Up-skilling the VET sector to Cloud Computing

KA220-VET - Cooperation partnerships in vocational education and training

NATIONAL REPORT

Afridat UG and NGO Nest

Germany

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1. Introduction

Up-skilling the VET sector to Cloud Computing is a 24-month cooperation partnership project in the VET sector. Project coordinator is Afridat UG (DE), and partners are Umbria Training (IT), European Career Evolution (IE), NGO NEST (DE), NATSIKAS K & SIA EE COMPUTER GR (GR), Nicea Kültür ve Eğitim Derneği (TR). The project was initiated by the consortium to assist the digital transformation of the VET sector by supporting the digital readiness and resilience of the VET providers. To accomplish this feat, the consortium will focus on disseminating knowledge regarding cloud computing best practices and support the VET provider in developing expertise in ICT skills that could be distributed amongst the VET learners. The project will also address professional and sustainable needs of the target group via its deliverables.

The objective of the project is to offer work based learning opportunities and vocational trying in the area of cloud computing sector and ICT skills. The opportunities will be adapted to the digital world of the modern era and will be in accordance with the policies of the European Commission. Therefore as a result of this project, VET providers will gain the chance to build upon their educational foundation and would be able to assist VET learners in upskilling themselves with the latest trends and insights in the area of cloud computing. This in return would prepare the learners for the labour market and instil them with the skills necessary to take advantage of the available opportunities and meet the demand of the workforce.

The project aims to target the following objectives:
- Promoting the use of cloud computing curriculum as a new teaching opportunity and training offer within the VET sector.
- Fostering the skills of participating VET learners (16-25 years old) in the digitalization era by means of 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.

After the completion, the project will produce the following results:
- Research Report: State of the art publications, reports data collected by each partner country regarding the use of cloud computing, including best practices and showcases of SMEs.
- Training Scheme and Assessment Model: The deliverable will integrate a set of qualifications and skills in the cloud computing field, designed in accordance with the European lifelong learning instruments (EQF), allowing the target groups to acquire certifications relevant in the labour market.

- MOOC: A MOOC addressing different aspects of cloud computing for VET providers, regarding practical applications of cloud computing technology into the field for labour market guidance.
- Piloting phase Report: A Joint staff mobility and a local phase will be implemented to test the deliverables of the project with participants from each partner country.

2. Desk Research: Best Practices

Best Practice n. : 1
Best Practice title: dBildungscloud (Educational Infrastructure)

Project partner:

Topic	**An open source cloud based solution for schools across Germany.**
Best practice Title	**dBildungscloud**
Keywords	**Cloud computing, educational infrastructure.**

Best practice

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 Shulcloud. The solution is offered as a state centric solution which includes all the schools across various states of Germany.

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 Shulcloud regions of Germany.

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.

The Niedersächsische Bildungscloud, Schulcloud Brandenburg, and the Thuringen Shulcloud 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.

Objectives:

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, theri 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 su=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 Shulcloud 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 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.

Impact:

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)	https://dbildungscloud.de/ https://hpi.de/open-campus/hpi-initiativen/hpi-schul-cloud.html
Provided By	*- Name of the Institution/Partner that implemented the practice: Hasso Plattner Institute and Federal Ministry of Education and Research* *- Contact of the Institution/Partner (name, email, telephone): Dataport Bildungscloud | dBildungscloud Dataport AöR* *Altenholzer Straße 10-14, 24161 Altenholz* *Telefon: +49 (431) 3295-0* *E-Mail: poststelle@dataport.de* *De-Mail: poststelle@dataport.de-mail.de*

	- *Name of the Strategy/Programme: dbildungscloud*
	- *Other useful information (if any):*
Language	ENGLISH, DEUTSCH

Best Practice n. : 2
Best Practice title: Digital Strategy 2025

Project partner:

Topic	A nationwide strategy to boost the journey of digital transformation.
Best practice Title	Digital Strategy 2025
Keywords	Digital Transformation, Education Infrastructure
Best practice	

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.

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.

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.

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:

1. Data analyst skills: 45%
2. Social media competence skills: 35%
3. Data protection and security skills: 25%

The digital strategy is structured on the following 10 pillars essential for digital transformation to be established by 2025:

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.

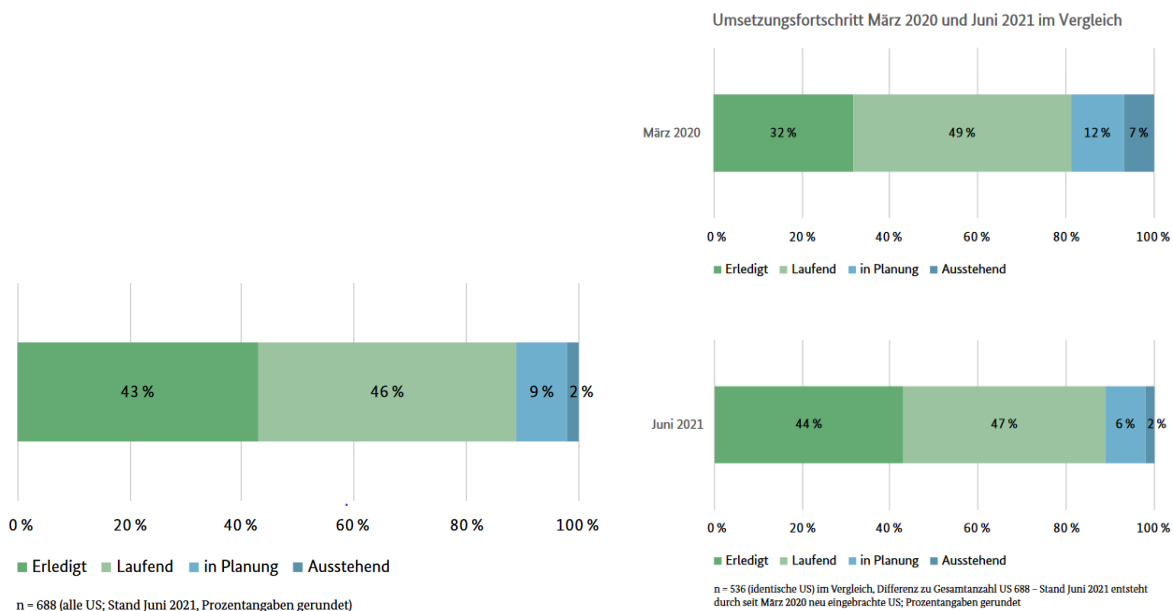Target Group: Labour force, ICT professionals, schools, VET sectros.

