



Country Report

Mapping the digital readiness and resilience of HEIs in response
to the COVID-19 crisis in Germany in the context of:

Governance and enabling services

Teaching and learning practices and infrastructure

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Table of Contents

1. Executive Summary	3
2. Pre-Covid-19 Status Quo of digitalisation of HE/VET/LLL in Germany	3
2.1. Policy and practice	3
2.2. Drivers and motivators	8
2.3. Barriers and obstacles	8
3. Post-Covid-19 Status Quo of digitalisation of HE/VET/LLL in Germany	9
3.1. Policy and practice (national/federal, regional, local)	9
3.2. Drivers and motivators	15
3.3. Barriers and obstacles	16
4. Future Outlook and Opportunities	17
5. Conclusion	17
6. Appendix	18
7. References	20

List of abbreviations used

- HE – higher education
- HEI – higher education institution
- VET – vocational education and training
- LLL – lifelong learning
- EU – European Union



1. Executive Summary

The research paper revealed that digitalization pre-Covid and (post-)Covid in higher education, VET/LLL has been a complex issue. In both periods digitalization has been put on the prominent level by policymakers, with obviously more prominence being given in post-Covid era. The accent on digitalization in the pre-Covid era was driven more by the need for innovation (digitalization has been perceived as inextricably linked with innovation, either as a vehicle or end in itself), while in the Covid and post-Covid era the digitalization was more need-based (during pandemics digital modes of education was the only way to continue with education services).

Though there has been a clear commitment on the government level, the implementation aspects have been exacerbated by issues such as underfunding, skepticism in academia, lack of competent/trained staff and lack of institutional commitment (among other ones).

2. Pre-Covid-19 Status Quo of digitalisation of HE/VET/LLL in Germany

2.1. Policy and practice

Higher Education context

In the pre-Covid 19 period digitalization in the context of higher education in Germany has started gaining more attention in the 2000's. The federal government sees digitalization as an important driver in fostering knowledge transfer and innovation in science, but it also has expectations of its citizens to be digitally literate, in order to be able to fully participate in education and society. To take just one example, in 2000, funds from the auctioning of UMTS licenses were used to finance the major funding program "New Media in Education" of the Federal Ministry of Education and Research (BMBF) with a total of 185€ million. (Zawacki-Richter, 2021) Digitalisation has been perceived as a critical challenge by policymakers (Hochschulforum Digitalisierung, 2016). The agenda of digitalization has been pushed primarily through 3 different angles in the context of Germany: Federal Digital Agenda (2014-2017), the think-tank Higher Education Forum on Digitalization (Hochschulforum Digitalisierung), and various calls for research proposals by the federal government, which foster research on digitalization in HE through funding by the German Ministry of Education and Research (BMBF) (Bond et al., 2018). BMBF pushed for the Higher Education Forum on Digitalization in particular to develop and accelerate concepts, tools and expert groups to drive the topic of digitalization at German universities. It was founded in 2014, and is a joint initiative by Stifterverband, CHE Centre for Higher Education and the German Rectors' Conference (HRK) sponsored by BMBF. It has mobilized more than 70 experts placed in six subject groups dealing with key issues of digitization, ranging from innovative teaching and learning scenarios to questions of university governance.

