Bologna Digital 2020

White Paper on Digitalisation in the
European Higher Education Area

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**Hochschulforum
Digitalisierung**

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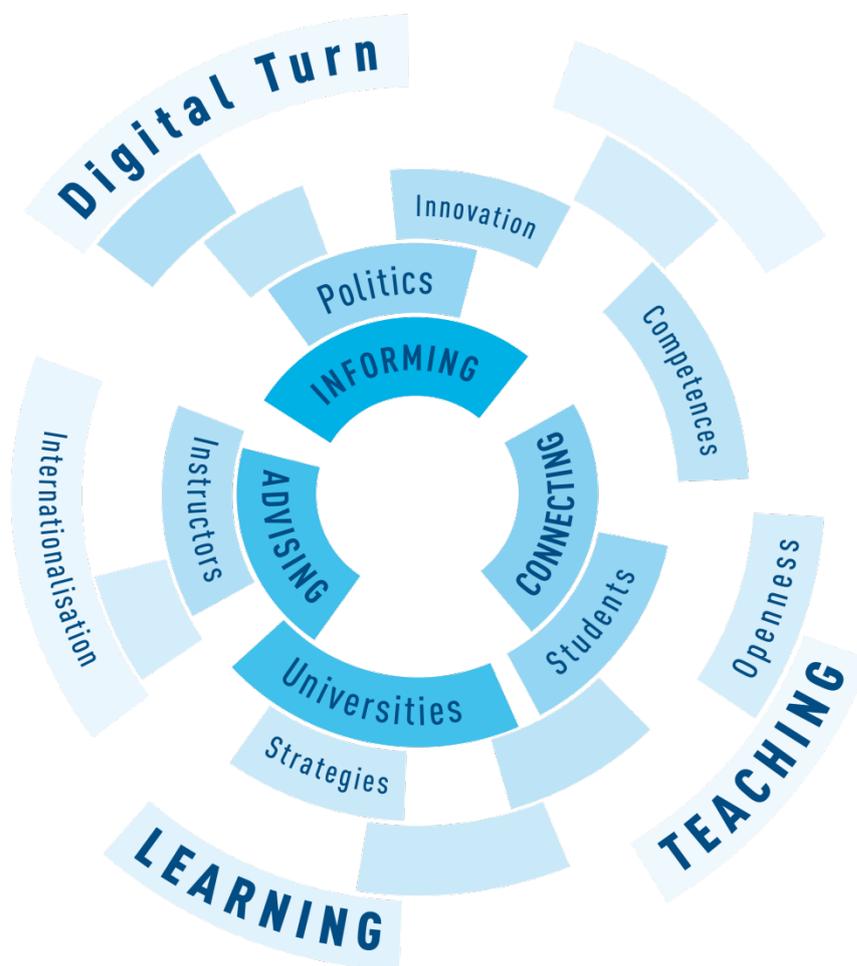Alexander Knoth · German Academic Exchange Service (DAAD)

Content

Hochschulforum Digitalisierung (HFD)

Hochschulforum Digitalisierung (HFD) orchestrates the discourse on higher education in the digital age. As an innovation driver, it informs, advises and connects stakeholders from higher education institutions, politics, business and civil society.

Founded in 2014, HFD is a joint initiative by Stifterverband[1], CHE Centre for Higher Education[2] and the German Rectors' Conference (HRK)[3]. It is sponsored by Germany's Federal Ministry of Education and Research (BMBF).

Further information is available at https://hochschulforumdigitalisierung.de/en.

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[1] https://www.stifterverband.org/english

[2] http://www.che.de/cms/?getObject=302&getLang=en

[3] https://www.hrk.de/home/

1 Towards a 'Bologna Digital 2020'

1.1 Why this White Paper?

Europe needs new visions for contemporary higher education in the digital age. Digitalisation is not only an additional challenge, but also an effective means to address key challenges for higher education in the 21st century. This paper focuses on current developments and the discourse to be sharpened by 2020, but looks to the future of higher education. It follows the vision that in 2030, universities and colleges of higher education offer courses of study that are much more flexible and offer different learning pathways recognising the diversity of the student population. They are central institutions of lifelong learning, on campus and on digital platforms. The university will be a networked and open institution in 2030, which cooperates much more closely with other universities as well as the community and jointly develops and provides educational programmes.

The aim of this White Paper is to provide a basis for public discourse and a foundation for strategic policy development on how to harness the digitalisation of higher education in the European Higher Education Area (EHEA).

As preliminary work, an internal background paper was disseminated among European experts as preparation for an international workshop, which took place in Berlin in December 2018. The workshop was part of the European activities of the German Forum for Higher Education in the Digital Age / Hochschulforum Digitalisierung (HFD) and thus sponsored by the German Federal Ministry of Education and Research (BMBF).

It invited European experts and stakeholders to comment on selected topics and positions and further develop joint approaches on making best use of digitalisation in the EHEA. As a follow-up, the Austrian Ministry of Science and Research (BMBWF) invited stakeholders to a second workshop which took place in Vienna in May 2019 and, amongst others, focused on examples of good practice.

Based on the discussions and outcomes of these workshops, this paper aims to highlight major topics and measures to be focused on by 2020 and beyond. Through showcasing practical examples from throughout the European Higher Education Area it also aims to set the ground for stronger European peer-learning in the context of digitalisation in higher education. These practical examples have been provided by experts and European stakeholder organisations that played an active role in the recent discourse.

The workshops gathered university representatives, European higher education stakeholders, governmental staff from different member states and other stakeholders active in European higher education. Participants included representatives from public authorities in Austria, Germany, the Holy See, Italy, the Netherlands and Romania as well as European stakeholder organisations such as the European University Association (EUA), the European Association of Institutions in Higher Education (EURASHE), the European Students Union (ESU), the European University Foundation (EUF) and the European Quality Assurance Register (EQAR).[4]

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[4] A complete list of all individuals who have participated at the two Bologna Digital 2020 workshops in December 2018 and May 2019 can be found in the appendix.

The experts representing these organisations agreed that there was an urgent need to take the topic of digitalisation further within the European Higher Education Area and its member states. This White Paper has been developed on the basis of fruitful discussions with the individuals who attended the two workshops and was subject of several feedback rounds. However, responsibility for the final formulation of the concepts, challenges and opportunities in this paper rests with the authors of this paper.

1.2 Digitalisation as a Policy Focus

Higher education is the domain, where many aspects of change arising for the digitalisation of our world come together. There are four specific requirements of a higher education, if society is to fully embrace the opportunities of the digital age within the framework of sustainable development:

- Learners need to acquire new skills and competences, which enable them to fully benefit from the 'digital dividends' of technology

- Study programmes need to reflect on and react to the developments in society and the labour market

- Higher education institutions should be a place to consider and even practice future social reform, which can truly harness the benefits of digitalisation for all

- The opportunities of digitalisation for creating new learning spaces should be harnessed to improve the accessibility and quality of educational provision

This understanding of higher education echoes what Ron Barnett has called the 'ecological university', which above all focuses on its role in society (2011).

Until recently, and as in many political circles, digitalisation has rather been seen as an additional challenge in connection to higher education reform, instead of being viewed as an integral part of higher education provision in a digital world.

In 2015, the EHEA ministers made a strong connection between teaching and learning at higher education institutions and this process of digital transformation:

> *"Enhancing the quality and relevance of learning and teaching is the main mission of the EHEA. We will encourage and support higher education institutions and staff in promoting pedagogical innovation in student-centred learning environments and in fully exploiting the potential benefits of digital technologies for learning and teaching." (Yerevan Communiqué, 2015)*

An even broader discussion was expressed early 2018 in the Position paper 'Bologna Digital' (Orr, van der Hijden, Rampelt, Röwert, & Suter, 2018b)[5], which was endorsed by several organisations (HFD, Kiron, FiBS, EADTU, ICDE, Groningen Declaration Network). The authors argue:

> *"[..] Digitalisation has not been ignored within the Bologna Process. [...] However, the full potential of digitalisation has not been reached on systemic level. This is partly due to digitalisation being viewed as an additional challenge, rather than a means to meet existing challenges for higher education."*

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[5] https://hochschulforumdigitalisierung.de/en/bologna-digital-0

While this argument is neither original nor new, the paper was welcomed in preparation for the ministerial meeting of the Bologna signatory countries in April 2018 due to its clarity and for its emphasis on the fact that the current goals of the Bologna Process can be better achieved through harnessing digital technology. One of the first European events focussing on higher education following the Paris Communique and organised under the Austrian European Presidency took on this view to discuss the opportunities for flexibility presented through digitalisation (Unger & Zaussinger, 2018).

The European Commission has focussed on the topic of education in the digital age. As early as 2016 its communication on modernising education stated:

> *"Digital transformation is changing the job market and requiring new skill sets. Digital technologies will also offer new ways of learning provided that there is adequate access to these technologies. To reap the benefits of these trends, education and training systems need to respond better to these changing realities." (European Commission, 2016)*

In 2018 it launched the Digital Education Action Plan, which set out three priorities: making better use of digital technology for teaching and learning; developing relevant digital competences and skills for the digital transformation; and improving education through better data analysis and foresight.[6]

The final communiqué of the Paris Ministerial Conference similarly set a new focus on the possibilities of digitalisation (*Paris Communiqué*, 2018):

> *"Digitalisation plays a role in all areas of society and we recognise its potential to transform how higher education is delivered and how people learn at different stages of their lives. We call on our higher education institutions to prepare their students and support their teachers to act creatively in a digitalised environment. We will enable our education systems to make better use of digital and blended education, with appropriate quality assurance, in order to enhance lifelong and flexible learning, foster digital skills and competences, improve data analysis, educational research and foresight, and remove regulatory obstacles to the provision of open and digital education. We call on the BFUG to take the issue of digitalisation forward in the next working period."*

This is promising and leads to the expectation that the Bologna Process will maintain a more open understanding and focus on digitalisation in the period leading up to the next ministerial conference in Rome in 2020. The aim of the "Bologna Digital" initiative is to galvanise debate and activities around this until 2020 and beyond.

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[6] https://ec.europa.eu/education/education-in-the-eu/digital-education-action-plan_en

2 Conceptual Framework

2.1 Principles

The conceptual framework used in this White Paper is based on the following preconditions:

1. The White Paper is intended to lead to strategic discussions that understand digitalisation as part of overall strategies for improving teaching and learning.

2. The focus remains on teaching and learning, as this is also the focus of the Bologna Process. Administration and research are considered to the extent that they are directly related to the further development of teaching and learning.