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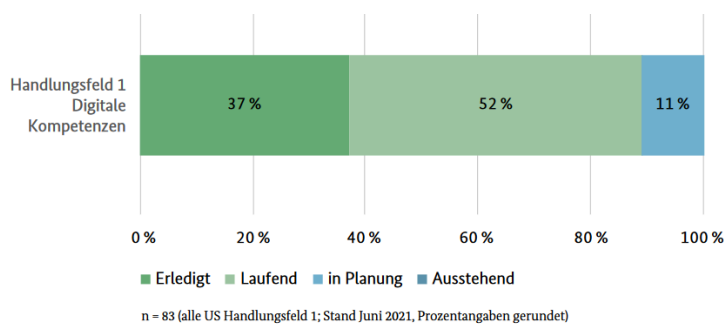
Quantitative outcomes: The various initiatives launched as a part of the strategy. The latest implementation interim report was released in June 2021. A total of 688 implementation steps
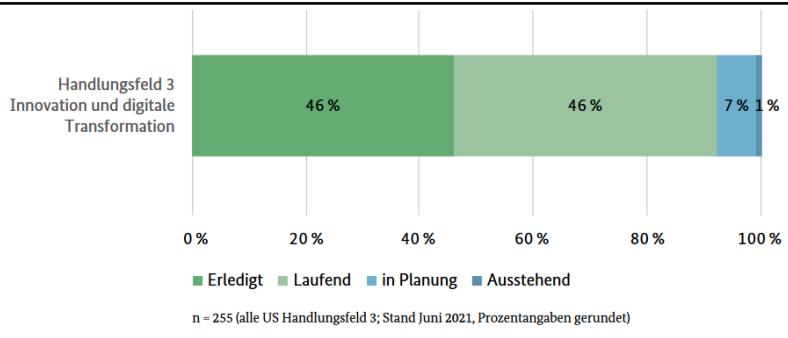
have been recognised. As of June 2021, 43% steps have been successfully implemented, 46% steps are currently being implemented with 9% in the planning phase and 2% outstanding. As compared to March 2020 the outstanding steps accounted for 7% with only 32% steps implemented.

Umsetzungsfortschritt März 2020 und Juni 2021 im Vergleich

	Erledigt	Laufend	in Planung	Ausstehend
März 2020	32 %	49 %	12 %	7 %

	Erledigt	Laufend	in Planung	Ausstehend
	43 %	46 %	9 %	2 %

n = 688 (alle US; Stand Juni 2021, Prozentangaben gerundet)

	Erledigt	Laufend	in Planung	Ausstehend
Juni 2021	44 %	47 %	6 %	2 %

n = 536 (identische US) im Vergleich, Differenz zu Gesamtanzahl US 688 – Stand Juni 2021 entsteht durch seit März 2020 neu eingebrachte US; Prozentangaben gerundet

Among a total of 688 steps, 88 steps belong to the education industry across all sectors (i.e. day-care facilities, universities, schools, continuing education institutions, VET sector, and non-formal and informal educational centres.) and 255 steps belong to the digital transformation category.

	Erledigt	Laufend	in Planung	Ausstehend
Handlungsfeld 1 Digitale Kompetenzen	37 %	52 %	11 %	

n = 83 (alle US Handlungsfeld 1; Stand Juni 2021, Prozentangaben gerundet)

As a part of the digital competency, the Government has launched 20 projects with 88 implementation steps in the key areas of In three key areas of education, training and continuing education. Whereas 20 projects have been launched with 255 implementation steps across sectors like health, innovations and start-ups, digital transformation of the economy, transformation in higher education and Research, Digital innovations for the environment, Climate and Resource and defence policy.

