in the further development of systemic framework conditions.
2. Pillar 2: digital literacy/media competence. This project aims to define media competences, which should be considered as an entry requirement and as a key competence across occupations in VET (for apprentices, teachers and trainers). Funding programmes to better equip training centres and to support small and medium enterprises (SMEs) in view of digitalisation complement this approach of promoting media competence in VET. There is currently no single definition for media competency as an entry requirement and as a key competency across occupations in vocational training. Following on from the results of the BIBB research project "Use and production of media – development of media competences in vocational education and training" a definition is to be developed with the aim, on this basis, of continuing the dialogue with all those involved in education and training.
3. Pillar 3: demand for skilled staff. A third project aims to establish a monitoring and forecasting system across occupations and sectors. The existence of such data would allow determining which qualifications will be needed for VET 4.0. The plan is to establish a monitoring and forecasting system across occupations and sectors from the perspective of the labour market and the demands it places on our employees. This will enable us to deduce which qualifications are needed for Vocational Education and Training 4.0.

By combining the outcomes from the different VET 4.0 projects, overarching conclusions for the future design of VET may be derived and disseminated among policy-makers, research and practice. For example, under the motto 'learning for the future: tomorrow's VET - experiencing innovations', around 900 VET experts from 25 countries discussed the current challenges and perspectives of VET on 7 and 8 June 2018 in Berlin, at the BIBB congress 2018. Two of the six forums were dedicated to VET 4.0: IVET and CVET in the digital age (Forum 1) and learning places with a future: cooperative and digital (Forum 2). Another example of dissemination: Each year, the association Innovative Berufsbildung awards the Hermann Schmidt Award for special achievements in selected areas of vocational training. In November 2017, under the umbrella of the VET 4.0 project, four projects having developed best practices in 'VET for the digitised working world' won the award.





Individual measures and approach

Interlocking pilot measures are planned that address the challenges for vocational education and training from three perspectives:

1. from the perspective of vocational education and training and its apprenticeship occupations by setting up a screening of selected sectors, apprenticeship occupations and further training regulations,
2. by defining and reviewing the media literacy required of new trainees from a VET perspective; and
3. from the perspective of the labour market and its demands on employees through an occupation and sector-differentiated monitoring and forecasting system.

The three perspectives are bundled through the exchange of information within the overall initiative "Vocational Education and Training 4.0" and the transfer of the results. In detail, the pillars include the following aspects:

A. **Pillar 1: Screening of selected training occupations, further training regulations and sectors**

The intention is to analyse qualification requirements on the basis of typical case studies relating to sectors, step-by-step companies, recognised training occupations and further training regulations in which work steps and job profiles are already affected by digitalisation either in full or in part, and on this basis to derive corresponding recommendations for action, both for the design of initial and further training at implementation level and for the further development of systemic framework conditions.

B. **Pillar 2: Media competence as an entry requirement and as a cross-occupational key competence in VET**

Currently, there is neither a uniform definition nor minimum standards for "media competence" in the sense of an entry requirement for VET. On the basis of literature analyses and qualitative interviews, such a definition will be developed and validated by experts, which can be used as a framework for the development of minimum standards.

C. **Pillar 3: Monitoring and projection system on qualification needs for VET 4.0**

Quantitative and qualitative studies are to be carried out to identify the sectors, fields of activity and occupations particularly affected by digitalisation from a labour market and qualification perspective and, based on this, to analyse future developments and derive recommendations for action for qualification needs.

D. **Transfer: Participation of social parties, public relations, events/conferences and publications**

The transfer activities have a cross-sectional character, thus ensuring continuous exchange in the sub-projects, with science, politics and practice as well as public relations work. The Federal Government's ongoing activities, especially within the framework of the Digital Agenda and the IT Summit, are to be supported.

Objectives

Within the framework of the project, jobs typical of Economy 4.0 in pacesetter companies will be examined with regard to activities and qualification requirements. Identified occupational profiles will be compared with education and training regulations and their current implementation at the learning locations. As far as different sectors and fields of employment are relevant for the respective occupations, this will be taken into account when selecting the pacesetter companies. The project gives answers to the following questions:

- How do Economy 4.0 job profiles fit with existing education and training occupations?





<ul style="list-style-type: none"> • Where do activity profiles crystallise that could possibly lead to new training and further education professions? • What influence does the lack of simultaneity of technological change have on organisational development in the economy? • How can training companies make better use of the scope for flexibility in training regulations when designing training? • Which inter-professional qualifications and competences are gaining in importance? • How does the change in work tasks and gainful occupations affect the self-image of training and training occupations? • What are the facilitating and inhibiting factors for the design of vocational training? • How can the transfer of the results be ensured as a basis for the future design of ordinance? 	
Reference Link (if any)	https://www.bibb.de/en/49603.php
Provided By	<p>- <i>Name of the Institution/Partner that implemented the practice:</i> Federal Ministry of Education and Research (BMBF) and the Federal Institute for Vocational Education and Training (BIBB).</p> <p>- <i>Contact of the Institution/Partner (name, email, telephone):</i></p> <p>- <i>Name of the Strategy/Programme:</i> VET 4.0</p> <p>- <i>Other useful information (if any):</i></p>
Language	ENGLISH

Best Practice n. 4

Topic	planet-beruf.de is a platform that provides information on all topics related to career choices, application and training
Best practice Title	Vet research platform: planet-beruf
Keywords	vocational orientation, platform, self-checks, knowledge tests
Best practice	





- **Pioneering** : planet-beruf.de provides information on all topics related to career choices, application and training. It supports pupils from secondary education and older than 13, pupils in vocational schools as well as young people "in bridging" and young people with special needs to become clear about their career planning.
- **Target group** : The main target group of planet-beruf.de are pupils. However, the portal is also aimed at teachers and parents, career counsellors and career orientation coaches. They learn here how to support young people in choosing a career.
- **Currently and reliably** : planet-beruf.de offers vocational orientation up to date. The portal is constantly updated, every 14 days a new TOP topic week with contributions for all target groups is also being published. News and newsletters inform about interesting innovations.
- **Interactive** : planet-beruf.de is a portal to join in. The initiative of the young people is in demand in self-checks and knowledge tests as well as for many other exercises in different difficulty levels. Checklists, videos and podcasts help in particular when promoting the topic.
- **Comprehensive** : planet-beruf.de is a media combination that is carefully tailored to the target groups. In addition to the internet portal, it includes numerous online books.

Reference Link (if any)	https://planet-beruf.de/ueber-planet-berufde
Provided By	<p>- <i>Name of the Institution/Partner that implemented the practice:</i></p> <p>BUNDES AGENCY FOR WORK</p> <p>- <i>Contact of the Institution/Partner (name, email, telephone):</i></p> <p>Southwest Park 82</p> <p>90449 Nuremberg</p> <p>Tel.: 09 11/96 76-310</p> <p>Fax: 09 11/96 76-701</p> <p>E-mail: kontakt(at)planet-beruf.de</p> <p>- <i>Name of the Strategy/Programme:</i> planet-beruf.de</p> <p>- <i>Other useful information (if any):</i></p>
Language	German





Survey

Aim of the survey is to reach out to various VET institutions/service providers and learners situated across Germany. The survey aims to gather information regarding the current situation of the courses/services offered by the VET sector in the field of cloud computing.

The survey is designed keeping in mind the requirements of the VET sector. Through this survey the consortium will be able to better understand the recent situation of the VET sector in the field of Cloud Computing. In addition to this, the consortium will gain clarity on the courses and services offered by various VET institutions at their local and national level. The consortium will also gain insight regarding the engagement among the VET institutions and learners. Moreover, the survey responses will assist the consortium in developing the Training Scheme and assessment model and MOOC with respect to the requirement of the VET learners while keeping in mind the services offered by the VET institutions.

The target group of the Survey are VET institutions located across Germany and individuals who are looking forward to gaining new skills or are registered VET learners. In order to record their survey, an email was drafted that contains introductory information regarding the SKILLS CLOUD project. The link to the survey was attached with the email. Following this, the partner searched for various institutions via the Google platform that provide Vocational and Educational Training to interested individuals. Then the institutions that provide Cloud Computing services are short listed and the drafted email was sent to them.

The questions that were formulated and were made part of the survey, were drafted keeping in the mind the following aspects:

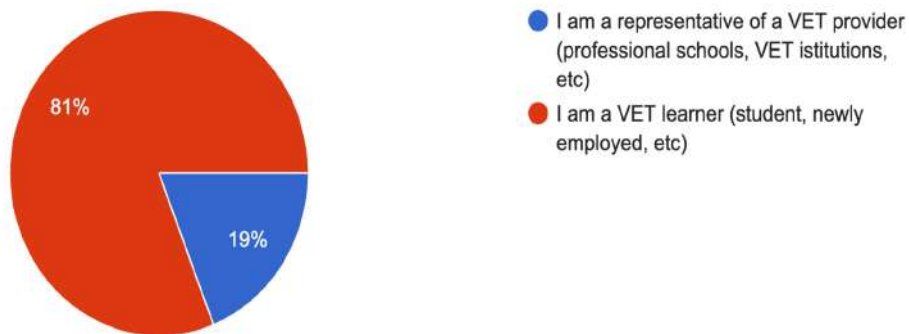
- VET providers and learners.
- Services offered by VET institutions.
- Importance and future relevance of cloud computing.
- Prior knowledge/courses participated in.
- VET Learners preferred learning methodology.
- Willingness to learn new/expand on cloud computing skills.





Survey Analysis

The participants who took part in the were a mix of VET Providers and Learners.



Total number of participants: 21

Number of VET Providers: 4

Number of VET Learners: 17

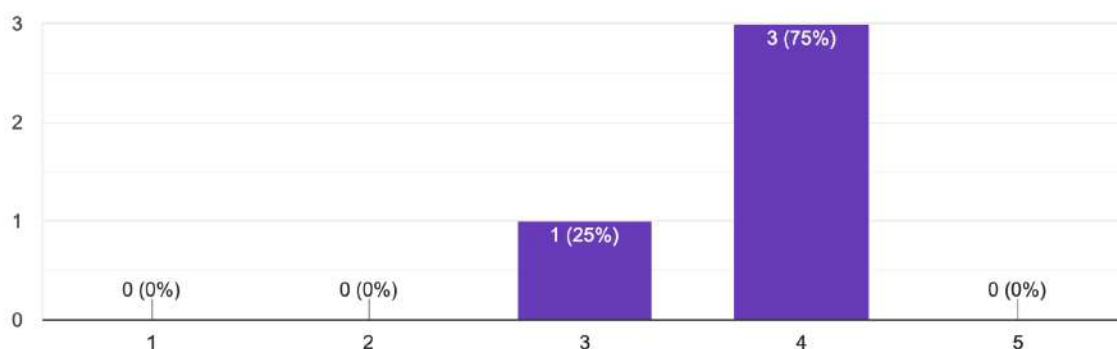
From the pie chart we can observe that the survey reached out to a greater number of VET learners as compared to VET providers.

VET Providers Analysis

The VET providers (4) who interacted with the SKILL CLOUD Survey Form belonged to different sectors that are:

- Computer Science
- System analysis and design
- Networking
- Information and Communication Technology

1. Familiarity with Cloud Computing and Its Applications in the workplace.

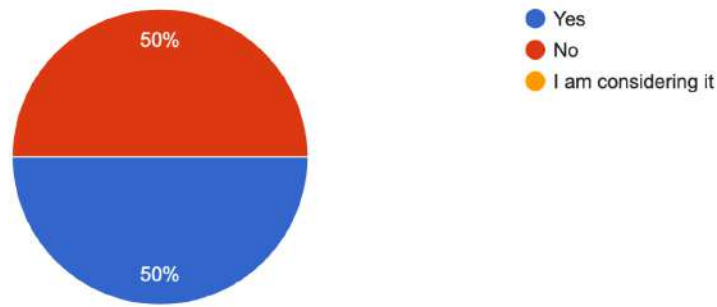


We can observe that a majority (75%) of the participants have interacted with cloud computation as a part of their professional role and are familiar with its applications.





2. Institution Offering any kind of educational path on cloud computing

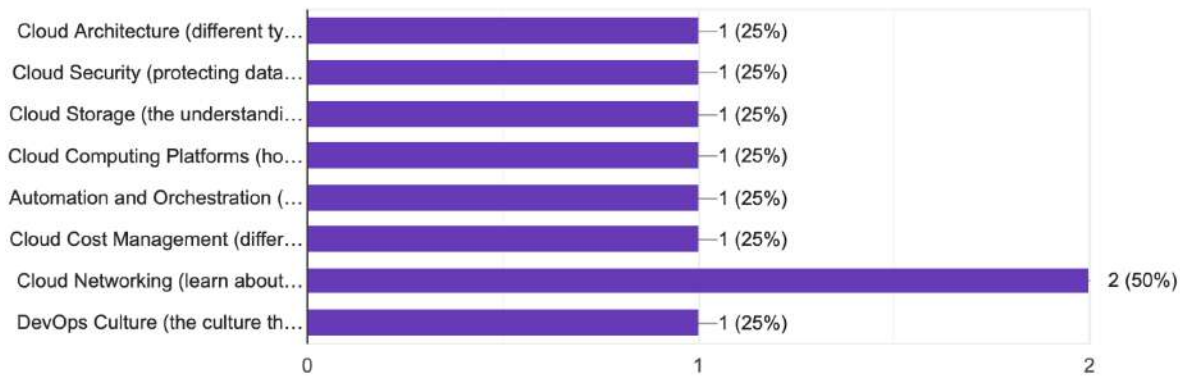


The figure above cannot assist us in coming to a decisive analysis, whether more VET institutions are offering education pathways to VET learners or not.

3. The following two challenges were reported by the participating VET providers while teaching cloud computing courses to VET students

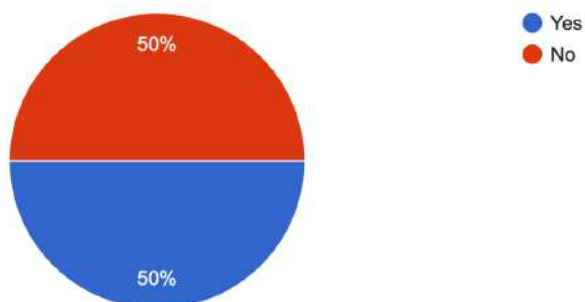
- Lack of basic understanding on different type of clouds, low familiarity in databases, portability is also a problem, data security
- Technical Complexity, Varying levels of prior knowledge, Keeping up with the latest trends

4. Half of the VET providers who participated in the SKILLS CLOUD survey identified Cloud Networking (learn about different types of cloud networking solutions, such as virtual private networks (VPNs)) as the most important cloud computing skill that VET students must acquire.

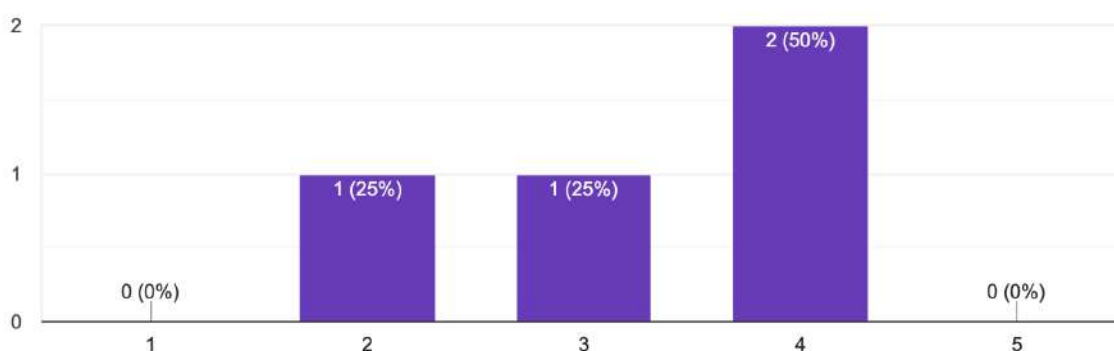


5. The following Pie Chart tells us that there is a balance between employers that are requesting for VET graduates and that are not. However, we cannot determine if the need for VET graduates is increasing or decreasing in response to the current job market

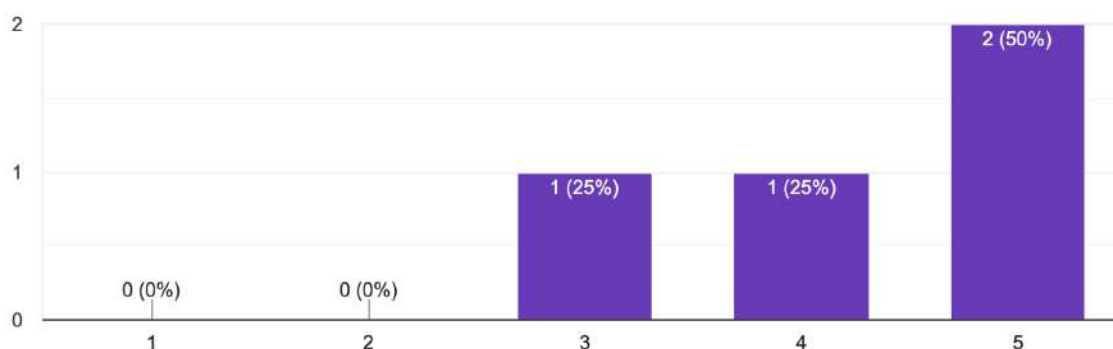




6. Half of the participants (VET Providers) are confident about their ability to provide teaching services and disseminate knowledge regarding cloud computing techniques. Whereas the other half of the participants were not so confident.

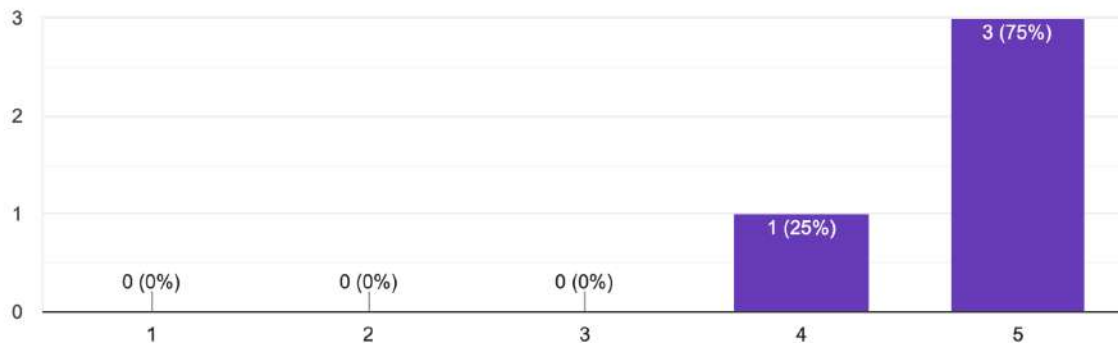


7. 50% of the VET providers have reported an immensely high demand for courses in the direction of cloud computing. Moreover, the other two participants have also reported high demand for cloud computing courses.

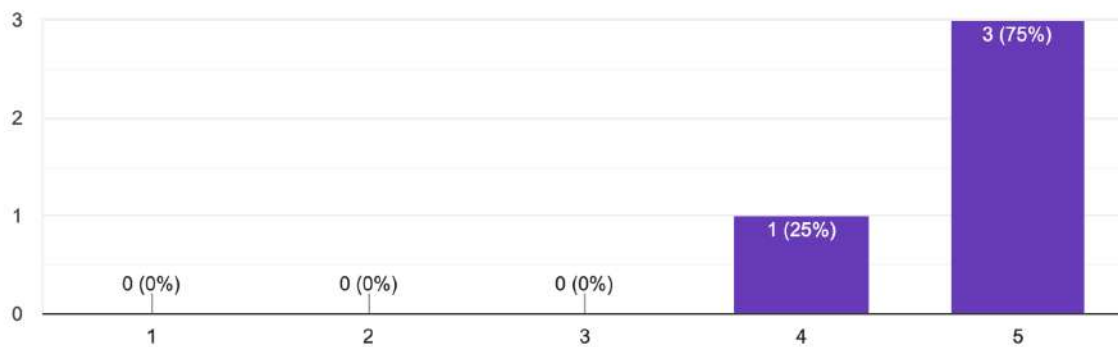




8. From the figure below we can conclude that every 1 out of 4 VET providers believe it is important to stay up to date with the latest cloud computing technologies. Whereas 75% believe being up to date regarding cloud computing technologies is of utmost importance.

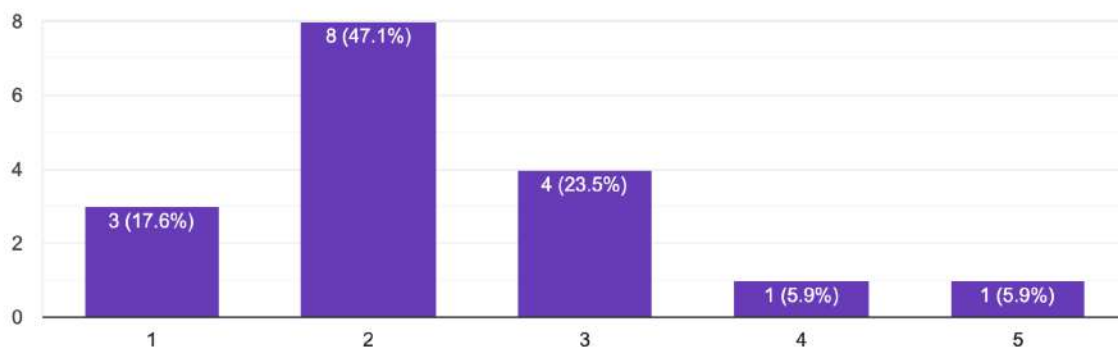


9. 3 out of 4 VET Providers are strongly interested in receiving professional development material and partake in the mobility activities in order to upgrade their teaching skills in the field of cloud computing.



VET Learners Analysis

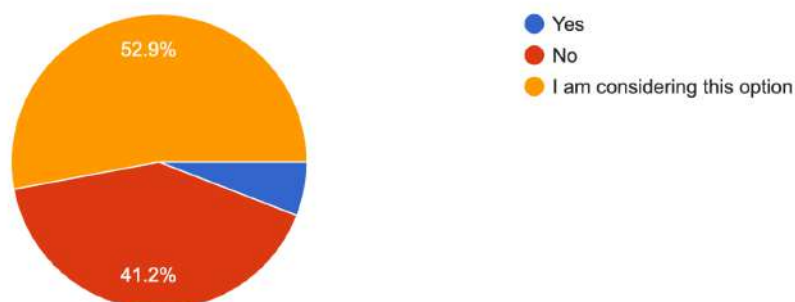
1. Responses on current level of familiarity with cloud computing technology





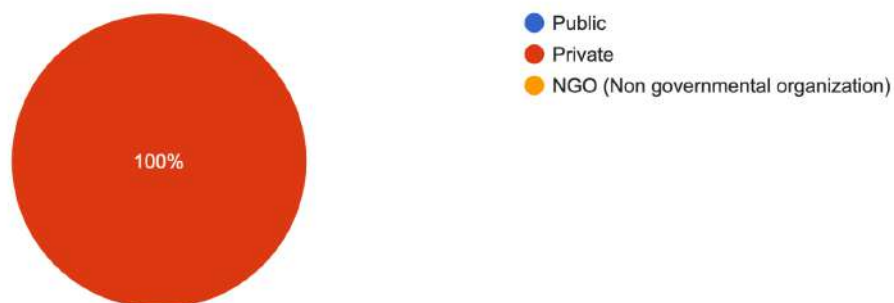
Out of the 17 VET learners who participated in the survey, 47.1% (8 learners) reported a level of familiarity with cloud computing technology, rating it as 2 out of 5. Approximately 24% (4 learners) rated their familiarity as 3 out of 5, indicating a moderate level of knowledge. Only one learner (5.9%) rated their familiarity as 4 out of 5 and 5 out of 5, indicating a high level of knowledge. However, 17.6% of learners reported a lack of familiarity with cloud computing technology, rating it as 1 out of 5 or lower.

2. Responses on if VET Learner have taken courses or training related to cloud computing



According to the responses provided by the surveyed VET learners, a majority of 52.9% are currently considering taking courses or training related to cloud computing technology. However, 41.2% of the respondents reported that they have not taken any courses or training related to cloud computing technology, indicating a potential gap in their knowledge and skill set in this area. Approximately 6% have already taken courses or training in cloud computing technology.

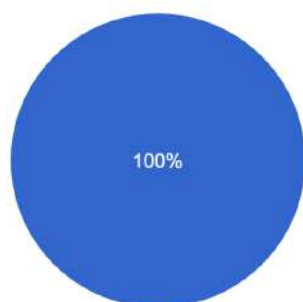
3. Responses on the kind of institution the provided Cloud Computing



All of the surveyed VET learners reported that they received cloud computing education or training from a private institute.

4. Responses on level of cloud computing expertise in VET Learner

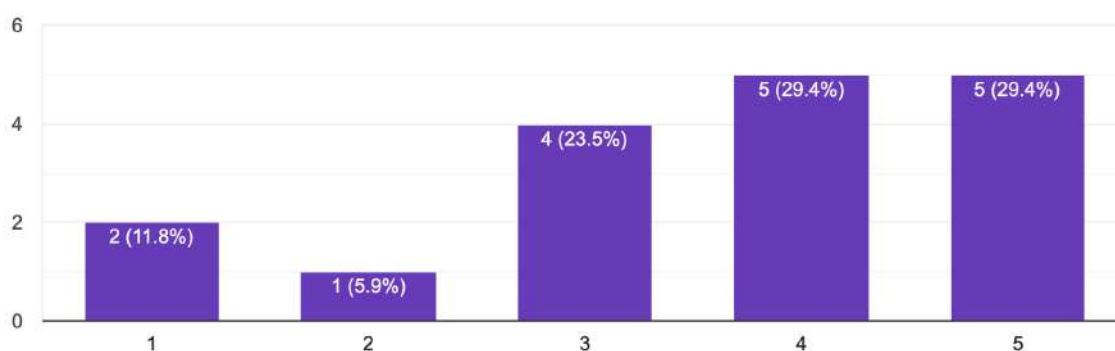




- Level 1: Basic awareness of cloud computing
- Level 2: Familiarity with cloud computing terminology and concept
- Level 3: Ability to implement cloud computing solutions
- Level 4: Advanced knowledge and expertise in cloud computing

All the VET Learner responded to have only Basic awareness of Cloud Computing

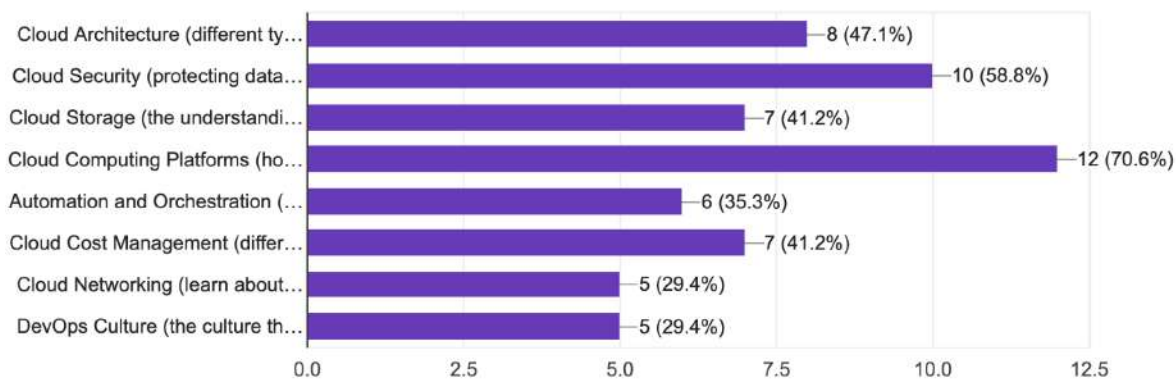
5. Responses on importance on cloud computing skills are for future career



The surveyed VET learners indicate that cloud computing skills are perceived as important for future careers. Approximately 58% of respondents rated the importance of these skills as 4 or 5 on a scale of 1 to 5, indicating that learners recognize the potential impact of cloud computing technology in the workplace. However, approximately 18% of respondents rated the importance of cloud computing skills as 1 or 2, which may indicate a need for further education and awareness of the benefits of cloud computing technology. VET institutions and training providers may need to adapt their offerings to meet the increasing demand for education and training in cloud computing technology, to ensure that learners are equipped with the necessary skills to succeed in the workforce.

