



School Education and Vocational Education & Training in the Era of Digital Transformation

Key points

- Education and digital skills are necessary for participation in a digitalised society and in the labour market. The digital transformation affects all levels of education and training, from early learning and school education through to vocational training, continuing professional development, adult education and active labour market policies.
- Digitalisation offers new opportunities in terms of learning methods and significantly broader access to education and training.
- However, it also carries the risk of creating divides in the population and in the labour market (“digital divides”).
- The acquisition of digital skills and the use of digital learning tools are dependent on access to resources (digital infrastructure) on suitable teaching methods and pedagogical skills. Adequate financing for the needed technical infrastructure, suitable learning environments as well as basic living costs of adult learners needs to be ensured.
- Additionally, critical thinking, reflection and social skills are essential to prepare students adequately for a digitalised world of work.

and the system of continuing professional development. Certain skills will be in greater demand in the future. To prevent a deeper social divide, everyone needs to be able to participate in change processes in the working world and at education and training institutions.

Studies that aim to predict the effects of digitalisation on employment differ may differ in detail, but there’s a consensus that the demand for low-skilled work/jobs (i.e. routine work) will decrease with digitalisation. This means that especially in the low-skilled segment, workers will experience greater pressure than in other segments.

Especially in manufacturing and administrative sectors, routine work is forecast to decrease. At the same time, prognoses show that the need for soft skills, project-based and interdisciplinary cooperation is increasing with digitalisation. Alongside high-skilled workers, confident consumers are needed for new digital markets, as well as capable, well-informed citizens.

Problems

- Not everyone has equal access to digital resources and digital education and training, resulting in deepening divides in the digital society (“digital divides”).
- Digital skills are becoming increasingly relevant in all areas of life and professions.
- The general availability of knowledge and the flood of information at our disposal call for different learning methods and learning targets.
- Forecasts about required skills are difficult and repeatedly need to be revised due to technological developments, resulting in a growing need for life-long learning.
- The costs of continuing professional development are often passed on to workers or the public sector (active labour market policies). In the field of school education, the costs of digitalisation are often passed on to parents, thereby deepening the social divide.

What does it involve?

Digital competences and qualifications will be a prerequisite for individuals to be able to participate in society and the labour market. Digitalisation poses new challenges with respect to vocational training

Key findings

Digital divides in the population refer to differing access to digital infrastructure (access/no access), familiarity with digital tools (digital natives/digital immigrants) and the distribution of digital skills (digital skill divide). The divides manifest themselves differently in the various sections of the population and therefore influence the respective challenges for digital education and training.

Schools

While almost all young people in Austria have internet access, access to digital education and training is distributed unequally. A Federal Chamber of Labour (AK) study of adolescents in Vienna (aged from 15 to 19) shows great differences in the use of computers in schools. While computers are used frequently (75 %) in schools providing a general qualification for university entrance (academic secondary schools, secondary business colleges, secondary technical colleges etc.), they are used much less frequently (59 %) in schools not providing a general qualification for university entrance (full-time vocational schools from year 9 and vocational schools that form part of the dual “apprenticeship training” system). In particular, half of apprentices report that their training is not IT-assisted at all. The situation is similar with respect to the use of teaching software and learning platforms. They are used by twice as many pupils in schools providing a general qualification for university entrance. Similarly, only half of vocational schools provide e-learning (cf. BMB 2017). The ability to use the internet to obtain information in a targeted way is associated not only with the type of school, but also to a considerable extent with the student’s family background. (Cf. OECD 2015a).