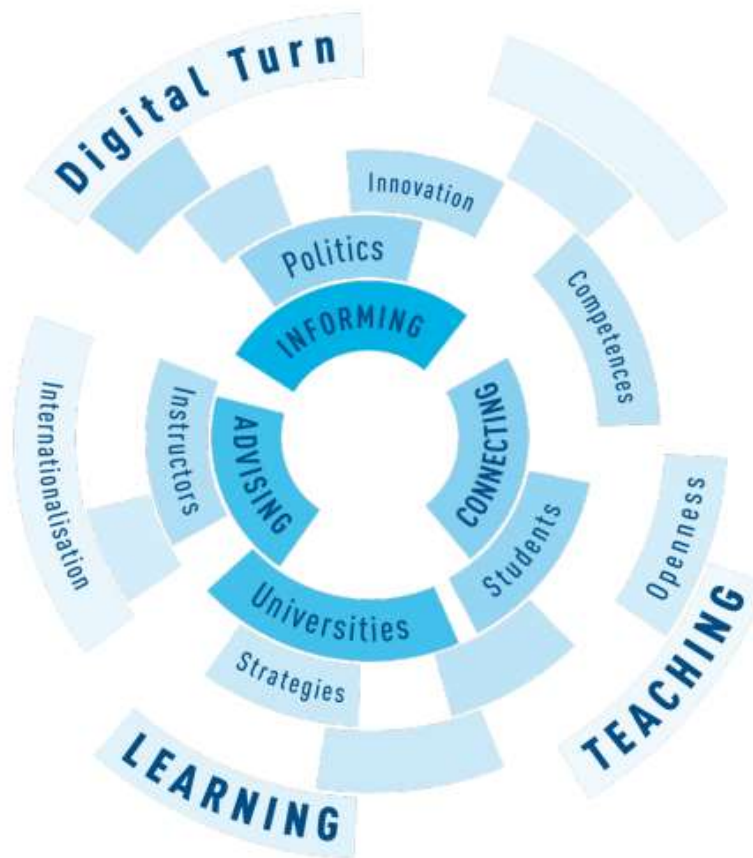


Figure 1 Conceptual frame of digitalization in German HE (Higher Education Forum on Digitalisation, 2016)

Governance

Speaking in particular about the governance of HEI in the context of digitalization, various theses and working papers initiated by Higher Education Forum on Digitalization clearly stated that for any sort of genuine digital transformation needs to come from the strategic level. DAAD argued that a comprehensive digital strategy needs to “evolve at higher education institution management level, in order to reduce obstacles in the introduction and use of digital learning environments by teaching staff” (DAAD, 2019). An important factor in the development of digital higher education is appropriate organizational and professional development. This in turn demands a clear commitment coming from the university management and must be nourished by all the stakeholders following the stipulations of the university-wide strategy. If German universities are to harness the full potential of digitalization (not just in teaching), the push needs to come from different stakeholders and it needs to be steered top-down. (Higher Education Forum on Digitalisation, 2016). Some of the universities in Germany saw the use of digital tools and strategies to improve internationalization efforts, such was the case with one of the oldest universities in Germany, University of Göttingen.

While there were some good cases of instilling digitalization strategies in universities pre-Covid, majority of HEIs were still slowly waking up to the importance of digitalization at HEIs. An inspection of digitalization strategies was carried out in 2017 by Bond et al., 2018 among doctoral degree granting universities in Germany (n = 155) which showed that only four have publicly available digitalization strategies in place, with another six at the time of the sampling (2017/18) were engaged in a peer to peer coaching process, in order to develop their respective strategies. (Bond et al., 2018)

Enabling services

In 2019, Council for Scientific Information Infrastructures (RfII) focused on the academic job market in its recommendation paper on digital skills. It stated that, no personnel capacities will be freed up in publicly funded research as a result of the digital transformation. In its paper RfII called on central infrastructure sectors to employ more academically qualified personnel in order to further improve the quality of services. (HRK German Rectors' Conference, 2021) Apart from the obvious need of IT experts to push the digital transformation, it was stated by HRK that experts in media didactics and course design are needed, particularly those who work with concepts (ibid.).

Teaching and learning

Digitalisation in teaching and learning has been discussed lively before Covid-19 and in what many studies, thematic groups and fora often wanted to discover is how digital formats can act as an added value to the existing physical offerings and how the quality can be ensured. Tied to this, the researchers and practitioners also sought to discover what skills and competencies the staff needs in order to ensure the abovementioned.