3. The White Paper offers a pathway between the current situation in higher educations and future developments, when digitalisation is viewed more holistically. In doing so, it is sensitive to developments that lead to parts of the higher education provision being offered cooperatively by educational institutions (e.g. through the new "European Universities" initiatives) or omitted (e.g. MOOC providers, where learning achievements cannot be directly recognised by the MOOC provider as ECTS, but this is done by an established university).

4. Furthermore, the White Paper contains a concept that is relevant to all Bologna Process member states, as this will be necessary for it to have relevance in the many different contexts of EHEA member states.[7]

5. Finally, the White Paper builds on the principles of the Groningen Declaration (GD)[8] to support Higher Education Institutions by agreeing on service-oriented, networked and interoperable IT application architectures. These are necessary for organising the exchange of student data and educational information both intra-institutionally and between students and educational institutions as well as to develop and distribute Open Educational Resources (OERs)[9]. Particularly, this includes agreeing on common open standards, interfaces and procedures in order to achieve the greatest possible European and global connectivity.

2.2 Digital Transformation and Key Processes in Higher Education

The White Paper follows the definition of digitalisation provided by Randall et al. as a result of their literature and policy review in the Nordic region (Randall, Berlina, Teräs, & Rinne, 2018). According to them, digitalisation is "*[t]he transformation of all sectors of our economy, government and society based on the large-scale adoption of existing and emerging digital technologies.*" The authors have adapted this definition to the higher education sector:

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[7] Currently, the European Higher Education Area has 48 member states.

[8] See website: https://www.groningendeclaration.org/

[9] For more information see: https://ec.europa.eu/jrc/en/open-education/ten-dimensions/content

"Digitalisation of higher education is a transformative process that substantially influences all activities of higher education institutions. It permeates all processes, places, formats and objectives of teaching, learning, researching and working in higher education. This digital transformation includes the development of new infrastructures and the increasing use of digital media and technologies for teaching and learning, research, support services, administration and communication, but also the need of students and staff to develop new (digital) skills for their current and future workplaces." (Rampelt et al., 2018)

When the Position Paper 'Bologna Digital' was published in April 2018, it reconfirmed the focus on teaching and learning but identified some further action lines that are closely related to this. The paper accordingly provided recommendations for harnessing the promise of digitalisation for seven key action lines in the Bologna Process: 1) Opening up higher education to a diverse population; 2) Recognition of non-formal (digital) learning; 3) Admission process; 4) Teaching and learning; 5) Degrees and qualifications; 6) Internationalisation and mobility; and 7) Quality assurance. The focal points proved to be helpful for the discourse on the topic. However, it also became clear that some topics could be summarised if necessary and others may be added based on feedback and suggestions from different stakeholders.

One major framework used for the experts' discourse is a model developed within the OOFAT study (Orr, Weller, & Farrow, 2018). This concept aggregates higher education provision into three key processes and looks to how digitalisation can offer more flexibility and more inclusive processes, while providing personalised support: 1) Providing access to and delivery of learning opportunities, 2) Developing learning content and providing learning support and 3) Recognising and certifying learning.

Based on this streamlining of key processes in higher education and substantial feedback from different stakeholders, six focus topics were identified and discussed as priorities for the current discourse:

1. More Proactive Preparation, Admission and Transition

2. Skills for the Digital Age

3. New Mobility Patterns: Virtual Exchange and Blended Mobility

4. Recognition of (Prior) Learning

5. Quality Assurance

6. Strategies for teaching and learning

The following chapters further elaborate on these focus topics. All chapters follow the same structure for each of the topics. The first section introduces the topic, then the opportunities and challenges presented by digitalisation are described. Finally, examples of good practice are discussed with the aim of highlighting what is already being done and where potential for expansion and elaboration of efforts already exists.

This White Paper should be read in connection with the Bologna Digital 2020 Position Paper, which draws recommendations for future action from the analysis, discussion and examples in this White Paper. It will be published by the end of 2019.

3 More Proactive Preparation, Admission and Transition

3.1 Introduction to the Topic

Ensuring that higher education is open for all is a key goal of the 'social dimension agenda' within the Bologna Process, which first entered the Bologna process in 2001 with the Prague Communiqué[10]. In 21st century society, the ability to access and succeed in higher education is central to social mobility and economic sustainability for European countries. The question of who goes on to higher education and who does not, who is steered towards it and who is steered away from it, is thus a major issue in forming dynamic and progressive societies (Orr, Usher, Haj, Atherton, & Geanta, 2017). Whilst admission systems have the task of selecting those who have the potential to succeed in higher education, they can also limit such opportunities for certain social groups. Therefore, admission systems and the overall transition process can be assessed on its capability to provide an efficient and effective route to study success, but also on the inclusiveness of this process.

Digital study orientation and preparation services can strengthen informed decisions on admission and increase permeability. Well-designed and well-guided transition programmes should become a much more important part of a holistic admission process and can even help learners prepare for the demands of their studies (Rampelt, Niedermeier, Röwert, Wallor, & Berthold, 2018). They might start and end before enrolment on a programme of study (as access or bridging courses) or continue alongside the main study programme in a student's first year of studies (as introductory and supporting programmes). The purpose of such access and bridging courses is multiple: to spark interest, to provide orientation and guidance (on the learning pathway and course choices), to equalise starting levels (taking account of prior learning and experiences), to provide support (including buddy-systems with current students, i. e. peers). Such programmes often cover topics such as language learning, induction to the learning culture, introduction to learning content, self-assessment and guidance. They are particularly relevant for supporting non-traditional and international / incoming students, who may need additional support during the transition process. Currently many such offers tend to require physical presence on-campus with little flexibility or blended options. In an ideal case such provisions would be proactive and directly supportive of students' individual needs.

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10 http://ehea.info/Upload/document/ministerial_declarations/2001_Prague_Communique_English_553442.pdf

3.2 Opportunities and Challenges of Digitalisation

The design and provision of good preparation and introductory programmes for a proactive preparation and admission system is confronted by a double challenge:

Can such programmes be personalised enough to be useful to individual students and at the same time be offered at the necessary scale to support all students requiring support?

Certainly, online courses coupled with technology-enhanced student support services have the potential to meet this double challenge.

We know that around 40% of HEIs in the EHEA are using MOOCs and this is probably an underestimate (Jansen & Konings, 2017). Such courses can be used by HEIs as appetizers for study programmes and attract local and international students into their programmes. But they can also be used to introduce students to the basic structure of the study programme and to give an impression of the knowledge and competences they will gain from such studies.

Moreover, students from underrepresented groups are frequently insecure about their study programme decisions and digitally-based bridging and support programmes, which do not require physical presence for access, can help to alleviate their worries or present opportunities for study orientation (Ubachs & Lizzie, 2018, p. 48 f.).

If such courses are to aid study preparation and orientation, they will also need to offer counselling and support services. Digitalisation can help to make such provisions scalable by harnessing the techniques of artificial intelligence to provide recommendations and by utilising social-bots in order to deal with at least the easiest questions of inquiring students quickly and efficiently and free-up time for the more difficult issues.

Digital provision also means that prospective (potential, future) students don't have to travel to campus to participate in preparatory programmes. Such programmes could also be used to smooth the transition process on admission to higher education, by recognising credits gained in the online course as part of the full study programme, once a student is enrolled, as has been done by the Kiron online education platform (Rampelt et al., 2018). A recent EADTU survey showed that many HEIs with MOOCs were open to giving credits for learning units, which could be officially recognised as part of a Bachelor programme (Jansen & Konings, 2017).

In all this, it is important to be wary of 'digital-only' support, which might not benefit those, who need support the most. Therefore, all programme forms should include periods of communication and exchange with advisers, teachers and peers. In this context, it is important not to forget the advantages of personal interaction. Some students need this and should not be kept away by supposedly more efficient, innovative digital offers. Digitally supported preparation and admission should not be implemented as an end in itself, but rather according to the needs and individual circumstances of a diverse target group. In this way, it can help to create better pathways into higher education, but also prevent a new digital divide.

3.3 Examples of Good Practice

The following examples demonstrate that programmes and initiatives harnessing the potential of digitalisation already exist within the EHEA, and there are certainly many more. Together they present an opportunity for peer-learning and collaboration on the part of HEIs and governments within EHEA and opportunities for further action within the Bologna Process.

Online bridging courses

There are already many examples of bridging programmes, which (prospective) students may take online before commencing their studies. University College Birmingham (UK) offers courses for students who have completed a higher vocational course of study and wish to transition to a full Bachelor degree. Students wishing to do this often lack a sufficient number of credit points, which they can gain through the online programme.

Link: https://www.ucb.ac.uk/our-courses/undergraduate/bridging/online-bridging.aspx

Another example is from a private provider called Engineering Academy (UK), which helps engineering students prepare for their Bachelor programme.

Link: https://engineers.academy/

In Germany, a group of universities have joined together to offer online mathematics courses (OMB+), which are relevant for prospective students of engineering, business studies, natural sciences and computer sciences.

Link: https://www.ombplus.de/ombplus/public/index.html

More ambitious programmes

There are more ambitious programmes, which aim to support the whole learning pathway. Two should be mentioned here: A technology-oriented approach developed by the STELA project and a mixture between digital learning and personal tutorials offered by Kiron Open Higher Education.

STELA is an acronym for "Successful Transition from secondary to higher Education using Learning Analytics". Academics from the universities of Graz, Leuven and Delft have worked on a prototype engine for dashboards driven by learning analytics, which help prospective students understand their learning style and scholastic performance.[11]

Link: https://stela-project.org/

Within the Kiron Open Higher Education programs, prospective students (in this case, refugees with interrupted educational pathways) are offered curated online learning pathways, application support and personal tutorials to facilitate preparation for a transition to a German higher education institution.

Link: https://kiron.ngo/study-with-us/

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[11] https://stela-project.org/outputs/casestudies/lassi-tudelft/ and
https://static.sched.com/hosted_files/oeglobal2018/ea/
Transferring%20learning%20dashboards%20to%20new%20contexts_presentation.pdf

4   Skills for the Digital Age

4.1 Introduction to the Topic

Skills agenda and the SDGs

Students attending higher education expect to acquire skills and knowledge that will empower them through personal and professional development to succeed in their future life. The 'skills agenda' from the European Commission states:

> *"With the right skills, people are equipped for good-quality jobs and can fulfil their potential as confident, active citizens. In a fast-changing global economy, skills will to a great extent determine competitiveness and the capacity to drive innovation. They are a pull factor for investment and a catalyst in the virtuous circle of job creation and growth. They are key to social cohesion." (European Commission, 2016)*

In this understanding, learning is not simply about achieving smoother transition and success in the labour market, but also about contributing to the transformation of society for the good of all. For instance, the Sustainable Development Goals from the United Nations, which should be reached by 2030, cover social and economic development issues including poverty, hunger, health, education, global warming, gender equality, water, sanitation, energy, urbanization, environment and social justice. These 'grand challenges' present a challenge to higher education, which is typically organised along the disciplines and study tracks. Raising people out of poverty, for instance, is about taking a global view on how food provision, health, education and the labour market work together to create a situation, which can contribute to raising people out of poverty. Teaching and learning in higher education should contribute to solving these grand challenges by supporting learning and research, which is creative, interdisciplinary and intercultural.