A number of different aims can be identified with respect to the use of ICT for digital education and training. The use of ICT for media use and creation, as a learning tool and for acquiring and sharing knowledge is relevant in every kind of general education and training. In vocational education and training, it is necessary to consider both the use of ICT as a tool in almost all occupations and the growing need for ICT professionals (cf. Dorninger/Schrack 2014). The digital skills to be acquired in schools are set out in the “digikomp” model for all school years. However, current studies indicate large gaps with respect to the teaching of basic media skills in schools (saferinternet.at 2017)

The ICT infrastructure in Austria depends heavily on the school provider (municipality, federal state or the federal government). Vocational schools (as part of the dual “apprenticeship training” system), for exam-

le, are much less likely to have Wi-Fi than secondary academic schools and federal vocational schools (BMB 2017). According to the PISA survey, the level of equipment in schools in Austria is above the OECD average. However, while the level of equipment at schools has, compared to the OECD average, improved, Austria is one of the few OECD countries where headmasters did not report an improvement in the level of equipment. Costs of digital teaching methods and infrastructures are often passed on to parents. In secondary education, parents spend on average 150 euros each year per school-aged child for ongoing IT costs. In addition, one in six families in Vienna spends 700 euros a year on IT for school purposes.

New teaching methods, such as the “flipped classroom” and exploratory, cooperative learning, are increasingly important and need to be integrated into teaching concepts. New teaching and learning methods change teachers’ roles from educators to coaches helping students to acquire knowledge independently. Mastering that new role should be a key aim of teacher training and continuing professional development. Smart digital learning environments and data-based teaching (learning analytics) raise the importance of data protection, data security and sensitive handling of personal data in the educational context.

The potential for ICT professionals is currently artificially restricted by the high dropout rate at secondary technical colleges and the lack of training places at universities. There is a particular need for in-service training at all levels.

The Labour Market

There are differing assessments of how “digitalisation of the economy” will affect jobs and the required skills. However, the increased use of digital technologies in almost all fields will change the nature of work, with workers needing to have digital skills in their “backpack”, as well as social, emotional, cognitive (e.g. creative) skills as well as occupation-specific skills. Skill structure requirements will rise at all skill levels, but there is also the risk of a growing gap, i.e. while tasks and skills for a “specialist elite” and professionals with a degree will increase, requirements and demand for operative work and semi-skilled workers will decrease. It is thus necessary to respond with suitable education and training schemes.

- Specialised skills remain important but differ depending on the industry and occupation. In the industrial field, skills involving Web 2.0/mobile devices, cyber-physical systems (CPS)/Internet of Things (IoT), additive processes (such as 3D

printing), robotics and wearables (such as data glasses) are gaining importance. (Cf. Pfeiffer, 2016)

- While interdisciplinary skills are often named as a priority by companies, continuing professional development provided by companies in those fields is still rare. What are the required skills? (Complex) problem-solving skills, language skills (especially English), intercultural and cognitive skills, an understanding of systems and overall processes (interdisciplinary thinking), ability to handle responsibility, and social skills (such as the ability to work in a team, creativity, thinking outside the box and a proactive approach). (Cf. Hausegger et al, 2016)
- Interdisciplinary skills such as data protection and privacy, handling of big data, interdisciplinary cooperation, innovativeness and creativity, are increasingly important in all occupations.
- Digital skills range from knowledge of data protection, searching for, selecting and analysing information, operating a mouse/touchscreen through to digital literacy and using, adapting and designing programs.

Workers do not need to learn all those skills from scratch. Many skills have already been learnt in the professional and private sphere, so people with vocational training are already well equipped. However, companies need to provide suitable opportunities for the education and training of all staff.

According to Eurostat (CVTS-4), 87 % of Austrian companies provide continuing professional development, but only a third of employees actually have the chance to participate. With respect to the content of continuing professional development, companies mostly provide specific job-related training, while there is little training in interdisciplinary skills, despite the fact that all the studies and surveys suggest these are urgently needed (Statistik Austria 2013). In addition, according to the PIAAC 2012 skills assessment, half of adults who have at most completed compulsory schooling have no computer skills or refused to do the computer-based assessment. The corresponding figure for adults with a degree is just 8 percent (OECD 2015b).

