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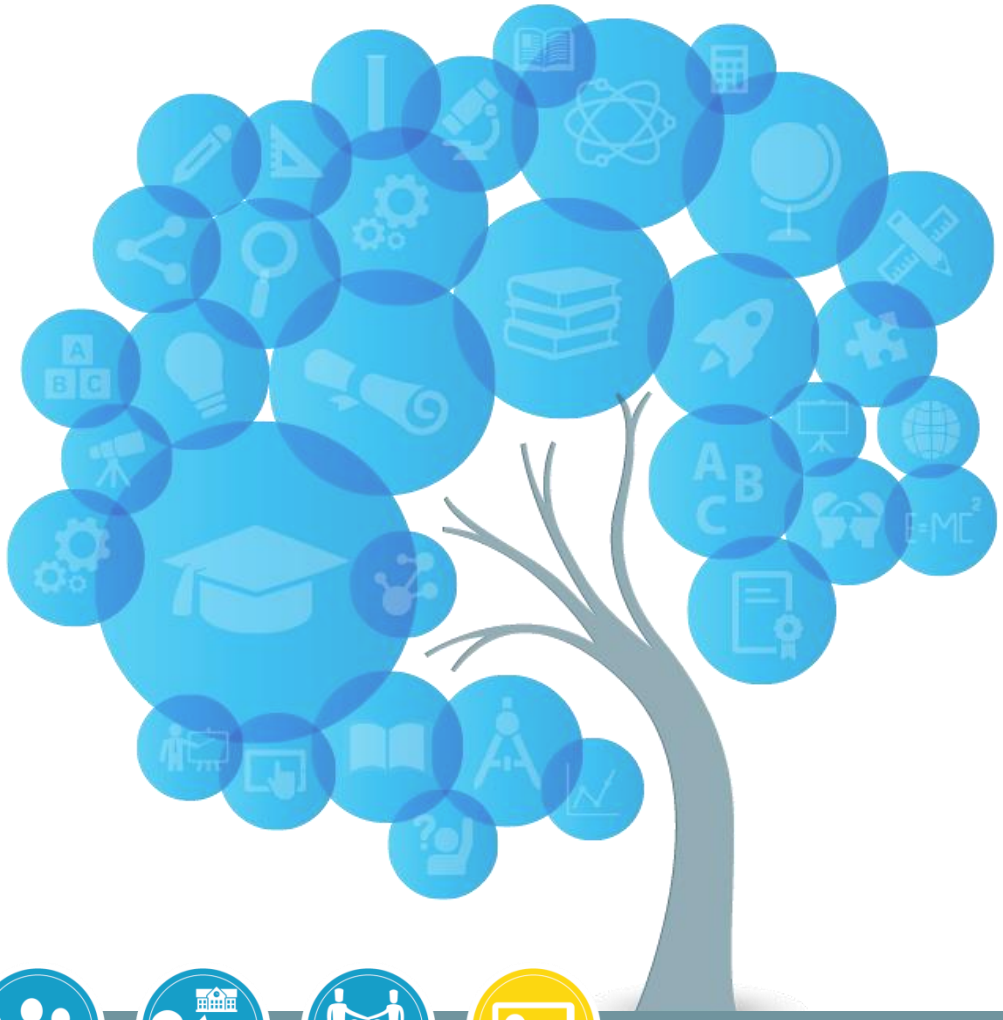

Education 4.0 – Mobile Learning
8-9 June 2017

Key Messages of PLA#5
Vienna June 2017

Education & Training 2020 Working Group on Digital Skills and Competences

Education and Training

The fifth Peer Learning Activity (PLA) of the ET 2020 Working Group on Digital Skills and Competences (WG DSC) took place on 8-9 June, in Vienna. It focused on comprehensive mobile learning strategies in education and how smartphones, tablets and laptops can be used to improve teaching and learning and to help students acquire digital skills and competences. The related themes of VET 4.0 (adapting vocational education and training to the needs arising from 'Industry 4.0) and digital assessment were also discussed.

The key messages below are intended to provide an overview of some of the key findings of the discussions and participants' insights and remarks. These key messages do not necessarily represent the views of all participants, but rather aim to reflect the overall discussions.

Austrian context

This PLA took place in Austria as the country has a long history of digital technology and device use in education – going back to 1998. The intention was in particular to learn in from the "Mobile Learning" project, run by the Austrian Ministry of Education since 2015, and presented the new Austrian strategy for digital education.