6. Responses on the most important cloud computing skills that VET students should learn

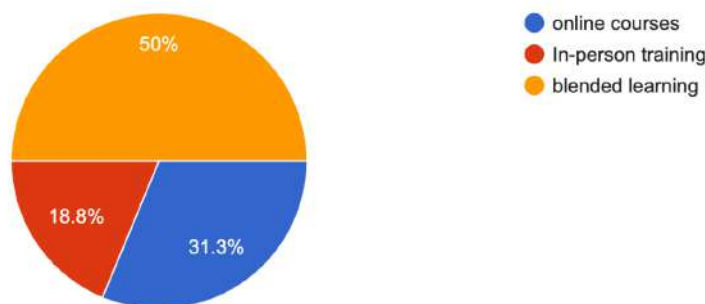




The responses provided by the surveyed VET learners indicate that there are several important cloud computing skills that VET students should learn. The most commonly cited skill was Cloud Computing Platforms, with 12 respondents emphasizing the importance of learning how to create and manage cloud computing platforms. Other highly rated skills included Cloud Security, with 10 respondents emphasizing the need for VET students to learn how to protect data and infrastructure in the cloud, and Cloud Storage, with 7 respondents emphasizing the importance of understanding different types of cloud storage solutions. In addition to these skills, respondents also highlighted the importance of Cloud Architecture, Automation and Orchestration, Cloud Cost Management, Cloud Networking, and DevOps Culture. Cloud Architecture was seen as important for understanding different types of cloud architectures, such as public, private, and hybrid, and the designing of cloud solutions. Automation and Orchestration were seen as important for learning about tools like Puppet, Chef, and Ansible for automating cloud deployments. Cloud Cost Management was seen as important for understanding different cost management tools and techniques for monitoring and optimizing cloud costs. Cloud Networking was seen as important for learning about different types of cloud networking solutions, such as virtual private networks (VPNs), and DevOps Culture was seen as important for understanding the culture that emphasizes collaboration between developers and operations teams to improve software development and deployment.

Overall, these responses suggest that VET students should learn a broad range of cloud computing skills, including both technical and non-technical skills, to succeed in the modern workplace. By providing comprehensive education and training in these skills, VET institutions and training providers can help prepare learners for the demands of the rapidly evolving job market.

7. Responses on kind of training format do you prefer for learning cloud computing skills

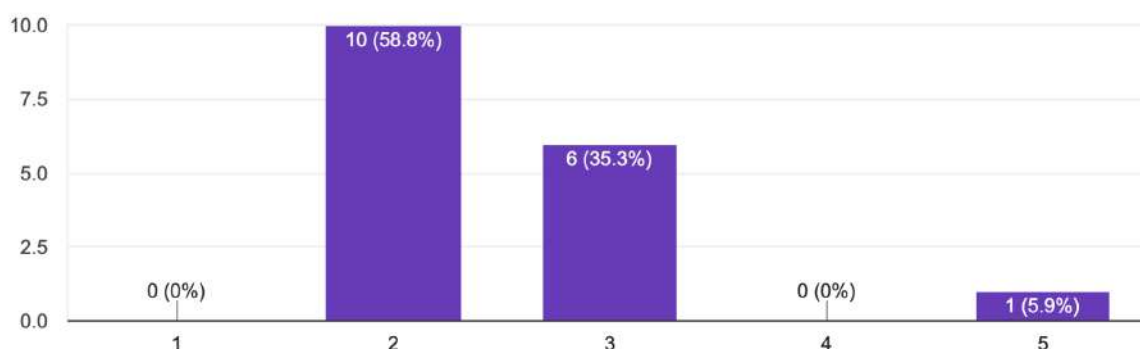




According to the survey results, it appears that there is a split among individuals regarding the preferred training format for learning cloud computing skills. Approximately 50% of respondents prefer a blended format, which combines in-person and online learning components. On the other hand, 31.3% of respondents favored online courses exclusively, while only 18.8% preferred in-person training.

These results suggest that there is no one-size-fits-all approach to cloud computing training, and that individuals have different preferences based on their learning styles and schedules. Therefore, organizations offering cloud computing training should consider offering a range of training formats to accommodate the needs and preferences of their learners.

8. Responses on the confidence in VET Learners ability to use cloud-based software and services

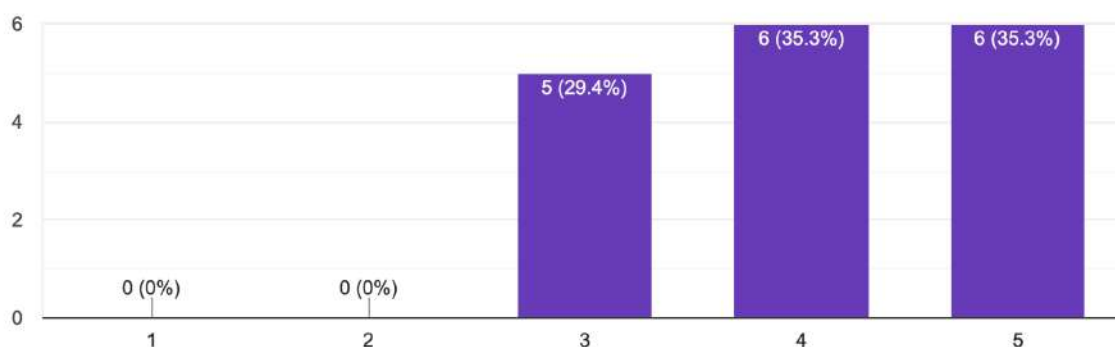


Based on the survey responses, it appears that there is a lack of confidence among some respondents regarding the ability of VET (Vocational Education and Training) learners to use cloud-based software and services. Only one respondent expressed a high level of confidence, with a score of 5 out of 5, while the majority of respondents rated their confidence at a level of 2 (10 respondents) or 3 (6 respondents) out of 5.

These results suggest that there is a need to improve the training and support provided to VET learners in the use of cloud-based software and services. This could involve developing more comprehensive training programs that focus on the practical application of cloud-based tools, as well as providing ongoing support and resources to help learners build their skills and confidence over time. By doing so, organizations can help ensure that VET learners are better equipped to navigate the increasingly digital landscape of the modern workplace.

9. Responses on VET Learners interests in receiving professional development materials or taking part in specific educational mobilities on cloud computing to strengthen their competences in this field





According to the survey responses, there is a high level of interest among VET (Vocational Education and Training) learners in receiving professional development materials or participating in educational mobilities focused on cloud computing to strengthen their competencies in this field. Six respondents rated their interest level as a 5, indicating a very high level of interest, while an additional six respondents rated their interest level as a 4. Five respondents rated their interest level as a 3, suggesting a moderate level of interest.

These results suggest that there is significant demand among VET learners for training and support in cloud computing, and that organizations offering such training and support are likely to find a receptive audience. To capitalize on this interest, organizations can develop targeted training programs and materials that address the specific needs and interests of VET learners, as well as identify opportunities for educational mobilities that enable learners to gain hands-on experience and build their skills in real-world settings. By doing so, organizations can help ensure that VET learners are well-equipped to succeed in the modern workplace and stay competitive in an increasingly digital landscape.

Conclusion on VET Learners Analysis

Based on the survey results, it appears that VET learners recognize the importance of cloud computing skills for future careers and are interested in receiving education and training in this area. However, there is a potential gap in their knowledge and skill set, with a significant number of respondents reporting a lack of familiarity with cloud computing technology and not having taken any courses or training related to it. Additionally, there is a split among individuals regarding the preferred training format for learning cloud computing skills, with approximately half preferring a blended format and the other half preferring online courses exclusively or in-person training.

To address these challenges, VET institutions and training providers may need to adapt their offerings to meet the increasing demand for education and training in cloud computing technology, to ensure that learners are equipped with the necessary skills to succeed in the workforce. They can offer a range of training formats to accommodate the needs and preferences of their learners. Furthermore, they can develop more comprehensive training programs that focus on the practical application of cloud-based tools, as well as providing ongoing support and resources to help learners build their skills and confidence over time.





Overall, by providing comprehensive education and training in cloud computing skills, VET institutions and training providers can help prepare learners for the demands of the rapidly evolving job market.

Focus group

- ❖ Please summarise the level of digital knowledge and skills of the adults learners based on the self-assessment they made during the focus group and the assessment made by the educators (max 2000 characters spaces included).

The participants are 6 adults and young adults, 4 of them are youth workers in local and European non-formal educational projects. Boris is an early lover of internet and IT, and works in exchange programs. Ela works mainly in the VET field, including coaching youth and adults. GV works in different fields of education and has recently moved to sustainability and digitalisation, focusing on digital empowerment of youth. Frank is both a facilitator and a process designer. The other 2 participants are professionals of IT. Martino is a physician and an engineer who works as a programmer, Lennart works a freelance programmer of e-learning tools. Both have had limited previous experience with teaching. All participants assess themselves as technologically competent and use it daily both for personal and professional reasons. The group of participants includes different genders, as well as cultural and geographical origins. All over the focus group, they are asked to express themselves both from their personal and professional perspective (educators), including their assessment of their target (learners and educators).

Martino quotes statistics and identifies as a main learning issue for young professionals in IT a lack of knowledge and skills in math and STEM in general. He states 'it's not only about knowing how to tape programs but also about their complexity', stressing.

Boris says the main problem for learners is that decision makers in the educational fields are old people who are not as digital as youth they work with, pointing at this gap as the main reason for a failed digital empowerment. Ela builds on, recalling that lockdowns forced the world to digitalisation, both outlining its importance, as well as a further need of digital education to use digital tools properly and impactfully.

Frank reports the main issue for her is that when she offers digital tools that could serve very usefully the teamwork of educators, people find it hard to adapt to such tools, i.e. Slack or Miro, preferring using Whatsapp 'because they're already used to it'. She states if educators do not learn how to use digital tools properly, they do not know how to handle them with their targets. Projects must include specific sessions of digital education for educators first. All agree. Ela and Boris add that for holding the know-how, such tools must be regularly used.

Lennart builds on saying that educators and decision makers have a limited perspective ('too basic') assuming that running and posting video-lessons is enough for digital empowerment.

GV sums it up sharing that there are already excellent solutions for digital empowerment, it is much harder to make people adopt them. Ela and Frank conclude acknowledging the main obstacle is adult resistance to digitalisation.





- ❖ Please summarise the level of STEM knowledge and skills of the adults learners based on the self-assessment they made during the focus group (max 2000 characters spaces included).

Only 2 of the 6 participants have a high competence in STEM, Martino and Lennart. Boris places himself in a middle level, being an early adopter and a true lover of IT. Others use several digital tools, while have no specific theoretical background in it.

- ❖ Please summarise the most relevant information gathered from Q1 and Q2 differentiating the point of view of learners and educators.

Participants point out that their target can be both educators and learners. In the case of educators, they recall the resistance in learning how to use smartly digital tools. When their target is youth, they are mainly 'born digital', which means 'technically already technological', missing more soft skills, accountability and consciousness related to the use of online platforms and their consequences. They recall especially social media and cases of cyberbullying, privacy policy, etc.

Boris says adults and youth, as well as educators and learners need to adopt a holistic approach to digital life. Personal development, i.e. creative problem solving, social skills, etc. should not be forgotten. All educators of the group agree that, in no case, digital life should substitute face-to-face life. 'Digital and face-to-face life must go hand to hand'.

Ela reports when she empowered her target groups to use digital tools, she enjoyed 'cool' results, because participants to different projects played e.g. role games that truly boosted their learning path. Everyone agrees, and some stress how teaching them how to use and then make them use such tools is crucial for a successful implementation of the process.

- ❖ Please summarise the most relevant information gathered from Q3 differentiating the point of view of learners and educators.

All report and recall how decision makers and educators should get trained in digital empowerment, while learners mostly handle it already. GV and Lennart state it several times.

Boris outlines how this is the good moment to boost such a process, as, after the covid crisis, everyone has been somehow forced to digital life and work. And Ela says this 'forced' use of digitalisation can be one of the few benefits to be taken from the pandemic, and that 'we shouldn't let it go'.

GV thinks that educational projects of digital empowerment targeting youth workers should have different objectives than those targeting directly youth and learners. He says 'learners know already how to use Internet and its tools, while they need to be educated in consequences of how they use it', instead adults must learn how to use digital tools – sometimes at all. Boris brings the case of an 'ordinary' teacher that cannot talk the kids about Tik-Tok, because he/she/* does not know much, and certainly all the learners know it better. This is the real gap.





Frank recalls the need of balance between 'easy to use' tools and their efficacy, and educating adults to use technology in education must provide a 'deep understanding of what you're doing'.

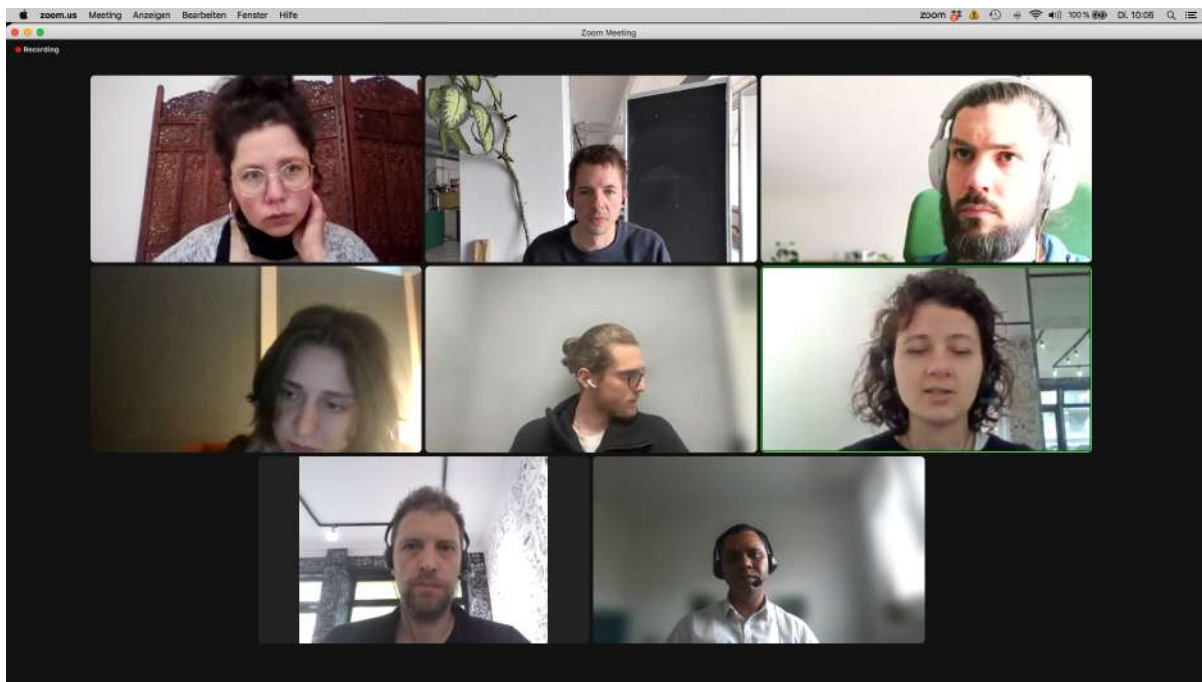
- ❖ Please add here any additional relevant information gathered through the focus group.

Participants are asked about cloud computing, Martino, as the High-Tec participant explains in detail what cloud computing is and how it serves digital work. All participants say they use it, and find it useful both for storing files and for cooperating with co-workers. Lennart points out again people's resistance to use it, while a regular use could avoid such problems as data loss. Boris says that there are too many digital platforms for cloud computing 'if you use Dropbox, you don't want to use Google Drive'.

Each one of the 4 educators agrees that in their non-formal educational field, STEM education is not much needed, while is needed a digital empowerment for getting a proper know-how among educators and fill the gap existing between educators' and learners' digital competence. The solution to fill the gap is to train educators from a high-tech point of view, and learners from an accountability point of view. Finally, yet importantly, the approach to technology and digitalisation, to be truly empowering, should be holistic. It means it should include practical tools and trainings as well as education in terms of soft skills and accountability.

Frank reminds everyone, and everyone agrees, that online education must go together with offline one, i.e. human beings cannot sit 10 hours in front of a laptop or live only online relations.







Research Report – Türkiye

Best practices

Best practice n. 1

Topic	Addressing digital transformation through development of digital readiness, resilience and capacity
Best practice Title	EDUCATIONAL INFORMATION NETWORK (EBA)
Keywords	Cloud computing, education platform
Best practice	
<p>Education Information Network (EBA) is as a cloud-based online education platform offered free of charge to students and teachers by the General Directorate of Innovation and Education Technologies of Türkiye. EBA platform is one of the sub- projects of the FATİH project, (Movement to Increase Opportunities and Improve Technology) is an initiative of the Ministry of National Education of the Republic of Turkey that aims to use technology in education. The EBA system is a system that includes educational content as well as educational tools that can be used by both teachers and students. In EBA, there are resources in the form of video narration as well as text, sound and picture resources. EBA provides opportunities for uploading files, providing digital space, storing content, organising competitions, making announcements, and sharing classes suitable for different levels. EBA platform was founded in 2012, at the beginning, it was a database for teachers and students to upload new educational materials and download materials uploaded by experts and other teachers to foster academic success in the education system.</p> <p>EBA was the key education provider for all levels of education during the COVID-19 pandemic. After the pandemic, it was used as a tool of hybrid education, and now some teachers and students use it as an additional source to school education.</p> <p>Objectives of EBA are; To integrate technology to education.</p> <p>To disseminate the culture of digitised education all around Türkiye.</p> <p>To respond the educational needs of different target groups</p> <p>To provide teachers and students with a space to exchange knowledge, skills and experience.</p> <p>To provide a space to create large archive of content</p> <p>Target groups/ beneficiaries are; Teachers and students who are the participants of the Turkish National Education</p>	





System.

Activities and methodologies;

EBA platform consists of several parts. Parts and their function are presented below briefly. EBA Lesson Section;

Teachers' Part; teachers both used materials produced by experts and can produce their own materials like content, exam, competitions and other visual and audio materials. Teachers can assign students with homework, exam or more and

EBA Student Part; In this part, students share messages, they can initiate discussion and voting. Also they can see the messages shared by teachers and other students and participate in discussions and voting. In this part, students share messages, they can initiate discussion and voting. Also they can see the messages shared by teachers and other students and participate in discussions and voting. Students also have the option to comment on messages, send likes, add the message to their favorites and share the message with their own name.

Content Section; In this section, there are news, video, visual, audio, e-book, e-journal and document subsections.

News Section; In the EBA news section, newsworthy works of students, teachers and schools are shared with all EBA users.

EBA Video Section; In this section, videos are offered to users on lectures, presentations, various experiments, current issues, social and educational projects and many more.

Visual Section; In this section, courses, projects, studies and many other subjects are presented to users in visual form.

Audio Section; In the EBA audio section, users can access audio recordings on lectures, introductions, help, music, fairy tales and many more.

Book Section; In this section, users can access books on lessons, introductions, help, games, fairy tales and many other subjects.

Journal section; In this section, users can access journals on courses, promotions, help, education and many other subjects.

EBA Document Screen; In the EBA document section, users can access many documents shared by teachers, such as assignments, written questions, lecture presentations, projects, in pdf, Word or PowerPoint format.

Competition section; In the EBA competition section, users can participate in various competitions by presenting their talents in artistic, cultural and scientific fields.

Applications section; The EBA applications section offers applications in education, art, entertainment and many more for users.

File Section; This section enables teachers and students file storage and sharing. Students are offered 1 GB of cloud storage, teachers 10 GB.





Blog Section; The EBA Blog section is a space where users can share their memories, articles, projects, opinions and thoughts on any subject, and make their voices heard.

Tools section; This section consists of two parts, content development tools and utilities.

Quantitative and qualitative outcomes; EBA was founded in 2012 as a part of the Fatih Project. During the COVID-19 pandemic, it was the primary source of education for students at all levels. %87 of all students and teachers were actively using the system. Now it is not the main source of education; it is a complementary tool both for teachers and students that is why the number of active users varies daily now.

Impact; EBA was founded as a complementary platform for teachers and students. Because of its cloud-based systems, teachers and students were able to find a place that was specific to them, which allowed them to share what they had produced and store it for future use. It has been helpful, especially for the students who have disadvantages like a disability, cannot attain a formal education because of geography, are nomads, and more. EBA has created a sense of balance among all students. It also motivated teachers to be creative and productive. Teachers created a variety of content, activities, exams, and other materials that are used by teachers all over Turkey. It has increased the academic success of students. Students have had a platform to revise, exercise, and learn from each other.

Reference Link (if any)	https://www.eba.gov.tr/
Provided By	<ul style="list-style-type: none">- <i>Name of the Institution/Partner that implemented the practice:</i> Stakeholders; General Directorate of Innovation and Education Technologies and Ministry of National Education- <i>Contact of the Institution/Partner (name, email, telephone):</i> 0312 4132680 - 0312 4132681 - 0312 4131838- <i>Name of the Strategy/Programme:</i> 2023 Education Vision/ Fatih Project- <i>Other useful information (if any):</i>
Language	TÜRKÇE





Best practice n. 2

Topic	<ul style="list-style-type: none"> • qualifications and skills in the cloud computing field
Best practice Title	Development of Innovative Learning and Practicing Modules, Implemented in Cloud Computing and IoT in Digital Industry
Keywords	ICT - new technologies - digital competences
Best practice	
<p>The overall objective of the project is to develop innovative, modern and easy-to-implement learning and practising modules in the areas of Cloud Computing and IOT, which are located within the Industry 4.0 area at the VET Schools of IT and universities.</p> <p>Objectives of the project:</p> <p>1: Training 10 volunteers vocational teachers, academicians or educators who are selected among the local partners of the project and vocational education institutions working in similar fields in Cloud Computing and IOT areas in order to provide the manpower of our country as qualified teachers, lecturers / instructors in Cloud Computing and IOT fields.</p> <p>2: In order to provide qualified manpower of our country grown in Cloud Computing and IOT areas; a training will be provided by our project partner, BFU University and EVM, for 10 students who will be enrolled these courses officially in Cloud Computing and IOT areas. Beside, a pilot scheme will be applied to 40 students studying at Zonguldak MTAL (silent pilot partner).</p> <p>Coordinator; Zonguldak Ticaret ve Sanayi Odası</p> <p>Partners; BUCKINGHAMSHIRE NEW UNIVERSITY (UK) GT-ARC GEMEINNUTZIGE GMBH (DE) , ECOSISTEMAS VIRTUALES Y MODULARES SL (ES) BURGASKI SVOBODEN UNIVERSITET (BG)</p> <p>Target groups/ beneficiaries are; VET Providers, labour market stakeholders, teachers, trainers, VET students</p> <p>Activities and methodologies;</p> <p>* Activities that encourage the implementation, development and testing of innovative practices in education, training and youth (our outreach outcomes, our products and short- term training activities are suitable for this title)</p>	





*Activities facilitating the approval and recognition of knowledge, skills and competences acquired through formal and informal learning (opening the courses at the undergraduate level and crediting them in ECTS with international validity).

*Seminars, conferences, press announcements to be held within the scope of dissemination activities

Results;

- Modern and innovative learning and practicing modules in the easy-to-implement Cloud Computing and IOT areas
- E-Learning Platform for the delivery of lesson learning and practicing modules to every segment of society
- To raise awareness: -Conferences, seminars -Project Magazine, Brochure, CDS, Website -Informing the public through the media and publishing organs -Posters.

"Instructional System Design " will be referred to in the development of the project products and in the development of the learning and practicing modules which are our intellectual outputs. "ADDIE Model " was chosen as the project methodology. This model is a systematic approach model based on Analysis, Design, Development, Implementation and Evaluation processes. All the work of our project will be carried out in accordance with the principles of "satisfaction, process improvement, teamwork and decisions are based on actual evidence".

Quantitative and qualitative outcomes; In addition to active participants (55 persons per partner) of the project, each institution gave a seminar about the project and its outputs. It targeted more than 350 people per partner.

Impact;

- Raised awareness of VET providers and teachers about use of cloud computing in VET sector
- Trained educators and students on practical use of cloud computing
- Developed an e- Learning platform

Reference Link (if any)	https://cciot-edu.eu/the-project/
Provided By	<p>- Name of the Institution/Partner that implemented the practice: Zonguldak Ticaret ve Sanayi Odası</p> <p>- Contact of the Institution/Partner (name, email, telephone): http://webmail.ztso.org.tr/ +90 0(372)251 11 11</p> <p>- Name of the Strategy/Programme: Erasmus+ VET</p> <p>- Other useful information (if any):</p>
Language	English/ Türkçe





Best practice n. 3

Topic	<ul style="list-style-type: none"> ICT skills for VET providers
Best practice Title	A Holistic Approach for Upskilling Competences of SMEs, VET Institutions and VET Providers for Preparing the Future Works in the Digital Era
Keywords	<i>ICT, VET providers, Future work, digital era</i>
Best practice	
<p>In 2019, the International Labour Organization published a report which points out that in almost every country SMEs are an important factor of job development and account for an increasing share of employment. Digital innovation has the capacity to transform practices, raise performance and increase growth across all industry sectors. Digital change wants that individuals need the necessary skills to adapt. This will necessitate changes to educational systems and an increased need for on the job training to understand the benefits of digital change.</p> <p>Objectives of the project; Project aims to upskill the competences of SMEs, VET Institutions and VET Providers in a holistic way in order to prepare them for future work in the digital era.</p> <p>Activities</p> <p>The project will achieve its objective through focusing on these two issues: (1) What kind of jobs will the market need in the next few years? (2) What kind of competence do educational organizations need to teach? For the first question, It can be said that forthcoming employment needs a high level of knowledge and skills and constant assets in education is required in order to deal with the rate of change brought about by developments in digital technology. The project worked not only with SMEs to help them develop their future workforce, meeting their current and future needs, but also with VET institutions and VET providers to mitigate their inefficiencies in shaping the future workforce in SMEs.</p> <p>Target Group -The first group are the SMEs or owners of the SMEs and managers or human resources managers of the SMEs that aim to shape their future work and employment process. -The second group are the VET institutions and VET providers, universities, professional organizations, Chambers, research centers, policy makers, public authorities and other stakeholders who specifically focus on the needs of SMEs in the age of the digital era.</p> <p>Project results</p> <p>-The holistic approach will provide the gap analysis between existing competences and future competences of SMEs and VET institutions/providers for future jobs and competences in partner countries.</p>	





<p>-The holistic approach, which includes tracking and developing skills governance model for shaping the future of the work force, will provide good workforce planning for SMEs and VET institutions/providers.</p> <p>- The holistic approach will provide a guide including how SMEs and VET institutions/providers can deal with shaping the future of work in their organizations via upskilling competences of both existing employees and future employees.</p> <p>-The holistic approach will provide how VET Institutions and VET Providers can build a dual side relationship and communication which not only increases the competences of the workers but also upskills the employers and SMEs.</p> <p>-The holistic approach will provide how SMEs of the project can develop “Hol Up Self-paced Open Online Course” and how VET Institutions and VET Providers can meet the requirements of the digital era.</p> <p>Impact; Project created awareness on upskilling policy as an increasingly popular approach taken by forward-thinking SMEs, help SMEs overcome barriers to growth and competitiveness not only in private sector but also in the public sector, provide easy access/preparation to future workforce community, which allows to exchange experiences from different European Countries, provide a road map for SMEs and VET institutions/providers in order to fill the unemployment gap and contribute to build the future.</p>	
Reference Link (if any)	http://www.holup.mu.edu.tr/en
Provided By	<p>- <i>Name of the Institution/Partner that implemented the practice:</i> MUĞLA SITKI KOCMAN UNIVERSITY</p> <p>- <i>Contact of the Institution/Partner (name, email, telephone):</i> http://www.mu.edu.tr/tr , (0252) 211 10 00</p> <p>- <i>Name of the Strategy/Programme:</i>Erasmus+ Key Action: Cooperation for innovation and the exchange of good practices Action Type: Partnerships for Digital Education Readiness</p> <p>- <i>Other useful information (if any):</i></p>
Language	English/Italian/Spanish/Czech/ Romanian/Portuguase





Best practice n. 4

Topic	<ul style="list-style-type: none"> Adapting vocational education and training to labour market needs;
Best practice Title	Career in Cloud Computing: Exploratory Analysis of in-Demand Competency Areas and Skill Sets
Keywords	Cloud computing; skill requirements; competency areas; topic modeling; job-posting analysis; text mining
Best practice	
<p>Objectives of the research; This research aims to investigate up-to-date career opportunities and in-demand competence areas and skill sets for cloud computing, which plays a crucial role in the rapidly developing teleworking environments with the COVID-19 pandemic.</p> <p>Methodology; In this paper, researchers conducted a semantic content analysis on 10,161 cloud computing job postings using semi-automated text-mining and probabilistic topic-modeling procedures to discover the competency areas and skill sets as semantic topics.</p> <p>Target Group; Labour market stakeholder, policymakers, teachers, trainers, young people</p> <p>Research results; In this study, a semantic content analysis was performed on CC job postings using textmining and topic-modeling procedures in order to reveal the competency areas, knowledge domains, and skills sets demanded by the CC industry. This study found that (1) the discovered competency areas and skills also reveal the emerging trends and demands in the CC industry, as well as the required qualifications for CC professionals; (2) CC expertise requires a wide spectrum of knowledge, skills, and abilities with an interdisciplinary background; and (3) as leading actors, CC professionals can undertake different roles (22 competency areas and 875 different job titles) that require comprehensive skill sets that combine many technical and soft skills (46 different skills).</p> <p>Impact; Since there is no experimental study in this context in the literature, this study is expected to make significant contributions to CC communities. The findings of this study can provide valuable insights into the understanding of the main characteristics and requirements of CC jobs. These findings may offer meaningful implications for CC stakeholders from different aspects. At the institutional level, the findings may help cloud companies to identify qualified CC professionals, and they may help academic institutions meet the need for a qualified CC workforce. At the individual level, the findings may be helpful for CC professionals in measuring and updating their own competencies, for instructors in educating CC candidates in line with emerging demands, and for students in scheduling their career paths. In addition, the methodology of this study can be used in future research to reveal the needs and trends of different IT industries.</p>	





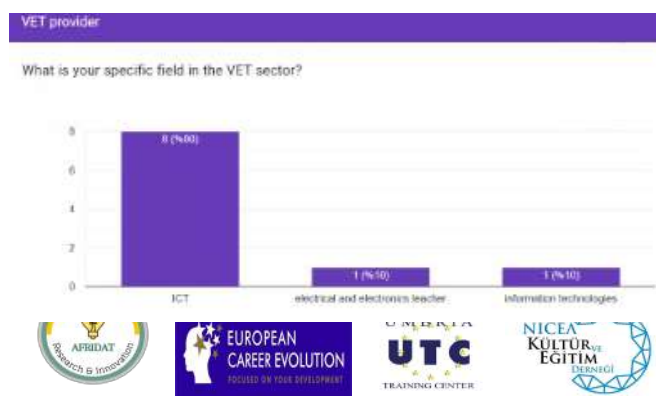
<p>Reference Link (if any)</p>	<p>Applied Sciences Free Full-Text Career in Cloud Computing: Exploratory Analysis of In-Demand Competency Areas and Skill Sets (mdpi.com)</p>
<p>Provided By</p>	<p>- <i>Name of the Institution/Partner that implemented the practice:</i> Özcan Özyurt , Fatih Gürcan , Gonca Gökçe Menekşe Dalveren, and Mohammad Derawi</p> <p>- <i>Contact of the Institution/Partner (name, email, telephone):</i></p> <p>Fatih Gurcan (0000-0001-9915-6686) (orcid.org)</p> <p>Gonca Gokce Menekse Dalveren (0000-0002-8649-1909) (orcid.org)</p> <p>Mohammad Derawi (0000-0003-0448-7613) (orcid.org)</p> <p>- <i>Name of the Strategy/Programme:</i> Multidisciplinary Digital Publishing Institute (reviwd and published by)</p> <p>- <i>Other useful information (if any):</i></p>
<p>Language</p>	<p>English</p>

Survey

The survey consisted of two parts that focused on two separate target groups; VET providers and VET learners.

