Adapting vocational qualifications to progress in digitalisation

POLICY DEVELOPMENT | **PRACTICAL MEASURE/INITIATIVE** | GERMANY

Timeline

2019 **Implementation** 2020 **Implementation** 2021 **Implementation**
2022 **Implementation** 2023 **Implementation** 2024 **Implementation**
2025 **Implementation**

ID number 28141

Background

In order to adapt vocational training to the new demands brought by digitalisation, it is first necessary to investigate changes in work processes, tasks and requirements in profiles of skilled workers. Through the study of job profiles, the requirements for the qualification of skilled workers were to be recognised at an early stage. Based on these findings, recommendations for action were formulated for the development of training regulations or for the further training of trainers.

Objectives

Adapting vocational education and training (VET) to the rapid progress in digitalisation, allows graduates to gain the respective qualifications needed on the labour market and counteracts the challenge of skills mismatches and shortages. These activities are of fundamental importance for ensuring the quality of dual VET.

Description

The preliminary examination of the potential restructuring of IT occupations carried out by the Federal Institute for VET (BIBB) in 2015-16 and the subsequent research initiative 'Skills, qualifications and competences for the digitised work of tomorrow' on 14 occupations (2016-18) touched upon developing key competences. Findings from the selected screening showed that the process of ‘digital penetration’ into training occupations occurred at different rates, depending on the company and on the occupation. Digitalisation has reached all 14 of the occupations investigated. However, only one in three of the surveyed skilled staff, trainers, supervisors and training managers assessed the degree of digitalisation in their workplace as high. Therefore, in many cases, slight changes to training regulations, such as the provision of additional qualifications and mandatory or optional modules, seem sufficient in the transition phase.

Additional IT-related qualifications have been developed. For the metal-working occupations, these are process integration, system integration, IT-based plant modifications, and additive manufacturing procedures. In the mechatronics fitter profile,

those were programming, IT security, digital networking, and additive manufacturing procedures. The electrical occupations include programming, IT security, and digital networking.

The recommended time for acquiring all additional qualifications is 8 weeks. Testing takes place in the form of a task-based oral examination included in the final examination. This optional training content is certified separately. Additional qualifications provide apprentices with an attractive way of expanding their skill sets to include new competences, which are in high demand. Additional qualifications also improve opportunities for skilled workers to pursue continuing training.

It is also apparent that increasing digitalisation is accompanied by a further shift in expectations to the core competences of skilled workers. Occupational competence remains important; the use of information and communication technologies, digital work and IT security are increasingly integrated into work tasks; process and system understanding are required, as are independent and continuous learning, flexibility, problem-solving and communication skills. This reflects the German concept of the ‘coherent vocational action competence’ which means that acquiring key competences does not take place by teaching isolated lessons or modules but is integrated into the vocational learning process. The learning process is based on professional activities identified in the real working world, in the companies.

In 2018, the most important metalworking and electrical occupations, as well as mechatronics technician, were amended. BIBB is currently conducting an evaluation project on this: Evaluation of the additional qualifications and the new integrative occupational profile item of the industrial metalworking and electrical occupations as well as the occupation of mechatronics technician. The aim is to examine the fitting accuracy, implementation, acceptance and quality of the changes introduced and to gather impulses for the further development of the occupations.

2019 Implementation

In 2019, BIBB published the results of the comparative study Vocational training 4.0 – Skilled workers' qualifications and competences for digitised work. (Zinke, 2019). The overall study documents the comparison of occupation-related results from a screening that focused on 14 occupations. The sample base illustrates how digitalisation affects occupational task areas and what this means for the initial and continuing VET of skilled workers.

In October 2019, BIBB launched a new series of events Digitisation of the world of work and occupations – implementation examples from practice. The aim is to promote dialogue on implementation between stakeholders, multipliers and interested parties.

2020 Implementation

In 2020, BIBB evaluated the amendments carried out in the most important metalworking and electrical occupations, as well as those for mechatronics technicians, with a focus on the additional qualifications and the new integrative occupational profile item of the industrial metalworking and electrical occupations, as well as on the occupation of mechatronics technician. The aim is to examine the fitting accuracy, implementation, acceptance and quality of the changes introduced and to gather impulses for the further development of the occupations.

Four events related to the Digitisation of the world of work and occupations – implementation examples from practice took place in 2020 and more are planned in 2021. One example is the virtual event ‘You ask – we answer: the new IT occupations, held by BIBB on 10 December 2020. More than 250 participants from various practical fields of IT initial and continuing education and training attended the event, asked questions and learned about the outcome of the amendment and the implementation process for new IT occupations (as example, from 1 August 2020, four training regulations for new IT occupations came into force).

In a 2020 publication, BIBB is presenting figures, data and facts on regulated IVET

additional qualifications offered by the chambers. The special review of the AusbildungPlus database provides an overview of those additional qualifications that are regulated by legal ordinances of the chambers, which go through a formal procedure and end with an examination before the chamber. The publication offers all VET actors a wide range of data and information that can be helpful, for example, in vocational orientation for career planning.

2021 Implementation

In August 2021, the group of skilled electrical and information technology occupations was redefined. BIBB, together with the responsible Federal ministries and the social partners and experts from company practice, has modernised the training content of the skilled electrical occupations and largely standardised examination regulations on behalf of the Federal Government.