9

Handlungsfeld 3 Innovation und digitale Transformation: Erledigt 46 %, Laufend 46 %, in Planung 7 %, Ausstehend 1 %

Erledigt   Laufend   in Planung   Ausstehend

n = 255 (alle US Handlungsfeld 3; Stand Juni 2021, Prozentangaben gerundet)

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 Government
	- Contact of the Institution/Partner (name, email, telephone): Federal Ministry for Economic Affairs and Climate Action
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	Scharnhorststraße 34-37
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	Email: info@bmwk.bund.de.
	- Name of the Strategy/Programme: Digital Strategy 2025
	- Other useful information (if any):
Language	ENGLISH, DEUTSCH

Best Practice n. 3

Best Practice title: Additional qualifications for digital competences in training and further education

Project partner: ABB Bildungszentrum Berlin gGmbH in partnership with kos GmbH

Topic	developing an approach to prepare apprentices, skilled workers and educational staff for the digitised and automated world of work
Best practice Title	Additional qualifications for digital competences in training and further education
Keywords	qualifications for digital competences in training and further education germany
Best practice	

Additional qualifications for digital competences in training and further education

"Additional qualifications for digital skills in education and training" is a project as part of the Berlin Senate's "Work 4.0 made in Berlin" strategy, which deals with the challenges of digitization and implements various model projects. One focus is on training, further education and the design of "good work". The "Additional Qualifications" project is funded by the Senate Department for Integration, Labor and Social Affairs (duration: 03/2016 to 12/2018, as transfer office 01/2019-12/2019). In January 2020, it was extended again as the transfer office "Additional qualifications in digital skills for trainees and training staff". The project sponsor is ABB Training Center Berlin gGmbH.

The task of the project is the development of cross-occupational and job-specific additional qualifications (ZQ), which are intended to close "digital competence gaps". The mere acquisition of knowledge and skills no longer adequately prepares for the working world of tomorrow - the development of "digital skills" is central, ie in particular personal skills for self-organized, creative action and for self-organized coping with (today unknown) challenges.

In order to be able to develop and train these competencies, the learning processes must also change: they become more self-organized, they use the Internet as a social space for the development of competencies, and the acquisition of knowledge in the learning process takes place through tasks to be solved. These requirements form the starting point of the "Additional Qualifications" project.

Further information on the content, structure and scope of the project can be found here.

The project "Additional qualifications for digital skills in education and training" was implemented by ABB Bildungszentrum Berlin gGmbH in partnership with kos GmbH from March 2016 to December 2018. From 01.01. From December 31, 2019, the project was transferred to the "Transfer Office for Additional Qualifications for Digital Skills", which was implemented by kos GmbH in partnership with ABB Training Center Berlin gGmbH.

Model approach

In the project, we are realizing the development of cross-occupational and job-specific additional qualifications (ZQ), which are intended to enable the necessary development of skills against the background of Work 4.0 for different target groups. We use the additional qualification instrument as an element of a forward-looking qualification and further training policy. In addition to the cross-occupational additional qualification, we use examples to determine which job-specific digital skills will be required in the future and how these can be mapped.

When developing additional qualifications, we have different target groups in mind; in addition to trainees, these are company training staff and teachers at vocational schools. However, specialists who need additional skills for the world of work 4.0 are also a target group in the context of professional training.

The model approach also includes the development of a teaching-learning concept that is suitable for the development of skills geared towards the digitization of the working world.

Reference Link (if any)	kompetenzen-digital.de/

Provided By	*- Name of the Institution/Partner that implemented the practice:* ABB Bildungszentrum Berlin gGmbH; kos GmbH
	- Contact of the Institution/Partner (name, email, telephone):
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	Lessingstr. 89, 13158 Berlin
	- Name of the Strategy/Programme: Additional qualifications for digital competences in training and further education
	- Other useful information (if any):
	RESULTS: https://kompetenzen-digital.de/ergebnisbox/
	PUBBLICATIONS: https://kompetenzen-digital.de/publikationen/
Language	ENGLISH

Best Practice n. 4

Best Practice title: VET 4.0 initiative

Project partner: Federal Ministry of Education and Research (BMBF) and the Federal Institute for Vocational Education and Training (BIBB).

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	

VET 4.0 initiative

The BMBF and the BIBB want to contribute to the implementation of the Digital Agenda with a joint initiative "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 I) 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 occupationand 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 pacesetting 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 pacing companies. The project give an answers to the following questions:

- How do Economy 4.0 job profiles fit with existing education and training occupations?
- 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	- *Name of the Institution/Partner that implemented the practice:* Federal Ministry of Education and Research (BMBF) and the Federal Institute for Vocational Education and Training (BIBB). - *Contact of the Institution/Partner (name, email, telephone):* - *Name of the Strategy/Programme:* VET 4.0 - *Other useful information (if any):*
Language	ENGLISH

3. Survey Report

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.

3.1 Survey Analysis

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

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

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.

3.1.1 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.
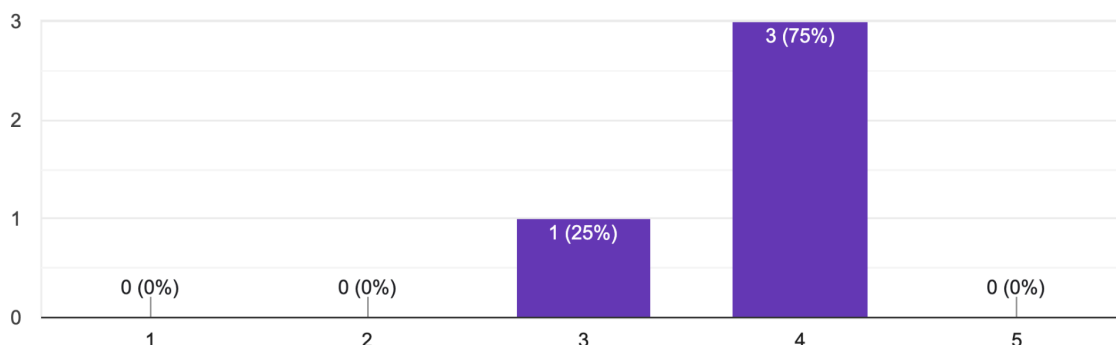
We can observe that a majority (75%) of the participants have interacted with cloud computation as a part of their professional role and are familiar with its applications.