The survey was completed by 23 participants in total. VET learners N = 13 (56,5%) and VET providers N = 10 (43.5%).

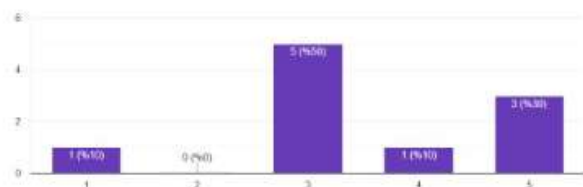
VET Providers



1- 90% of the VET providers that completed the survey were in the ICT sector.



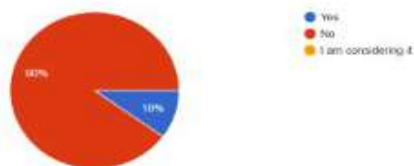
How familiar are you with cloud computing and its applications in the workplace?



2- More than % 50 of the participants stated that they are familiar with cloud computing and its applications in the workplace.

3- Responses to this question highlight the gap in education in the cloud computing sector. Just 10 percent of the sample offers any kind of educational path on cloud computing

Do you, or the institution you work with, already offer any kind of educational path on cloud computing?



4- Because of the low percentage of participants that carry out training, there are no responses to “If you, or the institution you work with, are already carrying any kind of education path on cloud computing, have you encountered any challenges when teaching cloud computing to VET students, and if so, what were they?”.

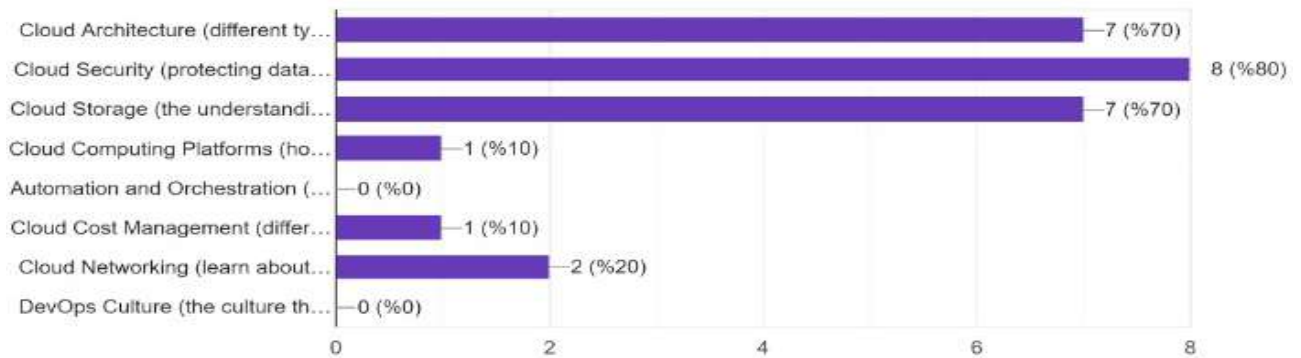
5-The graph shows that VET providers believe that the most important cloud computing skills that VET students should learn are;

- 1- Cloud Security (protecting data and infrastructure in the cloud)
- 2- Cloud Architecture (different types of cloud architectures, such as public, private, and hybrid, and the designing of cloud solutions)



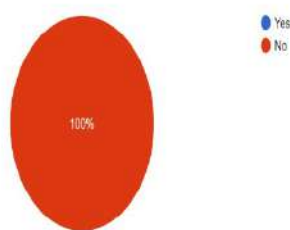


Cloud Storage (the understanding of the different types of cloud storage solutions).
In your opinion, what are the most important cloud computing skills that VET students should learn?



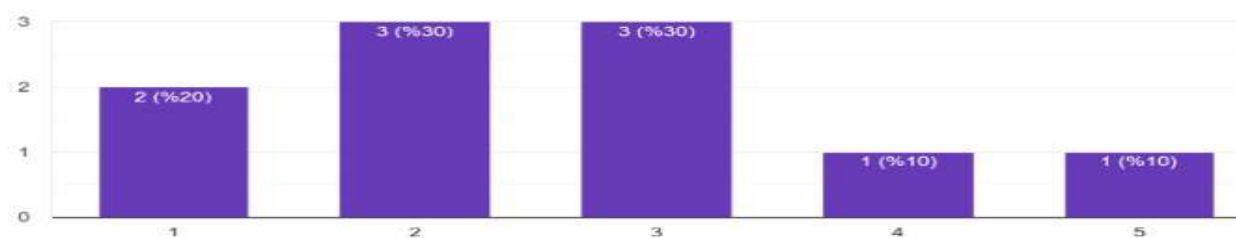
6- None of the participants in the sample has not received any requests from employers for VET graduates with cloud computing skills.

Have you received any requests from employers for VET graduates with cloud computing skills?



7- The VET providers are mostly **not** confident in their ability to teach cloud computing skills to VET students.

How confident are you in your ability to teach cloud computing skills to VET students?



8- There is a poor demand among VET students for cloud computing courses.



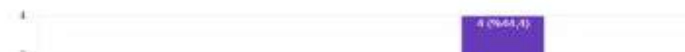


How much **demand** do you see for cloud computing courses among your VET students?



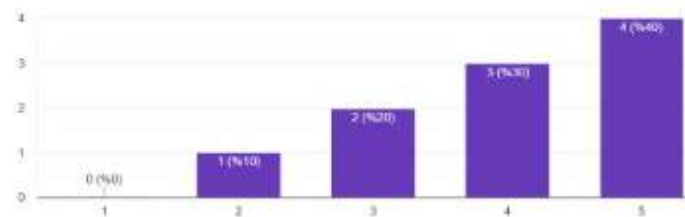
9- To stay up-to-date with the latest developments in cloud computing is highly important for VET providers.

How **important** is it for VET providers and educators to stay up-to-date with the latest developments in cloud computing?



10- The VET providers are highly interested in receiving professional development materials or take part in specific educational mobilities on cloud computing to strengthen their teaching skills.

How much would you be **interested** in receiving professional development materials or take part in specific educational mobilities on cloud computing to strengthen your teaching skills in this field?



VET Learners

11- Replies to this question showed that current level of **familiarity** with cloud computing technology of VET learners are inconsistent, it might be resulted from the gap in education in cloud computing at formal education.

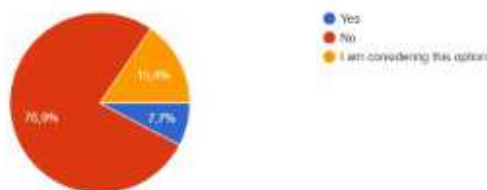
VET learner

What is your current level of **familiarity** with cloud computing technology?





Have you taken any courses or training related to cloud computing?

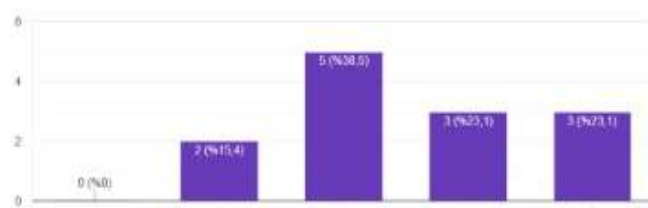


12-The number of VET learners that took any courses or training related to cloud computing is very low (n = 1); about 77 percent of the sample has not received any courses or training, and 15 percent of the sample is considering taking a course or training.

13- One participant who took a training/ course about cloud computing was provided with it by public institutions and

14- Participants possessed the Level 3: Ability to implement cloud computing solutions after the course.

How important do you think cloud computing skills are for your future career?

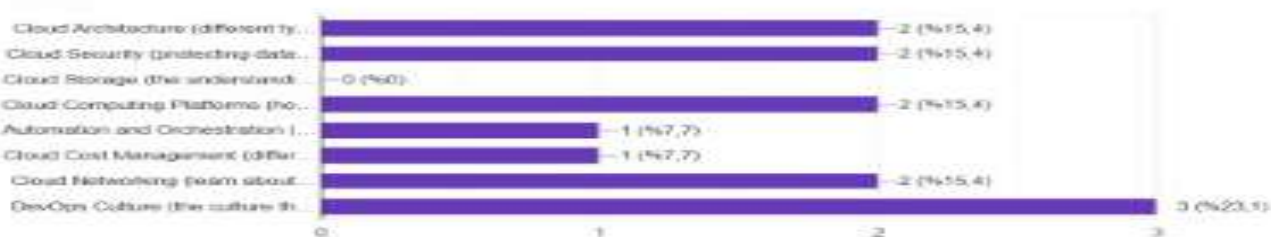


15- VET learners think cloud computing skills are important for their future career at different levels.

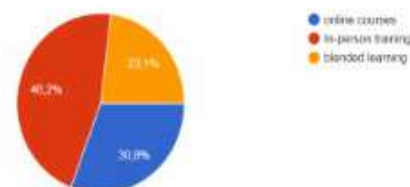
16- VET learners' opinions on the most important cloud computing skills that VET students should learn varies.

DevOps Culture (the culture that emphasizes collaboration between developers and operations teams to improve software development and deployment) is the most chosen one while The Cloud Storage (the understanding of the different types of cloud storage solutions) is not a preferred skill.

In your opinion, what are the most important cloud computing skills that VET students should learn?



What kind of training format do you prefer for learning cloud computing skills?

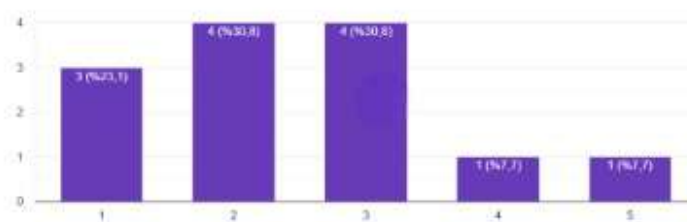




17- Replies to “What kind of training format do you prefer for learning cloud computing skills” showed that In- person training is the most preferred one, online course is the second one and blended learning is the least preferred one.

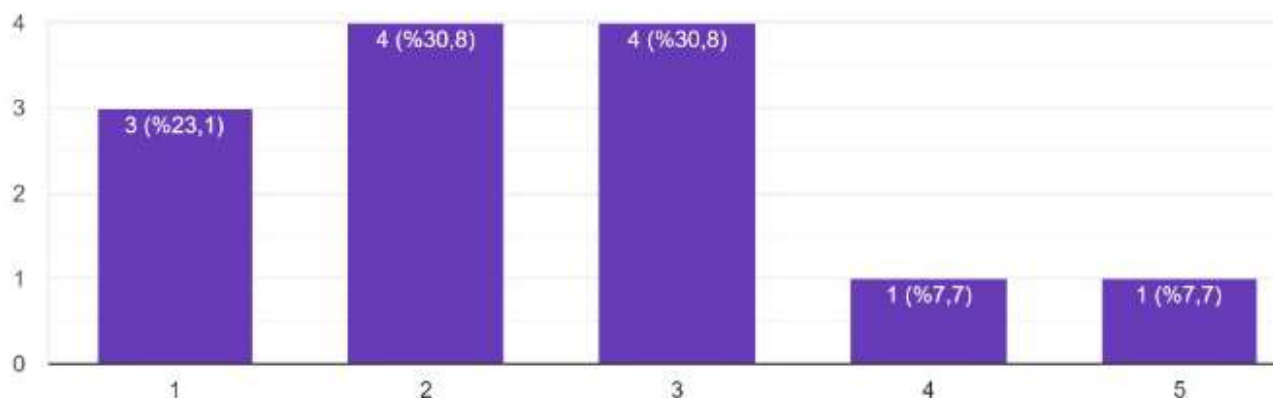
18-VET learners are not highly confident in their ability to use cloud-based software and services. They have an average level of confidence.

How much would you be **interested** in receiving professional development materials or take part in specific educational mobilities on cloud computing to strenghten your competences in this field?



19- The VET learners have not the strongest motivation to receive professional development materials or take part in specific educational mobilities on cloud computing, they have an average level of interest.

How much would you be interested in receiving professional development materials or take part in specific educational mobilities on cloud computing to strenghten your competences in this field?





Focus Group

1. Introduction

This focus group was held under the desk research of the “Up-skilling the VET sector to Cloud Computing” Project with aim of to defining and understanding the state-of-the-art regarding the specific sector of Cloud Computing in partner countries, analyze the specific needs and gaps in the sector, and assess the professional skills needed in the labor market for VET providers. The focus group followed the directions in the research guideline that was elaborated at the beginning of the project.

Topics that was discussed are;

1. General Information about Respondents

2. Information about VET situation on the labor market and the existing education opportunities in the cloud computing sector

3.Challenges/obstacles that VET learners are facing to establish a career in the ICT and cloud computing-related professions

4. Comments and personal opinion

2. Participant Demographics

Moderator

Project coordinator of NICEA Culture and Education Association

Participants of the focus group research are;

- A VET learner in ICT Department (18 years old)
- A VET learner in ICT Department (17 years old)
- A VET learner in Software Development Department (18 years old)
- A department chief of the ICT Department at a public high school and free-lance code programmer
- A VET provider in ICT sector (teacher for 15 years)

3. Summary of findings with each outcome, including representative quotes, results of yes or no questions, and quantitative data

Eligibility checklist

		YES	NO
1	The moderator introduced her/himself	*	
2	The moderator presented the Project and its objectives	*	





3	Moderator informed the participants about the objectives and themes of the focus group and how long is it expected to take?	*	
4	Moderator assured that the data obtained will be used just for research aims.	*	

Moderator: M, Participants; P1,2,3,4,5

Outcome 1: There is a demand regarding cloud computing in the labor market in Türkiye.

- Question asked during focus group and responses from the focus groups

M; What is the current situation of cloud computing in the ICT sector in Turkey? Is it a demanded skill in the sector?

P1; Cloud computing is a demanded skill in the sector, and because of the lack of skilled professionals, the wages of this job are very high

In which sectors is it demanded most?

P1; From health to security all sectors demand cloud computing technology. Cloud computing is a skill, it is not a service, and is getting important day by day, that is why there is a competition in the sector about it.

P2; It is expected that in the near future, we will quit using ordinary storage tools and use just the cloud to save space, time and money. Most of the big firms have already started to use this technology.

M; Is cloud computing a need in İznik (where we live)? For example, are there stakeholders who particularly demand cloud computing?

P3; No, not yet, because it is a small place and its economy is based on agriculture and tourism so it is not an urgent need in İznik, it is also a problem because we can not find workplaces where our learners can do internship on cloud computing.

Outcome 2: There is an education/training gap in Türkiye regarding cloud computing in the ICT

M; Is there a subject/course or training in school curricula about cloud computing?

P1; No, there is not

M; Do you think that having cloud computing skills can get you one step ahead of your competitors in the sector?

P5; Yes, it will surely, because it is the future's technology

Outcome 3 : There are not many training opportunities that specifically focus on cloud computing.

M; What are the current training opportunities about cloud computing in İznik/Bursa or Turkey? If yes, what are they? Are they public or private?





P2; Cloud computing is not a department at universities, it is an optional lesson. The courses about it are provided by private organizations, also courses about it are provided by <https://www.btkakademi.gov.tr/> which is a governmental education network basically focused on ICT and its branches.

P4; What is important about cloud computing courses and training is knowing where to begin. Most of the people know just the storage feature of the cloud system, but it's more than storing data, that's why newcomers need to begin with its ABCs. Learners need to be guided.

M; Do you use cloud computing in your daily life?

P3; Yes we use it, we use it especially to store the projects that we work on.

P1; Each learner is expected to have a cloud account to follow their lessons in the ICT department.

P1; Teachers use cloud computing as a teaching and class management tool in the ICT department, they can floor and check learners' through the cloud.

Outcome 4 :VET providers and learners are interested in developing their skills

M; Do you think that you need a course or subject at the schools?

P3; Yes we need to have.

Firstly we need to begin with destroying the idea that cloud computing is just for storage.

P5; We always use the cloud to keep the games we play. Also, we play games through the cloud.

M; Do all of you have a cloud account? Or do you use flash memory cards?

P1; We use both now, because it is a transition process, in case of low quality internet connection, we keep very important documents also in flash disk.

Outcome 5 :There are several challenges and obstacles that VET learners are facing to establish a career in the ICT and cloud computing-related professions from lack of guidance to lack of communication with the sector.

What are the challenges and obstacles that VET learners are facing to establish a career in the ICT and cloud computing-related professions?

Both VET providers and learners agreed on the same challenges and obstacles;

- lack of guidance
- lack of technical materials
- lack of workplaces to do internship
- lack of communication with sector

4. Implications and Conclusions

The field research data suggests that there is a high demand for cloud computing skills in the ICT sector in Türkiye. This demand is widespread, with cloud computing being sought after in all sectors ranging from





health to security. However, there is a significant education/training gap in the sector. Participants noted that cloud computing is not currently included in school curricula and that there are limited training opportunities available. This lack of training opportunities is further exacerbated by the absence of workplaces to do internships, which is crucial for VET learners to gain practical experience and hone their skills.

Despite the lack of formal training opportunities, it was noted that cloud computing is already being used in daily life, both by learners and teachers. Many participants have also identified the need for learners to have a cloud account to follow their lessons in the ICT department, and teachers use cloud computing as a teaching and class management tool.

Several challenges and obstacles were identified by both VET providers and learners that they face in establishing a career in the ICT and cloud computing-related professions. These include the lack of guidance, technical materials, and communication with the sector. Learners need to know where to begin with cloud computing and require guidance to understand that it is more than just data storage. To address these challenges and equip learners with the necessary skills to meet the demands of the sector, VET providers need to work closely with the industry to develop comprehensive training programs that address these challenges and obstacles. This will enable learners to gain practical experience, as well as improve their technical skills and communication with the sector.

In conclusion, the data from Türkiye highlights the need for VET providers to take the necessary steps to provide learners with the required skills to meet the demands of the rapidly developing ICT sector in Türkiye. With the proper training and guidance, VET learners can develop their cloud computing skills, leading to more opportunities and a fulfilling career in the ICT industry.







Research Report – Italy

Best practices

Best practice n. 1

Topic	Adapting vocational education and training to labour market needs
Best practice Title	RE-ENGAGING YOUNG PEOPLE IN EUROPE
Keywords	Labour market, vocational education and training
Best practice	
<p>The Project is based on the provision of flexible and customised interventions based on vocational education and training pathways and links with the labour market.</p>	
Objectives and Target group	
<p>The project aims to involve young people NEET (Not (engaged) in Education Employment or Training) to promote youth employment and prevent social exclusion of young people. Possible activities include: increasing work skills, addressing mismatches between labour supply and demand, providing traineeships in local communities.</p>	
Target groups	
<ul style="list-style-type: none"> • NEET young people aged between 15 and 19, mainly from disadvantaged socio-economic and family backgrounds. • VET providers and their staff including teachers / trainers / technicians / tutors / counsellors and other education and training professionals; employment services / counsellors; political representatives of education and training; enterprises and social partners; local / regional authorities with responsibilities in VET and active labour market policies; families and communities 	
Steps of intervention	
<p>1 - Good practices of social inclusion: The project intends to analyse experiences in other European countries aimed at the social inclusion of young NEETs and aimed at promoting a multi-sectoral network approach. The project also involves the main stakeholders at local level in order to develop and implement effective social inclusion actions by improving the cooperation between schools, training institutions and enterprises.</p>	
<p>2 - Intervention Model: The project envisages the development of a targeted and customised intervention model for young NEETs consisting of flexible pathways and a methodology to improve the transition to the labour market. The developed methodology will be tested through the active involvement of young NEETs in</p>	





individual and group mentoring and coaching sessions, work experiences in order to facilitate contacts with the labour market.

3 -Guide "Social Inclusion, Development of Local Partnerships and Employability": The guide will provide information on the main measures adopted in different European countries to intercept the most critical NEET target groups, as well as the prevention policies adopted to promote an effective transition between school and work. Issues such as social inclusion, development of soft skills such as motivation, self-esteem, flexibility, creativity and others will be addressed.

4-Impact evaluation and model review: Impact evaluation of the proposed model through: the use of different approaches and tools, the involvement of experts, the analysis and contextualisation of the results of the experimentation phase carried out in Portugal, Spain and Italy as well as the challenges and opportunities offered by the model to young NEETs, employers, vocational training centres/schools, employment and career guidance services and social partners. The project envisages the organisation of group discussions, awareness-raising sessions and seminars for the presentation, validation and transferability of the project results.

5 A training course based on the intervention model : The aim is to prepare field professionals, technicians and researchers to apply the intervention model. A good and thorough understanding of the basic concepts, intervention rationale, tools and resources and how to use them is essential for successful use

<p>Reference Link (if any)</p>	<p>https://neetsinaction.eu/</p> <p>https://www.cpv.org/comnetneet</p>
<p>Provided By</p>	<p>- <i>Name of the Institution/Partner that implemented the practice:</i></p> <p>Fondazione Centro Produttività Veneto (IT) and CEOA-centro de Formação Profissional para o Comércio e Afins (PT)</p> <p>- <i>Contact of the Institution/Partner (name, email, telephone):</i></p> <p>- <i>Name of the Strategy/Programme:</i></p> <p>ComNetNEET "Community Networking for Integration of Young People in NEET Situation"</p> <p>- <i>Other useful information (if any):</i></p>
<p>Language</p>	<p>ENGLISH</p>





Best Practice n.2

Topic	Addressing digital transformation through development of digital readiness, resilience and capacity; Adapting vocational education and training to labour market needs
Best practice Title	“Pane e Internet” - “Bread and the Internet”
Keywords	ICT training, Digital literacy, Digital facilitation, Digital culture
Best practice Online training activities addressed to all citizens in need of digital education in order to enhance their abilities to use Internet and consequently their adaptation to the labour market needs	
<p>Objectives and Target group</p> <p>Pane e Internet (“Bread and the Internet”) - Pel, started in 2009 as a pilot initiative of the Emilia Romagna (Italy) regional government (RER). It has been developed in collaboration with local administrations and several other public and private actors. Pel’s strategic goal is to enhance citizens’ digital competence and reduce digital exclusion.</p> <p>The project’s main target groups are citizens who do not use the Internet and citizens who use the Internet, but ignore security aspects and lack awareness and critical usage capacity (e.g. many high school students > VET LEARNERS).</p> <p>Activities</p> <p>Pel’s initiatives for digital competence development revolve around three main activities:</p> <ol style="list-style-type: none"> 1. Digital literacy for citizens with low or no digital skills. RER redesigned its training offer with two courses, called Digital literacy for citizens level 1 and 2, reflecting DigComp three proficiency levels 2. Digital facilitation or “e-facilitation”. This service provides citizens with continuous non-formal digital competence training and customised support to enhance Internet usage 3. Digital culture programme. Pel organises workshops, conferences and other events aimed at developing personal and professional potential through digital technologies and promoting their safe and creative use among citizens. 	





Outcomes

In 2014-17, 3,750 citizens attended digital literacy courses and about 8,000 the e-facilitation service in over 60 municipalities; 7,700 citizens attended 175 digital cultural events; 110 teachers and 100 tutors delivered the training.

In all three-action lines, RER used DigComp to create a common language and promote understanding of digital competence, with some differentiations.

With digital literacy courses, DigComp was used as a methodological tool to redesign existing training goals and outcomes, learning resources and activities.

DigComp was used as a “knowledge tool” in the training of e-facilitators (mostly public library staff and volunteers). The aim is to develop e-facilitators’ soft skills and educational skills and to enhance their awareness of digital competence relevance for inclusion and full citizenship.

DigComp is presented in a dedicated Learning Unit and taught as the common language to understand and describe citizens’ skills and the gaps to be filled in facilitation sessions. In the Digital culture programme, DigComp is a source of inspiration to design events and seminars and stimulate citizens’ curiosity about various information society topics.

Since 2020, “Bread and the Internet” training activities have taken place online, expanding the audience of potential participants to all citizens residing in the region.

The training activities are designed and delivered with the cooperation of the network of municipalities and Unions of Municipalities, which have set up their own “Bread and the Internet Point” offering citizens training, digital facilitation services and digital culture events on a permanent basis.

The Emilia-Romagna Region provides the “Bread and Internet” Points and all other local authorities and promoters with a Regional Service Centre through which to share teaching projects, facilitation best practices, communication materials and management and communication support.

Reference Link (if any)	https://www.paneeinternet.it/
Provided By	<p>- <i>Name of the Institution/Partner that implemented the practice:</i></p> <p>Emilia-Romagna Region</p> <p>- <i>Contact of the Institution/Partner (name, email, telephone):</i></p> <p>Regione Emilia-Romagna</p> <p>Viale Aldo Moro, 30 - 40127 Bologna Italy</p> <p>- <i>Name of the Strategy/Programme:</i></p>





	Pane e Internet (“Bread and the Internet”) - <i>Other useful information (if any):</i>
Language	ENGLISH

Best Practice n. 3

Topic	Addressing digital transformation through development of digital readiness, resilience and capacity; Cloud computing teaching; ICT skills for VET providers
Best practice Title	Book in Progress
Keywords	ICT training, Digital competences, Digital education, Innovative education, Digital skills policy

Best practice

The project helps combat early school leaving through the use of cloud computing in the digitisation of teaching material. The project is innovative in that the school books are written by the school's teachers themselves, with a very low financial impact on the students' families, and with a high level of attraction for the learners, who are now digital natives.

Objectives and Target group

At the Institute, Industrial Technical and Scientific High School, Ettore Majorana in Brindisi (<http://www.majoranabrindisi.it/>), the successful combination of innovative pedagogical theories and the use of new technologies as the cloud computing made it possible to launch a unique and highly advanced digitisation project. The experimentation is based on web-based textbooks, with content created by the teachers themselves, student information accessible online by parents and teachers, video lessons and online afternoon tutorials, but also sharing of information via the web for the use of both pupils and parents, paperless class assignments the use of paper and certificates through electronic signatures.

The structure of the Book in Progress allows for the creation of a flexible product that can be updated from year to year, varying the content to be transmitted on the basis of the educational and training needs of the students, and of the stimuli coming from the territory. Currently, the Book in progress initiative covers 13 disciplines: Italian, History, Geography, Integrated Science Chemistry, English, Integrated Science Physics, Law and Economics, Mathematics,

Computer Science, Technology and Drawing, and Natural Sciences for the first and second classes of Licei,





Technical Institutes and Professional Institutes. Within a broader perspective aimed at the renewal of the scholastic and educational reality, one year after its inception and with Majorana acting as leader, the initiative has already expanded to a circuit of 14 scholastic institutes located throughout Italy: Apulia, Campania, Sicily, Abruzzo, Calabria, Molise, Lombardy, Liguria, Tuscany, Friuli, Marche and Umbria. Today the national Book in Progress network involves 73 schools

From “Book in progress” to “Net in Progress”

The Book in Progress Project evolves and expands on the Net thanks to the Net in Progress Project. The Net in Progress Project concerns books, written by the school's teachers, but contained in a pen drive to be used with the netbook that the institute makes available to families at a cost of around 350 euros (against a market value of 700 euros). This cost includes not only the personal netbook and the pen drive, with the educational content, but also the books printed by the school to be kept at home for study in the classical sense.