This emphasis on bringing multiple perspectives together is also highly relevant to digitalisation, since digital transformation can only be successful, if it is also seen as both a technical and social process. This all requires more open, more collaborative forms of learning organised and carried out with students, with other people in the community and with the business sector.

Specific and general skill types

A focus on skills requires a distinction between different types or profiles. The existing variety of definitions and distinctions is enormous and can only be taken up to a very limited extent here. We therefore focus on current discussions on concepts of skills that seem particularly relevant to the specific context of the White Paper.

One differentiation is between specific and general types. Specific skill sets are those required for a particular field of work or discipline (such as engineering or law) and provide a basic foundation of knowledge and practice for effectiveness in the workplace. The identification and transmission of such knowledge and skills depends on there being an agreed consensus on what is required in a particular field (Bessen, 2015).

The challenge in the digital age is that technological change leads to new demands on people in the labour market and the need for higher education curricula to be regularly reviewed for their relevance.

These specific skill sets must be combined with general skill sets consisting of fundamental skills (such as numeracy and literacy) and transversal skills (such as team-working, problem-solving, communication and reflection). Learners should be able to apply their mastery of such skills to familiar and to new settings. Transversal skills are often referred to as 21st century skills, since they are gaining importance in the context of automation and developments in artificial intelligence (Bialik & Fadel, 2018).

Future Skills

A recent report for the engineering sector in Germany emphasised how both specific and general skill sets need to be combined in people's professional profiles (Eckert et al., 2018): *"In the future there will be a greater need for graduates with hybrid skills; in other words, domain know-how in an engineering discipline paired with solid basic knowledge in digital disciplines."* This can be stated as a requirement for all fields of study.

A recent Delphi study carried out by Ehlers & Kellermann (2019) defines such "future skills" as "the 'ability to act successfully on a complex problem in a future unknown context of action'.

Skills for the digital age

Besides discipline-specific and general skills and competencies, the digital age also requires graduates of higher education to have acquired mastery in using and reflecting the opportunities and challenges of digitalisation for the common good. There is already a consensus on the general skill set, which is shared by different stakeholders. Based on this, the European Commission has initiated a "Digital Skills and Jobs Coalition"[12] that brings together Member States, companies, social partners, non-profit organisations and education providers, who take action to tackle the lack of digital skills in Europe. People need to attain competency in using, working with and understanding digitalisation (devices, processes, information flows and data security). In most recent studies, the types of skills required by a person are clustered around assumptions on how they will apply them in the future (cf. Working Group on Education, 2017). Three such sets of skills are the following:

- **Basic functional digital skills**, i.e. being able to use digital devices effectively as a medium for simple information retrieval and modification, including having sufficient knowledge of privacy and security issues.

- **Generic digital skills**, i.e. harnessing digital devices to use, interpret and create numeric and literary information sources for communication and collaboration with others.

- **Using digital technology in empowering and transformative ways**, i.e. manipulating how a device works (e.g. especially through coding) and what type of operations it can perform. With the further development of computer technologies, the number of levels at which manipulation is taking place will increase to include 'surface-level programming', which requires only limited programming skills. A key competence in this domain, which is relevant to all persons using digital media is what is termed 'computational thinking', i.e. understanding what the device or the coding is doing, even if a person is not executing this change themselves. This is especially important in the context of understanding the impact of machine or deep learning and algorithms behind artificial intelligence solutions.

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[12] https://ec.europa.eu/digital-single-market/en/digital-skills-jobs-coalition

Curriculum development

The approaches to skills for the digital age discussed above can only be effective if they are accompanied by fundamental changes to the process of curriculum development. With a focus on digital transformation, a German group has termed this 'Curriculum 4.0':

> *"As a curriculum 4.0, we understand a curriculum that takes up the process of digital transformation in a targeted manner, both at the level of content and the skills and competences to be imparted. [...] We [view] digital change in the context of curriculum development holistically as a technical, didactic and content challenge."* *[Michel et al., 2018]*

The implementation of future (digital) skills is therefore basically a question of new and innovative approaches towards curriculum development. HEIs and professors must be supported in this by their respective institutions in a sustainable manner.

4.2 Opportunities and Challenges of Digitalisation

This topic area makes it clear that the new learning opportunities and requirements presented by digitalisation and the overall transformation of labour markets and society should be harnessed to implement the new skills agenda and at the same time to avoid a new "digital divide". This requires efforts in curriculum development and expanding the learning experience.

Content for learning should be regularly updated and should be enriched through collaboration with and reflection on innovative fields of practice in society. Curricular recommendations for learning outcomes regarding digital skill sets could be based on common schemes (e.g. based on the EU's DigiCom) in collaboration between HEIs. At the same time, new curriculum development approaches also call for more agile learning content development and could benefit from using open Educational Resources (OER), which are often collaboratively developed and are expected to be modified through use (dos Santos, Punie, & Muñoz, 2016; T&L, 2019).

The learning experience should give students sufficient opportunities to apply all three types of skill sets together (specific, general and digital literacy), for instance in problem-based settings. This can be done through closer interaction with real-case scenarios (which can be supported through online collaboration), through simulation experiments benefitting from virtual and augmented reality (i. e. Klimova, Bilyatdinova, & Karsakov, 2018; Sommerauer & Müller, 2018). Digital learning environments can and should combine the benefits of access to digital artefacts and online collaboration with working together and should not overlook the need for social interaction as basis for developing transversal skills. Learning-rich environments can be achieved through harnessing machine learning, social-bots, geo-data and recommender systems to stimulate and encourage debates between learners, who may not be on-campus, but have a similarity of interests or are located near to each other.

4.3 Examples of Good Practice

The following examples demonstrate that programmes and initiatives harnessing the potential of digitalisation already exist within the EHEA, and there are certainly many more. Together they present an opportunity for peer-learning and collaboration on the part of HEIs and governments within EHEA and opportunities for further action within the Bologna Process.

Using the EU's Digital Competence Framework as a basis for curriculum development

DigComp has become a key tool to help Europe respond to – and anticipate - the impact of all things digital. It was initiated by the European Commission. DigComp is a reference framework that describes what it means to be digitally competent. It sets out the 21 competences necessary to be digitally competent and maps these across 8 proficiency levels. According to the report being digitally competent is more than being able to use the latest device or software. For the authors digital competence is a key transversal competence: that means being able to use digital technologies in a critical, collaborative and creative way.

As an example, the Anglia Ruskin University (UK) has applied the DigComp framework from the EU for staff development and for embedding digital literacies into the curriculum. Their Digital Literacy Barometer includes competency statements about a spectrum of digital capabilities aligned to DigComp. Using a quiz format, individuals receive a score for their overall self-reported competency as well as for each of the five literacies in the framework. Staff is able to use the results to identify their existing strengths and areas for further development. The University provides also a range of staff development activities aligned to the framework, including bite-sized training following completion of which participants receive digital badges. The embedding of digital competencies in the curriculum was piloted in one faculty. Digital badges were developed for each digital literacy domain and proficiency level. As part of a review process, course curricula were examined and subsequently mapped to identify opportunities to deliver the elements of the ARU digital literacy framework. A variety of stakeholders representing academics, professional services and students were engaged in the development of the framework.

Link: https://aru.ac.uk/anglia-learning-and-teaching/good-teaching-practice-and-innovation/technology-enhanced-learning-and-teaching/digital-literacy

Utilising Augmented and Artificial Reality to improve teaching and learning

A large-scale project by the University Lyon (France) has developed anatomical 3-dimensional models for medical students. The models are openly licenced and can be used and adapted by other users.

Link: http://anatomie3d.univ-lyon1.fr/

A similar internal project by the Aachen University (Germany) entitled 'Anatomy 2.0' also aims to create a pool of digital 3D anatomical models, which can be accessed anytime over the Web using a standard Web browser.

Link: http://dbis.rwth-aachen.de/cms/projects/creating-a-pool-of-digital-3d-models-for-teaching-anatomy-online/

Encouraging innovative approaches through external funding: Data Literacy Programmes

In cooperation with Heinz Nixdorf Foundation, Stifterverband has initiated a "Data Literacy Programme" in Germany that supports the implementation of data literacy initiatives for higher education students and an enrichment of their learning environment. As part of their "Future Skills" initiative, three universities (Gottingen University, Mannheim University of Applied Sciences and Leuphana University Luneburg) were selected to receive up to 250,000 euros each to establish data literacy offers across disciplines.

Link: https://www.stifterverband.org/data-literacy-education

As an example, at Gottingen University, within the Learning to Read Data (Daten Lesen Lernen) project, a basic data literacy course is developed, which is accessible to bachelor students of all subjects. Secondly, the university establishes a DataLab as an interface between the different subjects, the regional economy and society. Thirdly, the recognition of a curated set of high quality OER material (in connection with own exams) developed elsewhere is part of the university's approach to offering new learning opportunities.

Link: https://www.uni-goettingen.de/de/592287.html

5   New Mobility Patterns:
Virtual Exchange and Blended Mobility

5.1 Introduction to the Topic

The mobility of students and staff within the EHEA and beyond is seen as a key route to a person's formation as a European and global citizen and to improving social cohesion between populations of different nations as well as to internationalising higher education.

Historically, efforts to develop student mobility have focused on cross-border exchanges of students, such as those supported by the Erasmus+ programme. Student mobility in general and the Erasmus exchanges in particular are now one of the most powerful symbols of the European project. They have been a key catalyst for the internationalisation of European universities and paved the way for cornerstone initiatives like the Bologna Process. Perhaps as important as its systemic impact in European education systems and higher education institutions, Erasmus has also had a profound cognitive impact on the students that take part in it: research has shown that students gain significant competences through the participation in mobility programmes, notably with regard to increasing their resilience in new situations and becoming more open-minded, tolerant and curious (European Commission, 2017).

The Erasmus programme and various national initiatives have been highly effective in supporting physical movement of students and staff within the European region (European Commission, 2017). Indeed, there is a ET 2020 benchmark that an average of at least 20% of higher education graduates should have had a period of study or training abroad by 2020. The EUROSTUDENT data from 2018 shows that this 20% average might indeed have been achieved in 2017 (Hauschildt, Vögtle, & Gwosć, 2018b).