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

Legend: Yes, No, I am considering it (pie chart showing 50% Yes, 50% No)
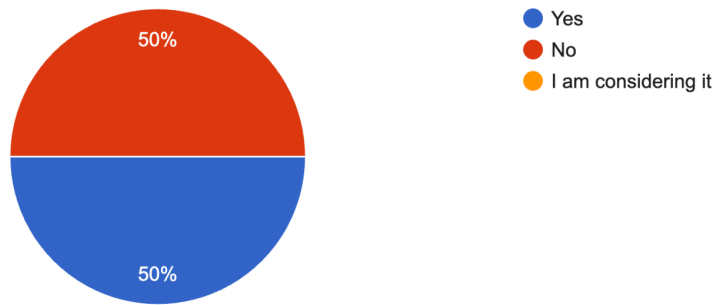
The figure above cannot assist us in coming to a decisive analysis, whether more VET institutions are offering education pathways to VET learners or not.

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.

Bar chart:
- Cloud Architecture (different ty…): 1 (25%)
- Cloud Security (protecting data…): 1 (25%)
- Cloud Storage (the understandi…): 1 (25%)
- Cloud Computing Platforms (ho…): 1 (25%)
- Automation and Orchestration (…): 1 (25%)
- Cloud Cost Management (differ…): 1 (25%)
- Cloud Networking (learn about…): 2 (50%)
- DevOps Culture (the culture th…): 1 (25%)
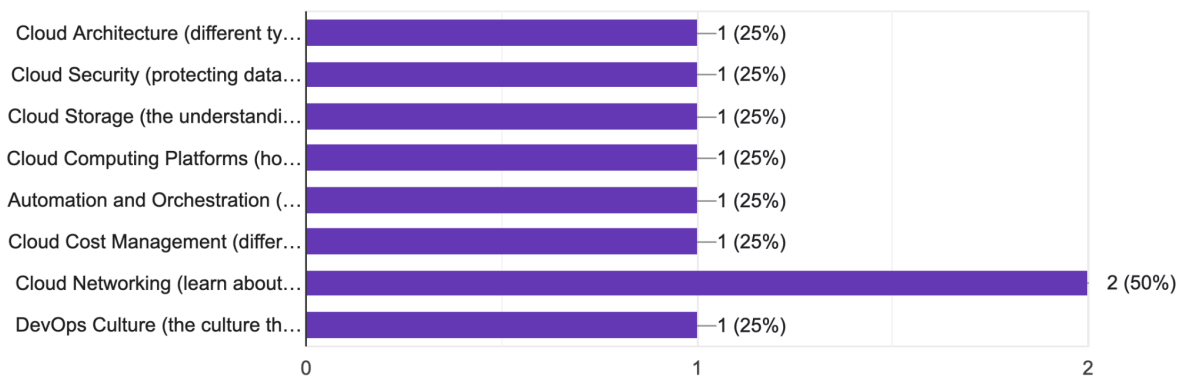
5. The following Pie Chart tells us that there is a balance between employers that are requesting for VET graduates and that are not. However, we cannot determine if the need for VET graduates is increasing or decreasing in response to the current job market
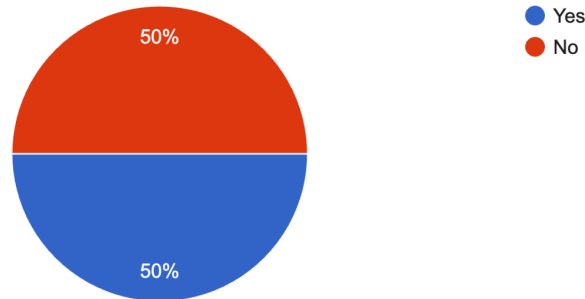
6. Half of the participants (VET Providers) are confident about their ability to provide teaching services and disseminate knowledge regarding cloud computing techniques. Whereas the other half of the participants were not so confident.
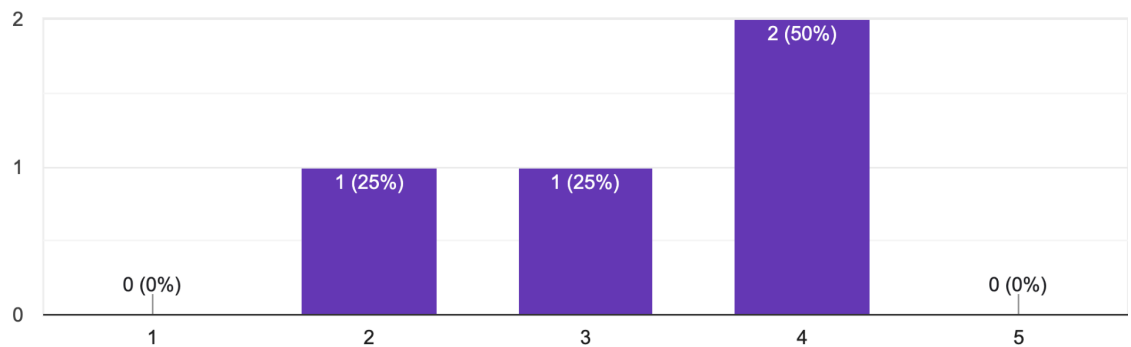