'Schule 4.0'

- The upcoming Austrian strategy for digital education 'Schule 4.0' will address all sectors of education: schools, pedagogical colleges and universities which provide teacher training, other universities, vocational education and training, adult education and informal education. It aims to improve digital competences across all levels, and to increase the use of digital technologies for teaching and learning.
- The strategy rests on four pillars: basic digital education for all pupils and students, digitally competent educators, infrastructure and IT equipment and digital educational media.
- Schule 4.0 aims to provide by 2020 basic digital competences at primary school level and comprehensive digital competences and media literacy by grade 8.
- A core element of the strategy is that 'expert' schools that have good experiences in using digital devices coach 'partner' schools on how to successfully implement the device strategy. This partnering helps both exchange and cooperation with the other school as well as internally. Schools are free to choose their partners, and often chose to partner with different types of schools and/or educational levels.[1]

Key Messages

General issues

- Participants stressed the importance of starting digital technology education at an early age.
- When mobile devices are introduced in classrooms, technical infrastructure support, further education and training for teachers, and information about applications are vital.
- E-textbooks and digital resources can provide more interactivity than traditional textbooks. This allows for higher engagement, better individualisation and differentiation of teaching. However this depends highly on software and resources and the pedagogical approach used.

[1] More information (in German): https://www.bmb.gv.at/schulen/schule40/index.html

- There is wide agreement that Open Educational Resources (OER) play an important role. They allow adaptation to specific contexts, reduce costs, and encourage new, more collaborative teaching methods.
- Digital technologies allow for the capturing of learning data and thus make it possible to improve early detection of learning difficulties. Smart use of data combined with individual consultations with students, educators and support staff can be used to develop measures to help students.
- Change is slow: "Changing schools and school practices is a challenging and time-consuming process, which usually takes three to five years before the change has become a natural part of school practice" (Michael Fullan, Canadian researcher).
- The effects of digital interventions might not be fully apparent until years later, when effects on students' further studies or careers can be analysed. It is often not possible to demonstrate clear cause and effect at this timescale. E.g. a project in Norway presented at the PLA found a negative effect for 3rd grade mathematics but a positive effect for the same students by 5th grade.
- The introduction of digital approaches can be 'a leap of faith' as the potential will not always be clear when a new technology becomes available for education.
- It is vital to gather input and feedback from learners, educators and administrators both at the beginning and throughout the intervention. This can indicate success or failure in a more qualitative manner than e.g. exam data which might capture only certain parts of students' learning.

Devices

- In most cases when mobile devices are introduced in schools, tablets are preferred for younger students while older students are provided with laptops.
- While introducing 1:1 computing in schools is expensive, schools may save money on reduced acquisition of commercial resources (e.g. textbooks) and printing costs. In the Austrian experience, the tablet was a didactic device on its own, i.e. no paper textbooks were needed.
- A Norwegian example shared at the PLA used a leasing scheme to provide both up-to-date devices and technical support to schools.
- Many countries have had positive experiences with Bring Your Own Device (BYOD) approaches. The PLA in Hamburg (July 2016) explored this model in depth.[2]
- However BYOD classes imply that devices are not all equivalent. This can be an issue, e.g. if the intention is to run digital tests and examinations. In regular laptop- or tablet classes this is normally not a problem.
- A core concern remains technical support. In practice, students and teachers often have to solve technical problems themselves.
- To ensure successful integration of digital technologies in school, training should not just be provided for teachers, but also general support staff and even parents.

Teachers

- Teachers are the key element to change how we teach with technology. They need training programmes, support, encouragement and concrete good practices and tools to use. Peer learning is an important factor.
- Many teachers are eager for more use of technology, but have legitimate concerns, in particular on training needs and opportunities, infrastructure, equity among students, technical support, time investment, and how to manage focus and attention in the classroom.
- Teachers should be supported in developing digital competences both in initial training and continued professional development; including generic digital

[2] See https://ec.europa.eu/education/sites/education/files/2016-pla-bring-your-own-device_en.pdf

competences but also specific didactical knowledge regarding how to use technology in their specific subject.
- Peer learning from experienced teachers can empower and encourage teachers to introduce mobile learning devices. Such mutual exchange of knowledge and support can improve overall teamwork among teachers.
- Malta had positive experience in applying the SAMR model (substitution, augmentation, modification, redefinition) – digital devices first substitute existing tools, then are used to augment teaching, finally help to modify and redefine teaching models.
- A project in Turkey, trained a group of teachers to collaborate with software and web developers to create resources. Such a model can help assure the pedagogical relevance of materials as well as quality design and implementation.
- In Spain online courses, including short courses suitable for mobile phone delivery are used intensely for teacher training; participation is rewarded with pay incentives. Cross-border projects and local peer learning are perceived as important.
- In some countries, regulations on teacher training are a limiting factor if they prohibit or do not recognise certain forms of training (e.g. online, by private providers, etc.). While quality assurance is needed, this might limit the spread of innovative practices. In a similar vein, it might be important to consider that even school teachers could be enabled to use distance of blended learning modes.