However, even then, this means that one in five students and even fewer staff take part in such mobility programmes. There is no 'mobility for all' – and more importantly non-traditional students are the least likely to be internationally mobile during their studies (Orr, 2012). The additional financial burden associated with enrolment abroad remains the main obstacle to student mobility. As detailed in the 2018 Eurostudent survey, among those students who do not plan to go abroad during their higher education studies, 62% of these students perceive financial restrictions to be a (big) obstacle to enrolment abroad. Almost half (47%) find the separation from their partner, children and friends to be an obstacle; followed by a possible loss of a paid job (35%) and a lack of motivation (30%) - perhaps due to missing support mechanisms (Hauschildt, Vögtle, & Gwosć, 2018a). The 2018 Bologna Implementation Report from therefore concludes: "This calls for improving attention to the mobility participation of students from under-represented groups throughout the EHEA." (European Commission/EACEA/ Eurydice, 2018, p. 274).

At the same time, universities see themselves increasingly challenged to develop strategies for 'Internationalisation at Home' and to make use of the potential of digitalisation for internationalisation. Internationalisation at Home has been defined as "...the purposeful integration of international and intercultural dimensions into the formal and informal curriculum for all students within domestic learning environments" (Beelen & Jones, 2015). It also has much in common with 'internationalisation of the curriculum', a concept that emphasises the importance of internationalising learning outcomes for all students, not simply those who study abroad.

That leads to the question, how future student journeys will look like? How can internationalisation at home activities be combined with cross border exchanges? How should study programs in general and teaching and learning scenarios in particular be designed to entangle physical classroom activities with online phases and stays abroad?

Against this background, an approach that has been attracting the interest of the academic community are 'virtual exchanges' and the emergence of new, digitally supported mobility arrangements. Virtual exchanges "refer to the engagement of groups of learners in online interactions and collaboration projects with partners from other cultural contexts or geographical locations as an integrated part of their educational programs" (O'Dowd, 2018). Similarly, teaching and learning opportunities developed in the spirit of 'collaborative online international learning' scenarios (COIL[13]) focussing on transnational student interactions, peer-learning activities and the co-creation of various learning artefacts can be considered as effective instruments to stimulate student and teacher collaborations as well as to strategically combine internationalisation with digitalisation processes on the (intra-)institutional level (Knoth & Herrling, 2017).

Yet, within the emerging field of creating European and globally networked teaching and learning environments, there is an ongoing academic and political discussion about the terminology and concepts that should be used. UNIcollaboration[14] has recently published a meta-analysis which captures the state-of-the-art of transnational e-learning collaborations and offers an informative classification scheme of approaches that have been used since the rise of modern telecommunication technologies. "Subject-specific virtual exchanges" such as 'telecollaboration' and 'online intercultural exchanges' related to foreign language initiatives, "service provider" (e.g. iEarn) and "shared syllabus approaches" such as the COIL scenarios are distinguished. The European Association of Distance Universities (EADTU) has also recently developed a matrix that lays the focus on three major forms of mobility: physical exchange mobility, virtual exchange mobility and open virtual exchange mobility (Ubachs & Henderikx, 2018).

Highlighting 'mobility' as the core term within those concepts can, however, be misleading, because the importance of physical mobility and face-to-face interactions in the sense of becoming culturally immersed in an environment should not be undermined. Therefore, increasing physical mobility numbers should still be the top priority, safeguarding and fostering the chance to benefit from a longer period of staying abroad, enriched and complemented by manifold collaborative, cross-campus teaching and learning opportunities that digitally support the student journey at best.

5.2 Opportunities and Challenges of Digitalisation

With regards to cross-border student mobility, digitalisation holds the promise to profoundly improve the visibility, provision of information and transparency of mobility processes. In fact, traditional forms of mobility are already facing pressure to fully leverage on the possibilities offered by contemporary technology.

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[13] The short form and label COIL stands for the Collaborative Online International Learning Center at the State University of New York (SUNY) at its truly global network (see: http://coil.suny.edu).

[14] https://www.unicollaboration.org

New Mobility Patterns:
Virtual Exchange and Blended Mobility

A critical aspect for the functioning of any academic exchange programme is the provision of transparent and clear information on leaning opportunities at partner institutions, notably for the purpose of the planning of studies abroad. For many years this has been hampered by the inability to access course catalogues that are accurate and updated in a timely manner. This is already changing as these resources become more accessible and interconnected, while some universities are experimenting with embedding multimedia elements that help guide students' curricular choices.

Student mobility also stands to be enhanced by novel ways to monitor and ensure quality assurance, as well as better provision of information. The later aspect is in particular need of profound rethinking, since processes and structures underpinning cross-border student mobility have not kept up with times – a millennial coming into contact with a typical Erasmus application procedure will hardly consider this a modern or soothing experience. Common-day endeavours such as booking an online service often provide contextual information such as feedback of prior users – but there is very little published and aggregated information about the mobility experiences, difficulties and suggestions made by previous exchange students.

Another aspect that holds disruptive potential is the provision of personalised guidance to students. This already starts with the information of the students before their studies, but also refers to digital support mechanisms during their studies at home, abroad and back home. Again, the model of the digitized student journey can be helpful to identify specific issues on which digital technologies might play a role.

In addition, one possible area of interest is that of reflexive mobility, where students interact with online-self-assessments (questionnaires and exercises) designed to render them aware of how their perceptions and attitudes are impacted, and in some cases reshaped, by mobility experiences. Similar technologies could be deployed to offer counselling and support regarding mental health, and others.

Blended mobility has already been deployed in the context of staff mobility schemes, and it should also be considered as a powerful way to enhance the impact of student mobility. This is already the case with regards to linguistic preparation of exchange students, and such an approach could be extended to equipping the student to navigate different cultural contexts.

And yet, while participation rates for European students on mobility and exchange programmes have risen, they cover only a fraction of the student body in Europe and continue to exclude some parts of the student population, unable or unwilling to be away from home for an extended period of time. Also, the potentials of digitalisation have not sufficiently been taken into account to create network-based teaching and learning environments. Digital technologies can play a role here in promoting connections between citizens, fostering collaborative learning as well as enriching, deepening and extending physical mobility (Knoth & Kiy 2018). This speaks to the importance of promoting not just greater cross-border mobility but also new transnationally entangled study programs, personalised learning opportunities and seamless data flows - based on common standards, interoperable interfaces and service-oriented IT-infrastructures.

Digitally-driven educational offers and online solutions complement physical mobility, create different transnational and cultural experiences and provide access to worldwide distributed pedagogical resources. Used well within a didactic concept, they can strengthen the links between study programmes at the 'home' HEI and those in other places around the globe.

Stronger links facilitate more intensive exchange even with shorter periods abroad – when being chosen more frequently (Haaristo & Orr, 2014).

Harnessing the technologies of social media, video conferencing and virtual teamwork can be used to achieve similar (or, dependent on the teaching and learning scenario, totally different) learning outcomes and competences. Staff can benefit from working together with colleagues from different HEIs to enrich the overall teaching and learning offer for these students and the institutions as well. Especially regarding the focused support and preparation of mobility, digital technologies and exchange measures can help students and staff to be better prepared for their period abroad. By combining the advantages of digital and analogue worlds, blended mobility approaches can be used to strengthen student and staff mobility in general.

For example, mentoring, peer-learning and learning outcome documentation as well as various forms of assessment can be done with the help of digital technologies. After returning to the home institution, follow-up meetings and activities can be organised as well as credentials, learning artefacts and other study related data can be easily transferred online (see Groningen Declaration Network) in order to make a trouble-free re-start happen. Taking the perspective on the whole student journey it becomes much clearer that mostly a 'triple-blend' of digital supported learning opportunities, outgoing mobility and classroom teaching will be characteristic for new blended mobility patterns.

In order to harness the benefits of digitalisation it is therefore necessary to specify in more detail which skills, competences and long-term outcomes are expected from blended mobility programmes. With a clarification of the goals, it will be possible to implement rich combinations of physical and virtual experiences and exchanges. This can help piloting and rolling out new configurations of such blended mobility schemes.

5.3 Examples of Good Practice

The following examples demonstrate that programmes and initiatives harnessing the potential of digitalisation already exist within the EHEA, and there are certainly many more. Together they present an opportunity for peer-learning and collaboration on the part of HEIs and governments within EHEA and opportunities for further action within the Bologna Process.

Deeper collaboration through the European University Initiative

The core goals of the European University Initiative, a program which goes back to an idea of the French President Emmanuel Macron, are to create framework conditions in Higher Education where a diverse student body can build their own programmes and experience mobility at all study levels. The aim behind this initiative is to bring together a new generation of creative Europeans, who are able to cooperate across languages, borders and disciplines to address the big societal challenges and skills shortages that Europe faces. Therefore, transnational university alliances should change their traditional organisational structures and create new entities with outstanding governance and jointly developed student-centred curricula where a diverse student body can build their own programmes and experience mobility at all study levels.

New Mobility Patterns:
Virtual Exchange and Blended Mobility

Today, the European Universities Initiative is one of the EU'S flagship programmes in their ambitions to build a European Education Area (EEA).

Link: https://ec.europa.eu/education/education-in-the-eu/european-education-area/european-universities-initiative_en

Harnessing digital solutions for Erasmus+ Virtual Exchange (EVE)

ERASMUS+ Virtual Exchange is part of the ERASMUS+ programme enabling youth in Europe and the Southern Mediterranean to engage in meaningful intercultural experiences online, as part of their formal or non-formal education. The focus is primarily on people-to-people interaction and dialogue, and not that much content production. Learning outcomes consist in seeking mutual understanding and developing intercultural awareness as well as digital literacies. The initiative is based on four pillars:

1. **Online Facilitated Dialogue:** These actions are aimed at facilitating safe online dialogues to discuss current issues that matter to young people. Thereby, participants develop a better understanding of each other, build meaningful relationships across borders and cultures, and practice employability skills.

2. **Training to Develop Virtual Exchange Projects:** Youth workers and university educators are gaining professional development to learn how to develop a Transnational ERASMUS+ Virtual Exchange Project (TEP).

3. **Advocacy Training:** Young people from different backgrounds are developing parliamentary debate skills together supported by a network of trained team leaders, fostering listening and understanding through advocacy training.

4. **Interactive Open Online Courses:** Facilitated online meetings are the core of peer-exchanges whereby young people are given the opportunity to learn both with and from their peers across cultural contexts and national boundaries.

Partners in this initiative are: Search for Common Ground, Anna Lindh Foundation, UNIMED, Sharing Perspectives Foundation, Soliya, UNICollaboration, Kiron Open Higher Education, and Migration Matters.