Demands

Since not everyone can participate equally in digital education and training, proactive measures by all stakeholders are necessary to prevent a divided labour market and society. The aim must be for everyone to be able to participate actively in our society in future.

School education

- The digital skills specified in the “digikomp” model need to be firmly established and implemented in day-to-day-teaching at all levels of education. Children need to become familiar with digital technologies from as early an age as possible. Schools not only need to have suitable ICT equipment (Wi-Fi, tablets, fast internet connections, sockets etc.), but also enable the broad use of digital learning aids. Particular emphasis should be placed on vocational schools.
- In order for digital education and training to be successful, didactic and pedagogical concepts need to be updated. Teacher training and continuing professional development are pivotal in this respect.
- For innovative digital teaching, teachers need an extensive, quality-assured set of open and modifiable educational resources. Accordingly, open education resources (OER) need to be financed through existing public resources.
- Data-based teaching (such as learning analytics) and the use of digital aids in teaching must comply with the privacy rights of learners and teachers and data protection law. Decisions about educational paths and assessment of performance will have to be determined by professionally-trained educationists and not by algorithms. School students, legal guardians, teaching staff and head teachers need extensive information on the topic of “data-assisted teaching and data protection”. The full-scale expansion of IT clusters and shared services is necessary for data security and a professional IT infrastructure.
- The costs of digitalised learning environments should not be passed onto parents. Comprehensive public provision of digital learning aids, such as tablets, laptops and free learning software, is required.

Vocational education

- In order to cover the need for ICT professionals and to ensure that students have the means to enter into high-quality jobs, training capacity needs to be expanded in ICT training in the dual system, vocational schools and at universities.
- Training requirements and the associated training programmes in the dual training system and curricula at vocational schools need to be evaluated and revised to reflect the required digital skills. Up-to-date equipment and modern teaching methods in vocational schools and at companies offering apprenticeships are necessary if the dual system is to retain its importance in the digital era.

Life-long learning and vocational training

Learning requires the right conditions, namely time, money and a suitable learning environment.

Specifically, that means the following:

- Time and money for education and training: People who wish to gain a professional qualification because they have not yet done so or their current skills are no longer demanded for in the labour market should be legally entitled to a minimum income during their training ("training allowance").
- Greater inclusion of formally low-skilled workers in in-company and external training and continuing professional development to counteract the digital divide and increasing segmentation within the labour market.
- Entitlement to leave of absence for training and education since learning and innovation take time. Everyone should be legally entitled to take time off to pursue their continuing professional development.
- Expansion of schemes to promote women in the field of training and continuing professional development and gender-sensitive career guidance in schools to ensure women entering those sectors with strong future prospects.
- Improvement of the Austrian Act on Recognition of Qualifications (AuBG): Progress needs to be made in Austria with respect to the recog-

nition of non-formal and informally acquired skills. Given the increasing importance – due to digitalisation – of integrated and workplace learning, the acquired skills need to be recognised as formal qualifications.

- Promotion of digital skills is also important in the field of adult education, along with active labour market policies (training courses). Increased take-up of digital learning (webinars, MOOCs, serious games, augmented reality etc.) in these fields.
- High-quality career and educational guidance throughout longer learning phases. Periods of unemployment can be used for training purposes.

More Links

All AK policy papers concerning digital work can be found here:

https://www.arbeiterkammer.at/interessenvertretung/arbeit_digital/policypapers/index.html

More links to studies on the topic of digitalisation and effects on the labour market here:

AK EUROPA (2018): Communication on Digital Education Action Plan; <https://www.akeuropa.eu/communication-digital-education-action-plan>

OECD (2015a): PISA in Focus: Are there differences in how advantaged and disadvantaged students use the internet; http://www.oecd-ilibrary.org/education/are-there-differences-in-how-advantaged-and-disadvantaged-students-use-the-internet_5jlv8zq6hw43-en

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https://wien.arbeiterkammer.at/interessenvertretung/arbeitsdigital/bildung_digital/index.html