Infrastructure for mobile devices – what do we need to support enhanced learning?

- Investment in infrastructure is not one-off, but rather a continuous effort, in particular as increased use of audiovisual content demands higher bandwith. Both teachers and students are increasingly using not only one device (e.g. a laptop), but at times several devices simultaneously (eg laptop and smartphone).
- Security and data protection of students who bring their own device is a source of concern for schools. This can be exacerbated if private learning tool providers are not following EU rules or do not communicate their data privacy policies.
- Learning management systems (LMS) are provided in many cases by a national or regional authority. They can be seen as a part of schools' digital infrastructure.
- Cloud computing offered by larger companies is increasingly used in education and sometimes replaces official LMS offers. This can at first provide some cost reductions and administrative efficiencies for schools but can give rise to privacy and data ownership concerns, issues of long-term sustainability (e.g. if a vendor discontinues a product), and might reduce schools' ability to coordinate data and tools with other schools or the responsible administration. Vendor lock-in can also be a problem in the longer term.
- While teachers are best placed to determine classroom practices and tools according to their own skills, needs and learner interests, schools often lack the technical expertise to make informed decisions on digital infrastructure.

Personalisation and collaborative learning

- Conscious and active participation of students in the learning process is important. This starts with planning, setting goals, selecting learning strategies, defining success criteria, implementation, and evaluation. Digital technologies, when used appropriately can support such strategies.
- Personalisation of education should not be confused with students working on their own. Learners are eager to take control of their own learning and want to learn from and with peers.
- Digital devices should support collaborative learning, peer learning, and peer feedback, and can help to strengthen both in-person and online social skills.

Digital assessment

- "Digital tests" can mean either digitally distributed tests or digitally executed tests. Digitally distributed tests can be printed out at each school, saving costs for envelopes and postmarks. Digitally executed tests means also cheaper distribution of tests, collection of answers, validation of results, and reduced printing costs; they require, however, equitable access to suitable devices. Digital tests can test both subject knowledge and digital skills.
- Depending on the testing model, it might also be necessary to create a secure digital testing environment at school to counter cheating and prevent exchanges among students or access to the internet if this is not permitted.[3] Data security also needs to be addressed. With a clear environment in place, not just new digital testing formats (like Multiple Choice), but also entire new types of tasks (voice recording, handling competences) might be possible.
- Digital assessment can allow for (all of partial) automated marking which reduces cost. Digital tests be easily anonymised meaning that marking can be more objective. They can also be adaptive which means they respond to answers given by the student. By adapting the next test items to the students previous answers a larger knowledge area can be covered within the same timeframe. Digital tests also enable students to be assessed in a medium that they used for learning and will continue to use in work and life beyond formal education.
- Some of the challenges with digital tests are higher development costs, the need for robust digital infrastructure in schools and at higher level, and the risk of attacks or failures of the system.

Industry 4.0 and implications for VET 4.0

- Around 10-50% of jobs are 'vulnerable' to digitalisation; but for many jobs it might be that only certain tasks will be automated – especially repetitive job routines in production, the service sector and office work.
- Many of the job losses are in areas that have seen low growth. Reskilling and upskilling remain key issues.
- Technologies are not just changing the actual work, they are also challenging the understanding and definition of many professions in all parts of VET.
- New cooperation between industry and education (VET, HE, but also school) are needed to respond to these needs.
- In Germany, specific funding calls and projects aim to bring technology to (T)VET, both as a learning aim and as a tool. E.g. for 'social virtual learning' (virtual reality to practice maintenance of otherwise unaccessible machines) and even assessment ("assemble this machine").

Individual participants' key takeaways:[4]

- Teachers are the key element if we want to change how we teach with technology; focus should be on teacher education and professional development.
- Teachers should be involved in all stages of the digital transformation of education to ensure buy-in and effective solutions. Leaders, parents, and students should also be involved.
- While countries and systems differ the challenges are similar; sharing of experiences and approaches helps all countries.
- Digital technologies should be seen as an integral part of any education policy.

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[3] The Danish approach as presented at the WG DSC's 4th Plenary (March 2017) allowed students the use of own devices and access to the internet for some exams, but prohibited students to actively interact with one another or third parties.

[4] These insights were not part of the discussion but indicated through the follow-up survey.

- Digital assessment is developing in many Member States, further exchange on this topic would be valuable. Encouraging schools to assess their own digital progress is important. School need to develop an action plan to support the systematic integration of digital technologies for teaching and learning.