Link: https://europa.eu/youth/erasmusvirtual

Open Pedagogical Resources for European Universities (OpenU)

Among the European policy experimentations (Key Action 3), the OpenU project with 21 European partners and five different thematic clusters was approved by the European Commission in 2018. The aim is to create a common, digital infrastructure (hub) by connecting existing EU funded IT services such as ERASMUS Without Papers (EWP), Online Learning Agreement (OLA) or the European Student Card Initiative results, catering for authentication and identification aspects. The Hub will have three main pillars of action: Teaching and Learning, Cooperation and Mobility. As one of the core activities, the module catalogues of the participating universities (gradually including other providers of Learning Opportunities) should be made available online, so that students will get a comprehensive overview of diverse learning opportunities, also including manifold teaching and learning scenarios like MOOCs, virtual classrooms, webinars etc. Next to that, it will also create spaces for cooperation between the institutions that will allow for establishment of new partnerships, working on the curriculum design together as well as benefiting from guidelines,

methodologies, good practices and other pedagogical resources shared. It will also connect the HEIs to facilitate the student and staff mobility and foster enrichment of the exchange experience by benefitting from the resources made available via the Hub.

The overall goal consists in strengthening teaching and learning, cooperation and mobility digitally, to dismantle borders and to further digitally develop the internationalisation of European higher education institutions.

Link: https://eu.daad.de/infos-fuer-hochschulen/beispiele-aus-der-praxis/erasmusplus-politikunterstuetzung/de/69336-online-pedagogical-resources-for-european-universities-openu/

Pan-European Programmes and Pedagogical Cooperation – EIT Digital

EIT Digital aims at global impact through European innovation fuelled by entrepreneurial talent and digital technology. EIT Digital strengthens Europe's position in the digital world by delivering breakthrough digital innovations to the market and breeding entrepreneurial talent for economic growth and improved quality of life. EIT Digital helps business and entrepreneurs to be at the frontier of digital innovation by providing them with technology, talent, and growth support. The EIT digital pan-European ecosystem consists of 170 partners (universities, research institutes and business corporations) aiming at developing harmonized courses, joint programs and communities of teaching practitioners by enabling collaborative teaching and learning. Therefore, EIT Digital serves as the strategic roof under which four areas of action are tackled:

1. Education community building through practices-sharing, innovation in education, adoption and diffusion of successful teaching and learning scenarios.

2. Online learning through education harmonization, educational assets development and dissemination as well as education distribution.

3. Industry connection through the implementation of industrial experiences, relevance and impact of education, contributing to companies' challenges and talents acquisition.

Link: https://www.eitdigital.eu

Center for Global Engagement at Coventry University

In the context of the COIL Network, the Center for Global Engagement at Coventry University has adapted and implemented its own approach refer to 'virtual exchange' experiences that are embedded into the formal curriculum and provide students with an opportunity to interact with peers at international universities and professionals, so they can develop intercultural competences and digital skills while working together on subject-specific learning tasks or activities. There are four key elements that define such a project:

1. It involves a cross-border collaboration or interaction with people from different backgrounds and cultures.

2. Students must engage in some sort of online interaction, whether it is asynchronous or synchronous.

3. It must be driven by a set of internationalised learning outcomes aimed at developing global perspectives and/or fostering students' intercultural competences.

4. There must be a reflective component that helps students think critically about such interactions.

Teachers can decide how (and to what extent) their project is embedded into any of the modules they teach. Teaching and learning scenarios can vary in duration and format. Some might involve for example a 'live' interaction for no more than one hour, whilst others will involve a series of activities scheduled throughout the entire duration of a module.

OIL Projects can take place in 'real-time' so that students from different universities abroad are communicating and interacting 'live' simultaneously or 'asynchronously,' which means students from each country can interact and work together at different times. Teachers can also select the type of activities and tools that are more suitable for their students and amenable to subject-specific needs, such as blogs, social media, video-conferencing and video-sharing platforms.

Link: http://onlineinternationallearning.org

International Mobility and Cooperation through Digitalisation

In addition to European approach, the German Academic Exchange Service (DAAD) has at the beginning auf 2019 launched a program called *"International Mobility and Cooperation through Digitalisation"[15]* in order to take into account that access to and participation in research and higher education are becoming increasingly global. Traditional outgoing mobility coupled with virtual access, teaching and cooperation opens up potential for rapid structural change with fundamental shifts in learning, knowledge and skills acquisition as well as for transnational collaboration and exchange scenarios. The overall goal consists in the establishment of new forms of international cooperation and networked educational environments which requires an increased alignment of teaching and student's mentoring to the model of the Student Journey.

Link: https://www.daad.de/hochschulen/programme-weltweit/hochschulpartnerschaften/de/69381-internationale-mobilitaet-und-kooperation-digital-imkd/

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[15] https://www.daad.de/hochschulen/ausschreibungen/projekte/de/11342-foerderprogramme-finden/?s=1&projektid=57465065

6   Recognition of (Prior) Learning

6.1 Introduction to the Topic

Certification of learning and competencies is usually the precondition for transition between social systems – between different educational levels (i.e. schooling and tertiary education), between different learning institutions and later between the educational system and the labour market. In general terms, the central questions here are: what knowledge and competences a person brings from an institution (educational institution, company, etc.) to the new institution and how he or she can prove this – or rather: *how this is formally recognised.*

These questions are particularly relevant to the Bologna Process in two specific contexts: for recognition of prior learning on accessing higher education and for improving the information about graduates when they are exiting higher education. Additionally, when students learn part of their study programme in a different higher education institution (e.g. for incoming international students or for domestic students during mobility programmes) it is helpful to have a flexible recognition system, which is based on smaller units than full study programmes (also see Chapter 7).

In the first instance, the discussion focuses on recognition of prior learning (RPL), in the second on 'employability' and in the third on 'credit points'. Common to all these practical usages is the need for clear documentation of learning outcomes. A focus on learning outcomes leaves more flexibility for the issue of where those outcomes were acquired – in a foreign university, in the labour market or on a learning platform (e.g. as a MOOC).

The EHEA has reached an agreement on standards between countries on what constitutes a higher education study programme – with the four cycles of study (short-cycles, Bachelor, Master and Doctoral programmes) commonly understood throughout Europe. Furthermore, the European Credit Transfer System (ECTS) has been established to enable mobile students to have their achievements during a period abroad recognised when they return to their home higher education institution. Additionally, the Bologna Communiqués have emphasised that such developments also require a clearer focus in curricula on learning outcomes.

However, recognition of learning remains a challenge for higher education in the EHEA and this must be confronted through new reforms and better clarity for those working with an increasingly diverse field of credentials.

According to the Trends 2018 report of the EUA, three-quarters of all HEIs responding to their survey state that all of their courses are aligned to specific learning outcomes – a rise from around half in 2010 (Gaebel & Zhang, 2018, p. 35 ff.). Furthermore, HEIs state that recognition of credits or degrees from other institutions has become easier (73% agree at least to some extent), cooperation among teaching staff has improved (75%), recognition of prior learning has become easier (68%) and learning pathways have become more flexible.

In general, the systems are already in place. However, a critical view from the student perspective complains that implementation of recognition is still weak and often based on single-case decisions. The 2018 publication from ESU entitled "Bologna with student eyes" states (European Students' Union, 2018):

> *"In the large number of national contexts such recognition is still not available to students and there seems to be no improvement since the previous Ministerial Communique. Lack of trust in validation procedures being seen as the main barrier to development of recognition of prior learning is probably a signal that detailed, reliable and transparent procedures need to be developed and promoted in order to stimulate recognition authorities to improve their recognition of prior learning."*

The challenge for recognition is, therefore, to find a way of simplifying exchange through good documentation and good information exchange. Digitalisation offers potentials in these areas.

6.2 Opportunities and Challenges of Digitalisation

Developments related to increased mobility of students, widening pathways into higher education and widening learning pathways through higher education to include both physical and digital provisions present clear challenges to higher education. These call for a more comprehensive and seamless recognition of learners' competences. Especially the recognition of prior digital learning (RPDL) shows potential for opening up higher education, but it requires transparency and has to abide by the regulations set for the system in order to build trust.

Looking to the future, there are four key areas, where recognition and certification work must progress:

1. Mobility periods abroad

2. Learning at HEIs other than the one, where a student is enrolled

3. Learning through MOOCs from various providers

4. Learning in the workplace (i.e. prior to applying for HE access, especially for adult / lifelong learners)

The key objective has to be providing transparent documentation (certification) of the skills, competencies and experiences learners have obtained, which are useful to both the learners and the institutions that are expected to recognise them (HEIs, employers etc.). This means that this documentation should be verifiable and aligned to quality criteria. Certification will not be accepted if it is not transparent and trusted. The common currency within the Bologna Process for inter-institutional recognition are ECTS credits. However, for recognition of prior learning other more ad-hoc systems are usually applied.

Digital solutions can facilitate this progress in two key areas:

- Simplifying the exchange of quality-assured information on what was learnt by a student between one learning place and another (HEI to HEI or MOOC to/and HEI).

- Documenting learning achievements digitally and in a standardised form, which is available to all relevant stakeholders in a fast and efficient way (while maintaining data privacy).

Exchange of Data for Recognition of Credits

In general terms, digital solutions call for common digital student data depositories, which will make the exchange of information about students on their learning achievements easier, more efficient and more transparent. The Groningen Declaration focusses on this technical-operative topic and highlights the need to pay attention to the issues of ownership of data sets, privacy rights and identification, access, compatibility, comparability, acceptance, and recognition.

Credentials and Documentation

More comprehensive recognition will also require new formats for displaying learning achievements, which go far beyond the idea of a digital transcript of courses and acquired ECTS points. More comprehensive profiles are especially relevant for the following cases:

- For the purpose of widening participation: for informal and non-formal learning acquired before entering higher education, especially when the learner has a lower than normally required level of formal education or this formal education was acquired a long time ago.

- For the purpose of highlighting transversal and 21st skills, which are implicit, but not explicit to the main curriculum, e.g. communication skills, teamwork, creativity, political engagement.

A credential, in its most essential form, is a statement awarded from one party to another describing the latter's qualities. Credentials are used for the purpose of proving to a third party that the holder qualifies for something. An educational credential is typically awarded by a responsible and authorized body that attests that an individual has achieved specific learning outcomes or attained a defined level of knowledge or skill relative to a given standard. (ACE, 2016, p. 5)

Currently different technologies are used with digital badges being amongst the most prominent (Chakroun & Keevy, 2018). The Horizon Report on educational technology in higher education considers the integration of alternative credential schemes into higher education a 'solvable challenge' (Adams Becker et al., 2017). As an example, all digital badge solutions have the same general characteristics, since global specifications are managed through the IMS Global Learning Consortium. Open Badges contain detailed metadata about achievements: Who earned a badge, who issued it, what were the awarding criteria and the context? Earners and issuers have unique identifiers and the openness of the standards allows the badges to be saved on multiple platforms (e.g. in the HEIs learning management system like Canvas, in professional networks like LinkedIn and other platform services).