In one of its reports from 2016 Higher Education Forum on Digitalization made these conclusions in relation to higher education teaching and learning and digitalization:

- “Innovations in digital teaching are not just technical innovations but rather academic, curricular, organisational and structural innovations”
- “The use of digital media contributes to the improvement of higher education teaching”
- “Technological change not only creates new virtual learning environments but also alters existing physical learning environments”
- “There is no shortage of digital teaching and learning innovations at universities but their structural and strategic advancement is deficient”
- “The integration of digital media in teaching and learning is a complex process of negotiation between different stakeholders within
- the universities”

(Higher Education Forum on Digitalisation, 2016)

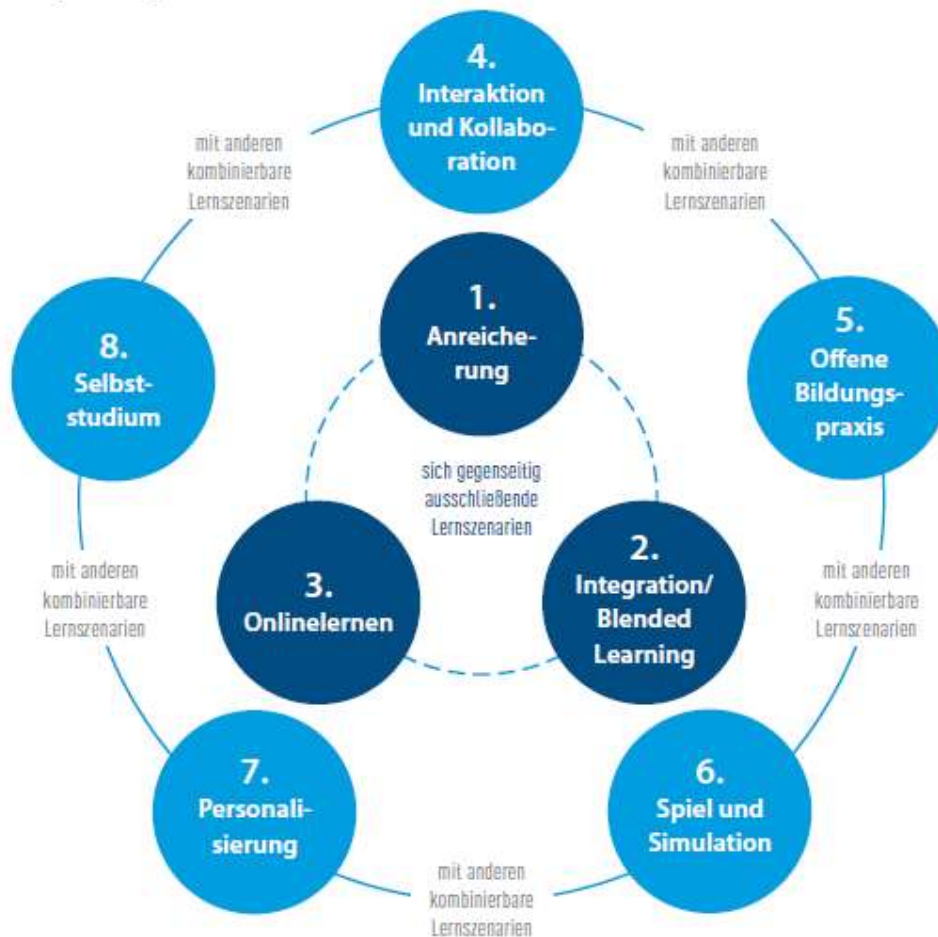


Figure X Learning Scenarios Overview (Higher Education Forum on Digitalisation, 2016)

As part of the work done by thematic group “Innovation in Learning and Examination Scenarios”, 7 scenarios were developed fitting for digital age (See Figure x). The 7 seven scenarios include: Enrichment, Integration/Blended Learning, Online Learning, Interaction and Collaboration, Open Education Practice, Game and Simulation, Personalisation and Self-directed study (Higher Education Forum on Digitalisation, 2016).

Infrastructure

Council for Information Infrastructures was established in 2013 to aid research and education entities in particular in their digital infrastructure efforts by providing advice and recommendations. It referred to both research and education, and improving infrastructure such as archives, libraries and research and publication databases, but also digital media strategies and tools to aid universities in their learning and teaching efforts. (Digital Agenda, 2014) Digitalization at HEIs was seen as inextricably linked to harnessing innovation potential and boosting regional and national growth and competitiveness.