7. 50% of the VET providers have reported an immensely high demand for courses in the direction of cloud computing. Moreover, the other two participants have also reported high demand for cloud computing courses.
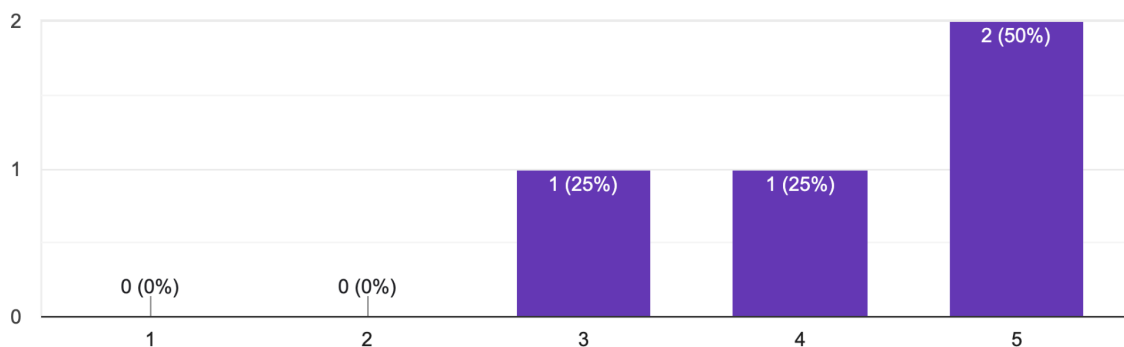
8. From the figure below we can concur that every 1 out of 4 VET providers believe it is important to stay up to date with the latest cloud computing technologies. Whereas 75% believe being up to date regarding cloud computing technologies is of utmost importance.
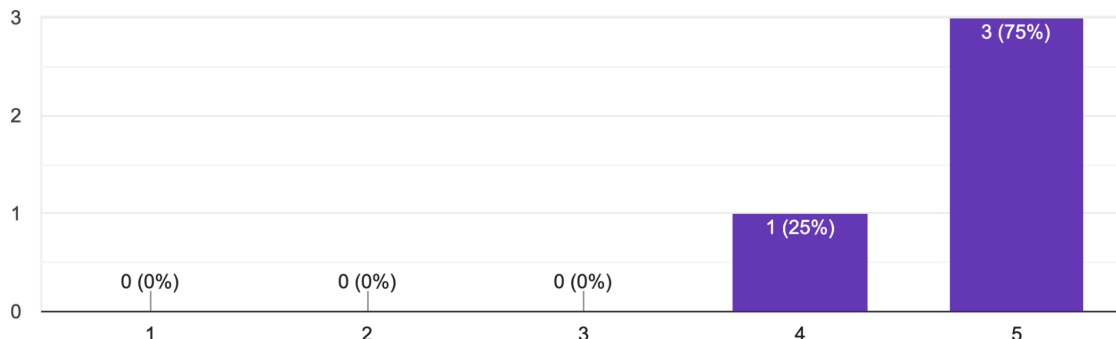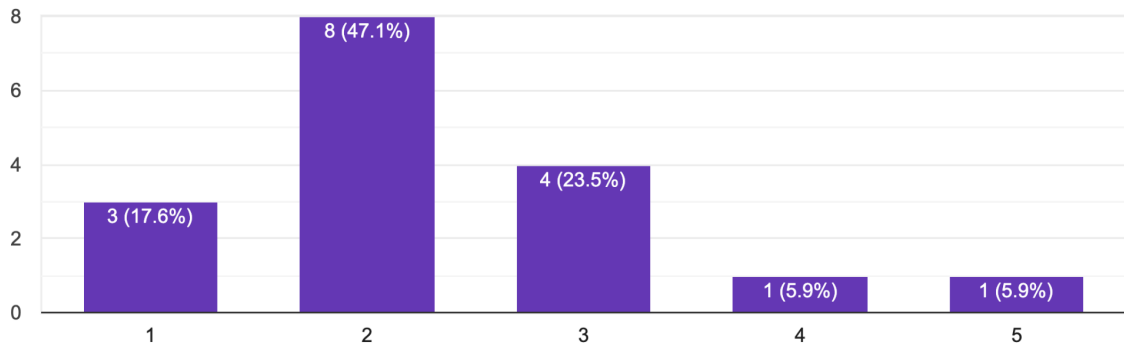

9. 3 out of 4 VET Providers are strongly interested in receiving professional development material and partake in the mobility activities in order to upgrade their teaching skills in the field of cloud computing.
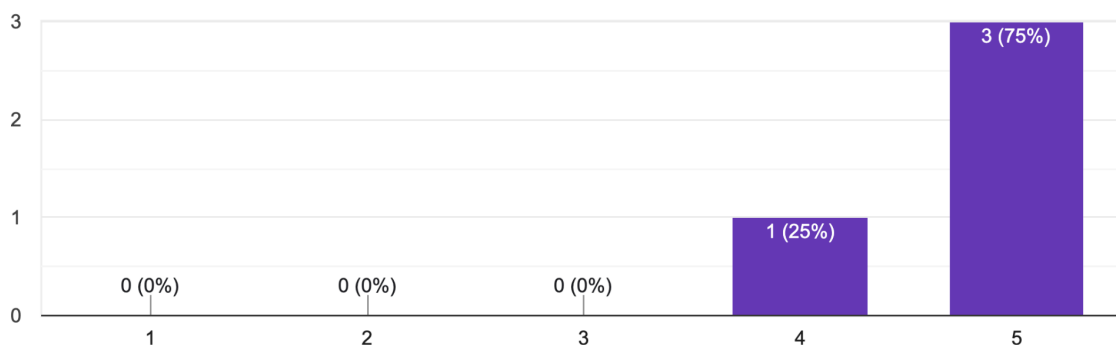
3.1.2 VET Learners Analysis