Recognition of Prior Digital Learning

Digital learning is meant here to refer to learning gained in an online learning environment, which will tend to mean that the course structure is highly modularised (micro-credits) and in many instances will be provided by an institution other than the one at which the student is currently enrolled. A German overview paper argues that there are two principal issues with this type of learning provision, the first being easier to deal with than the latter (Rampelt et al., 2018):

- If the learning was offered by the higher education institution where the student is enrolled or at least in an HEI as part of a partnership agreement between two or more institutions, recognition should be relatively easy and may in fact be supported through the Lisbon Accord. Such a case is common within Erasmus exchange agreements and may be extended to MOOCs, if they are offered by partnering universities.

- If the (non-formal) learning is not offered by an accredited HEI, there are less specific regulations on recognition at the moment, although the prominence of the Bologna agendas on widening participation and lifelong learning do exert some pressure on HEIs to enable recognition here.

6.3 Examples of Good Practice

The following examples demonstrate that programmes and initiatives harnessing the potential of digitalisation already exist within the EHEA, and there are certainly many more. Together they present an opportunity for peer-learning and collaboration on the part of HEIs and governments within EHEA and opportunities for further action within the Bologna Process.

EMREX, EWP, eCard & EDCI – Streamlining and Standardising Data Flows

An example of a data depository with a focus on mobile students is the EMREX project. EMREX is a solution to electronic transfer of student records between higher education institutions in Europe being trailed by five European countries currently. The biggest benefit of EMREX is seen in the increased transparency, quality and reliability of information about student records of achievement, which will facilitate recognition between higher education institutions.

Link: http://www.emrex.eu/

There are also further initiatives looking to streamline data flows between institutions – some of the most well-known ones are focusing in this issue within the context of Erasmus exchange programmes, such as Erasmus Without Paper (EWP), Erasmus Dashboard and the Online Learning Agreement.

Link: https://www.erasmuswithoutpaper.eu

Link: https://www.erasmus-dashboard.eu/intro

Link: https://www.learning-agreement.eu

A more ambitious initiative is now being taken by the European Commission with the efforts to establish the EU Student eCard. This initiative is just starting with the aim to have a fully operational system across Europe by 2025 (European Commission, 2018).

Link: https://ec.europa.eu/education/education-in-the-eu/european-student-card-initiative_en

A further important initiative on European level is the European Digital Credentials Infrastructure (EDCI), which is being developed in parallel to the new Europass documentation framework (everis, 2018). This framework has the role of enabling and standardising digitally-signed credentials, which are issued by awarding bodies to individuals to confirm and provide proof of their learning outcomes.

The framework being developed will standardise the information collected about issuer, receiving and credential and regulate storage and validation procedures.

Link: https://ec.europa.eu/futurium/en/system/files/ged/europass_background-info_framework-digitally-signed-credentials.pdf

Groningen Declaration Network (GDN)

The Groningen Declaration Network was established as a voluntary association of HEIs, digital service providers and national authorities around the globe. Currently, more than 90 signatories are gathered under the Groningen Declaration umbrella. The core objective of the GDN is defined as "supporting academic and professional mobility through digital transferability of student data". A so-called "Digital Student Data Ecosystem" should be promoted. The three central sub goals are:

1. providing expertise from the academic and user perspective;

2. working together as an interest group as well as a community of practice to create synergies between regional and global organisations and initiatives, and

3. enabling new stakeholders to participate in the policy dialogue through regional hubs; and promoting organizations and projects on all continents.

The aim is also to agree on common standards, interfaces and procedures to achieve the greatest possible international connectivity and interoperability. The annual Groningen Declaration meeting serves as the international platform for good practice exchanges in the fields of finding solutions for student data transfers, (inter-)national data repositories and IT support for recognition processes.

Link: https://www.groningendeclaration.org/

Cooperation between higher education providers

Cooperation on digital credentials

The Digital Credential initiative started in April 2019 with the mission "to create a trusted, distributed, and shared infrastructure that will become the standard for issuing, storing, displaying, and verifying academic credentials, digitally".

It is coordinated by MIT (USA) and involves Delft University of Technology (Netherlands), Hasso Plattner Institute at the University of Potsdam (Germany) as well as Technical University of Munich (Germany) from Europe. Other partners include Tecnológico de Monterrey (Mexico), Harvard University Division of Continuing Education (USA), University of California, Berkeley (USA), University of California, Irvine (USA), Tecnológico de Monterrey in Mexico, and the University of Toronto (Canada).

The initiative wants to create a central platform for storage of the achievement records of students, which will continue even after that student has graduated, based on the latest advances in public key infrastructures, public ledgers and blockchains.

Link: https://digitalcredentials.mit.edu

Cooperation with a focus on the recognition of prior digital learning

The European MOOC Consortium (EMC) consists of the main European MOOC platforms FutureLearn, FUN, MiriadaX, EduOpen and OpenupEd ("The European MOOC Consortium (EMC) launches a Common Microcredential Framework (CMF) to create portable credentials for lifelong learners - FutureLearn," 2019). These partners offer together over 2000 MOOCs and represent a large network of 250 higher education institutions and companies working in a variety of European languages, including English, French, Spanish and Italian. In 2019 they launched a Common Microcredential Framework (CMF) with the aim of ensuring that the microcredentials could be easily recognised within common qualification frameworks. They require that courses leading to microcredentials must be developed within a university's national qualification framework and, in Europe, in line with the European Qualification Framework (EQF).

Link: https://emc.eadtu.eu/

There are other European wide initiatives looking into the integration of micro-credentials into higher education services. The project MicroHE is currently reviewing requirements and the feasibility of such systems, including the application of blockchain technologies for robustness and reliability. The micro-credentials being developed should have the capability to be aligned to the existing ECTS standards.

Badges as alternative documentation of achievement

In Italy, CINECA, an inter-university consortium, has developed a badge platform called Bestr, which is being used by over 60 universities to document students' attainment. For instance, the business school Ca' Foscari University of Venice is using 47 different badges at the moment.

Link: https://bestr.it/organization/show/43

In Spain, Insignias INTEF offers a similar service.

Link: https://insignias.educacion.es/en/node/119

In the USA, the Education Design Lab offers tool kits and facilitates badges for 21st century skills, which are being used in multiple universities and colleges in the USA.

Link: https://eddesignlab.org/badgingchallenge/

Some open badges have also been developed to recognise the types of skills and competencies obtained through international exchange in the Erasmus+ Open Virtual Mobility project the badges are hosted with the Open Badge Factory in Finland.

Link: https://www.openvirtualmobility.eu/

7   Quality Assurance

7.1 Introduction to the Topic

The establishment of quality assurance as a key element to higher education provision has been one of the success stories of the Bologna Process. Quality assurance systems were seldom in 1999, when the Bologna Declaration was signed, but today there is a consensus that quality assurance is necessary to ensure accountability and support enhancement and 22 countries have established external quality assurance agencies since the Bologna Process was launched (European Commission/EACEA/Eurydice, 2018). The agencies have the remit to assure the transparency of provision and to set threshold norms, which must be fulfilled by higher education providers for the learning experience. These relate to infrastructure, staffing levels and qualifications, methods for developing curricula, but they also pay attention to performance indicators such as student completion rates and student satisfaction. It is recognized that quality assurance has been a key element in trust-building for higher education within society and for recognition between member states of the EHEA (Szabo & Tück, 2018). This development has been facilitated by the European Association for Quality Assurance in Higher Education (ENQA), the European Quality Assurance Register for Higher Education (EQAR) and formalized in the European Standards and Guidelines for Quality Assurance across the European Higher Education Area.

The challenge for quality assurance currently is that it has been focussed on assuring the institutional integrity of higher education provisions and has paid less attention to learning outcomes and other performance indicators (Hazelkorn, 2018). According to the 2018 Bologna Implementation Report, "less than half of the countries (16) have adapted their legal framework and external quality assurance procedures to facilitate and monitor digital provision" (European Commission/EACEA/Eurydice, 2018, p. 78). Also standards for digital technologies used for teaching, learning and recognition have not yet sufficiently been considered in existing QA mechanisms (Camilleri, Rampelt, 2018).

Ensuring and improving the quality of teaching and learning for all students in higher education is a central challenge for institutions and policy-makers, but current forms of quality assurance are very institution-centred. This type of quality assurance is significantly challenged, when provision of learning units (leading e.g. to micro-credentials) is not directly aligned to individual HEIs, which have already received positive quality assurance reviews.

7.2 Opportunities and Challenges of Digitalisation

Digital approaches to learning provision remain subject to uncertainty. On the one hand, new forms of learning provision are to be welcomed as they enable more flexible and more personal learning support. However, on the other hand, there are concerns about degree mills (i.e. providers with low quality learning provision and assessment) and fraud (i.e. the verification that a person really did complete a course or programme). Accordingly, the topic is important in order to ensure transparency and trust in the quality of digital learning provision. Within the framework of the Bologna Process, clear standards and guidelines (ESG) have been established and it has been shown that these can be applied to digital learning in principle (Huertas, Biscan, et al., 2018).

But the same ENQA report concludes:

> *"The present challenge remains with HEIs and QA agencies. On one hand, QA agencies should develop external review methodologies that take into consideration the particularities of e-learning, while on the other hand, traditional institutions providing e-learning or blended programmes should adapt their internal quality assurance systems in order to guarantee the quality of their teaching and learning processes." (ibid.)*

Existing criteria and measures for quality assurance must accordingly be renewed and supplemented, to take appropriate account of digitalisation in teaching and learning and to ensure security and transparency for all student groups. If digital learning leads to students acquiring learning in many different settings, a less institution-focussed provision could also lead to the requirement for a more learner-centred quality assurance framework. Additionally, quality standards for digital technologies used at HEIs need to be discussed. The challenge therefore is to modify the existing quality assurance procedures (standards and guidelines) for more flexible learning programmes, which may only partly take place on-campus, may integrate both teaching and peer learning, and may be aligned to multiple study programmes. Furthermore, the challenge is to review how existing external quality assurance can also be applied to providers of digital learning (e.g. MOOCs) for higher education studies, which are outside of the normal higher education system. The extent of the challenge in this area is directly related to developments regarding the diversity of higher education providers and whether recognition of learning provided by organisations, which don't already have a formal accreditation through a quality assurance agency, is accepted. If neither flexibility of provision, nor extensive recognition is foreseen in quality assurance procedures, this is likely to discourage or even impede the efforts of HEIs to harness digital opportunities.