The digital infrastructure such as stable and reliable bandwidth and WLAN was seen of essential importance. The same was seen for Cloud and data space infrastructure as well as

various software licenses. These however are not often present or are present for limited period of time. Many HEIs have secured their infrastructure needs for digitalization through third party funding from the states, federal government or the EU. This strong dependence on third party funding creates difficulties in ensuring stable and sustainable digital environment. (Higher Education Forum on Digitalisation, 2016) The creation of stable digital infrastructure requires strong financial commitments as well as capable and determined HEI management involvement to ensure that the inner HEI structures are well integrated and connected in the digital sphere.

Speaking about students and infrastructure they possessed at the time to execute successfully digital learning, Zawacki-Richter, Dolch & Müskens (2017) found that more than 99% of students have Internet access and are furnished well with digital devices and gadgets. On average a German student owns five different devices, while a third of the sample owns even six devices. Therefore, it can be concluded that pre COVID-19, there has been a reasonable demand climate on the side of students, but the supply side has been lacking on the side of HEIs. In general, students ardently supported the introduction and acceleration of digitalization, but voiced the concerns on data privacy. (Weisflog & Böckel, 2020)

German universities have established a cooperative company, HIS Hochschul Informations System eG, Hannover, to develop administrative software solutions that operate according to EU data protection and privacy regulations. (Kerres, 2020)

VET

Before onset of COVID-19, digitalization was on the agenda of VET in Germany. Digitalisation was put prominently in connection with the “future skills” emerging from Industry 4.0. In the Economy 4.0 scenario, 2,542,000 jobs would be lost on the one hand while 2,768,000 jobs would be created at the same time. The Federal Ministry of Labour and Social Affairs has forecasted that due to digitalization and shifting landscapes of occupation, there would be a massive shortage of skilled occupations. Also was expected that there will be an increasing complexity of some occupations. Therefore, it has been crucial that VET education also adapts and anticipates these.

With its umbrella initiative VET 4.0, the Federal Ministry of Education and Research (BMBF) and the Federal Institute for Vocational Education and Training (BIBB) have been tackling since 2015 issues in research, training, skilling and practice, related to the digital transformation of the world of work and VET. VET 4.0 has been adding value to the implementation of the digital agenda via exchange of information on an ongoing basis between academia, policy-makers and industry and practice. (BIBB, 2020)

With another initiative, namely “Digital Media in Vocational Education and Training” support programme (Digitale Medien in der beruflichen Bildung), the idea was to strengthen vocational education and initiate structural changes with the aim of significantly increasing the use of digital tools for initial and continuing training in vocational education. (The Federal Government, 2014).

The Vocational Training Pact (VTP, 2018) has been a formal effort stemming from the federal government and the states to modernise VET by harnessing digital tools, upgrading equipment and increasing flexibility and permeability between tracks. An amendment (2019) to the Vocational Training Act saw the introduction of “a minimum training allowance, and C-VET qualifications to give greater equivalency between general and vocational studies, and expanded part-time training”. (OECD, 2020)

2.2. Drivers and motivators

Guidelines: Reflect on your country’s Drivers and motivators in the context of digitalization in education before Covid-19

There are several drivers and motivators before Covid-19 that pushed for digitalization at HE and VET. Those include:

- Pressure to innovate and bring novelties to different areas of education
- Foster inclusion and access to education
- Foster flexible pathways in education
- Prepare better people for demands of 21st century and digital professions
- Strengthen digital literacy in the digital era
- Include citizens more in education
- Include different stakeholders as co-creators in education

2.3. Barriers and obstacles

Guidelines: Reflect on your country’s Barriers and obstacles in the context of digitalization in education before Covid-19

Before COVID-19 pandemic, digitalization in Germany has been on a thorny path. Despite digitalization being placed on the radar of the policymakers and finding itself in the public and academic discourse its development was slow and hindered by several factors. In 2019 the Expert Commission on Research and Innovation (EFI) noted the processes underlying digitalisation are jeopardised by growing complexity and structural underfunding, among other things. (HRK German Rectors’ Conference, 2021). Further barriers and obstacles included:

- Lack of strategic commitment on the top level (e.g. lack of Digitalisation Strategies)
- Lack of connectedness, communication and collaboration among different stakeholders who are critical in making digitalisation cross-cut entire institution in a smooth and holistic manner
- Lack of structural support to properly guide students through counselling
- Lack of structural support to properly guide staff in leveraging digital opportunities
- Discrepancy between perceived importance of digitalisation and its implementation
- Scepticism in attitudes
- Resistance to change
- Concerns about data protection and privacy and accent on data austerity

- Marginalised and vulnerable students less likely to be included/use digital services

3. Post-Covid-19 Status Quo of digitalisation of HE/VET/LLL in Germany

3.1. Policy and practice (national/federal, regional, local)

Guidelines: Reflect on your country's Policy and practice (national/federal, regional, local) in the context of digitalization in education during/after Covid-19

Without doubt, the Covid-19 pandemic significantly changed the landscape of higher education, and of studying and teaching. After the pandemic hit, the semester start was delayed until after Easter holidays in 2020. In the meantime, university buildings and all its facilities were closed (with the exception of some lab activities and exams), internships were either cancelled or postponed, exchange semesters were cancelled. At the same time, students faced other challenges such as ability to finance themselves (due to lost/reduced part-time jobs), changes in their living arrangements (some students were forced to move back with their parents, etc.). Many students in Germany admitted that due to the disruption in their ordinary schedule, they had less time for studies (Stammen, K.-H. and Ebert, A., 2020). Similarly, for the HE staff, the new status quo posed challenges as well in blurring the lines between professional and private spheres of lives with many having to balance child upbringing and homeschooling with their jobs. The new normal had a significant impact on social, psychological and economic aspects of individual lives, which in turn impacted the spheres of studying and learning. The situation was unprecedented in so many ways.

With HEIs closing their doors and students and teachers being forced to continue their learning and teaching from their own home, the digital tools posed as the only way forward. However, the rapid shift in how teaching and learning is executed revealed that many HEIs are not ready and that there is a lot more effort to be poured. The fault lines in digital-readiness showed that the work previously done to push the digital agenda in higher education was not enough.

Governance

The general, knee-jerk reaction, when confronted with unprecedented Covid-19 pandemic without ready/comprehensive digital infrastructure was to just learn by doing it. As Michael Kerres mentions in his paper, there are no managerial strategies, teacher training, debates on technology and design and no analysis on advantages and disadvantages – the idea was that “we just do it”. (Kerres, 2020)

This “walk in the dark” without strategy and a bigger vision by the management opened the doors to a lot of challenges such as insecurity/confusion on the part of the students and staff as well as inefficiencies and ineffectiveness in transferring knowledge online. This digital semester experiment revealed that for successful and effective online/digital learning different systems need to get connected. It is not all about digital pedagogy, but a lot of other offices and departments need to come together for student experience in the digital environment to be executed successfully.

German Rectors' conference outlined clear need for a comprehensive framework under which digitalization is to be implemented. At the moment “framework conditions required

for the continued dynamic development of digital teaching do not yet exist". (HRK German Rectors' Conference, 2021) The key aspects of digitalization, namely teaching, services, infrastructure are in dire need of personnel boost and upskilling if the change in these 3 areas is to be sustainable.

Apart from obvious resources and commitment needed for executing digitalisation at universities, having the legal framework conditions are of imperative importance. HRK German Rectors' Conference federal government and states are urged "to create tariff structures that are appropriate to qualifications, suitable regulations on teaching hours and curricular standards, legal protection for digital examinations, appropriate regulations for data protection and more science-friendly copyright legislation". (HRK German Rectors' Conference, 2021) In another study carried out by Institute for higher education development (HIS-HE) titled Expert survey on Digital Sommer Semester (EDiS)" a call was made for formalising management structures more to aid in digital learning and teaching environments. It was made clear that teachers and staff universities need an improvement of the framework conditions when it comes to conceptual, legal and personnel aspects. (Seyfeli, Elsner, & Wannemacher, 2020)

Furthermore, the unprecedented situation at German universities made it clear of how critical it is to have a good crisis management strategy to tackle not just Covid-19 pandemic but also be crisis-proof when other unexpected crisis hit and have a good response (both digital and non-digital).