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**
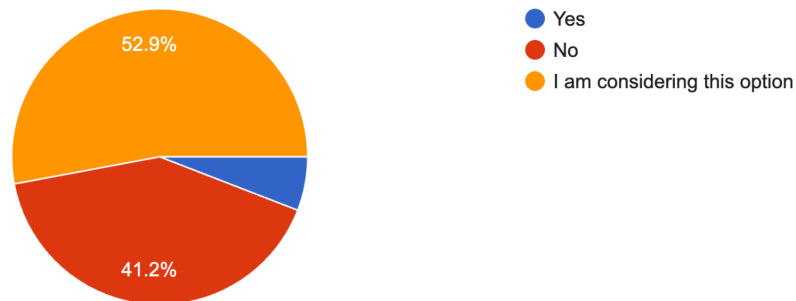
According to the responses provided by the surveyed VET learners, a majority of 52.9% are currently considering taking courses or training related to cloud computing technology. However, 41.2% of the respondents reported that they have not taken any courses or training related to cloud computing technology, 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.

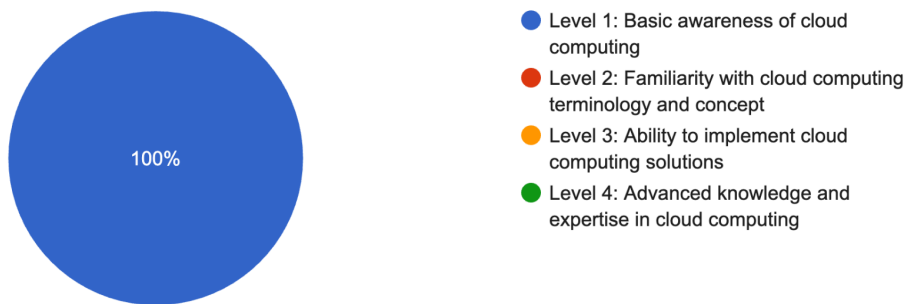3. **Responses on the kind of institution the provided Cloud Computing**

- Public
- Private
- NGO (Non governmental organization)
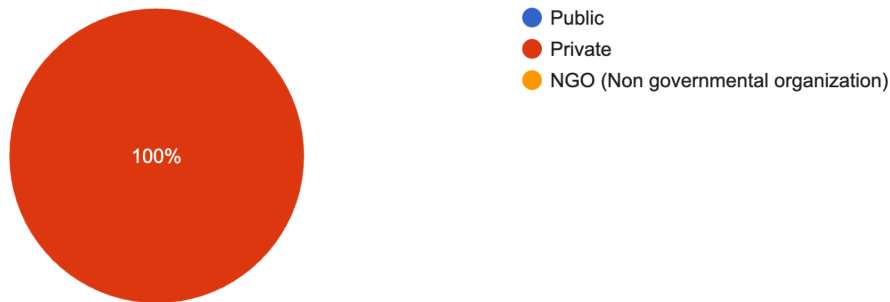
All of the surveyed VET learners reported that they received cloud computing education or training from a private institute.