Quality assurance procedures must be expanded to cover digital learning in two environments: 1) in the case that it is offered within a HEI's own course programme (e.g. also as blended learning) and 2) in the case that it is used by learners to supplement their own learning pathway. In both cases, they require a more student-centred approach to quality assurance.

Quality assurance focussed on on-campus teaching and learning typically covers the quality of the teaching environment, the quality of organisation of teaching, the student teacher ratio and the other related on-site issues. But quality assurance of online learning needs to be extended to cover the virtual learning environment (VLE and learning management system), the pedagogical quality of the learning situation and the availability of student support (Mazohl & Makl, 2017) – areas, which have been criticised as lacking for online learning in the past. Moreover, the new Digital Education Agenda emphasises that learning provision which is largely digital, must also ensure that the learner has sufficient access to adequate digital infrastructure and has sufficient digital literacy skills – otherwise a digital provision will only increase socio-structural divides in society (European Commission, 2018).

7.3 Examples of Good Practice

The following examples demonstrate that programmes and initiatives harnessing the potential of digitalisation already exist within the EHEA, and there are certainly many more. Together they present an opportunity for peer-learning and collaboration on the part of HEIs and governments within EHEA and opportunities for further action within the Bologna Process.

Work on digital learning environments by quality assurance agencies

The UK's Quality Assurance Agency (QAA) commissioned a report to look into the preconditions for good digital teaching and learning environments according to existing literature and reports. The report concluded that the lead term 'digital capability' is most often applied to individuals' competencies (i.e. those of students and teachers) and not to the whole teaching environment and the provided infrastructure (Austen, Parkin, Jones-Devitt, McDonald, & Irwin, 2016). This report was followed up by JISC, a university membership organisation in the UK, which extended its concept to cover six dimensions on an organisational level, which should be the cornerstones of good digital provision in higher education (JISC, 2017). This could be used as a foundation for new quality assurance procedures.

A working group of ENQA is also developing a toolkit for ensuring the quality of digital learning environments (Huertas, Roca, Ranne, & Gourdin, 2018). It covers eight areas, which are aligned with the ESG, but have been further specified for digital learning, with a focus on e-assessment: Policies, structures, processes and resources for quality assurance of e-assessment; assessment of learning; e-assessment system security, capacity and authenticity; infrastructure and resources; student support; teaching staff; learning analytics; and public information.

OpenupEd Quality Label

The OpenupEd initiative has developed quality standards based on a fully new understanding of quality in a digital world that is focused on the aspect of openness. OpenupEd aims to be a distinct quality brand embracing a wide diversity of (institutional) approaches to open up education via the use of MOOCs. As a consequence, OpenupEd partners agreed to develop a quality label for MOOCs tailored to both e-learning and open education. This label was already published in January 2014. The OpenupEd Label aims at supporting institutions in their quality enhancement of MOOC provision, focussing on Quality Assurance processes in place. They therefore have developed several checklists that support universities in self-assessing their MOOC development.

Link: https://openuped.eu/quality-label

Quality of Credentials

If new forms of documentation and data exchange are being used (also see chapter on recognition), this leads to some challenges for quality assurance and recognition – i.e. finding the similarities between the 'alternative credential' and common credentials (see also Chapter below) (Camilleri & Rampelt, 2019).

In general, the standards that exist for formal recognition and quality assurance in higher education can and should also be applicable to any new forms of (open) learning, certification and credentialisation. This means, that when assessing credentials as a proof for the quality of (open)

learning, key elements of a qualification should always be considered, with learning outcomes being the most important criterion (Nuffic, 2016).

As part of the PARADIGMS project the Dutch ENIC-NARIC NUFFIC has recently released a criteria framework which aims to solve this problem (NUFFIC, 2018). The detailed criteria could, indeed, be applied to both virtual and physical programmes. The authors recommended using seven criteria to evaluate alternative credentials:

1. Quality of the study programme – this criterion is focusses on the legitimacy of the awarding organisation, i.e. Is it well-known and accepted by third-parties? Does it use internal and external quality assurance mechanisms?

2. Verification of the certificate – this criterion focuses on whether the certification can be independently verified, i.e. Can it be externally found and checked (as a badge it would have its own URL)? Does it have a watermarked signature etc.?

3. Level of the study programme – this criterion is about assessing what level of education outcome was demonstrated through the certificate? This can be reviewed directly in the curriculum or implied through access requirements.

4. Learning outcomes – this criterion relates to details on the envisaged learning outcomes and how these might be aligned with the outcomes of more standard study programmes.

5. Workload (volume) – this criterion uses study hours and similar to try and align the outcome with similar outcomes from more standard study programmes.

6. The way study results are tested – this criterion seeks to ensure that the stated outcomes were actually proven through some kind of assessment.

7. Identification of the participant – this criterion looks to evidence that the holder of the credential is also the person who demonstrated their competencies and knowledge to achieve it.

Based on this, the OEPass project (Camilleri & Rampelt, 2018) has slightly adapted the model suggested by NUFFIC for the evaluation of the necessary elements of the credential statement (see Figure 1).

	Learning Outcomes	Quality of Learning	Level of Learning	Workload of Learning	Assessment of Learning Outcomes	Identity of Learner	Identity & Reputation of issuer
Credential	• Red • Orange • Green • No Info	• Red • Orange • Green • No Info	• Red • Orange • Green • No Info	• Red • Orange • Green • No Info	• Red • Orange • Green • No Info	• Red • Orange • Green • No Info	• Red • Orange • Green • No Info

Figure 1: Elements of a Credential Statement (Camilleri & Rampelt, 2018, p. 5)

When using such criteria to evaluate the quality of a credential it also has to be clear, though, that high quality credentials can have different characteristics and do not necessarily need to comply with all criteria to the same extent (also see Nuffic, 2018).

The Fifth Cycle – Towards a European Framework for Microcredentials

Based on the discussions during the Bologna Digital workshops and the already existing examples on new quality approaches in this chapter[16], we propose a European Framework for Microcredentials establishing a kind of 'fifth cycle' complementary to the existing short cycle, bachelor, master and doctorate.

This "fifth cycle" could be developed based on seven common features:

1. It has an average duration of 3-5 ECTS (equivalent to a workload of about 100-150 hours for the learner).

2. It has well-defined learning outcomes at Bachelor or Master level (First or Second Cycle of the Qualification Framework for the EHEA - Level 6 or 7 of the EQF).

3. It contains reliable testing of learning outcomes.

4. It is subject to accreditation by EQAR registered agencies as part of their regular review of universities' wider offering and internal QA (an extension of the existing review system).

5. Accreditation is at the same time also possible in separate series for other providers (labour agencies, in-company training, training by professional associations, private HEIs, NGOs, etc.)

6. Quality assurance processes are complemented by trusted crowd assessment, e. g. other institutions allowing for credit recognition, positive feedback on courses from learners, employers or professional associations

7. It is from the beginning developed as part of the concept of "digitally signed credentials", uploadable in the New Europass 'wallet', in line with GDPR and the principles of the 'Groningen Declaration Network'.

This initiative would help to widen learning on an unprecedented scale. It would create a new 'Fifth Cycle' next to short cycle, bachelor, master, doctorate. A wide take-up of microcredentials would serve both social and economic innovation.

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[16] Notably the criteria developed by ENIC-NARIC Centres for the evaluation of MOOC certificates and the Common Microcredential Framework (CMF) developed by the European MOOC Consortium.

8   Strategies for Teaching and Learning in the Digital Age

8.1 Introduction to the Topic

A new vision for contemporary higher education must necessarily provide a clear understanding on how digital technologies can enrich the student experience in the European Higher Education Area. This requires strategic approaches to teaching and learning on national as well as institutional level. The first rounds of the Bologna Process aimed to increase the quality of learning and teaching by indirect means – focusing on structural reforms to standardise and harmonise structures and processes around study conditions. While individual academic autonomy for the implementation of concepts for teaching is the backbone of the EHEA, there is further need to acknowledge that major improvements to ensure and enhance the quality and relevance of learning and teaching can only take place in an ecosystem of strong institutional and national support.

Related reform and adaptation can only be implemented in higher education through concerted efforts at three levels – national, institutional and individual levels.

On national and institutional level, the Bologna Implementation Report 2018 started measuring national strategies and policies on the use of new technologies in teaching and learning. The authors emphasize the importance of strategic approaches towards digitalisation and new technologies in teaching and learning:

> *"For new technologies to be used in an effective, efficient and trustful way in teaching and learning in higher education, certain framework conditions need to be met. New technologies need resources, infrastructure and human resources to use them. They equally need to be integrated into curricula, while learning outcomes acquired through using new tools need to be assessed and trusted at national level and abroad. Action required for the implementation of these changes needs long-term strategic planning, changes in the legal environment and financial resource allocation." (European Commission/EACEA/Eurydice, 2018, p. 75)*

According the report, 38 EHEA member states have accordingly implemented some kind of national strategies and/or policies on the use of new technologies in teaching and learning. An important next step would, however, be an even stronger focus on the institutional level and respective support mechanisms for strategy development.

The institutional level is the remit of the management and leadership of a HEI, where the objective is to react adequately to changes in the institutional environment. This requires changes to processes and encouragement of specific behaviours by academics and administrative staff through organisational change which is enabling and encouraging. Higher education policy and state regulations are an important part of the environment of a higher education institution. Institutions and the behaviours of staff in higher education are governed by regulations, incentive-setting and monitoring instruments set by higher education policy.

Put more succinctly, the combination between state-level policy and strategic efforts of higher education institutions set common goals and directions, focuses efforts, defines organisational

structures and provides a certain stability to institutional responses (Mintzberg, Ahlstrand, & Lampel, 2009).

So, whilst higher education institutions should be developing strategies for higher education in the digital age to fully harness the opportunities and limit the risks of digital technologies, state policy should work to ensure that the environment within which higher education institutions operate is supportive of digitalisation.

In the context of new public management, higher education institutions have been actively using strategy to secure collective and coherent responses to changes in their environment, including adoption of the Bologna Process structures (Jongbloed, 2015); and the challenges of 'Bologna Digital' should be treated in the same way.

8.2 Opportunities and Challenges of Digitalisation

According to the EUA Trends study, around half of all responding HEIs affirmed ("Yes, it is the case") that digital learning was "becoming part of the institutional strategy" and just under half affirmed that digital learning was now being used more strategically (Gaebel & Zhang, 2018). This is good news, although it currently tells us little of how embedded digitally-enhanced teaching and learning are. It does, however, put an important emphasis on digitalisation being part of holistic strategic approaches rather than isolated digitalisation strategies. However, there is also a discrepancy between documented strategies and what is actually implemented. This is also connected to the constraints on HEIs in terms of resources (e.g. funding system), regulations (which might inhibit some changes) and existing structures, which undervalue excellence in teaching and learning.