This has made it possible to create a true national academic network. Productivity systems were loaded onto the students' computers, to be used within teaching. Thanks to the *Cloud technology platform Bpos* - business productivity online suite - the application of collaboration tools inspired by social networking are exploited to improve the educational and training performance of the students and to promote distance learning.

Within the virtual community, represented by the Ettore Majorana Institute, all the protagonists of school life find the possibility of an active and fruitful confrontation:

- teachers, adequately trained in the new digital teaching methods thanks to the *Intel teach* programme, can interact with students through online multimedia repetition lessons;
- the material can then be put online and shared by students who, in turn, meet and discuss through forums created ad hoc and on specific topics.

<p>Reference Link (if any)</p>	<p>https://www.bookinprogress.org/site/it/home/</p> <p>http://www.majoranabrindisi.it</p>
<p>Provided By</p>	<p>- Name of the Institution/Partner that implemented the practice:</p> <p>Istituto Ettore Majorana di Brindisi</p> <p>- Contact of the Institution/Partner (name, email, telephone):</p> <p>- Name of the Strategy/Programme:</p> <p>Book in Progress / Net in Progress</p> <p>- Other useful information (if any):</p>





Language	ITALIAN
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Best Practice n.4

Topic	Cloud Computing teaching; ICT skills for VET providers; qualification and skills in cloud computing
Best practice Title	EIPASS Teachers
Keywords	ICT training, Digital competences, e-learning, Innovative education

Best practice

ICT certification for teachers that enables them to become familiar with cloud-based tools to make teaching and school provision more efficient and attractive

Objectives and Target group

EIPASS Teacher is the first digital skills certification programme dedicated to Trainers and Teachers, which we promote by pursuing the mission of diversifying and specialising EIPASS certification services, for specific areas of intervention and/or professional categories, as indicated in the e-Competence Framework, where we explicitly talk about job profiles.

- Teachers, from schools of all levels, who want to learn about the potential of the new tools offered mainly by the Web, but not only, to integrate them into teaching; and who want to certify their specific skills for the sector, through a real knowledge of digital tools and a methodological reflection on their application in the school environment.
- Trainers and educators, who wish to exploit the resources offered by the new digital tools and media in the educational and training spheres, in order to carry out training in step with the times and be educators aware of the current digital reality.

The training, aimed at the final certification and recognition of competences, is developed on following modules:

- **CONTENT CREATION TOOLS** Know the advantages of the cloud for teaching, identifying the best cloud services. Know how to use the G Suite for content creation, sharing and collaboration.
- **CREATING TEACHING MATERIALS** Use the appropriate tools to create your own video lessons or adapt content created by others.
- **INTERACTION ENVIRONMENTS ON THE WEB** Can create a virtual classroom on Google Classroom, can create a course and organise an activity.
- **SOCIAL LEARNING PLATFORMS** Knows the advantages and usefulness of social learning platforms





where students, teachers and families can interact.

- **BYOD (BRING YOUR OWN DEVICES) CONFIGURATION** Knows BYOD and its ideal configuration for maximum performance. Know the critical points and be able to identify them in order to solve them. Know how to implement a "BYOD pact" between school, family and students. Know the technical characteristics needed to create a good school network infrastructure, functional for BYOD.
- **E-LEARNING AND TEACHING PLATFORMS INNOVATIVE** Know the eLearning teaching and use modalities. To know the most important and popular platforms for realising eLearning courses. Become familiar with the possibilities offered by MOOCs and MOODLE and recognise the functional teaching value of using WordPress and Altermvista.
- **COMPUTATIONAL THINKING - ITALIAN AND EUROPEAN PROJECTS** Getting to know the main skills for effectively using IT in one's own life. To know how to define computational thinking and the concepts, practices and attitudes related to it. To know the main Italian and European projects to introduce students to coding.

The **EIPASS** Teacher certification is recognised by the Ministry of Education (MIUR) and is valid for scoring in the Childhood and Primary, Secondary I and II Grade, ITP, Support and Educational Personnel GPS. The certifying body is CERTIPASS, which has translated the European directives (providing for 4 levels of IT) into objective, measurable and recognised competences, in full compliance with the e-competence Framework for ICT Users (e-CF) and the Digital Competence Framework for Citizens (DigComp).

Reference Link (if any)	Eipass: https://it.eipass.com/
Provided By	<p>- Name of the Institution/Partner that implemented the practice:</p> <p>EIPASS teacher</p> <p>- Contact of the Institution/Partner (name, email, telephone):</p> <p>- Name of the Strategy/Programme:</p> <p>CERTIPASS</p> <p>- Other useful information (if any):</p>
Language	ENGLISH

Survey

The survey consisted of two parts that focused on two separate target groups; VET providers and VET learners.

The survey was completed by 15 participants in total.

VET learners = 10 (66,7%)

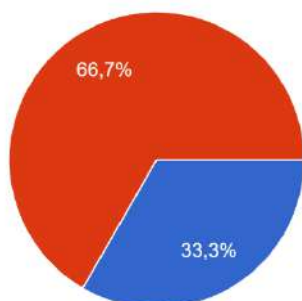




VET providers = 5 (33,3%).

Are you representative of a VET provider or a VET learner?

15 risposte



- I am a representative of a VET provider (professional schools, VET institutions, etc)
- I am a VET learner (student, newly employed, etc)

VET PROVIDERS

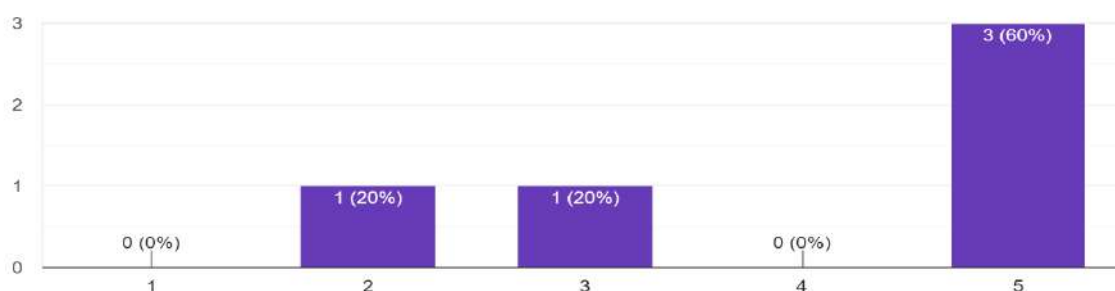
In regard to the specific field in the VET sector, the following are the answers received:

- Administration
- Training and evaluation
- Language
- Education and Training
- Project assistant

2. In relation to the familiarity with cloud computing and its applications in the workplace 3 out of 5 are very familiar with the topic. The other 2 respondents are not that much confident with cloud computing.

How familiar are you with cloud computing and its applications in the workplace?

5 risposte



3. About any kind of educational path on cloud computing offered by their company, a consistence 40%

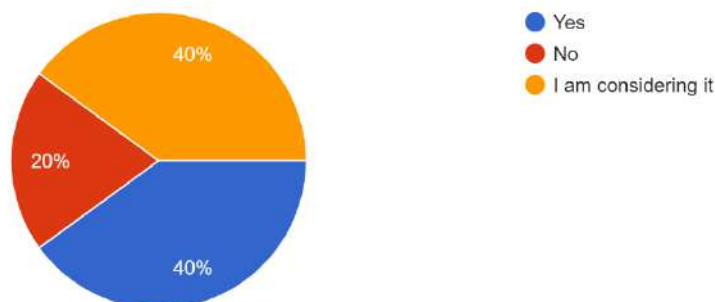




answered “yes”, a 20% “no” and a 40% is considering to start a specific educational path.

Do you, or the institution you work with, already offer any kind of educational path on cloud computing?

5 risposte

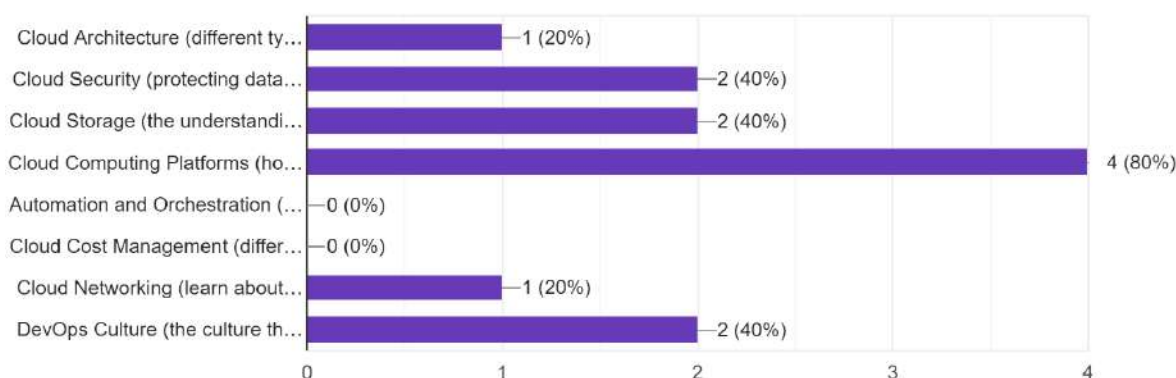


4. Even if there are positive answers to the previous question, there are no answers to the question “If you, or the institution you work with, are already carrying any kind of education path on cloud computing, have you encountered any challenges when teaching cloud computing to VET students, and if so, what were they?”.

5. Among the options, the most voted option overall is this Cloud Computing Platform (80%), and 3 other highly voted (40%) are Cloud Security, Cloud Storage and DevOps Culture:

In your opinion, what are the most important cloud computing skills that VET students should learn?

5 risposte



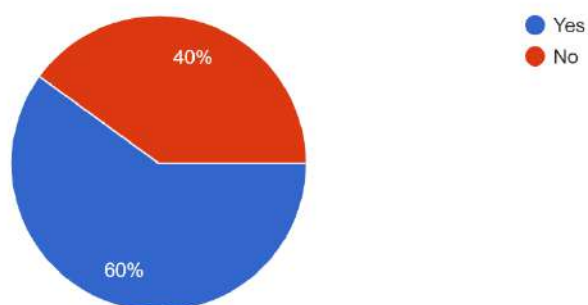
6. When asked if they received any requests from employers for VET graduates with cloud computing skills, 3 persons replied positively and 2 negatively.





Have you received any requests from employers for VET graduates with cloud computing skills?

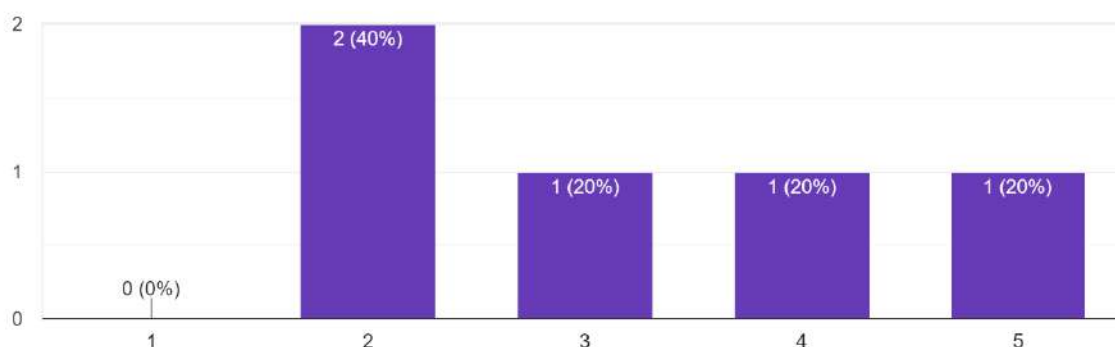
5 risposte



7. The VET providers are mostly **not that** confident in their ability to teach cloud computing skills to VET students. Only one respondent feels highly able to.

How confident are you in your ability to teach cloud computing skills to VET students?

5 risposte



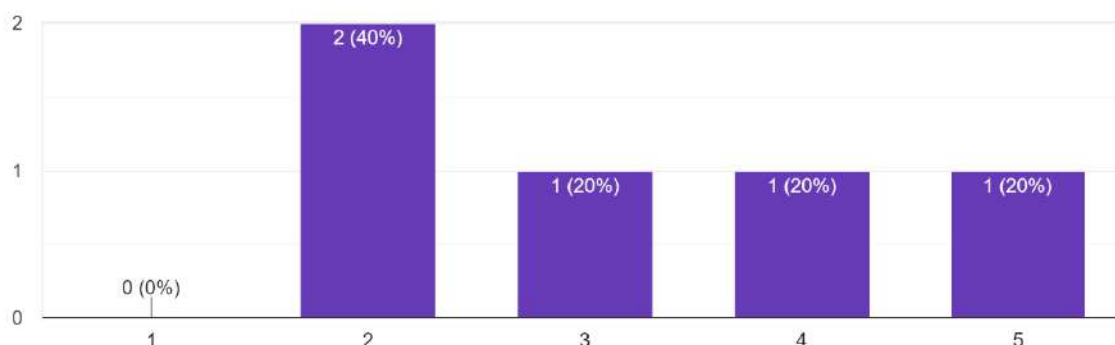
8. Agree to previous question, there is little demand from VET students about cloud computing.





How much demand do you see for cloud computing courses among your VET students?

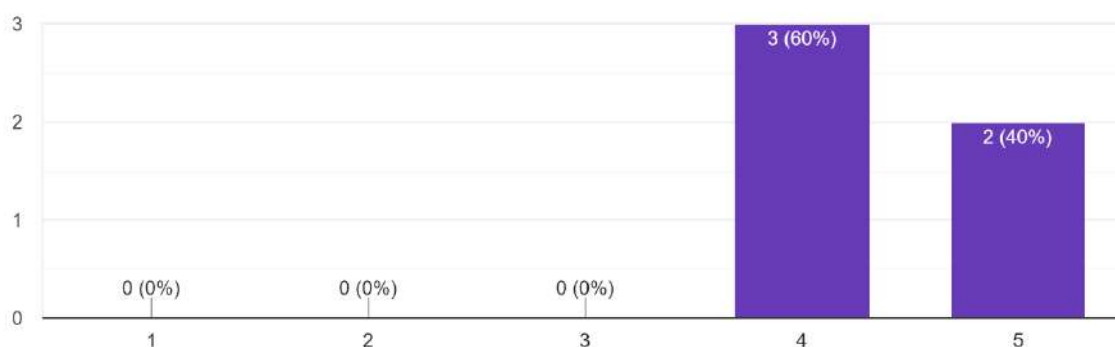
5 risposte



9. Despite the not too much confidence in the teaching of the topic and the low demand from students, VET providers think it is very important to stay up-to-date with the latest developments in cloud computing

How important is it for VET providers and educators to stay up-to-date with the latest developments in cloud computing?

5 risposte



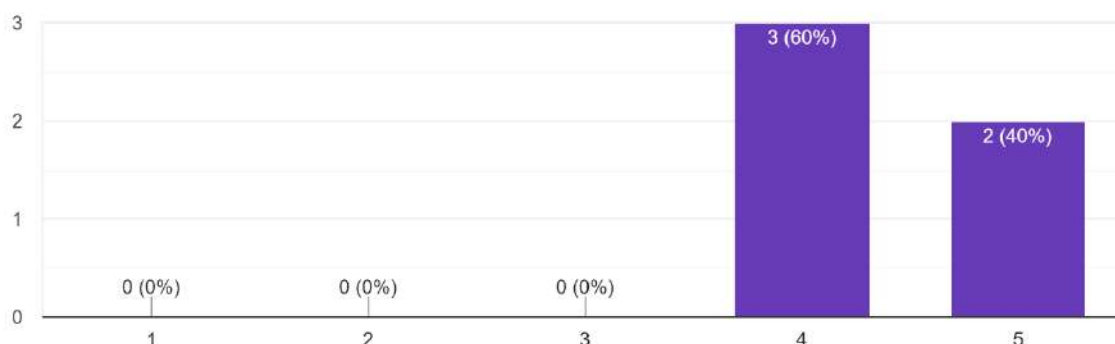
10. VET providers are mostly interested in receiving professional development materials or take part in specific educational mobilities on cloud computing to strengthen their teaching skills





How much would you be interested in receiving professional development materials or take part in specific educational mobilities on cloud computing to strengthen your teaching skills in this field?

5 risposte

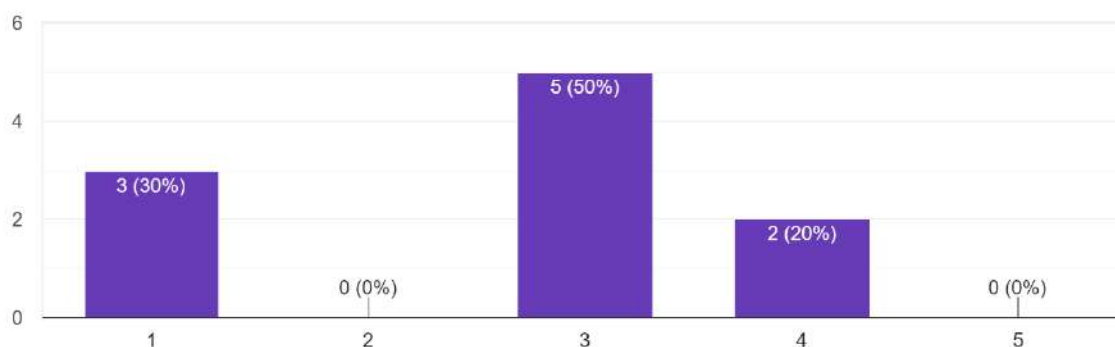


VET LEARNERS

1. The level of familiarity with cloud computing technology is very different among the VET learners interviewed. Although 20% replied that they are familiar with cloud computing, 50% are not that much familiar and a 30% are not at all.

What is your current level of familiarity with cloud computing technology?

10 risposte



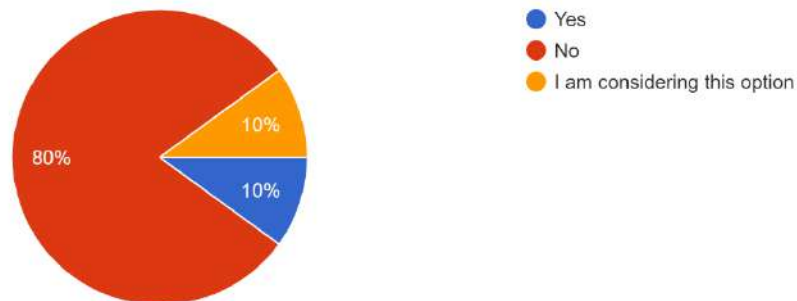
2. 80% of respondents answered negatively. Only 10% of respondents attended courses or training around cloud computing, and only 10% is considering this option. From this response emerges a not too marked interest in the topic, which corresponds perfectly to the responses of the VET providers on the low demand from students with respect to the topic.





Have you taken any courses or training related to cloud computing?

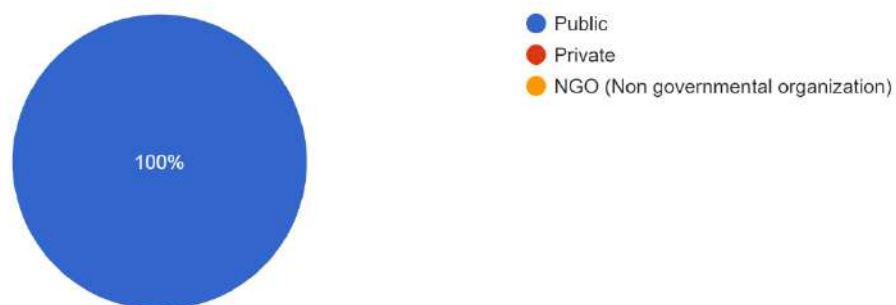
10 risposte



3. About the kind of organization that organized the course on cloud computing, answers are 100% "Public" as in Italy is the main providing service.

what kind of institution the provided was?

1 risposta



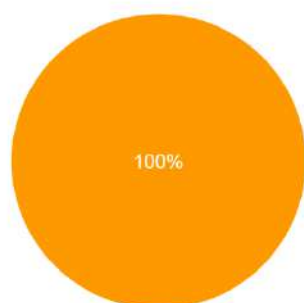
4. Respondents agreed that their level of expertise after the course is Level 3: Ability to implement cloud computing solutions





what level of cloud computing expertise do you possess after taking the course?

1 risposta

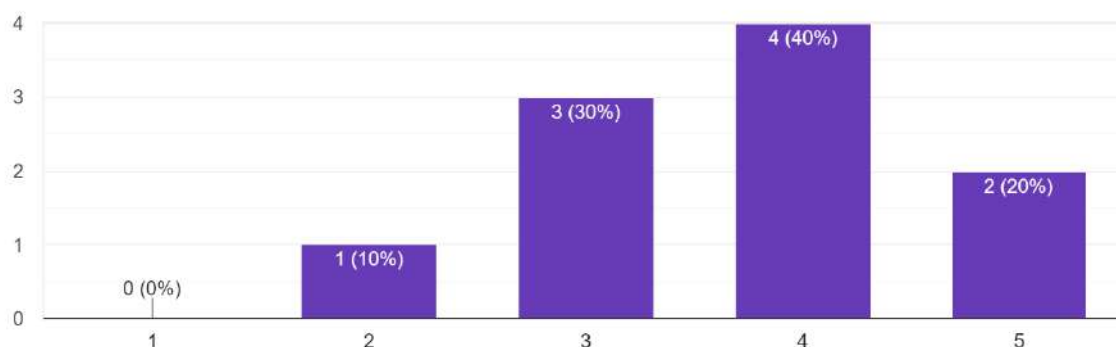


- Level 1: Basic awareness of cloud computing
- Level 2: Familiarity with cloud computing terminology and concept
- Level 3: Ability to implement cloud computing solutions
- Level 4: Advanced knowledge and expertise in cloud computing

5. Most of VET learners (90%) agree that it is important or important enough to possess cloud computing skills for their professional future career.

How important do you think cloud computing skills are for your future career?

10 risposte



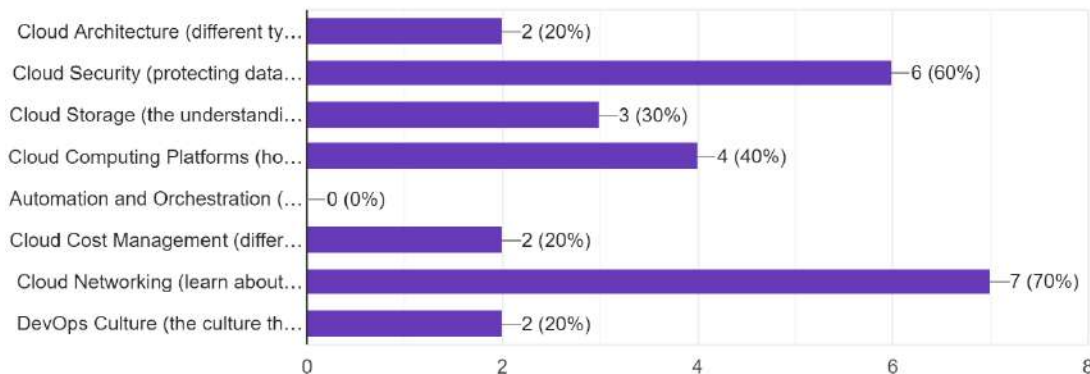
6. In relation to the most important cloud computing skills that VET students should learn, the opinions are different. The most chosen skill are “Cloud Security” – with 6 respondents and “Cloud Networking” – with 7 respondents. However, there is a quite general interest around all cloud computing skills, except for the option “Automation and Orchestration” that none of the voters selected.





In your opinion, what are the most important cloud computing skills that VET students should learn?

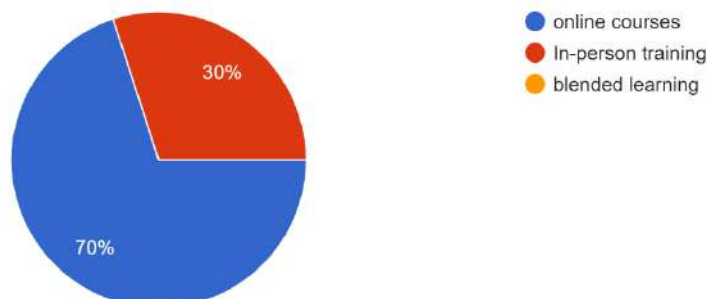
10 risposte



7. Most of VET learners prefer an online training format around cloud computing (70%). None is considering the blended training

What kind of training format do you prefer for learning cloud computing skills?

10 risposte



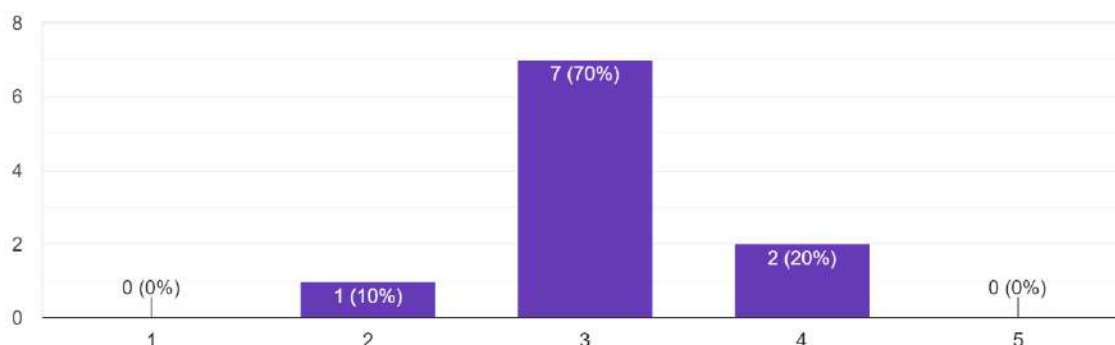
8. Generally, there is a good level of confidence on personal ability to use cloud based software and services. Although most of the respondents have not attended a specific course, they have skills acquired independently.





How confident are you in your ability to use cloud-based software and services?

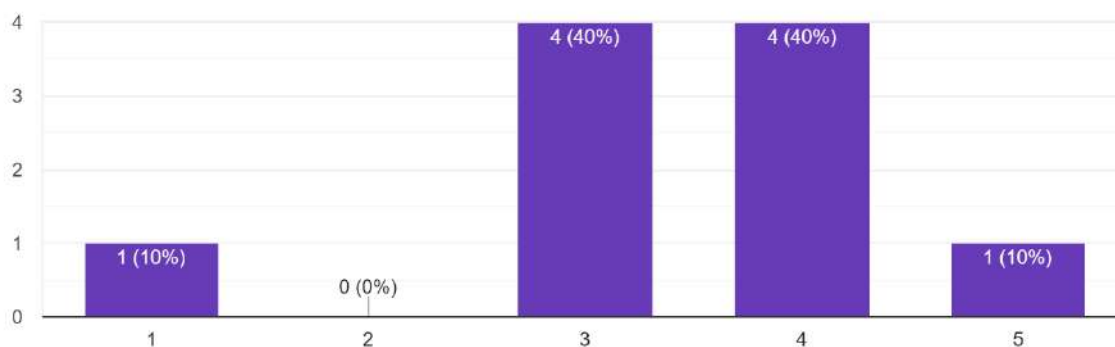
10 risposte



9. Only 10% of the respondents is not interested. All the other VET learners that answered the survey are interested in receiving professional development material or take part in specific educational mobilities

How much would you be interested in receiving professional development materials or take part in specific educational mobilities on cloud computing to strengthen your competences in this field?

10 risposte



Focus Group

This focus group was held under the desk research of the “Up-skilling the VET sector to Cloud Computing” Project with aim of to defining and understanding the state-of-the-art regarding the specific sector of Cloud Computing in partner countries, analyse the specific needs and gaps in the sector, and assess the professional skills needed in the labor market for VET providers. The focus group followed the directions in the research guideline that was elaborated at the beginning of the project.

The following topics were discussed:





1. General Information about Respondents

2. Information about VET situation on the labor market and the existing education opportunities in the cloud computing sector

3. Challenges/obstacles that VET learners are facing to establish a career in the ICT and cloud computing-related professions

4. Comments and personal opinion

Participant Demographics

Moderator: Project referent person of Umbria Training Center

Participants of the focus group research are;

- 3 VET providers
- 16 VET learners (17-18 yo)

Of the Technical Institute Franchetti Salviani school <https://www.franchettisalviani.it/>



Summary of results

(Including representative quotes, results of yes or no questions, and quantitative data)

Outcome 1: General Information about Respondents (VET providers and VET learners)

Do you know what cloud computing is?