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
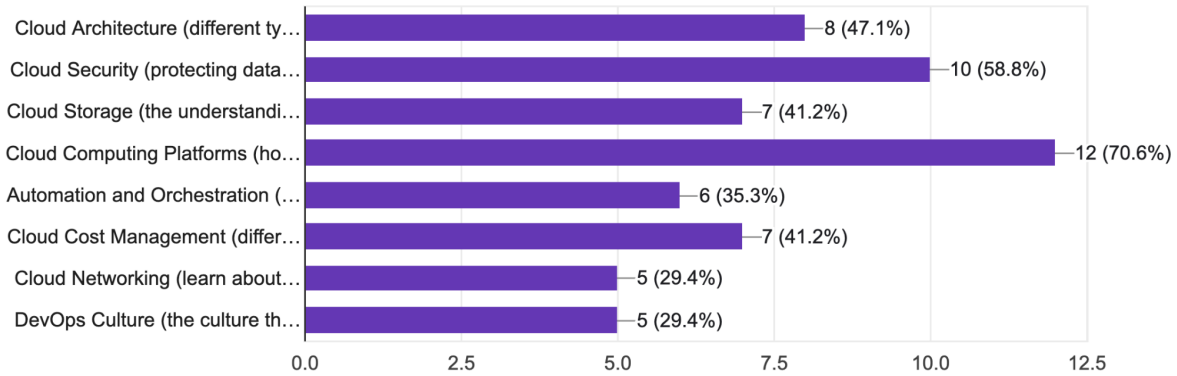
5. Responses on importance on cloud computing skills are for future career
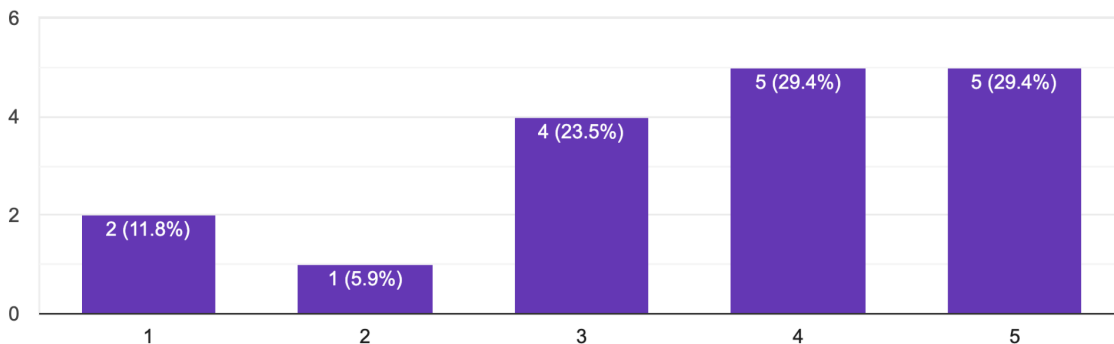
The surveyed VET learners indicate that cloud computing skills are perceived as important for future careers. Approximately 58% of respondents rated the importance of these skills as 4 or 5 on a scale of 1 to 5, indicating that learners recognize the potential impact of cloud computing technology in 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
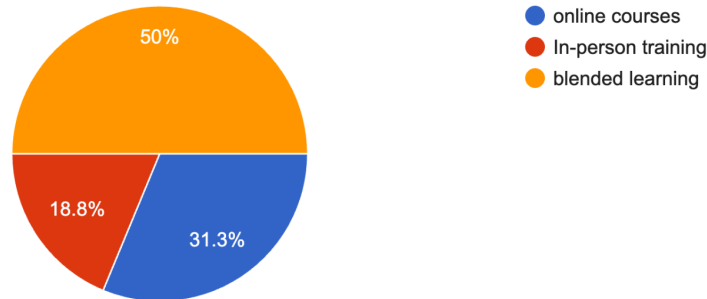
According to the survey results, it appears that there is a split among individuals regarding the preferred training format for learning cloud computing skills. Approximately 50% of respondents prefer a blended format, which combines in-person and online learning components. On the other hand, 31.3% 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
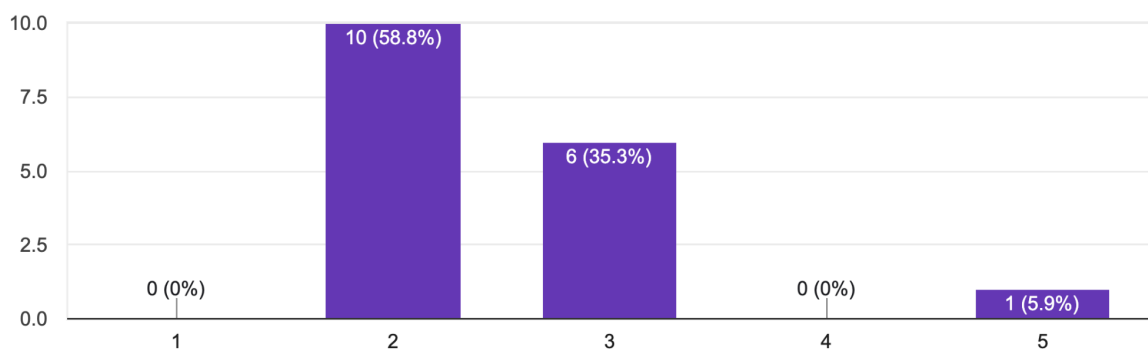

Based on the survey responses, it appears that there is a lack of confidence among some respondents regarding the ability of VET (Vocational Education and Training) learners to use cloud-based software and services. Only one respondent expressed a high level of confidence, with a score of 5 out of 5, 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 strenghten their competences in this field**
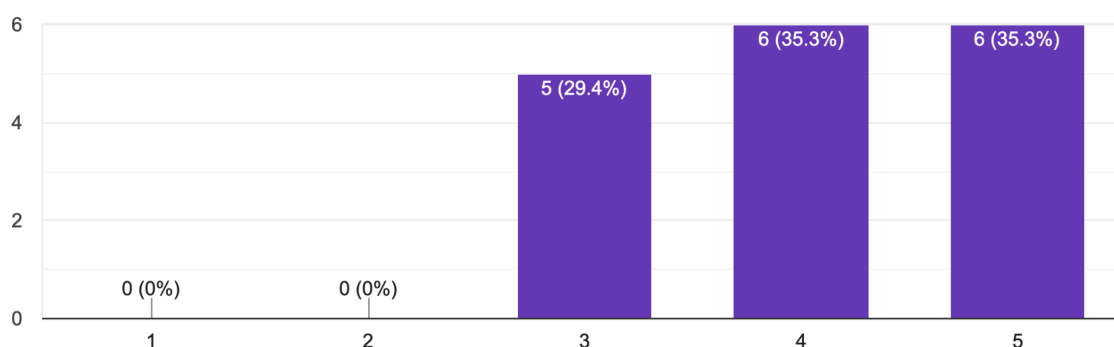
According to the survey responses, there is a high level of interest among VET (Vocational Education and Training) learners in receiving professional development materials or participating in educational mobilities focused on cloud computing to strengthen their competencies in this field. Six respondents 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.

4. Focus group

Focus Group GERMANY Report

❖ 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 digitals 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'.