Internal strategic discourse on digitalisation at HEIs and innovation in teaching and learning must therefore also be regarded as a catalyst for the overarching discourse on the role of teaching and learning at universities. The overarching debate on the understanding of "teaching and learning" amongst all HEI stakeholders is the, often still neglected, strategic basis for all other topics and sub-areas.

At the same time, a European analysis on strategic development in higher education institutions commissioned by the European Commission and the OECD in the context of the HEI Innovate initiative (see below), warn against a 'tick-box' approach to implementing change (Gibb, Hofer, & Klofsten, 2018). The challenge for strategies for higher education in the digital age is that this approach is common if there is a main focus on provision of infrastructure and digital devices. Innovation research warns against this: if the focus is primarily on technological innovation, social innovations (changes to people and processes) are understood mainly in their functional relationship to this (Howaldt, 2009; Howaldt & Schwarz, 2010). Instead – and as argued in the introduction to this paper – digital-enhancement in the sense of 'Bologna Digital' requires: "…a holistic, well-designed and integrated strategy that considers technologies as a key enabler and addresses specific, relevant institutional issues and requirements" (Gibb et al., 2018; Kelly & Hess, 2013).

The challenge of digitalisation is to find a way to embed it into the whole operation of the higher education institution. That is to say that the goal of strategies for higher education in the digital age should not be the provision of digital services, but the improvement and innovation of teaching and learning through digitalisation. This objective requires a high level of cooperation throughout the institution, which brings together the various parts of the HEI's operation to ensure that

all perspectives on objectives and capacities are considered when developing strategies for teaching and learning in the digital age. The following principles could, amongst others[17], be considered crucial to such a process;

- The HEI needs a clear profile that guides its overall strategies.

- The HEI needs a strategic vision, which emphasises specific teaching and learning objectives (such as those presented in the previous chapters).

- The HEI needs to ensure involvement of teaching staff administrative / support staff and student representatives in the design and implementation of strategies.

- The HEI needs clear capacity-building efforts for teaching and administrative staff.

- The HEI needs a visible and common monitoring framework.

Since most HEIs will be dealing with this challenge and looking for solutions at the same time, the opportunity for sharing and exchanging knowledge and indeed best practices should be considered.

A clear objective for the near future is to make strategies and successfully implemented activities visible and valuable through bottom-up analyses that serve both a better visibility on political level as well as within institutions. This could also be flanked by a monitoring framework on the European level, which uses key indicators to make such activities visible (such as currently used within the Bologna Process Implementation Report for other areas and the national strategy level). Such work should also clarify overlaps and opportunities for consolidation in reforms around digitalisation in the areas of research and administration.

As mentioned above, national policy frameworks are also a key enabler in this context – and if they have not been adapted to the impacts of digitalisation such as flexibility and personalisation of support, they can also be an inhibitor. Therefore, it is vital that policies (strategies) are also launched at national level, which support and promote a digitally-enhanced provision of higher education. The Bologna Process Implementation Report found that most higher education systems have a national strategy or policies in place on the use of digital technologies in learning and teaching. Four countries (Estonia, Germany, Italy, and the Netherlands) have a specific strategy on the use of digitally-based teaching and learning methods in higher education and 21 promote and support institutions in making the use of new technologies mainstream. However, only seven systems provide new resources for staff training on this (Croatia, Czech Republic, Finland, France, Germany, Kazakhstan, and Poland).

This level of reporting provides only minimal insight into whether and how governments are truly supporting 'Bologna Digital' becoming a reality. This leads to the conclusion that there is not a monitoring framework currently being used, which provides sufficient insights into how digitalisation strategies and policies are structured and how effective they are. New strategy development programmes could be promoted through competitive funding for institutions or fellowship programmes for learning and exchange for people in key roles in higher education (teachers, institutional leaders, students, policymakers).

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[17] In a joint approach with project partners and members of the HFD community, HFD has developed 14 strategic fields of action for higher education in the digital age. These fields of action serve as an orientation framework for German HEIs. They are described here (in German): https://hochschulforumdigitalisierung.de/de/dimensionen-des-digitalen-wandels

8.3 Examples of Good Practice

The following examples demonstrate that programmes and initiatives harnessing the potential of digitalisation already exist within the EHEA, and there are certainly many more. Together they present an opportunity for peer-learning and collaboration on the part of HEIs and governments within EHEA and opportunities for further action within the Bologna Process.

Promoting digital solutions through the SURF Acceleration Plan (Netherlands)

In the Netherlands, a collaborative organisation for ICT in Dutch education and research called SURF was established that is fully owned by its member organizations. With the mission "Driving Innovation Together", SURF cooperates with more than 100 education and research institutions.

In late 2017, SURF, the Association of Universities in the Netherlands (VSNU) and the Netherlands Association of Universities of Applied Sciences (Vereniging Hogescholen, VH) presented the Acceleration Agenda for Innovation in Education. This agenda was intended to designate a new joint course to change education successfully. In their 2018 Acceleration Plan, the Dutch stakeholders further elaborate on the agenda and describe the design of a strategic four-year programme to achieve these objectives. According to the Acceleration Plan, digitalisation offers a great deal of opportunity for higher education in the Netherlands. It can contribute to the quality of education and strengthen the international position of higher education.

The Acceleration Plan is based on 3 shared ambitions:

1. Better connection to the job market

2. Making education more flexible

3. Learn smarter and better by using technology

Link: https://www.surf.nl/en/acceleration-plan-for-educational-innovation-with-ict

Promoting peer learning and exchange through the HFD Peer-to-Peer-Program (Germany)

The German Hochschulforum Digitalisierung (HFD) has the mission to orchestrate the discourse on higher education in the digital age. As an innovation driver, it informs, advises and connects stakeholders from higher education institutions, politics, business and society. Founded in 2014, HFD is a joint initiative by Stifterverband, CHE Centre for Higher Education and the German Rectors' Conference (HRK). It is sponsored by Germany's Federal Ministry of Education and Research (BMBF).

Amongst other activities, HFD offers peer-to-peer consulting services to German higher education institutions. This peer-to-peer strategy consulting is a developmental tool geared to universities that want to actively shape the digital turn in higher education and strategically reinforce the digitalisation of teaching and learning. Accordingly, it is addressed in a targeted manner to university leadership and each university's individual profile and goals. Central to this free-of-cost program are so-called peer experts, who accompany the university by contributing their own practical experience in the strategy process.

From 2017 to 2019 more than 100 different higher education institutions from Germany applied for the opportunity to participate in the program, 22 have been selected to participate between 2017 and 2020.

Link: https://hochschulforumdigitalisierung.de/en/strategies-higher-education-digital-age

Self-assessment tool for HEIs through HEInnovate (European Commission)

HEInnovate is an initiative of the European Commission, DG Education and Culture and the OECD LEED Forum, and supported by a panel of independent experts. HEInnovate is a free self-assessment tool for all types of higher education institution. It allows them to assess their institution using a number of statements related to its entrepreneurial activities, including leadership, staffing and links with business. Extensive training and support materials, including practical case studies, are available to support workshops and further development within the institution. HEInnovate is intended for higher education institutions (Universities, University Colleges, Polytechnics, etc.) who are interested in assessing themselves against a number of statements related to the entrepreneurial and innovative nature of their higher education environment.

HEInnovate covers eight areas for self-assessment: 1) Leadership and Governance, 2) Organisational Capacity: Funding, People and Incentives, 3) Entrepreneurial Teaching and Learning, 4) Preparing and Supporting Entrepreneurs, 5) Digital Transformation and Capability, 6) Knowledge Exchange and Collaboration, 7) The Internationalised Institution and 8) Measuring Impact.

The objective is to provide higher education institutions with a guidance framework helping them to identify hidden opportunities and strategically develop their entrepreneurial and innovative potential (see Gibb et al., 2018).

Link: https://heinnovate.eu

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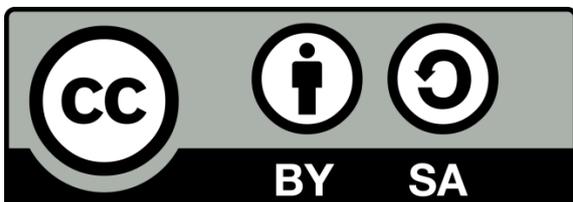
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Appendix

Workshop Participants (December 2018 and/or May 2019)

1.	Victor Aguilar	*EUF*
2.	Gottfried Bacher	*BMBWF, Austria*
3.	Christien Bok	*SURF, Netherlands*
4.	Barbara Buzeczki	*BMBWF, Austria*
5.	Perrine de Coetlogon	*University of Lille, France*
6.	Martin Ebner	*University of Graz, Austria*
7.	Chiara Finocchietti	*CIMEA, Italy*
8.	Manuela Fried	*BMBWF, Austria*
9.	Julius-David Friedrich	*CHE / HFD, Germany*
10.	Michael Gaebel	*EUA*
11.	Irina Geanta	*UEFISCDI, Romania*
12.	Andrea Geisler	*BMBWF, Austria*
13.	Peter Hassenbach	*BMBF, Germany*
14.	Peter van der Hijden	*Former Head of Sector Higher Education Policy at the European Commission*
15.	Michael Hörig	*DAAD, Germany*
16.	Oliver Janoschka	*Stifterverband / HFD, Germany*
17.	Michal Karpisek	*EURASHE*
18.	Maria Keplinger	*BMBWF, Austria*
19.	Alexander Knoth	*DAAD, Germany*
20.	Alexander Kohler	*BMBWF, Austria*
21.	Katrina Koppel	*ESU*
22.	Daiga Kuzmane	*EUF*
23.	Heba Ledwon	*Kiron Open Higher Education, Germany*
24.	Hedwig Mahn	*BMBWF, Austria*
25.	Dominic Orr	*Kiron Open Higher Education, Germany*
26.	Stephan De Pasqualin	*BMBWF, Austria*
27.	Martin Rademacher	*HRK, Germany*
28.	Florian Rampelt	*Stifterverband / HFD, Germany*
29.	Melanie Rosenbaum	*CEC, Holy See*
30.	Peter Seitz	*BMBWF, Austria*
31.	Melinda Szabo	*EQAR*
32.	Anna Wöckinger	*BMBWF, Austria*
33.	Heribert Wulz	*BMBWF, Austria*

Imprint

Hochschulforum Digitalisierung (HFD) orchestrates the discourse on higher education in the digital age. As an initiator and innovation driver, it informs, advises and connects stakeholders from higher education institutions, politics, business and society.

Founded in 2014, HFD is a joint initiative by Stifterverband für die Deutsche Wissenschaft, CHE Centre for Higher Education and the German Rectors' Conference (HRK). It is sponsored by Germany's Federal Ministry of Education and Research (BMBF).

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