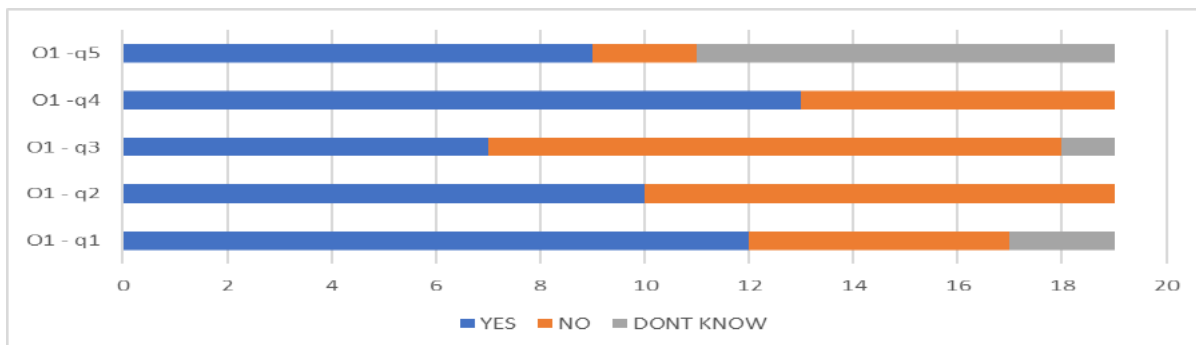
Are you confident in using cloud computing tools and platforms in your daily life?

Do all of you have a cloud account?

Do you use online storage?

Do you think that having cloud computing skills can improve your possibilities in the labor market?





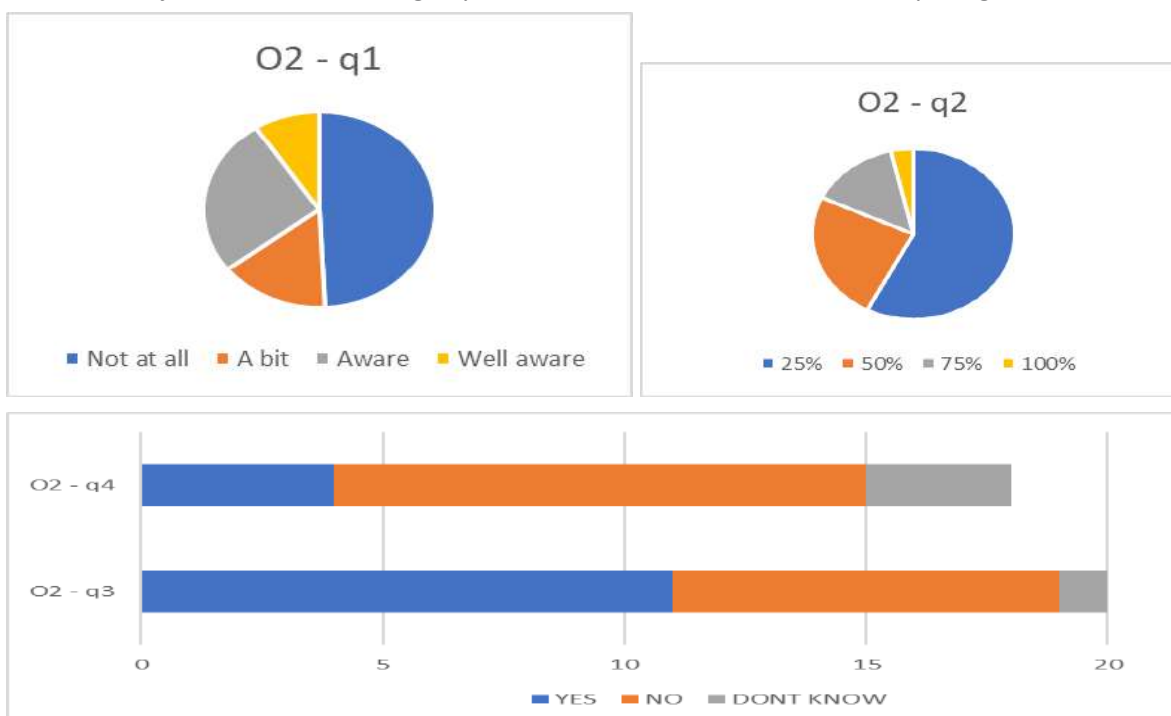
Outcome 2: Information about VET situation on the labor market and the existing education opportunities in the cloud computing sector (for VET providers)

How well known is cloud computing in the Italian education and professional training system?

How many companies use cloud computing? (in Umbria context)

In student outward orientation activities, is there a relationship between supply and demand regarding cloud computing?

Is there a subject/course or training in your school curricula about cloud computing?



Outcome 3: Challenges/obstacles that VET learners are facing to establish a career in the ICT and cloud computing-related professions (VET providers and VET learners)

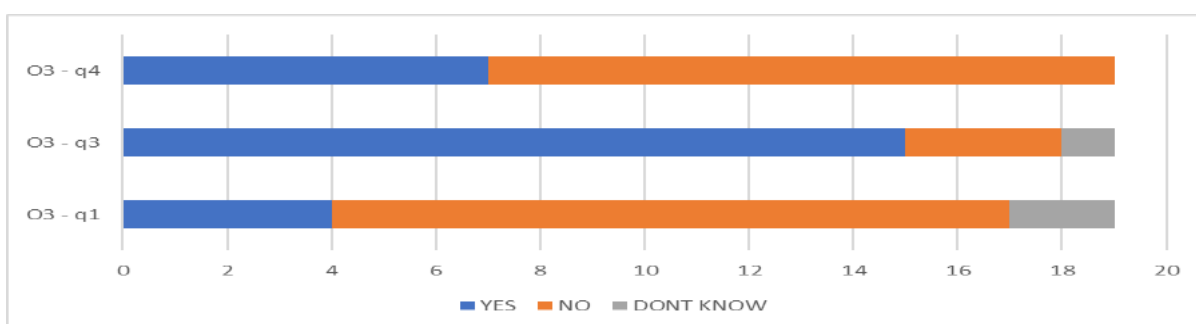
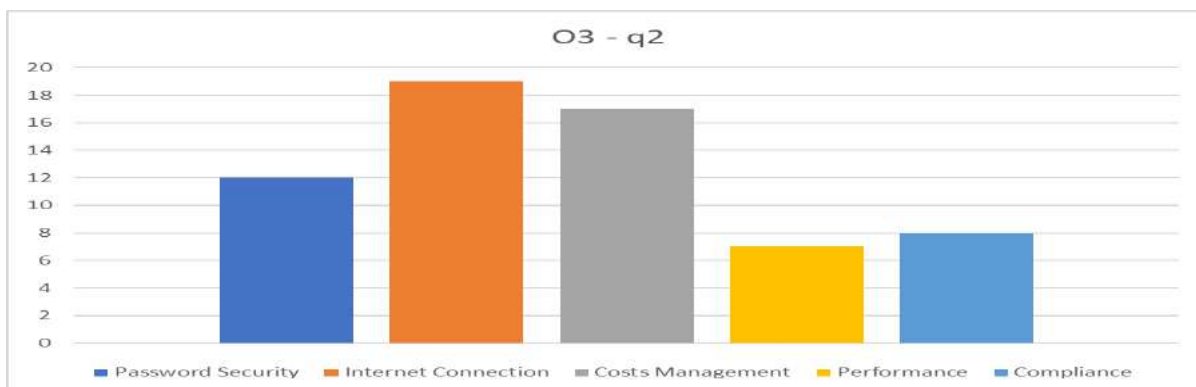
Is cloud computing well known and well taught in VET Italian schools / training centers?

What are the main challenges and obstacles that VET learners are facing to start attending a cloud computing course?





Do you think there is a gender gap for those who would like to make a career in cloud computing?
Are you informed about the current training opportunities about cloud computing in Italy?



Conclusions

During the focus group we divided the targets - students and providers. Subsequently we activated a moment of discussion by mixing the targets and the result was strongly positive.

Although it has emerged that in Italy - particularly in Umbria and in the school that lent itself for the focus group - there is still not much knowledge of the importance of cloud computing, young people are strongly interested.

Furthermore, already projected into the world of work and in particular in the ICT sector, they know well that the demand for cloud computing skills is now in great demand.

VET providers must improve their relationship with the local fabric and with businesses and must increase student participation in cloud computing, using it more frequently and systematically in the classroom.

In general, cloud computing is of great interest and the project was innovative and useful for increasing knowledge and attractiveness of the topic.





Research Report – Ireland

Best practices

Best Practice n. 1

Topic	ICT skills for VET providers; Adapting vocational education and training to labor market needs;
Best practice Title	Screenagers International, Information and Communication Technology (ICT), digital and social media use in Youth Work
Keywords	<i>ICT skills, digital skills, youth work opportunities</i>
<p>Best practice The aim of the collaborative research was to explore the extent, value and development of the use of ICT, social and digital media as a tool in youth work, and to provide an evidence-base for recommendations to promote the development of ICT in youth work at organisational, national and European levels.</p>	
<p>This project produced the Screenagers international research report, "Using ICT, digital and social media in youth work - A review of research findings from Austria, Denmark, Finland, Northern Ireland and the Republic of Ireland", a synthesis of the five national reports and a summary infographic report. This report presents an overview of key findings from research conducted by the five partners, and more specifically it aims to identify and demonstrate:</p> <ul style="list-style-type: none"> • the use of ICT, digital and social media in youth work; • best innovative practice; • outcomes of the use of ICT, digital and social media in youth work; • the challenges and barriers, and supports required; • training available for the youth sector and recommendations for training needs. <p>Central Research Questions</p> <p>1. What is the extent of the use of i) social media and ii) digital media in youth work?</p>	





2. What types of digital media are used in youth work, and for what purposes?
3. What is the value / contribution of the use of social and / or digital media in youth work for young people, and for youth work practice?
4. What are the challenges of the use of social and / or digital media in youth work and how can these challenges be overcome?
5. Is there training available to the youth work sector, and what supports are required to enable youth workers to apply social and digital media as a tool in their youth work?

Methodology: Variation in Methodological approach

Given the different contexts in which the research was undertaken, it was agreed that a standardised research design with identical data collection tools was not feasible. At the research design stage, the research partners agreed that different methodological approaches to answer the 6 common research questions could be employed, but that fieldwork must include:

- Desk research to provide an overview of the youth work and ICT context
- A survey, to encompass the central research questions
- 4 focus groups (2 with youth workers and 2 with young people)
- 3 case studies

Common findings/ recommendations

- strategic financial investment - in infrastructure, hardware, professional development, and practice development
- meeting the identified training needs of youth workers at all levels, from introductory basic skills training to professional development and bespoke courses, and with a focus on the practical application of skills
- the need to challenge resistant mind-sets, and to support a fuller and more creative use of ICT in youth work
- ensuring policy commitment within youth work sectors
- written guidance for youth workers, laying out principles of best practice and demonstrating impact, which could be supported through national Centres of Excellence and/or through national champions for ICT in youth work





<p>Reference Link (if any)</p>	<p style="text-align: right;">Project:</p> <p>https://erasmus-plus.ec.europa.eu/projects/search/details/2014-2-IE01-KA205-008474</p> <p>Ireland Report on the use of social and digital media in the youth work setting:</p> <p>https://ec.europa.eu/programmes/erasmus-plus/project-result-content/bc855d02-895d-4604-99b0-61d61645d0bc/Screenagers_Report_-_Republic_of_Ireland_FINAL.pdf</p>
<p>Provided By</p>	<p>Coordinator - NATIONAL UNIVERSITY OF IRELAND MAYNOOTH</p> <p>Coordinator Type: Higher education institution (tertiary level)</p> <p>Phone: (353-1)7083553</p>
<p>Language</p>	<p>ENGLISH</p>

Best Practice n. 2

<p>Topic</p>	<ul style="list-style-type: none"> - Fostering the skills of VET learners in the digitalization era by means of providing them with knowledge and specific skills in the cloud computing sector and its applicability in the labor market. - Creating and matching synergies between the VET sector and the needs of the ICT sector to facilitate access to the job market.
<p>Best practice Title</p>	<p>Technology Enhanced Learning Mentoring Support</p>
<p>Keywords</p>	<p><i>ICT skills - New Technologies - Digital Competences</i></p>
<p>Best practice In order to maximise the potential technology can have on learning and teaching, the VET workforce must be supported to develop the skills and competences to enhance digital integration into their classroom practices.</p>	





TELMS project addressed the need for appropriate use of TEL within education provision and the facility to support the staff to embed this in the classroom. Within this project a TELMS Programme was developed and delivered to VET teachers from across partner countries. The Programme facilitated partners in establishing an ILT peer mentoring initiatives allowing them to explore how TEL can be embedded across the curriculum using a peer mentoring strategy. It has also promoted professional development of staff in ICT methodologies.

TARGET GROUP

The target groups reached within the project were:

- VET organisations and providers
- VET teachers
- VET learners
- Policy Makers, Research Bodies and Experts.

GOALS ACHIEVED

Within the 2 years of the project duration TELMS has achieved all of the objectives set out in the original project application, namely:

- 1.To develop a Teacher Peer Mentoring Programme in the effective use of ILT & associated learning and teaching strategies,
- 2.To develop a Teacher Toolkit,
- 3.To develop TELMS Online Platform,
- 4.To train 8 mentors at a transnational short-term staff training event in Northern Ireland,
- 5.To support the 8 mentors to establish & deliver an ILT Pedagogy Mentoring Programme to 16 teachers in the partner institutions,
- 6.To disseminate project outcomes across EU Member States.

OUTPUTS

The project has developed the following Intellectual Outputs::

1. Train the Teacher Mentoring Programme - this programme was developed and delivered by SERC during a one week training activity for VET teachers from partner organisations. The programme has built teachers'





<p>capacity and ensured that they could mentor their peers in the utilisation of a range of appropriate technologies and associated digital learning strategies.</p> <p>2. TELMS Teacher Toolkit available online through TELMS Online Platform to support the training and provide valuable resources and guidance on implementation of the peer mentoring strategy in the classroom.</p> <p>3. TELMS Online Platform to facilitate access to innovative training resources for TEL.</p> <p>Participation in the TELMS project gave partners opportunity to upskill their teachers and develop the organisation's capacity by facilitating learning experiences for the staff which ultimately have impacted on the learners; and provided access to new materials to support the teachers' professional development through the implementation of a pedagogy mentoring programme.</p> <p>The project website www.telms.eu contains a wide array of resources and it is expected that the TELMS Online Platform will grow into a permanent and evolving resource that can be used to support the ongoing professional development of VET teachers in digital education and training across Europe.</p>	
Reference Link (if any)	<p>Project description:</p> <p>https://erasmus-plus.ec.europa.eu/projects/search/details/2016-1-IE01-KA202-016891</p> <p>TELMS platform: www.telms.eu</p>
Provided By	<p>Coordinator: H2 LEARNING LTD (Dublin - Ireland)</p> <p>Coordinator Type: Small and medium sized enterprise</p> <p>Phone: +35314806201</p>
Language	ENGLISH

Best Practice n. 3

Topic	<ul style="list-style-type: none"> - Fostering the skills of VET learners in the digitalization era by means of providing them with knowledge and specific skills in the cloud computing sector and its applicability in the labor market. - Creating and matching synergies between the VET sector and the needs of the
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	ICT sector to facilitate access to the job market.
Best practice Title	Enabling the potential of handicraft CRAFT 4.0
Keywords	<i>ICT skills, digital skills, digital manufacturing, youth work opportunities</i>

Best practice Craft 4.0 aimed to create training tools for craftspeople in the areas of digital modelling and digital/ additive manufacturing. Furthermore, the project aims to improve digital competences in the craft sector and in doing so enhance the craftmaking process. Providing an opportunity for the craftspeople to cultivate product design and development skills, increase sectoral networking locally and internationally while also increasing customer engagement, with the purpose of improving and developing individual craft businesses.

Project Activities and Participants

Craft 4.0 consisted of three main outputs underpinned by multiple project activities.

- A survey of 160 craft professionals from the partner countries providing direct insights into specific requirements for the development of a focused training strategy
- A collection of 25 case studies sourced from the Craft 4.0 partners providing insights from established designers/ craftspeople who have adopted digital technology in their craft process
- Organisation of 6 focus groups by the partners with 100 participants from the craft sector who are interested in developing their digital making skills, further informing and refining the design of the proposed training content.

GOALS ACHIEVED

The Craft 4.0 Training Platform : The development of an online training platform which would be used to host the training content and support the learning needs of the craft sector in the area of digital modelling, digital manufacturing and additive manufacturing processes. The structure and functionality of the platform was developed during a 3 day design workshop hosted by Malardalens University and involving 12 participants from the partner organisations.

The Craft 4.0 Training Content : The development of extensive training content specific to the project in the form of video tutorials, presentations and tests, providing craft professionals with learning resources to help develop their practice and business through adoption of digital making technologies. In total there are 47 modules including 37 videos (177 minutes), 10 presentations and 4 tests. In particular, the decision to produce as much video content as possible is notable. Although not allowed for in the original plan, the partners felt





that this was the most suitable format for the type of learning and target audience.

IO3 involved 3 deliverables:

1. The project partners conducted a pilot test of 200 participants from 7 countries. 45% of the participant were from the Craft Sector, 38% from training providers and 17% described as others which included students.
2. Evaluation of the Pilot Test
3. The platform was evaluated via survey and a direct feedback loop to the project partners. The survey consisted of 19 multiple choice questions and 6 free text questions. There were 200 responses with 561 individual comments/ suggestions amounting to 7,700 words.

Results and Impact

The 3rd deliverable of IO3 was a report on the Pilot Test which summarised the outcomes of the pilot test and project generally. The overall satisfaction levels with the platform were very high. The survey evaluated the satisfaction level across 4 categories which included the Training Materials, Training Methodology, Training Platform, and Training Course Impact.

The overall satisfaction levels with the platform were very high with the satisfaction level across the 4 categories greater than 8.5 out of 10 and average satisfaction level being 8.77 out of 10.

Generally the feedback from the sector regarding the project was overwhelmingly positive. Further details and insights are delivered in the Pilot Test Report which is available on the Project Results Platform and Craft 4.0 Website.

At the time of this report, there were 4,100 site visits, 1,295 video views and 2,400 minutes of video watch time.

Reference Link (if any)	Project description: https://erasmus-plus.ec.europa.eu/projects/search/details/2018-1-IE01-KA202-038787
Provided By	Coordinator: TECHNOLOGICAL UNIVERSITY DUBLIN Coordinator Type: Higher education institution (tertiary level) Website: http://www.tudublin.ie Phone: +35314023000





Language	ENGLISH
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Best Practice n. 4

Topic	<ul style="list-style-type: none"> - Fostering the skills of VET learners in the digitalization era by means of providing them with knowledge and specific skills in the cloud computing sector and its applicability in the labor market. - Creating and matching synergies between the VET sector and the needs of the ICT sector to facilitate access to the job market.
Best practice Title	Digital youth work in youth centres
Keywords	<i>Digital Youth Work - Digital Skills And Competences -</i>

Best practice This project focuses on digital youth work in the context of youth centres and will explore the concept, challenges and good practices of such youth work: as well as map key competences needed for quality youth work in the digital sphere. It will support educators and youth work by providing them with skills and methodologies through training activity and webinars that will equip them with know-how to complement their existing youth work practices in youth centres with digital youth work.

Objectives

The project aims at mapping effective digital tools and models already implemented and tested in youth spaces around Europe, as well as at equipping youth workers with necessary skills and guidelines to implement these formats into the reality of existing youth centres and youth houses. This way youth spaces will be able to take advantage of the benefits of the digital solutions and foster youth participation in decision-making processes in a modern, sustainable and entertaining way. The project will contribute to mainstreaming the best digital practices across Europe, make youth organisations more aware of the importance of available digital solutions and equip them with tools that allow them to sustain their actions regardless of the circumstances.

The main objectives of the project are:

To map already existing, effective digital solutions in youth work within youth centres;

To equip youth workers with knowledge and skills necessary to implement digital solutions into youth spaces;





To reflect how to create sustainable, digital youth spaces that take full advantage from the digital tools and foster youth participation through different digital channels;

To reflect on how to follow the evolving technological trends while maintaining the principles of youth work within the context of youth centres and similar youth spaces.

Activities

Project consortium comprised of partners from Portugal, Belgium, Italy and Ireland will carry out a research on the state of the art of digital youth work in youth centres around Europe throughout the project, the results of which shall be turned into a Publication at the end of the project which will contribute to the achievement of the objective to map already existing, effective digital solutions in youth work within youth centres. The training course on key competences for digital youth work in youth centres will “equip youth workers with knowledge and skills necessary to implement digital solutions into youth spaces by providing them with information, tools and methodology that they can use in their daily work with young people through a series of workshops and experiential learning sessions based on non-formal education.

The Set of key competences for digital youth work in youth centres that will be created as an intellectual output of the project will allow for reflection on how to follow the evolving technological trends while maintaining the principles of youth work within the context of youth centres and similar youth spaces. It will elaborate on quality tools and quality systems that need to be in place to ensure that the digital youth work within youth centres is done respecting the core principles of youth work. This intellectual output will be used as a base for designing the training and it will also be presented in the Final Seminar that will also be a space for reflection that will contribute to achieving this particular objective.

Webinars that will be another intellectual output of the project will contribute to the goal of reflecting how to create sustainable, digital youth spaces that take full advantage from the digital tools and foster youth participation through different digital channels as they will be aimed at youth workers from youth centres and will serve as a tool to support them in their efforts to transfer their work with young people in youth centres to the digital space and how to ensure outreach and equal involvement of young people using digital tools, all the while maintaining the core principles of youth work. This is something that is also going to be presented and explored at the Training and Multiplier Event.

Impact

The main tangible results of the project will be the three Intellectual Outputs (IO) created, namely:

- State of the art research: how are the youth centres and youth houses fostering digital youth work (existing practices, their added value, implementation methods, challenges and skills needed to implement them);
- Set of competences for youth workers to create digital environments for youth centres and youth spaces;





- Webinars to train youth workers on digital competences in youth centres.

The results expected during the project and after its completion are the following:

- Increased knowledge on digital youth work among youth workers in youth centres, NGOs and Municipalities;
- Raised awareness of youth work practitioners of the importance of introducing digital youth work all the while maintaining the quality standards, values and principles of youth work;
- Trained and skilled youth workers equipped with tools to implement digital youth work in their daily work in the youth centres;
- Increased capacity of youth workers to respond to the need of practising youth work in the digital sphere especially in restraining situations such as the one we are currently living with the covid pandemic;
- Point of reference, criteria and ideas for all youth centres that want to implement or improve their digital youth work;
- Ensuring digital youth work practises within the context of youth centres that fit the standards of quality youth work

Reference Link (if any)	Project description: https://erasmus-plus.ec.europa.eu/projects/search/details/2021-1-IE01-KA220-YOU-000029141
Provided By	Coordinator: Ballyfermot Youth Service (Dublin) Coordinator Type: Non-governmental organisation/association/social enterprise Website: http://WWW.BALLYFERMOTYOUTHSERVICE.IE Phone: +353879251006
Language	ENGLISH





Survey

The survey has been built in order to be submitted to both target groups: VET providers and VET learners.

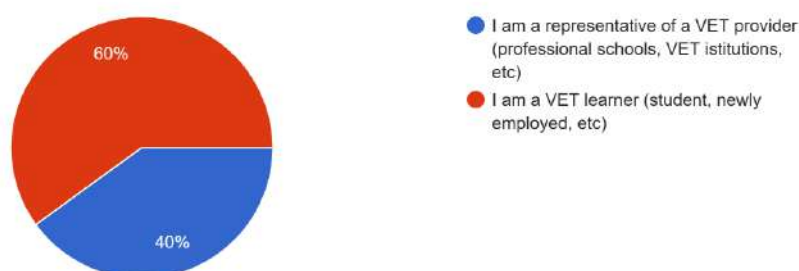
In Ireland, the survey was completed by 21 participants in total.

VET learners = 12 (60%)

VET providers = 8 (40%).

Are you representative of a VET provider or a VET learner?

20 risposte



NOTE: The graph is missing one answer to the first question.

VET PROVIDERS

In regard to the specific field in the VET sector, the main answer has been educator/teacher. The following are the answers received:

- Hotel
- Educator
- Human science teacher
- Educator high school
- Vocational training, organizing internships for students abroad
- teacher
- educator
- vocational projects
- english teacher

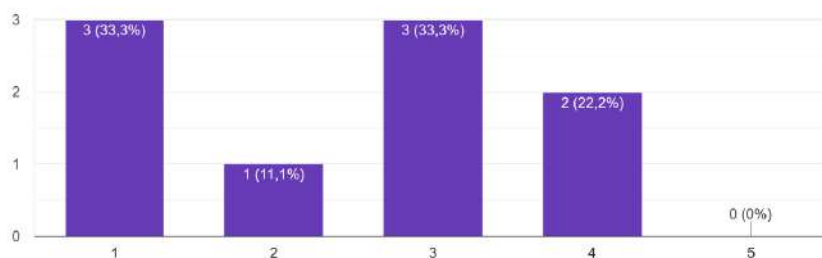
2. In relation to the familiarity with cloud computing and its applications in the workplace, the answers are split. In general, it is understood that most of the respondents don't have great familiarity with Cloud computing and its applications. In fact, only 22% of respondents report being really familiar with it.





How familiar are you with cloud computing and its applications in the workplace?

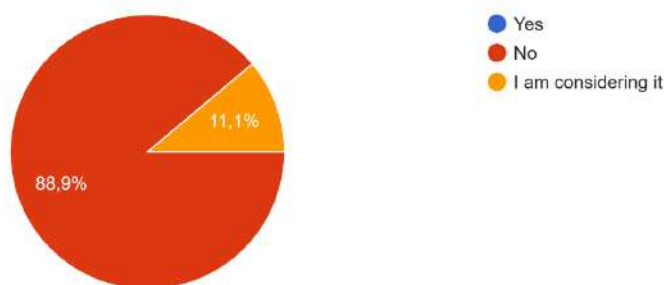
9 risposte



3. In regard to educational path on Cloud Computing offered by their company, all answers are negative. This is very important to underline the absence of training paths around the theme.

Do you, or the institution you work with, already offer any kind of educational path on cloud computing?

9 risposte



4. Due to the lack of services offered on Cloud computing, there are no answers to the question "If you, or the institution you work with, are already carrying any kind of education path on cloud computing, have you encountered any challenges when teaching cloud computing to VET students, and if so, what were they?"

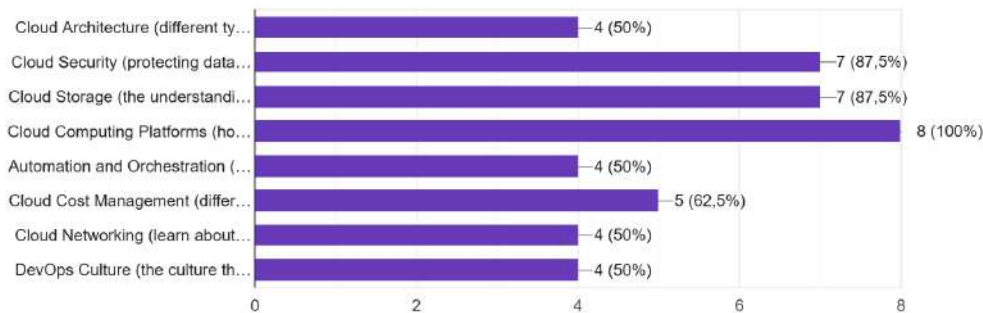
5. The three main cloud computing skills where VET providers think are most important are: Cloud Computing Platforms (100%), Cloud Security (87.7%) and Cloud Storage (87.7%)





In your opinion, what are the most important cloud computing skills that VET students should learn?

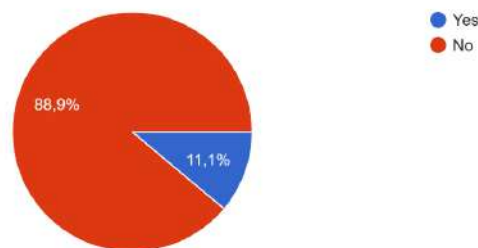
8 risposte



6. When asked if they received any requests from employers for VET graduates with cloud computing skills, just one person replied positively.

Have you received any requests from employers for VET graduates with cloud computing skills?

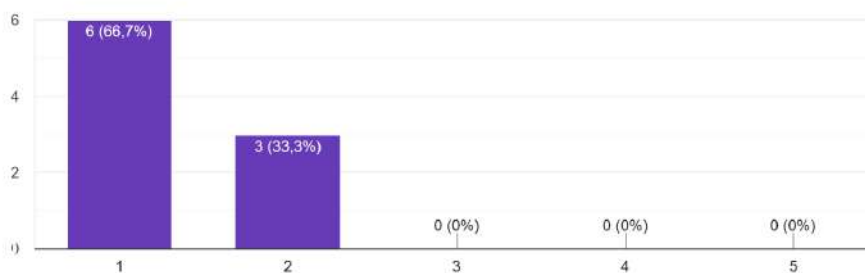
9 risposte



7. The VET providers are mostly **not** confident in their ability to teach cloud computing skills to VET students.

How confident are you in your ability to teach cloud computing skills to VET students?