The BIBB evaluation project: Evaluation of the additional qualifications and the new integrative occupational profile item of the industrial metalworking and electrical occupations, published an interim report. Additional qualifications that are acquired over and above the training content in parallel to dual VET hold great potential - both for companies and for trainees. For companies, additional qualifications in initial VET prove to be a flexible and versatile instrument for implementing a forward-looking qualification strategy. They enable companies to react to specific requirements during training, such as those brought about by technical and digital change.

In 2021, BIBB implemented eight events from different occupational areas as part of the project on Digitisation of the world of work and occupations – implementation examples for digitised work, in which approaches and solutions for implementing digitalisation in company practice were presented.

2022 Implementation

In 2022, the BIBB evaluation project 'Evaluation of the additional qualifications and the new integrative occupational profile item of the industrial metalworking and electrical occupations' continued.

2023 Implementation

In 2023 the final report on the BIBB evaluation project 'Evaluation of the additional qualifications and the new integrative occupational profile item of the industrial metalworking and electrical occupations' was published.

Furthermore, another evaluation report on the in 2018 modernized training regulations in the area of the industrial metalworking and electrical occupations was published by a research consortium. In particular, the report focussed on whether the changes made have been implemented in training practice, what effects they have had and what obstacles there are for a successful implementation. The 2018 revisions were intended to integrate Industry 4.0-relevant aspects into the training regulations in particular.

2024 Implementation

In 2024 BIBB published a research report on the impact of digitalisation on non-routine situations. With the increasing digitalisation of industries, only few studies so far have focused on competencies, which remain crucial in non-routine situations. In non-routine situations, professionals must quickly mobilise a wide range of knowledge and skills to make swift and competent decisions. These skills, however, are increasingly at risk of being forgotten, as automation has reduced the need for them in routine tasks. While this issue has already been explored in high-risk industries with a high degree of automation, no empirical studies have been conducted in the chemical or pharmaceutical production sectors.

In view of increasing digitalisation, adjustments have been made to the BBiG with regard to the implementation of vocational education and training. On August 1, 2024,

the Vocational Education and Training Validation and Digitalization Act (BVaDiG) came into force. It brought about comprehensive changes and additions to the existing Vocational Training Act (BBiG). These innovations aim to make vocational training more modern and inclusive. With regard to digitalisation, the most important changes are:

(a) the training contract can be concluded electronically;
(b) parts of the training can be carried out digitally and on a mobile basis under certain conditions, which enables greater flexibility and adaptation to modern technologies;
(c) with the consent of the apprentices, the certificate can be issued in electronic form;
(d) the Chamber of Industry and Commerce (IHK) can determine that, under certain conditions, examiners can participate via video when accepting and evaluating examination performances.

2025 Implementation

In 2025, the BIBB presented its 2025 annual research programme, which also includes research projects related to digitalisation.

Bodies responsible

- Federal Institute for Vocational Education and Training (BIBB)
- Chambers of industry and commerce (IHKs)

Target group

Learners

Learners in upper secondary, including apprentices
Persons in employment, including those at risk of unemployment

Thematic categories

Governance of VET and lifelong learning

Further developing national quality assurance systems

Establishing and developing skills intelligence systems

Modernising VET offer and delivery

Modernising VET standards, curricula, programmes and training courses

Acquiring key competences

Integrating digital skills and competences in VET curricula and programmes

Reinforcing work-based learning, including apprenticeships

Supporting lifelong learning culture and increasing participation

Promotion strategies and campaigns for VET and lifelong learning

Subsystem

IVET CVET

Further reading

BIBB evaluation project on restructuring of IT occupations in 2018 (2019-21)

AusbildungPlus - Additional qualifications - Special review of chamber programmes (2020)

BIBB website on occupational screening project (2016-18)

Press release on the reorganisation of the skilled electrical professions (2021)

Evaluation report on the industrial metalworking and electrical occupations; final report (in German) (2023)

Evaluation of the modernized training regulations in the area of the industrial metalworking and electrical occupations

BIBB research report on competences in non-routine situations (2024)

Vocational Education and Training Validation and Digitalization Act (BVaDiG)

Legal text of BVaDiG

Annual research programme BIBB (2025)

Related policy developments

2025 **Implementation**

Supporting SMEs to provide future-proof VET

Under the umbrella initiative, VET 4.0, the Federal Ministry of Education and Research (BMBF) initiated a special funding line (Initial and continuing vocational training in the economy 4.0 – Support structures for SMEs in the adaptation process of in-company training) within the JOBSTARTER plus

GERMANY

Type of development

Practical measure/Initiative

Subsystem

IVET CVET

2022 **Completed**

VET 4.0 project: effects of digital innovation on vocational training

The Federal Ministry of Education and Research (BMBF), in cooperation with the Federal Institute for VET (BIBB), started the initiative VET 4.0 for the period from February 2016 to April 2018. The initiative is based on three pillars.

GERMANY

Type of development

Practical measure/Initiative

Subsystem

IVET CVET

2025 **Implementation**

Modernising VET qualifications

The regulated qualifications of apprenticeships and advanced training occupations are based on examinations with nationwide uniform examination regulations.

GERMANY

Type of development

Regulation/Legislation

Subsystem

IVET CVET

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