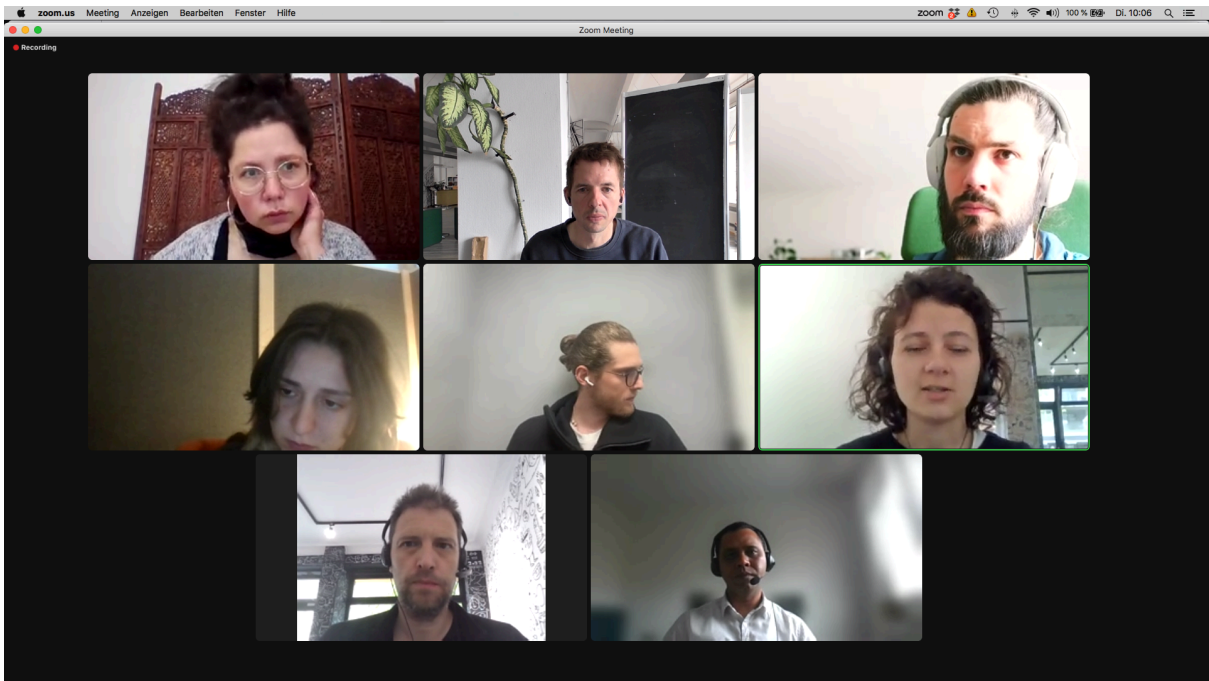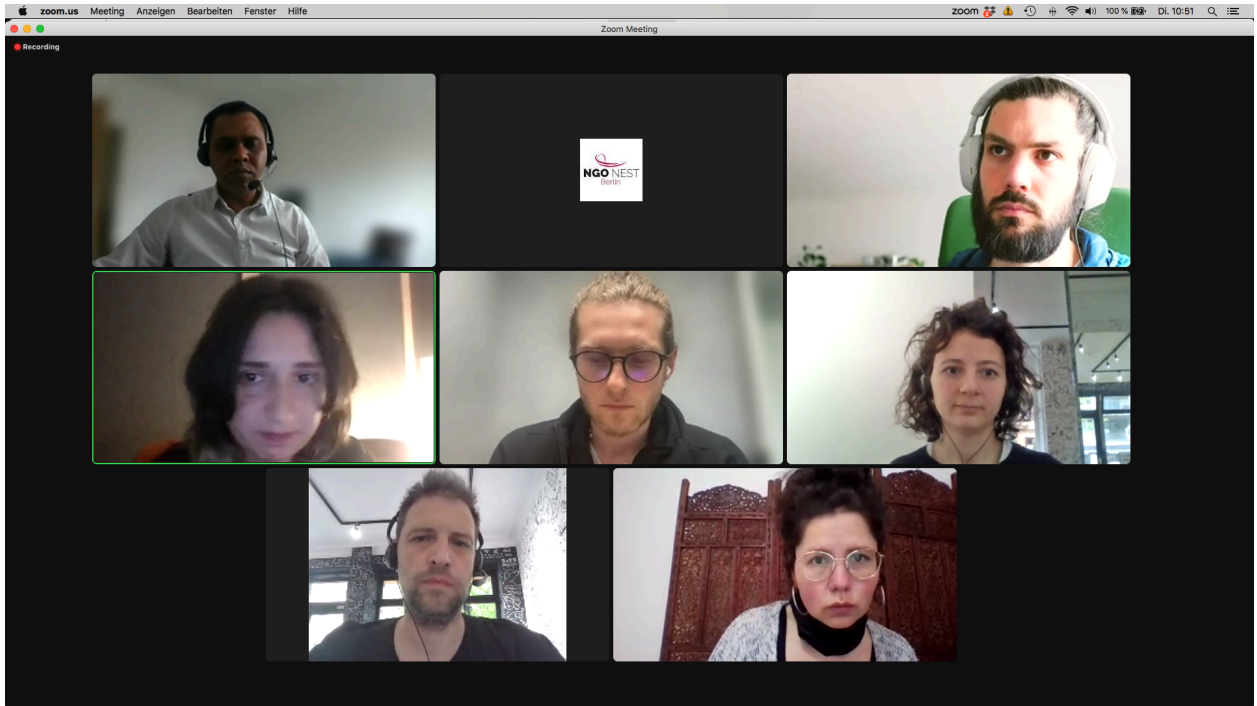❖ Please add here any additional relevant information gathered through the focus group.

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.

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