9 risposte



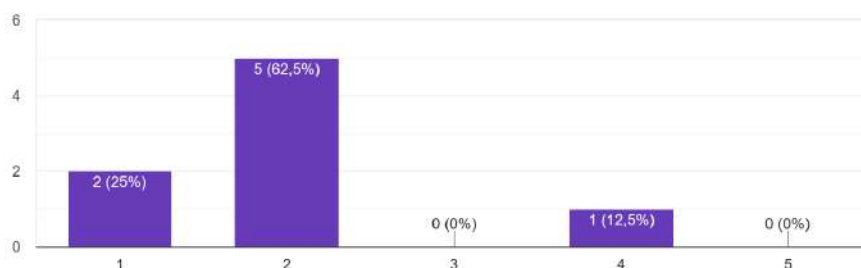
8. In general, there is a poor demand among VET students for cloud computing courses.





How much demand do you see for cloud computing courses among your VET students?

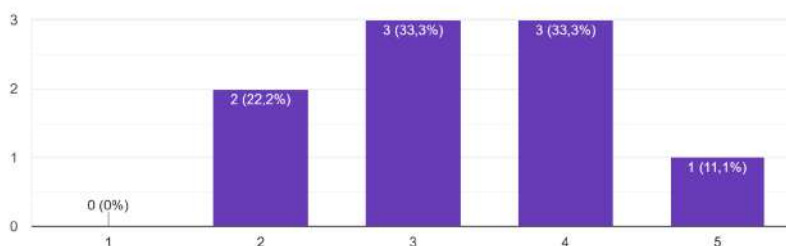
8 risposte



9. It's important to notice that VET providers mostly think is important to stay up-to-date with the latest developments in cloud computing

How important is it for VET providers and educators to stay up-to-date with the latest developments in cloud computing?

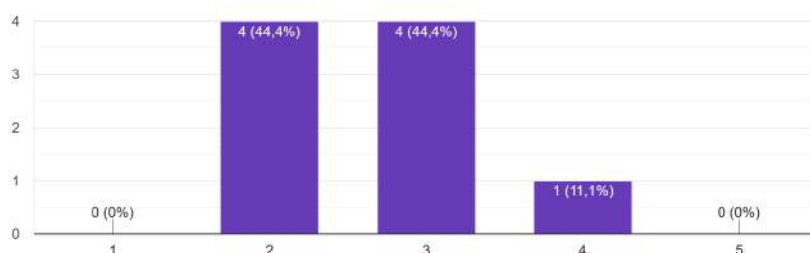
9 risposte



10. VET providers are mostly interested in receiving professional development materials or take part in specific educational mobilities on cloud computing to strengthen their teaching skills

How much would you be interested in receiving professional development materials or take part in specific educational mobilities on cloud computing to strengthen your teaching skills in this field?

9 risposte



VET LEARNERS

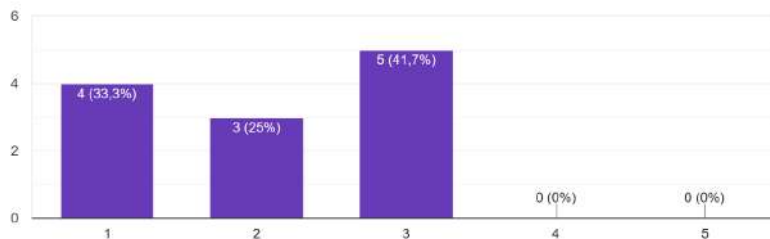
1. The level of familiarity with cloud computing technology is very different among the VET learners interviewed. Although 41.7% replied that they are somewhat familiar with cloud computing, 33% are not familiar at all and 25% are only slightly familiar with cloud computing.





What is your current level of familiarity with cloud computing technology?

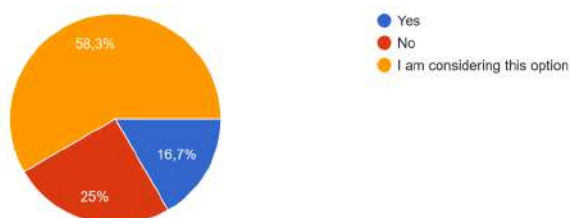
12 risposte



2. Only 16.7% of respondents attended courses or training around cloud computing, however 58.3% is considering this option. This reply shows interest among VET learners around the topic.

Have you taken any courses or training related to cloud computing?

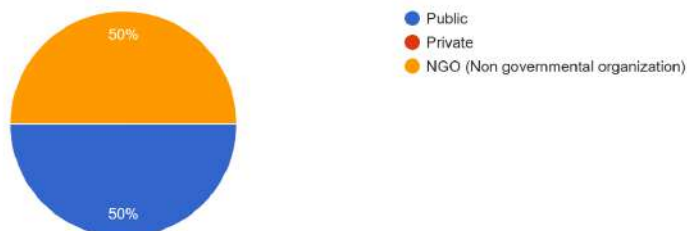
12 risposte



3. About the kind of organization that held the course on cloud computing, answers are perfectly split into "Public" and "NGO"

what kind of institution the provided was?

2 risposte



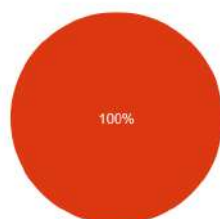
4. Respondents agreed that their level of expertise after the course is Level 2: Familiarity with cloud computing terminology and concept





what level of cloud computing expertise do you possess after taking the course?

2 risposte

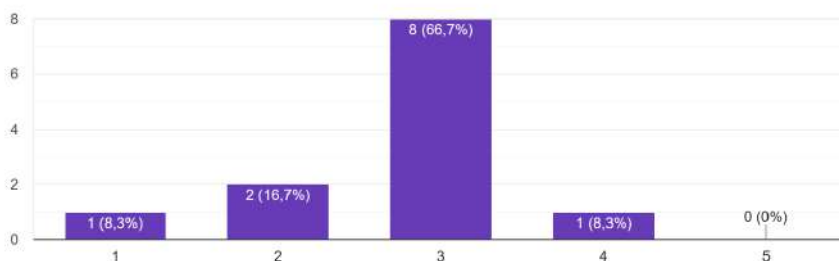


- Level 1: Basic awareness of cloud computing
- Level 2: Familiarity with cloud computing terminology and concept
- Level 3: Ability to implement cloud computing solutions
- Level 4: Advanced knowledge and expertise in cloud computing

5. Most of VET learners (66.7%) agree that is important to possess cloud computing skills for their professional future career.

How important do you think cloud computing skills are for your future career?

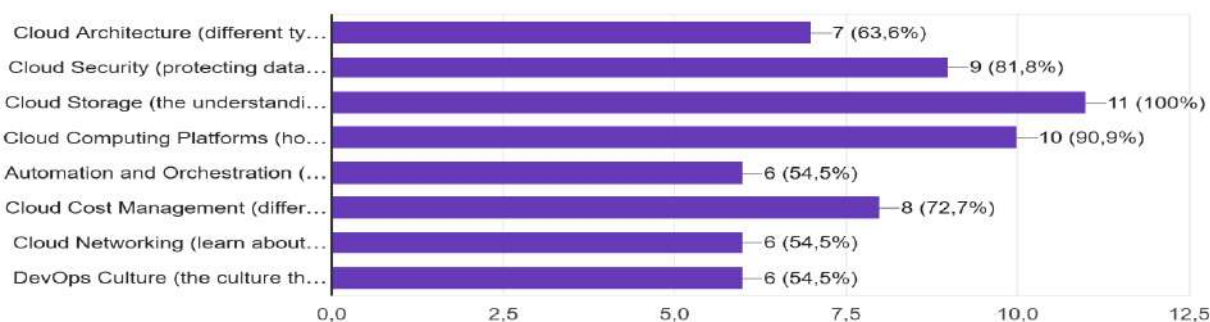
12 risposte



6. In relation to the most important cloud computing skills that VET students should learn, the opinions are different. The most chosen skill is "Cloud Storage" (100% of respondents agreed) however there is a quite general interest around all cloud computing skills. In fact, all skills received at least 54.5% of the responses.

In your opinion, what are the most important cloud computing skills that VET students should learn?

11 risposte



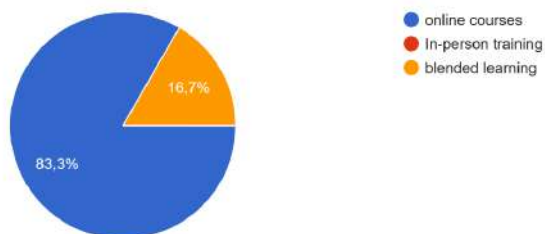
7. Most of VET learners prefer an online training format around cloud computing (83.3%)





What kind of training format do you prefer for learning cloud computing skills?

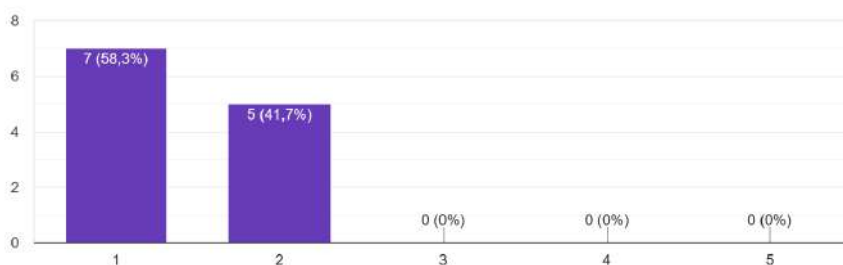
12 risposte



8. There is a general low confidence around personal ability to use cloud based software and services, due to the fact that most of the respondents do not have skills around the topic.

How confident are you in your ability to use cloud-based software and services?

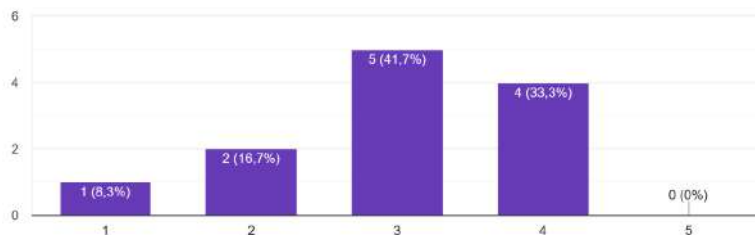
12 risposte



9. There is a general positive interest in learning more about cloud computing, almost all candidates would like to take part in some activity related to this field.

How much would you be interested in receiving professional development materials or take part in specific educational mobilities on cloud computing to strengthen your competences in this field?

12 risposte



Focus Group

This focus group was held under the desk research of the “Up-skilling the VET sector to Cloud Computing” Project with aim of to defining and understanding the state-of-the-art regarding the specific sector of Cloud Computing in partner countries, analyze the specific needs and gaps in the sector, and assess the professional skills needed in the labor market for VET providers. The focus group followed the directions in





the research guideline that was elaborated at the beginning of the project.

The following topics were discussed:

1. General Information about Respondents
2. Information about VET situation on the labor market and the existing education opportunities in the cloud computing sector
3. Challenges/obstacles that VET learners are facing to establish a career in the ICT and cloud computing-related professions
4. Comments and personal opinion

Participant Demographics

Moderator: Project referent person of European Career Evolution - Clarissa Caputo

Participants of the focus group research:

- 3 students from Graphic & Communication high school
gender: 1 girl & 2 boys
age: 20 years old
- 1 tutors educator in high school of multiple courses
gender: male
age: 39 years old

Summary of results

(Including representative quotes, results of yes or no questions, and quantitative data)





Outcome 1: General Information about Respondents

Do you know what cloud computing is?

All: not really

Note: the participants didn't know what Cloud Computing means but after a brief explanation they all agreed that they know the subject, even if they never gave it a proper name.

Do all of you have a cloud account? Are you confident in using cloud computing tools and platforms in your daily life? Do you use online storage?

M - In our school we need to use cloud computing every single day, we use it for sharing documents and homeworks with our teachers, we need it in order to download important files and to keep working on





projects started in class. All of us have a personal cloud profile and we need to access to it daily.

L - Yes, we couldn't go to school without it, over the past years everything for our course is made digitally and we need cloud services just for simple school tasks, we cannot use the normal e-mail.

D - I use online storage for school but also just for myself for many things, like pictures and videos or to work on personal digital projects. It's useful especially because you can leave any project and never lose it, get it back in a different computer at any time you need, I do use it very often.

Candidates agreed that one of the main good aspect of cloud services is the high safety level, no risk to lose documents and fast accessibility

Tutor - We *teachers and tutors* have a personal account as well for cloud computing with the school platform and sure we need to use it to upload documents or to access to files related to our job, however it's a completely different use. We don't need it as much as our students, specifically the Graphic course. To be honest we cannot say it is essential for our job, we could work without it. But sure, it helps a lot.

What kind of Cloud platforms do you use?

Students: The main one is Classroom, used in school for most of our needs, but we also use very often Google drive and Credit cloud

Tutors: Classroom and Google drive for personal use

Do you think that having cloud computing skills can improve your possibilities in the labor market?

D - Well yes, it is impossible for us to follow our course and do our job without this kind of skills.

L - Using these platforms allows us to work fast and easily, we could not imagine how to do it otherwise. Also, we are children of modern times, we are used to these kinds of solutions.

Did you use Cloud computing also when you worked in a company during some internship?

M - Yes all the time! Every company has its own digital world, they have platforms where they share files and documents, if you need anything you just go there.

L - I had the same experience, the platform used in my last internship was very useful also to keep track of everyone's job, at the end of the day we had to upload our work on the shared drive and we could see what our colleagues had done during the day. Also, if you needed to take some notes about the work to do the next day, you could do it in the same place. Very useful.

What kind of companies did you have your internship with?

All: 3D creation, graphic, communication & scripting for companies





Outcome 2: Information about VET situation on the labor market and the existing education opportunities in the cloud computing sector (for VET providers)

How well known is cloud computing in the ICT and Irish education training system?

Do you think it is a demanded skill in the sector?

M - Well I feel that over the past years in our school we use cloud computing more and more often, I am not sure if it is just about our Institute though. Our sector of study and job requires these skills for sure. If a graphic designer doesn't know how to store documents online and how to access cloud platforms, he can't work well in my opinion.

D - Yes, in our sector for sure this kind of skills are demanded both from the school and the companies. In school, we learn them from the beginning because we couldn't work without.

Tutor - For teachers and educators the situation is different, we don't need cloud services so much, we learned about it over the past years as we adapted to new ways of working. Covid for sure made all of us thinking about different solutions. For communication and graphic, sure this is a great skill to have and they need it.

Is there a subject/course or training in your school curricula about cloud computing?

L - No, we just learn about cloud computing going to class

Tutor - For teachers, we just had to follow one day course in school about the use of the platform

Outcome 3: Challenges/obstacles that VET learners are facing to establish a career in the ICT and cloud computing-related professions

What are the challenges and obstacles that VET learners are facing to establish a career in the ICT and cloud computing-related professions?

L - Artificial intelligence

D - Nothing specific, just general fear to don't find a job (*his colleague replied that it is impossible*)

What are the current training opportunities about cloud computing in Ireland / Cork ?

If yes, what are they? Are they public or private?

Tutor - Tutors and teachers don't really need great skills about cloud computing, in case it is required the school organizes a day of training, also for the rest of students it is less required. We need to consider that graphic sectors spend a lot of time in front of a computer, but other courses need less competences around it.

Students replied that they don't know about specific cloud computing courses in Cork or Ireland.





3. Implications and Conclusions

Taking into consideration the results of the survey and the focus group, we can state that the topic of cloud computing in Ireland/Cork still needs to be properly disseminated.

In fact, both the online survey and the focus group revealed an important disparity between those who are familiar with the topic and those who are totally unfamiliar with it. The numbers even out, making it difficult to draw univocal conclusions.

A high number of people in the survey - both VET providers and VET learners - admitted that they were not very familiar with the topic. However, the focus group revealed that the very concept of cloud computing is not well known to most, in other words there is a lack of awareness around what cloud computing really consists of. In fact, after workshop participants were given a definition, they all agreed that they know more about the subject than they initially thought.

This raises the possibility that some people in the questionnaire who answered that they did not know the subject of cloud computing might be confused about its practical, day-to-day uses. This reflection also arises because during the workshop it emerged that cloud platforms are widely used in schools. In recent years, more and more schools in Ireland have been using online document organisation platforms and not only that, since through these platforms it is possible to carry out numerous school and professional activities. Teachers and educators have to adapt to these uses as well, although it looks like their knowledge of the subject is limited to the bare minimum.

The survey and workshop certainly revealed a medium level of interest from VET providers to strengthen their skills on the topic of cloud computing, especially such skills seem necessary in increasingly modernised schools.

As far as VET learners are concerned, the situation is similar. There is a tie between those who do not feel close to the topic of cloud computing and those who are moderately familiar with it. However, the reflection proposed above also applies here, so it could be that more students know about the topic of cloud computing if the school includes any cloud platform.

Certainly, students who attend courses related to digital communication are facilitated in learning these skills and consider them essential for their future. Observing how the use of cloud platforms is also widespread in school, we can assume that the teaching of cloud-related skills will become more common in the years to come.

Probably more awareness around the topic of cloud computing and its applicability both in the business world and on a daily basis would be effective in enabling VET learners and providers to recognize the importance of the topic and explore it further with specific courses.





Research Report – Greece

Best practices

Best Practice n. 1

Topic	<p>Open and distance learning</p> <p>ICT - new technologies - digital competences</p> <p>Quality Improvement in Institutions and/or methods</p>
Best practice Title	Seize The Digital Time
Keywords	cloud computing, ICT skills
Best practice	
<p>Social conditions in education are affected by the needs and expectations of the era we live in. With Industry 4.0, we know the most advanced technologies in the world history. Many systems developed especially in the field of educational technologies enable educators to work more effectively. We can attend the trainings at one end of the world from the comfort of our home.</p> <p>While the world was being thrown in the wind of all these technological innovations, everything stopped suddenly while we were trying to catch up with these technological developments. The COVID19 pandemic has devastated the life of the whole world. While this epidemic affected the whole world and all sectors in the world, education was not</p> <p>tangent. The closure of schools and the transition from face-to-face education to "Online/ Distance" education was painful. Except for a few countries, most countries' education systems did not have sufficient technological infrastructure to transition to online education. Many problems came one after another such as programs/ applications required for distance education, course materials, technological equipment, professional competence of teachers, the process of meeting students with distance education and lack of motivation.</p> <p>In short, inequalities in education risked further deepening with the pandemic.</p> <p>UNESCO has published a document (https://en.unesco.org/covid19/educationresponse/consequences) that addresses the side effects of school closures and the distance education process. This document lists the main problems:</p> <p>*Confusion and stress for teachers</p>	





- *Parents unprepared for distance and home schooling
- *Challenges creating, maintaining, and improving distance learning
- *Rise in dropout rates
- *Social isolation
- *Prejudiced attitudes of educators and parents about the inadequacy of distance education
- *Incompatibility between the learning styles of new generations students and their teachers, which are intertwined with technology
- *Lack of digital competence of teachers within the scope of distance education
- *lack of innovative and quality digital resources
- *Difficulties in keeping students' motivation high in the digital environment and weakening of school ties

With the European cooperation (ET2020), the concept of countries exchanging knowledge and skills about their education and training systems comes to the fore. Erasmus+ and eTwinning projects are among the most important tools that enable this exchange, application and experience sharing. (National Skills Strategy 2025) "The Europe 2020 strategy, which defines the development of education and human resources as the leading force in the development of the European Union, draws attention to the potential contribution of education and training to smart, sustainable and inclusive growth. Professional development opportunities provided to staff in our institutions with our partnership are by acquiring up to date learning and teaching methods of its staff, observing and exploring innovative learning and teaching practices at the European level, contributing to the smart, sustainable and inclusive growth of education and training. Our project partners include experts in the fields of Digital Education, Z and Alpha generation, Student and Teacher motivation, Cyber Bullying, ICT (WEB2 tools).

With the partnership network created, we planned to benefit from each other's superior aspects and to identify our shortcomings and develop these aspects together. In this project, there were 6 VET schools: TR (2 schools), RO, GT, IT, and Czech Republic. All our institutions except Romania have project experience in E+ programs.

Our target groups is our institutions' managers and teachers, our students (5-16), and their parents. Our target group consists our school staff, students and parents in the short term, and managers, teachers, students and parents in other institutions and organizations nearby in the long term.

Objectives

- 1.To strengthen motivation of students, teachers, and parents from 6 partner schools in terms of digital education by using structured courses, and project's activities
- 2.To improve by 10% the quality and with 15 teaching methods in distance learning in 50 teachers from 6 partner schools by using structured courses





3.To increase our students' awareness of the positive aspects of online teaching and learning by equipping our education and training system to face the challenges presented by the recent sudden shift to online and distance learning by project activities

We also aimed to:

- support teachers to develop their digital competences and knowledge of cyberbullying
- come over the prejudice that digital education is more inadequate than face to face education
- help to provide and promote high quality inclusive digital education and Open Educational Resources
- strengthen the cooperation and networking between organizations
- help to increase both the awareness and knowledge of teachers in terms of cyberbullying and new generations.

At the end of our project, which was shaped by considering the individual needs and expectations of our teachers, students and parents, we aim to achieve the following results:

TANGIBLE RESULTS:

- *Project logo
- *poster
- *Project's roll-up
- *online lesson plan booklet in English, containing 18 lessons/learning activities (printed in RO with ISBN number in 50 copies and digital as OER)
- *project billboard in schools and etc. promotional and informative products.
- * Social media accounts and shares of our project
- * Digital children's choir YouTube channel- 6 videos
- * Website of course contents prepared with Web2 tools
- * Workshop in each school involving 60 peers on Innovative and qualitative Digital Course Materials
- * PPP about 1 traditional street game of each partner integrated into the distance education process
- *records of online lessons (6 zoom lessons, 1 per partner)
- *12 articles in local newspapers, websites, facebook and photo gallery in schools from all project's activities.





*Survey results to be applied to teachers, students and parents

*Google forms used for the questionnaires

INTANGIBLE GENERAL RESULTS:

* School-parent-student communication and cooperation will increase in education in general and in distance education in particular, and this will increase the quality of learning.

* Teachers' ability to use digital educational tools will increase

* Teachers can use motivational-enhancing digital games, competitions etc. in the distance education process. they will gain the ability to use tools and their creativity will increase.

* Traditional street games of the partner countries will be adapted to the distance education process and the motivation of distance education will be strengthened.

* The integrative dimension of distance education will be strengthened and disadvantaged groups will receive higher quality education.

* Students' ties with school will be strengthened

* Students will have intrinsic motivation in the process of participating in distance education / distance learning.

* Our teachers and students will get to know different cultures closely and interact with them digitally.

* Parents' knowledge / skills related to distance education will increase and they will be more active in their children's education processes.

* European citizenship awareness will increase in teachers and students

* Teachers knowledge and attitude toward cyberbullying and new Generations was increased.

*Most of the school staff about 75% will become more open minded, more willing to accept others, regardless the differences of culture, education, language, customs, traditions.

*Teachers' Language and ICT skills will be improved by monitoring, coordinating and achieving the partnership activities;

*Teachers managing, team work and cooperative skills will be improved in most cases (85%);

*The equal chances of participation for the staff (where available) will change the old stereotypical attitudes with the new ones based on emphasizing the similarities instead of focusing

on differences;

*The experience gained during the partnership and the materials produced by the partners will be shared and





<p>used by all the staff, in all schools.</p> <p>*The schools policy can benefit from the new and improved teaching, evaluating and managing strategies implemented by the European collaboration.</p> <p>*By adopting and applying specific measures and planning specific activities for the disabled, disadvantaged students and staff, persons from the ethnic minorities, male and female</p> <p>schools will ensure equal chances for all people and will share this experience with other schools in their area.</p> <p>*The local community will fully benefit from the partnership in terms of strengthening the bonds among its members by the means of the partnership activities;</p> <p>* The local community will play an active role in the school live also by attracting or delivering funds towards the school, where available</p>	
Reference Link (if any)	https://www.seizethedigitaltime.com/
Provided By	<p>- Name of the Institution/Partner that implemented the practice: Aristotle school</p> <p>- Contact of the Institution/Partner (name, email, telephone): erasmus@aristotelio.gr</p> <p>- Name of the Strategy/Programme: Erasmus+</p> <p>- Other useful information (if any):</p>
Language	ENGLISH, GREEK

Best Practice n. 2

Topic	Teachers Training and Certification
Best practice Title	In-service Training of Teachers in the utilization and application of Digital Technologies in the teaching practice (B-Level ICT)
Keywords	Teachers training, VET , certification





Best practice

The program constitutes the continuation and further development of the integrated training for the utilization and application of Digital Technologies in the teaching practice, which was implemented during the previous years and is widely known as the “B-Level ICT Teacher Training”.

It is implemented by the Computer Technology Institute and Press (CTI) – “Diophantus” (in particular by the Directorate of Training and Certification (DiTC) of CTI) acting as the beneficiary, in collaboration with the Institute of Educational Policy (IEP), within the Operational Program “Human Resources Development, Education and Lifelong Learning”, NSRF (2014-2020), co-financed by the European Union (European Social Fund) and the Greek State.

It is implemented through two projects with the general title “In-service Training of Teachers in the utilization and application of Digital Technologies in the teaching practice (B-Level ICT Teacher Training)” (1st & 2nd Phase) and it accommodates:

1st Phase 2016-2022, Project: "In-service Training of Teachers in the utilization and application of Digital Technologies in the teaching practice (B-Level ICT Teacher Training)"

the further development and update of the “B-Level ICT Teacher Training”, i.e.:

the enhancement and update of training methodologies and training content, taking into account modern pedagogical and technological developments, as well as the results and experience gained from the implementation of previous relative projects

the extension of teacher training to address all teacher specialties and disciplines of primary and secondary education, which means: the development of infrastructure and human resources (e.g. development of educational content and training material, development of teacher training support systems, training of new teacher trainers / educators, etc.) and consequently, the increase in potential trainees, and

the development and implementation of the teacher training in two levels, as follows:

“Introductory training for the educational utilization of ICT (B1-Level ICT teacher training)” and

“Advanced training for the utilization and application of ICT in the teaching practice (B2-Level ICT teacher training)”,

The combination of these two levels equals to the acquisition of knowledge and skills corresponding to the integrated training for the utilization and application of ICT in the teaching process (B-level ICT teacher training).

the training of 300 new B-Level ICT teacher trainers / educators, who will be trained and certified to complement and enrich the existing Registry of B-Level ICT Teacher Trainers (greater geographical coverage, new disciplines) and, following appropriate certification processes, will undertake teacher training along with the existing B-level ICT teacher trainers,





the participation of 30,000 teachers in B1-Level ICT teacher training,

the participation of 5,000 teachers in B2-Level ICT teacher training,

the certification of the above teachers in the corresponding knowledge and skills in ICT and additionally, teacher certification processes in Basic ICT skills (A-Level ICT skills), which is a prerequisite for the participation of the teachers in B1-Level ICT teacher training,

the development and adaptation of infrastructure, scientific and technological tools, large-scale training and certification support systems and mechanisms,

the implementation of complementary horizontal actions to support the project actions, such as dissemination and publicity, procurement of equipment, reproduction of educational material etc.

2nd Phase 2021-2023..., Project: "In-service Training of Teachers in the utilization and application of Digital Technologies in the teaching practice (B-Level ICT Teacher Training) - 2nd Phase"

With the aim of training and certifying more teachers, as well as updating and enriching the content and material of the provided types of training and certification (B1 and B2 Level ICT Teacher Training), the methodologies and the supporting implementation systems, the current project (2nd Phase) includes:

the participation of 12.600 teachers in B1-Level ICT teacher training (Introductory Teacher Training for the educational utilization of ICT)

the participation of 15.000 teachers in B2-Level ICT teacher training (Advanced Teacher Training for the utilization and application of ICT in the teaching practice)

Certification procedure as far as the above teachers are concerned in the respective ICT knowledge and skills and, additionally, certification procedure in basic ICT knowledge and skills (A-Level ICT skills), since this certification is a prerequisite for teachers' participation in B1-Level ICT teacher training.

Updating and enriching the content and the training and certification material of the above programs taking into account feedback and internal evaluation of the previous relevant project, the technological and pedagogical developments, as well as the current implementation needs and conditions. For the B1-Level ICT teacher training in particular, adaptations and enrichment of content are foreseen in order for the training to be offered in more clusters (following the organization of the B2-Level teacher training which includes 13 clusters instead of 4 clusters in the past). As a result, 13 distinct seminars/ e-courses will be developed. At the same time, special features of distance education are planned to be integrated for the full implementation of a blended training model. Furthermore, emphasis is put on the utilization of systems and environments that support and facilitate the functioning of the school community i.e. communication, distribution and sharing of materials, assignment and preparation of educational activities (e.g. e-me platform, e-class etc).

Updating and occasional adjustments and extensions in specific functionalities of the supporting systems for the implementation of the trainings and certifications (Management Information System/ MIS, Platform for asynchronous distance education, Portal etc).

Conducting complementary horizontal actions to support the project such as dissemination, internal





evaluation, supply of equipment and network services as well as specific actions for quality assurance as well as to ensure the sustainability of the project results.

For the implementation of the above, the infrastructure, the systems and scientific tools developed in the previous, relevant projects (e.g. the Integrated Information System for Data Management of Teacher Training and Certification - MIS, Systems and Applications for the support of the Certification process, the Library – Educational Activities Repository “Iphigeneia” (<http://ifigeneia.cti.gr>), curriculum content and educational material) in the current framework are being upgraded, enriched – expanded and adapted to meet the new requirements.

In addition, previous Registries are being used and updated, and in particular the:

Teacher Trainers Registry (appropriately trained for each type of offered training)

Teacher Training Support Centres (TTSCs) Registry

1. Certification Centre Registry

Reference Link (if any)	https://e-pimorfosi.cti.gr/
Provided By	<p>- Name of the Institution/Partner that implemented the practice: Ministry of Education and Religious Affairs by the Computer Technology Institute and Press (CTI) – “Diophantus”</p> <p>- Contact of the Institution/Partner (name, email, telephone):</p> <p>- Name of the Strategy/Programme: In-service Training of Teachers in the utilization and application of Digital Technologies in the teaching practice (B-Level ICT</p> <p>- Other useful information (if any):</p>
Language	GREEK





Best Practice n. 3

Topic	Introduction to cloud and it's applications
Best practice Title	Digital Alphabet
Keywords	Cloud computing, digital skills
Best practice	
<p>Programme Object & Purpose</p> <p>The aim of the programme is to familiarise students with the required knowledge and applied skills in digital education. The programme is about learning modern innovative available and easy-to-use digital tools. Trainees will be able to acquire basic and advanced digital skills that will help them to manage fundamental applications of a computer and collaborative cloud computing tools. The COVID-19 pandemic continues and is affecting the economy and the use of computers either at work, in education and in simple everyday tasks is vital. The digitisation of services and transactions makes learning and managing internet services and collaborative tools an urgent need.</p> <p>After completing this training programme, the Trainees will:</p> <ul style="list-style-type: none"> Be trained in the use of innovative cloud computing services Become familiar with the suites of the most widely used collaborative tools, such as Google Suite manage applications through collaborative tools such as word processing, spreadsheets, presentations, questionnaires, working both in teams and individually use services such as remote desktop management (Google Remote Desktop), video conferencing applications (Google Meet) and other modern internet services have acquired basic and advanced digital skills which are directly applicable to our daily lives and, in particular, to the labour market. have access to rich learning resources to further enrich their knowledge are able to apply for jobs requiring digital skills <p>The Programme is addressed to:</p> <p>Graduates and students of University and Technological Institutions in Greece and abroad,</p>	





<p>graduates of post-secondary education (Vocational Training Institutes)</p> <p>graduates of secondary education (e.g. from higher education institutions (Institutes of Higher Education, Institutes of Vocational Training) teachers</p> <p>After the successful completion of the project the trainees will be awarded 20 ECVET</p>	
Reference Link (if any)	https://ill.hua.gr/programmata/psifiako-alfavito/
Provided By	<ul style="list-style-type: none"> - <i>Name of the Institution/Partner that implemented the practice:</i> Lifelong training Center of Charokopeio University - <i>Contact of the Institution/Partner (name, email, telephone):</i> digitalpha@hua.gr - <i>Name of the Strategy/Programme:</i> : Digital Alphabet - <i>Other useful information (if any):</i>
Language	GREEK

Best Practice n. 4

Topic	Oracle APEX
Best practice Title	Better Employability for Everyone with Oracle APEX
Keywords	Cloud computing, databases, employability, Oracle APEX
Best practice	
<p>The IT sector in the EU is one of the fastest growing ones, and more importantly, it is one of the key sectors central to building a green, digital and resilient economy. The demand for cheap and reliable IT solutions, but also for staff with advanced IT skills, has grown due to Covid-19. According to a survey conducted by McKinsey, digital adoption in Europe has jumped from 81% to 95% because of the Covid-19 crisis. Traditionally, the EU has focused its efforts on developing its programming and consulting services, as opposed to countries like China where the manufacturing IT subsector is very strong. Consequently, the demand for programmers and</p>	





developers in the EU has registered a continuous annual increase since the 1990s, a trend explicit across all EU member states. Reflecting the growing complexity of the IT field and the unmatched demand for front- and back-end developers, two industry trends have manifested which have impacted employment patterns.

Firstly, in more advanced programming fields, a very narrow specialization has taken place requiring staff with advanced specialized knowledge. Secondly, and parallelly, tools and applications have emerged which have enabled low-code development, making it accessible to non-technical staff. Digital technologies are widely used in workplaces in the EU. The European Commission study "ICT for Work: Digital Skills in the Workplace" reveals that 93% of European workplaces use desktop computers, 94% use broadband technology to access the Internet, and 75% use portable computers. 90% of workplaces require that professionals have technical skills. 80% of workplaces require digital skills for sales workers, 50% for building workers, and 27% for employees in elementary occupations.

On the other hand, research carried out by the project consortium indicates that growing up with ICT is not enough to develop the digital skills necessary for the digital economy, and that ICT curricula (even basic level courses) offered to non-ICT majors should be revised in order to better prepare future business graduates for the needs of a digital workplace.

Specifically, the consortium's research has placed knowledge of general database management systems at the bottom of acquired digital literacy skills. While higher education institutions can do little to assist narrow specialization at the bachelor's level, they can develop courses, and learning and teaching materials which propagate the use of software which makes front-end and back-end development accessible to an increasingly larger number of students, thus providing them with skills which are, as seen above, highly valued on the marketplace.

Low-code software is software that can be fully customized with a minimal amount of programming. Instead of taking weeks or months to develop a custom application, it can be done in a few hours or days. While low-code development still requires some basic programming skills, it is faster, cheaper, and easier to learn. It also removes repetitive and boring tasks making development attractive to a larger number of people. Gartner forecasts that low-code application platforms will account for 65% of all application development by as soon as 2024.

The project thus supported the digital transformation of higher education institutions through the development of the digital readiness, resilience and capacity of educators and students. It led to the modernization of IT curricula and courses in the areas of front-end and back-end design of applications and databases by building up higher education institutions' capacities and adopting a more inclusive approach to digital literacy. Such an approach will provide students from non-technical majors with opportunities to advance their IT knowledge in an applied, practical field. This will increase their employability and fill in the gap between the demand and supply of IT developers providing employers with better educated workforce.

According to the European Commission's Higher Education Modernisation Agenda, higher education should enhance individual potential and should equip graduates with the knowledge and core transferable competences they need to succeed in high-skill occupations. In practice, while current EU graduates struggle to find full-time quality employment in line with their studies, employers are unable to meet their demands for highly-qualified staff possessing IT-intensive knowledge and practical digital skills.





The Agenda identifies the slow updating of curricula to the changing needs in the wider economy as one of the challenges higher education institutions need to resolve. The proposed project addresses the discrepancy between graduates' knowledge and the IT skills demanded on the labour market by involving employers (Oracle and local SMEs) in the design and delivery of IT courses, supporting exchange of know-how and expertise among the academic staff of 6 EU higher education institutions, and crafting practical courses which can help attune curricula to current and emerging labour market needs and foster employability and entrepreneurship.

In order to reach and educate a higher number of students, the provision of IT training in higher education should be reconsidered to expand to an increasing number of students enrolled in non-technical study programs, and the use of digital and blended learning tools and methodologies enabling self-regulated and collaborative learning activities should be enhanced.

The possession of development and coding skills is traditionally associated with concrete IT professions such as front-end developer, back-end developer and web developer. Because of the advancement of the digital economy, however, these skills are increasingly needed and used in a wide range of other professions in which case they are complementary, not primary, for the performance of one's job. Higher education should reflect this trend integrating advanced digital readiness in all educational programs.

The project's objective is to contribute to the digital transformation of 6 higher education institutions through the development of the digital capabilities of their educators and students, in particular through the development of blended learning resources and the development of novel teaching and collaborative capacities.

Firstly, the digital capabilities of teaching and research staff will be enhanced through the organizing of training on and expertise-exchange in the areas of digital course creation, low-code programming, and front-end and back-end development of applications and databases.

Secondly, the project contributed to the more inter-connected development of curriculum and blended learning in the area of low-code programming. The main project result is the creation of new courses (a short digital and an advanced extra-curricular course) available for all bachelor-level students enrolled at the higher education institutions.

The courses would be developed through partnership between the higher education and business sectors. Both educators' and students' digital skills in the area of low-code front-end and back-end development of applications and databases will be enhanced. The project proposes an innovative approach to course development based on cooperation with the business sector but also building knowledge from the beginner level (without the existence of previous knowledge) which would speed up the updating of course curricula and with them, students' knowledge, increasing their employability.

On business level, it would enable local businesses to have access to a better educated workforce which is productive and growth-driven. This would increase businesses' performance and lead to economic growth on local level. The project aims at producing the following outputs and tangible and non-tangible results: Tangible

- An advanced extracurricular bachelor-level course on low-code development of front- and back-end applications and databases will be developed. The course's curriculum will comprise lectures, practical





exercises, assessments, exams, and independent learning for a total of 75 hours, which is equivalent to 3 ECTS. The partner institutions will prepare all documentation needed to get the course recognized and awarded with 3 ECTS. The curriculum will not be copyrighted. It will be open access and made available to any other educational institution or any individual interested in independent learning.

- Learning, teaching and assessment materials for the advanced extra-curricular course will be developed, tested (in the advanced extra-curricular course), and assessed, • An e-book will be written on low-code programming with APEX,
- A short digital course for independent learning on low-code development of front- and back-end applications and databased will be developed. The course will be open access and made available to everyone free of charge,
- A 5-day training in Kranj, Slovenia for 18 professors, lecturers and postdoctoral teaching assistants (3 per institution) on the development of digital teaching, learning and assessment materials, and on the use of the low-code programming language APEX,
- 6 pre-recorded webinars on industry and employment trends will be created and distributed, • 12 case studies will be created jointly with local SMEs on the benefits of low-code programming for the business sector, in particular focusing on green and digital business applications,
- 6 academic articles will be written related to the project results,
- 100 higher education students (25 from the applicant institutions and 15 from the other 5 consortium members) will complete the advanced extra-curricular course,
- 180 higher education students (30 per institution) will complete independently the short digital course,
- A project website will be developed with all relevant information about the project activities, outputs and results,
- A showcase of selected students' project work will be assembled and available to watch online by all project partners and the general public,
- Dissemination and multiplier activities (organization of meetings with the academic community, with secondary school students and teachers, and with the business sector) will be organized, promoting the use of project outputs and ensuring their sustainability.

Non-tangible results

- Increased capacities for blended teaching and assessment of the faculty of 6 higher education institutions,
- Modernized curricula in the areas of low-code front and back-end development in 6 higher education institutions,
- Increased knowledge of educators and students in the areas of low-code development of front- and back-end





<p>applications and databases,</p> <ul style="list-style-type: none"> • More inclusive and student-centered IT education, • Improved connectivity between higher education institutions across Europe, • Improved connectivity among higher education institutions and employers on local and European level, • Increased awareness and adoption of project outputs by higher education institutions not included directly in the project, • Enhanced perception of the project benefits by employers on local, national and European level. 	
Reference Link (if any)	https://beeapex.eu/
Provided By	<p>- <i>Name of the Institution/Partner that implemented the practice:</i> International Hellenic University</p> <p>- <i>Contact of the Institution/Partner (name, email, telephone):</i> atsimpiris@ihu.gr</p> <p>- <i>Name of the Strategy/Programme:</i> : Better Employability for Everyone with Oracle APEX</p> <p>- <i>Other useful information (if any):</i></p>
Language	ENGLISH, GREEK, POLISH, SLOVENIAN, CROATIAN, GERMAN

Survey

Aim of the survey is to reach out to various VET institutions/service providers and learners situated across Greece. The survey aims to gather information regarding the current situation of the courses/services offered by the VET sector in the field of cloud computing.





The survey is designed keeping in mind the requirements of the VET sector. Through this survey the consortium will be able to better understand the recent situation of the VET sector in the field of Cloud Computing. In addition to this, the consortium will gain clarity on the courses and services offered by various VET institutions at their local and national level. The consortium will also gain insight regarding the engagement among the VET institutions and learners. Moreover, the survey responses will assist the consortium in developing the Training Scheme and assessment model and MOOC with respect to the requirement of the VET learners while keeping in mind the services offered by the VET institutions.

The target group of the Survey are VET institutions located across Greece and individuals who are looking forward to gaining new skills or are registered VET learners. In order to record their survey, an email was drafted that contains introductory information regarding the SKILLS CLOUD project. The link to the survey was attached with the email. Following this, the partner searched for various institutions via the Google platform that provide Vocational and Educational Training to interested individuals. Then the institutions that provide Cloud Computing services are short listed and the drafted email was sent to them.

The questions that were formulated and were made part of the survey, were drafted keeping in the mind the following aspects:

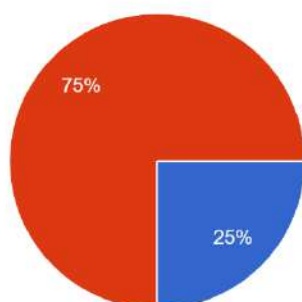
- VET providers and learners.
- Services offered by VET institutions.
- Importance and future relevance of cloud computing.
- Prior knowledge/courses participated in.
- VET Learners preferred learning methodology.
- Willingness to learn new/expand on cloud computing skills.

Survey Analysis

The participants who took part in the were a mix of VET Providers and Learners.

Are you representative of a VET provider or a VET learner?

28 απαντήσεις



- I am a representative of a VET provider (professional schools, VET institutions, etc)
- I am a VET learner (student, newly employed, etc)





Total number of participants: 28

Number of VET Providers: 7

Number of VET Learners: 21

From the pie chart we observe that the survey reached out to a greater number of VET learners as compared to VET providers.

3.1.1 VET Providers Analysis

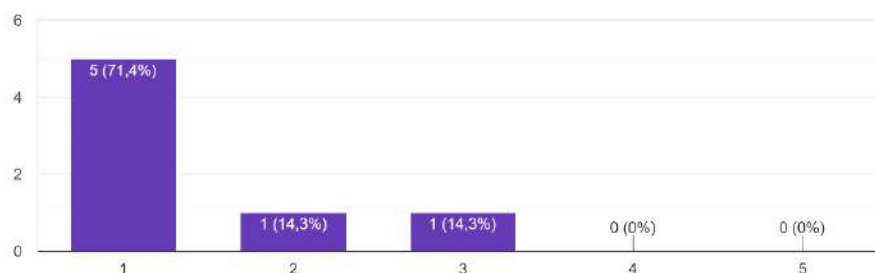
The VET providers (7) who interacted with the SKILL CLOUD Survey Form belonged to different sectors that are:

- Robotics
- Secretary 4
- Technician
- Assistant it

1. Familiarity with Cloud Computing and Its Applications in the workplace.

How familiar are you with cloud computing and its applications in the workplace?

7 απαντήσεις



We can observe that the participants have not interacted with cloud computation as a part of their professional role and are not familiar with its applications.

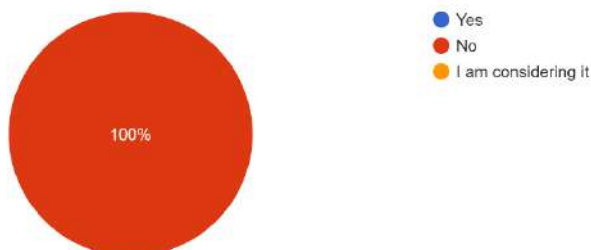
2. Institution Offering any kind of educational path on cloud computing





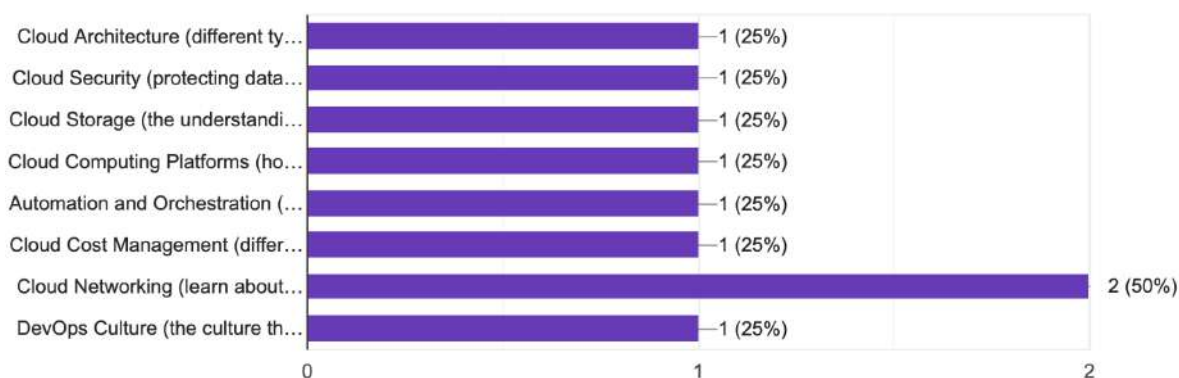
Do you, or the institution you work with, already offer any kind of educational path on cloud computing?

7 απαντήσεις



The figure above shows us that VET institutions are not offering education pathways to VET learners.

- The VET institutions are not offering any cloud computing educational programs so there are no answers.
- Half of the VET providers who participated in the SKILLS CLOUD survey identified Cloud Networking (learn about different types of cloud networking solutions, such as virtual private networks (VPNs)) as the most important cloud computing skill that VET students must acquire.

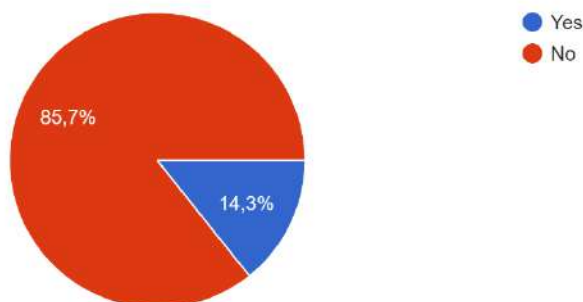




5. The following Pie Chart tells us that there are not many employers that are requesting for VET graduates and that are not.

Have you received any requests from employers for VET graduates with cloud computing skills?

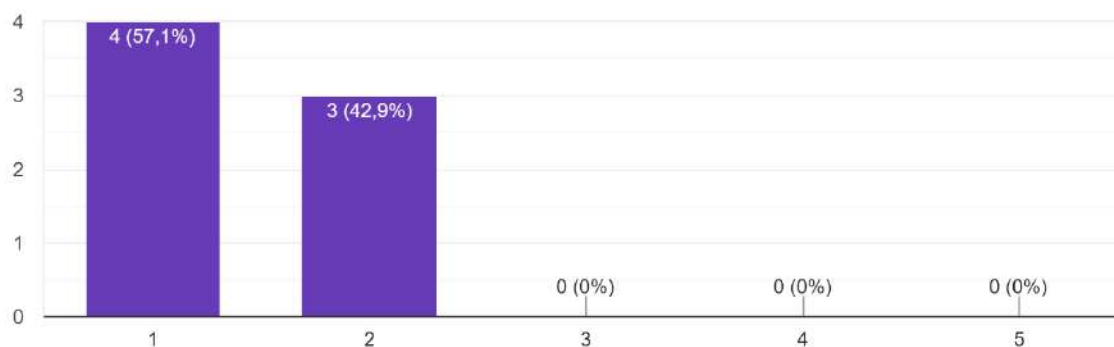
7 απαντήσεις



6. The participants (VET Providers) are not confident about their ability to provide teaching services and disseminate knowledge regarding cloud computing techniques.

How confident are you in your ability to teach cloud computing skills to VET students?

7 απαντήσεις



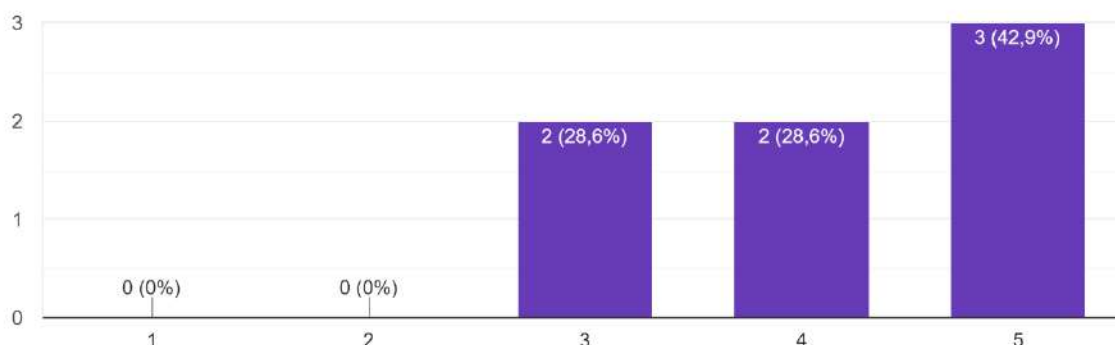
7. 43% of the VET providers have reported an immensely high demand for courses in the direction of cloud computing. Moreover, other two participants have also reported high demand for cloud computing courses and the remaining 2 also reported a demand.





How much demand do you see for cloud computing courses among your VET students?

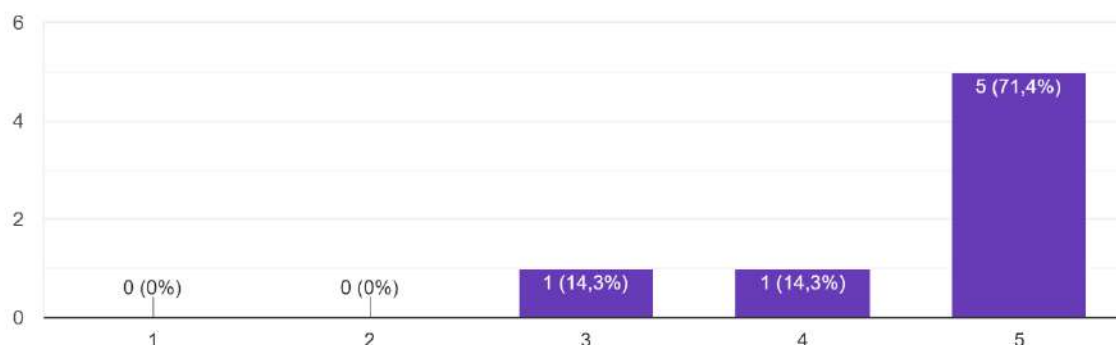
7 απαντήσεις



8. From the figure below we can concur that 70% of VET providers believe it is of upmost important to stay up to date with the latest cloud computing technologies.

How important is it for VET providers and educators to stay up-to-date with the latest developments in cloud computing?

7 απαντήσεις



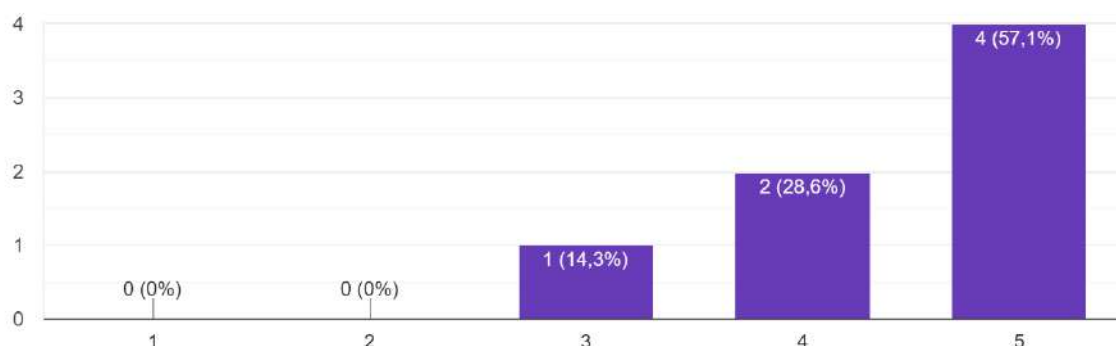
9. 4 out of 7 VET Providers are strongly interested in receiving professional development material and partake in the mobility activities in order to upgrade their teaching skills in the field of cloud computing.





How much would you be interested in receiving professional development materials or take part in specific educational mobilities on cloud computing to strengthen your teaching skills in this field?

7 απαντήσεις

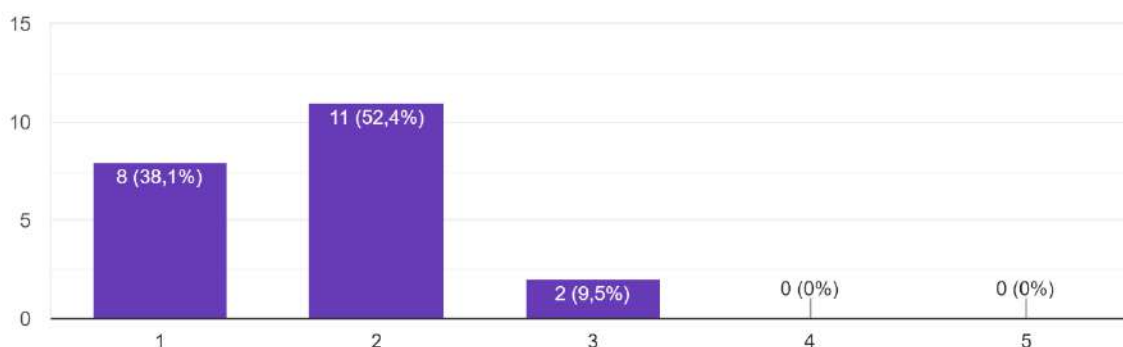


VET Learners Analysis

1. Responses on current level of familiarity with cloud computing technology

What is your current level of familiarity with cloud computing technology?

21 απαντήσεις



Out of the 21 VET learners who participated in the survey, 52.4% (11 learners) reported a level of familiarity with cloud computing technology, rating it as 2 out of 5. Approximately 9.5% (2 learners) rated their familiarity as 3 out of 5, indicating a moderate level of knowledge. However, 38.1% of learners reported a lack of familiarity with cloud computing technology, rating it as 1 out of 5 or lower.

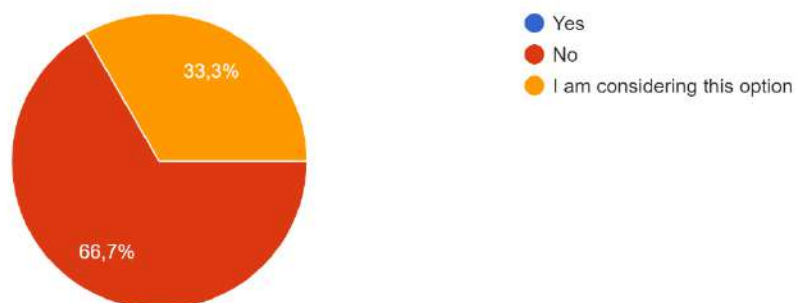
2. Responses on if VET Learner have taken courses or training related to cloud computing





Have you taken any courses or training related to cloud computing?

21 απαντήσεις



According to the responses provided by the surveyed VET learners, 33.3% are currently considering taking courses or training related to cloud computing technology. However, 66,7% of the respondents reported that they have not taken any courses or training related to cloud computing technology, indicating a potential gap in their knowledge and skill set in this area.

3. Responses on the kind of institution the provided Cloud Computing

No answers on this question since the learners have not taken any courses

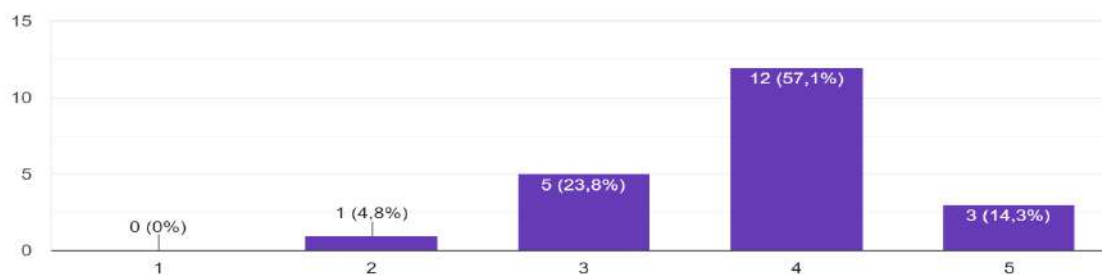
4. Responses on level of cloud computing expertise in VET Learner

No answers on this question since the learners have not taken any courses

5. Responses on importance on cloud computing skills are for future career

How important do you think cloud computing skills are for your future career?

21 απαντήσεις



The surveyed VET learners indicate that cloud computing skills are perceived as important for future careers. Approximately 57% of learners rated the importance of these skills as 4 or 5 on a scale of 1 to 5,



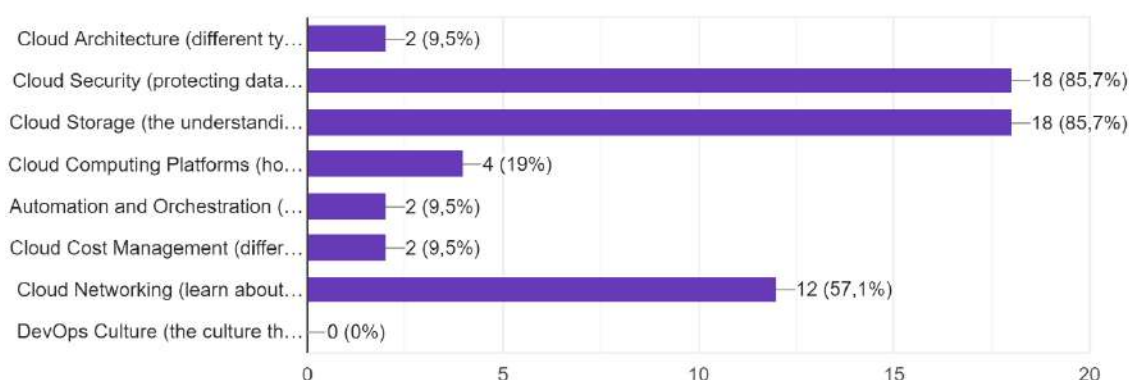


indicating that learners recognize the potential impact of cloud computing technology in the workplace. However, only 4.8% of respondents rated the importance of cloud computing skills as 2 and zero as 1, which shows an awareness of the benefits of cloud computing technology. VET institutions and training providers may need to adapt their offerings to meet the increasing demand for education and training in cloud computing technology, to ensure that learners are equipped with the necessary skills to succeed in the workforce.

6. Responses on the most important cloud computing skills that VET students should learn

In your opinion, what are the most important cloud computing skills that VET students should learn?

21 απαντήσεις

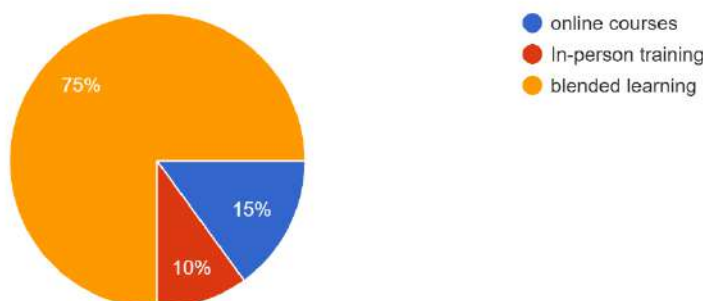


The responses provided by the surveyed VET learners indicate that there are several important cloud computing skills that VET students should learn. The most commonly cited skill was Cloud Security and Storage Platforms, with 12 respondents in each. Other highly rated skills included Cloud Networking, with 12 respondents.

7. Responses on kind of training format do you prefer for learning cloud computing skills

What kind of training format do you prefer for learning cloud computing skills?

20 απαντήσεις



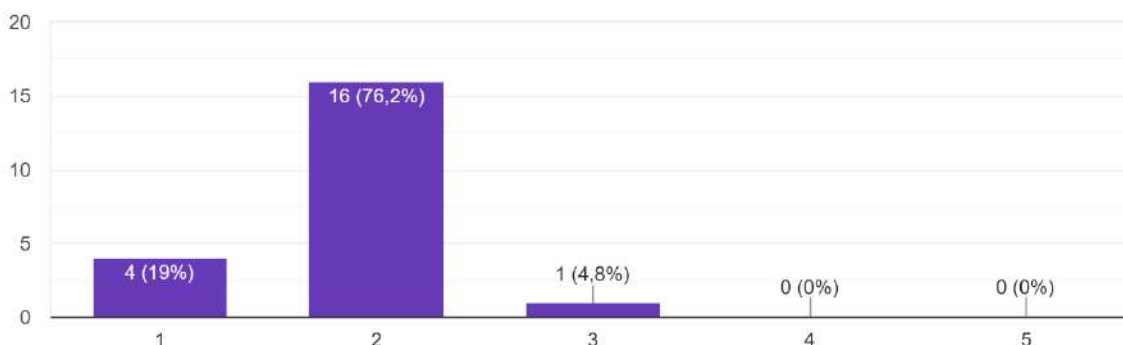


According to the survey results, it appears that 75% of respondents prefer a blended format, which combines in-person and online learning components. On the other hand, 15% of respondents favoured online courses exclusively, while only 10% preferred in-person training.

8. Responses on the confidence in VET Learners ability to use cloud-based software and services

How confident are you in your ability to use cloud-based software and services?

21 απαντήσεις



Based on the survey responses, it appears that there is a lack of confidence among respondents regarding the ability of VET (Vocational Education and Training) learners to use cloud-based software and services. Only one respondent expressed a level of confidence, with a score of 3 out of 5, while the majority of respondents rated their confidence at a level of 2 (16 respondents) or 1 (4 respondents) out of 20.

These results suggest that there is a need to improve the training and support provided to VET learners in the use of cloud-based software and services.

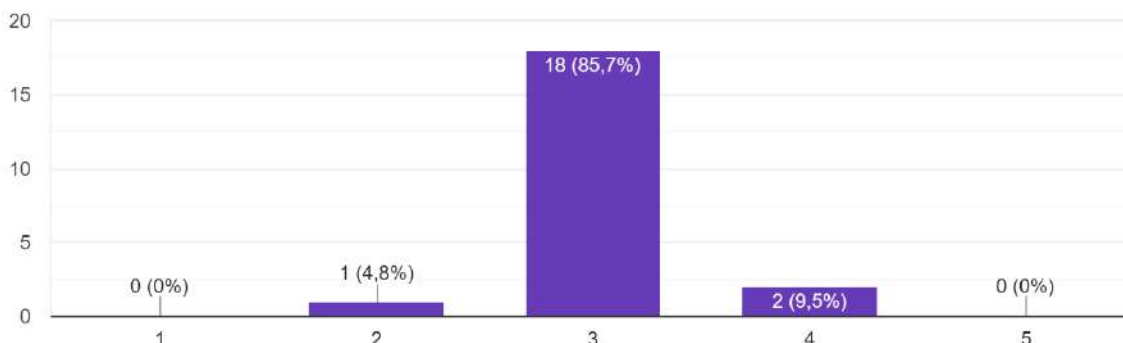
9. Responses on VET Learners interests in receiving professional development materials or taking part in specific educational mobilities on cloud computing to strengthen their competences in this field





How much would you be interested in receiving professional development materials or take part in specific educational mobilities on cloud computing to strengthen your competences in this field?

21 απαντήσεις



According to the survey responses, there is not a high level of interest among VET (Vocational Education and Training) learners in receiving professional development materials or participating in educational mobilities focused on cloud computing to strengthen their competencies in this field. 2 respondents rated their interest level as a 4, indicating a high level of interest, 18 respondents rated their interest level as a 3, suggesting a moderate level of interest.

Conclusion on VET Learners Analysis

Based on the survey results, it appears that VET learners recognize the importance of cloud computing skills for future careers and are interested in receiving education and training in this area.

However they are not familiar with cloud computing technology, never had any related courses and they are not confident to use cloud computing technology but they would like to have online or blended courses.

The VET institutions should start offering cloud related courses, especially in cloud Security, Cloud storage and Cloud networking since there is a lack of such courses in the Greek VET sector.

Focus Group

3.1 General Information about Respondents

Moderator: Project Manager of Computer GR

Participants of the focus group research:

- 21 Vet students 12 boys and 9 girls





- 5 Vet trainers
- 2 management staff from VET providers

The questions asked where:

What is cloud computing?

There was not a clear answer from the participants, they had partial knowledge but after a brief explanation and conversation they realized that this was not new to them but they could not use the proper terms.

Do you use Cloud services in your everyday life? Do you own any cloud accounts?

After a few minutes they realized that they all use Cloud services without even knowing it.

3.2 Information about VET situation on the labor market and the **existing education opportunities (or any educational gaps?)** in the cloud computing sector

Have you ever used Cloud Services at school or in training?

They had all used Cloud Services even though the term is new to them. There were some lessons at school regarding the use of Google Apps, and other Cloud tools.

The trainers and the managers stated that the use of such tools is very common in their work and that in the past years most of their work has moved to cloud.

3.3 Challenges/obstacles that VET learners are facing to establish a career in the ICT and cloud computing-related professions

The constant evolution and the rapid changes in the ICT sector, and as a result in the demands of the labor market has forced everyone to adapt and try to learn all the new tools and required applications. The learners are searching for providers that offer such courses, but most of the providers are not adapted to the new needs of the labor market and there are not many related courses.

3.4. Comments and personal opinion

There is a high demand for cloud computing skills in the labour market in Greece. Almost all sectors are searching for employees with such skills and according to a survey conducted by the Association of Greek industries there is a lack of 100.000 trained personnel.

There is also a gap in the training sector. The VET providers have to adapt to the new situation. They have to take the necessary actions to provide the required skills and knowledge of the rapidly evolving ICT Sector so that learners with the proper guidance and training can establish a career in ICT and cloud computing relating professions.





CONCLUSION

This report brought together data from project partners of the Skills Cloud project regarding best practices in the cloud computing sector and the needs of the sector to upskill their cloud computing skills.

The first part of the national reports contains the best practices of each partner country. Four best practices from each partner country were presented, for a total of 20 best practices. The best practices are national or international projects, academic research, initiatives, and entrepreneurial practices.

The second part of the report presents the data and findings of the quantitative research with VET providers and VET learners in partner countries.

Country-Specific Highlights of Quantitative Research

Germany

The survey analysis consisted of 21 participants, including 4 VET providers and 17 VET learners. It revealed that VET learners outnumbered VET providers. The majority of participants (75%) had experience with cloud computing and were familiar with its applications in the workplace. VET providers faced challenges such as understanding different cloud types, data security, technical complexity, and keeping up with the latest trends. Half of the participating VET providers identified cloud networking as the most important skill for VET students. Demand for cloud computing courses was reported to be high among VET providers. Most VET providers recognized the importance of staying up to date with the latest cloud computing technologies. They expressed a strong interest in professional development materials and mobility activities to enhance their teaching skills in cloud computing. Among VET learners, a significant portion reported a lack of familiarity with cloud computing technology. However, they expressed interest in taking courses or training related to cloud computing, indicating a demand for education in this area. Private institutes were the primary source of cloud computing education for VET learners. VET learners recognized the importance of cloud computing skills for future careers. Important cloud computing skills highlighted by VET learners included cloud computing platforms, cloud security, cloud storage, cloud architecture, automation and orchestration, cloud cost management, cloud networking, and DevOps culture. Preferences for training formats varied, with a significant portion favoring a blended format combining in-person and online components. Confidence levels in VET learners' ability to use cloud-based software and services varied, indicating a need for improved training and support. VET learners expressed a high level of interest in receiving professional development materials and participating in educational mobilities focused on cloud computing.

Türkiye

A total of 23 participants completed the survey, with VET learners comprising 56.5% (N = 13) and VET providers accounting for 43.5% (N = 10). For VET Providers, the findings revealed that 90% of the





participants belonged to the ICT sector. Additionally, over 50% of the respondents expressed familiarity with cloud computing and its applications in the workplace. However, the survey also highlighted a significant gap in cloud computing education, as only 10% of the sample offered any form of educational path in this field. Consequently, there were no responses regarding the challenges faced in teaching cloud computing to VET students, given the low percentage of participants involved in training activities. The survey results indicated that VET providers consider several key cloud computing skills important for VET students. These skills include cloud security, cloud architecture, and cloud storage. Interestingly, none of the participants reported receiving requests from employers for VET graduates with cloud computing skills. Confidence levels among VET providers in teaching cloud computing were generally low, and there was limited demand for cloud computing courses among VET students. However, VET providers expressed a strong interest in receiving professional development materials and participating in educational mobilities to enhance their teaching skills in cloud computing. Turning to VET Learners, the survey revealed inconsistencies in their familiarity with cloud computing technology, potentially resulting from a lack of formal education in this area. Only a small number of VET learners (n = 1) had taken courses or training related to cloud computing, while the majority (77%) had not received any such education. Nevertheless, VET learners recognized the importance of cloud computing skills for their future careers at varying levels. Regarding the most important cloud computing skills for VET students, VET learners had differing opinions. DevOps culture emerged as the most favoured skill, emphasising collaboration between developers and operations teams. In contrast, cloud storage was not considered a preferred skill. In terms of training preferences, in-person training was the most preferred format, followed by online courses, while blended learning ranked the lowest. VET learners exhibited an average level of confidence in their ability to use cloud-based software and services, indicating room for improvement and support. Their motivation to receive professional development materials or engage in educational mobilities specific to cloud computing was also found to be average.

Italy

A total of 15 participants completed the survey, with 66.7% being VET learners (N=10) and 33.3% being VET providers (N=5). For VET providers, their specific fields in the VET sector varied, including administration, training and evaluation, language, education and training, and project assistance. Regarding familiarity with cloud computing and its applications, 3 out of 5 respondents were very familiar, while the other 2 had less confidence in the topic. Around 40% of the VET providers reported offering some form of educational path on cloud computing, while 20% did not, and 40% were considering starting such a program. However, there were no responses to the question regarding challenges encountered when teaching cloud computing to VET students. The most voted cloud computing skills among VET providers were cloud computing platforms, cloud security, cloud storage, and DevOps culture. Only 3 respondents received requests from employers for VET graduates with cloud computing skills, while the majority lacked confidence in teaching cloud computing to VET students. Despite this, VET providers emphasized the importance of staying up-to-date with the latest developments in cloud computing and showed interest in receiving professional development materials and participating in educational mobilities to enhance their teaching skills. Among VET learners, familiarity with cloud computing technology varied greatly, with 20% being familiar, 50% having limited familiarity, and 30% having no familiarity at all. Only 10% of respondents had attended cloud computing courses or training, and the same percentage was considering it. This corresponds with the perception of low demand for cloud computing among VET students expressed by VET providers. All respondents who attended a cloud computing course reported it being organized by public organizations. VET learners agreed that their level of expertise after the course was at Level 3, indicating the ability to implement cloud computing solutions. The majority of VET learners (90%) considered cloud computing skills





important for their future careers. Opinions on the most important cloud computing skills for VET students varied, with cloud security and cloud networking being the most chosen. However, there was a general interest in all cloud computing skills except for automation and orchestration. Online training was preferred by most VET learners, with none considering blended training formats. VET learners generally had a good level of confidence in using cloud-based software and services, even without attending a specific course. The majority of VET learners expressed interest in receiving professional development materials or participating in specific educational mobilities.

Ireland

A total of 21 participants completed the survey, with 60% being VET learners (N=12) and 40% being VET providers (N=8). For VET providers, the main occupation reported in the VET sector was educator/teacher. Familiarity with cloud computing and its applications was generally low, with only 22% of respondents stating they were really familiar with it. None of the respondents reported having an educational path on cloud computing offered by their company, indicating a lack of training opportunities in this area. Consequently, there were no responses to the question regarding challenges encountered when teaching cloud computing to VET students. VET providers identified the most important cloud computing skills as cloud computing platforms, cloud security, and cloud storage. Only one respondent received requests from employers for VET graduates with cloud computing skills, and most VET providers lacked confidence in their ability to teach cloud computing to VET students. There was also a poor demand for cloud computing courses among VET students. However, VET providers recognized the importance of staying up-to-date with the latest developments in cloud computing and expressed interest in receiving professional development materials or participating in educational mobilities to enhance their teaching skills. Among VET learners, familiarity with cloud computing technology varied. About 41.7% reported being somewhat familiar, while 33% were not familiar at all, and 25% were only slightly familiar. Only 16.7% of respondents had attended cloud computing courses or training, but 58.3% were considering this option, indicating interest in the topic. Cloud computing courses were held by both public and NGO organizations. VET learners perceived their level of expertise after the course as familiarity with cloud computing terminology and concepts. The majority of VET learners (66.7%) agreed that possessing cloud computing skills was important for their professional future. The most chosen skill was cloud storage, but there was a general interest in all cloud computing skills. Online training was preferred by most VET learners, and there was generally low confidence in personal ability to use cloud-based software and services due to a lack of skills in the area.

Greece

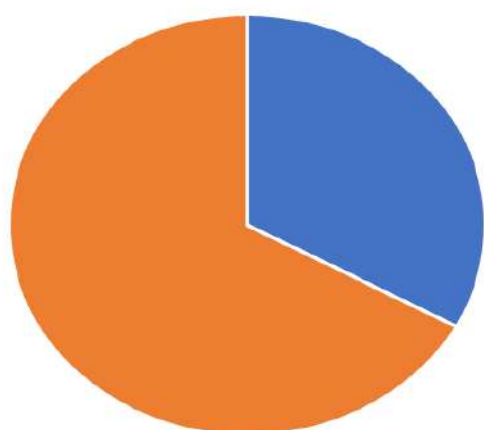
There were more VET learners (21) than VET providers (7) who participated in the survey. The VET providers were from various sectors, but they lacked familiarity with cloud computing and did not offer any educational pathways in this field. However, there was high demand for cloud computing courses, particularly in cloud networking. VET providers expressed the importance of staying up to date with cloud computing technologies and showed interest in receiving professional development materials and participating in mobility activities. Among the VET learners, approximately 52% reported some familiarity with cloud computing, while the majority had no prior training or knowledge in this area. Cloud computing skills were considered important for future careers, with an emphasis on cloud security, storage platforms, and networking. Blended learning formats were preferred by 75% of learners, and there was a lack of confidence in their ability to use cloud-based software and services. Interest in receiving professional development materials or participating in educational mobilities related to cloud computing was moderate.





Comparative Analysis

The participants who took part in the survey were a mix of VET Providers and Learners
(n:36 VET providers, n:73 VET learners)



■ VET Providers ■ Vet Learners

VET learners

The survey completed by 36 VET providers from different sectors like;

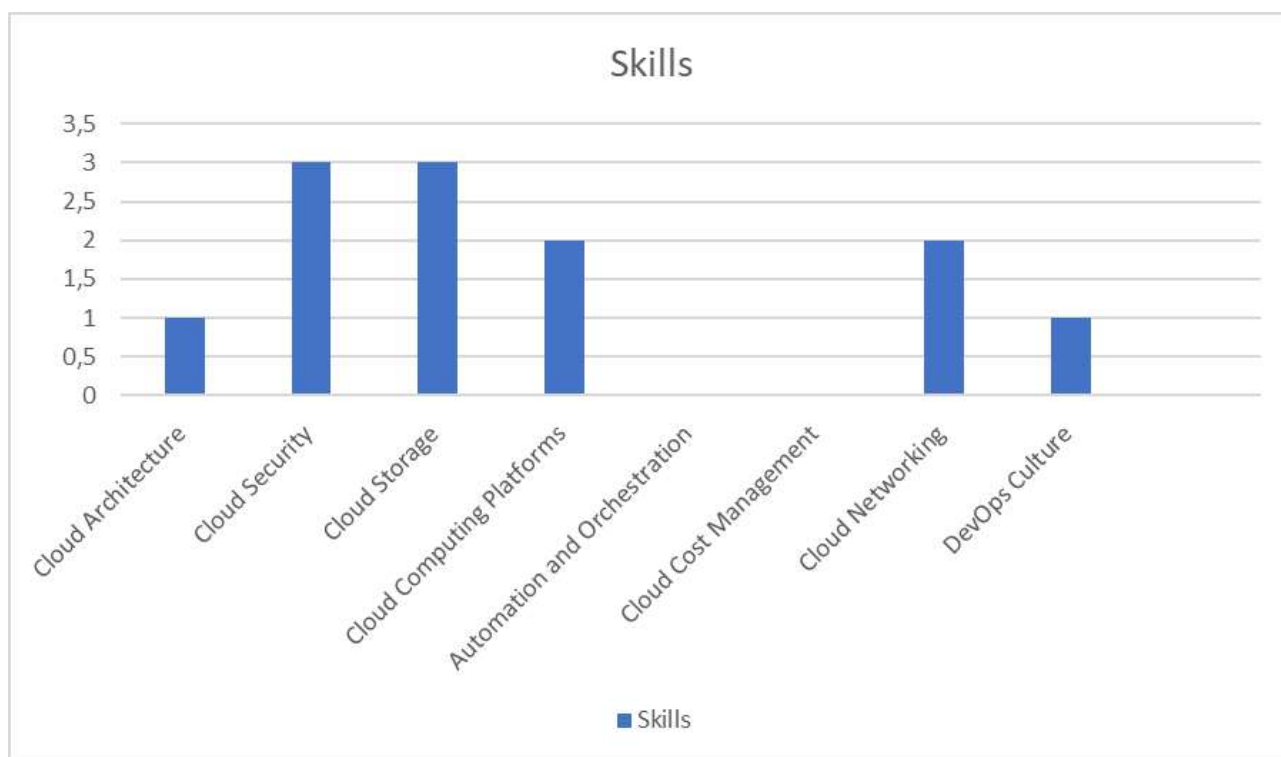
- Computer Science
- System analysis and design
- Networking
- Information and Communication Technology
- Electronics
- Robotics
- Secretary
- Technician
- Assistant IT
- Hotel
- Educator
- Human science teacher
- Educator high school





- Vocational training, organizing internships for students abroad
- Teacher
- Educator
- Vocational projects
- English teacher
- Administration
- Training and evaluation
- Education and Training
- Project assistant

The survey shows that VET providers are mostly familiar with cloud computing and its applications in the workplace. In contrast to this finding, there is not any kind of educational path on cloud computing in partner countries, which highlights the gap in education in cloud computing.



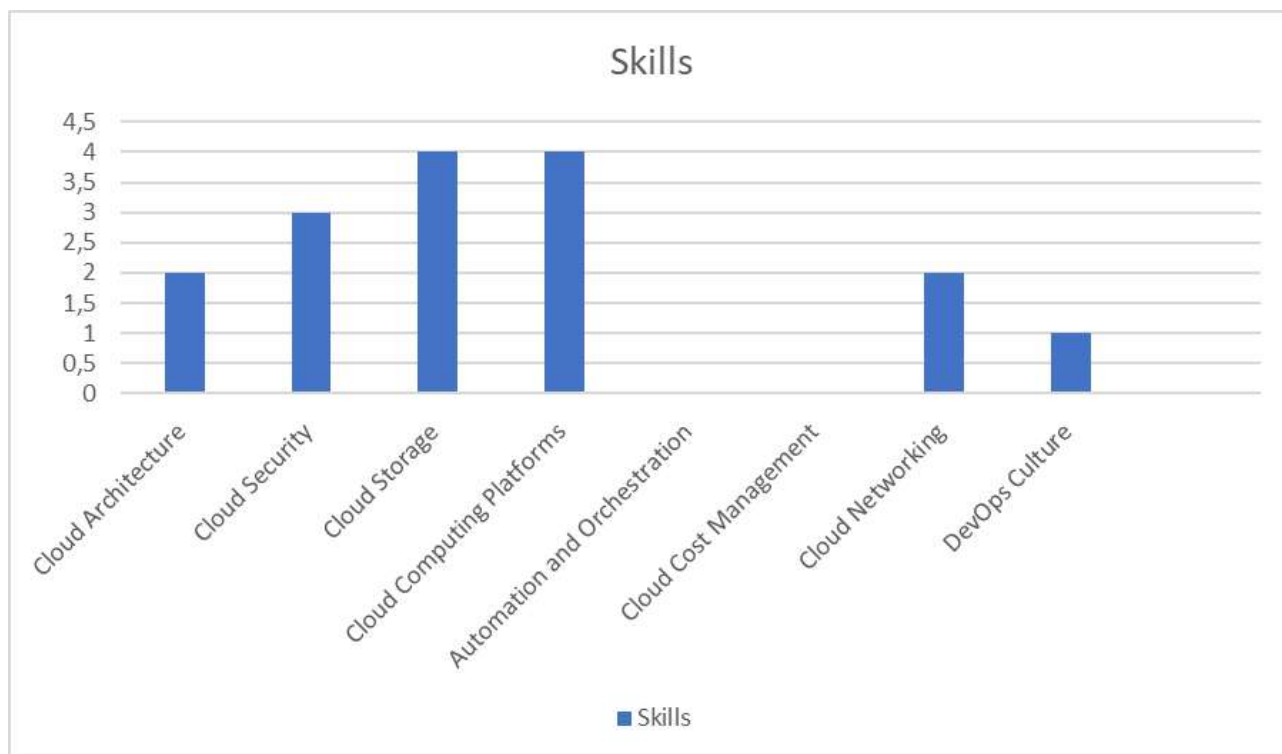
The graph shows that VET providers believe that the most important cloud computing skills that VET students should learn are; Cloud Security (protecting data and infrastructure in the cloud) and Cloud Storage (the understanding of the different types of cloud storage solutions). The least important ones are cloud cost management and Automation and Orchestration. To stay up-to-date with the latest developments in cloud computing is highly important for VET providers from all partner countries. Parallel to this finding, the VET providers are highly interested in receiving professional development materials or





taking part in specific educational mobilities on cloud computing to strengthen their teaching skills. Finally, according to VET providers, there is a low demand for cloud computing skills in this sector.

The survey was also completed by 73 VET learners in total. The familiarity of VET learners is inconsistent and low; it might result from the gap in education in cloud computing in formal education. Because, later question shows that a very low number of VET learners have taken a course about cloud computing, The VET learners who took a course about cloud computing stated that the course was provided by public institutions.



According to VET learners, cloud computing platforms, cloud storage and cloud security are the most important cloud computing skills that VET learners should learn. Similar to VET providers, the least preferred skills by VET learners are cloud cost management and automation and orchestration. VET learners consider cloud computing skills to be very important for their future careers. They would like to take courses on these topics. VET learners prefer blended training first and online training second. The least preferred type of training is face-to-face training. VET learners are not very confident about their cloud computing skills and there is an above average demand to receive professional development materials or to participate in specific educational mobilities on cloud computing.





According to comparative analysis, Similarities are;

1. VET providers in all countries expressed the importance of staying up-to-date with the latest developments in cloud computing.
2. There was a demand for professional development materials and educational mobilities among VET providers in all countries.
3. VET learners in all countries recognized the importance of cloud computing skills for their future careers.

Differences are;

1. Familiarity with Cloud Computing: Germany had the highest percentage of participants with experience and familiarity with cloud computing (75%), while other countries reported lower levels of familiarity among participants.
2. Cloud Computing Education: Germany had high demand for cloud computing courses among VET providers, whereas Türkiye, Italy, Ireland, and Greece reported low demand or a lack of educational paths in this field.
3. Skills Emphasised: The most important cloud computing skills varied across countries. For VET providers, Germany highlighted cloud networking, Türkiye focused on cloud security, storage, and architecture, Italy emphasised cloud computing platforms, security, storage, and DevOps culture, and Ireland emphasized cloud computing platforms, security, and storage.
4. Training Preferences: VET learners' preferences for training formats varied. Blended learning ranked the lowest in Italy and Greece, while in-person training was the most preferred format in Türkiye and Ireland.
5. Confidence Levels: Confidence levels in using cloud-based software and services varied among VET learners. Germany and Ireland had average confidence levels, while Greece reported a lack of confidence due to a lack of skills in the area.

Highlights of the Focus Groups

In addition to the quantitative study, a focus group study was conducted with sector stakeholders and the data obtained were analysed. Based on the focus group reports from different countries, findings regarding the VET situation in the labor market and existing education opportunities in the cloud computing sector:

VET Situation in the Labor Market:

There is an increasing demand for cloud computing skills in the labor market across multiple sectors, including health, security, and ICT. The demand for cloud computing skills is widespread and significant, with some reports mentioning a shortage of trained personnel. VET providers need to adapt to the new situation and take necessary actions to provide the required skills and knowledge for the rapidly evolving ICT sector.





Existing Education Opportunities in the Cloud Computing Sector:

The focus group participants identified a gap in the education/training sector related to cloud computing. Cloud computing is not currently included in school curricula in some countries, and there are limited training opportunities available. Despite the lack of formal training, cloud computing is already being used in daily life by learners and teachers. VET providers should work closely with the industry to develop comprehensive training programs that address the challenges and obstacles faced by learners in establishing a career in the ICT and cloud computing-related professions.

Challenges/Obstacles for VET Learners in ICT and Cloud Computing-related Professions:

Resistance to digitalization and limited digital skills of educators pose challenges for learners in adopting and effectively using digital tools, including cloud computing. There is a gap in foundational STEM education, particularly in math and STEM-related skills required for understanding the complexity of programming and cloud computing. Learners need guidance and technical materials to understand the broader scope of cloud computing beyond data storage. Communication with the sector and understanding the practical applications of cloud computing are crucial for learners to establish a career. Lack of awareness and familiarity with cloud computing among VET providers and learners is a common obstacle that needs to be addressed. Access to practical experience through internships and workplace opportunities is limited, hindering learners' ability to gain hands-on experience in the field.

To address these challenges, it is important for VET providers to enhance their relationships with the industry, update curricula to include cloud computing, provide proper guidance and training, and ensure a holistic approach that includes technical skills, soft skills, and a comprehensive understanding of the implications and applications of cloud computing in various sectors.





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