The survey data carried out by DigiTransformEdu partners reveal that only 57% of teachers/trainers are satisfied with the way their HEI responded to the pandemic. When asked why, some of them mentioned poor adoption of technology, poor policy to adopt technology, weak or no communication, too many platforms with lots of changes and no good tools for pedagogy. Compared to teachers/trainers, students have a slightly more positive outlook, with 67% of them stating that they are satisfied with the way their HEI responded to the pandemic. When asked why they were not satisfied, some mentioned that the communication was confusing and there were no clear guidelines, while others mentioned lack of facilities such as libraries and no appropriate substitute was put in place.

Some of the qualitative insights from teachers reveal that online education should have been on the agenda of the top management before Covid-19.

Enabling services

In a study conducted by University of Hildesheim (Stu.diCo) more than 3000 students from various universities in Germany were asked to reflect on their studying experience in the first fully online semester (Summer semester 2020). They were specifically asked about what services they would like to have to help in learning processes. Students from Stu.diCo study stated they like support with subject-related questions about course content (55.7%), in preparing for exams (55.4%) and in obtaining literature and other research (45.9%). Respondents would also like further advice and support in organising their learning and studies.

The research has revealed that students require much more support and counseling in the digital environment. Particularly important are psychological counselling, study progress counselling, counselling for students with children, and much more. The need for counselling is still there and - according to the results of this study - it is increasing in the current situation. (Stammen, K.-H. and Ebert, A., 2020)

Looking into the finding of another student survey carried out at the University of Hildesheim, it is recommended that the infrastructure at universities is digitally and analogously and that advisory services are set up and improved. Particularly highlighted is that staff capacity is needed (therefore more funding) for the counselling services, which include technical but also psycho-social and student counseling services. (University of Hildesheim, 2020)

In another study carried out by Institute for higher education development (HIS-HE) titled Expert survey on Digital Sommer Semester (EDiS)" a call for expanding services was reiterated by students. Students outlined that there is a clear need for expanding communication, professional, technical and social support services to assist in the digital learning environment. (Seyfeli, Elsner, & Wannemacher, 2020)

One of the important further points with respect to enabling services that The Conference outlined in their address to the Federal Government, referred to the call for collaboration between internal university departments or faculties when it comes to communication services, support structures or comprehensive campus management systems. (HRK German Rectors' Conference, 2021)

Teaching and learning

The digital push forced quite substantial changes in delivering modules and lectures. Many lecturers were said to have put a lot of effort and dedication into setting up online modules, recording interactive videos, developing learning materials, quizzes and tests, adding innovative elements (to some extent), creating learning paths, moderating forums and holding consultation hours via video calls. Up until then the Learning Management System was primarily used for course management or as a place to provide readings and presentations, but due to Covid-19 it started being a new teaching and learning environment (Zawacki-Richter, 2021) . It has been said that the arrival of the new normal pushed the teachers to the innovation edge. Some managed to go over it, some not. The influx of changes made things easier for some while, for other people it made it more challenging, both from student and teacher perspectives.

Despite the efforts the first digital semester was far from perfect, when looking through the lens of students.

The Stu.di Co study revealed that on average students attended fewer classes than it was the case with their physical semester done the year before (6.6 classes per week compared to 7.6 classes in the semester done before). 44.5% of the total respondents stated that they were able to attend fewer classes than last semester. Within that respondent group, the most common reasons for attending fewer classes included the increased workload in the semester (42% of this respondent group); more distractions (37% of this respondent group) and lack of desired classes (33% of this respondent group). (University of Hildesheim, 2020)

Gründe für den Besuch von weniger Lehrveranstaltungen (n = 1046)	Prozent
Ich muss keine Lehrveranstaltungen mehr belegen	18,5
Weil die Arbeitsbelastung dieses Semester höher ist	42,1
Weil es dieses Semester mehr Ablenkungsfaktoren für mich gibt	37,8
Weil ich neben dem Studium mehr arbeiten muss	12,9
Meine gewünschten Lehrveranstaltungen werden nicht angeboten	33,1
Weil ich mit technischen Problemen zu kämpfen habe	16,2
Weil ich meine Abschlussarbeit schreibe	13,9
anderes	20,3

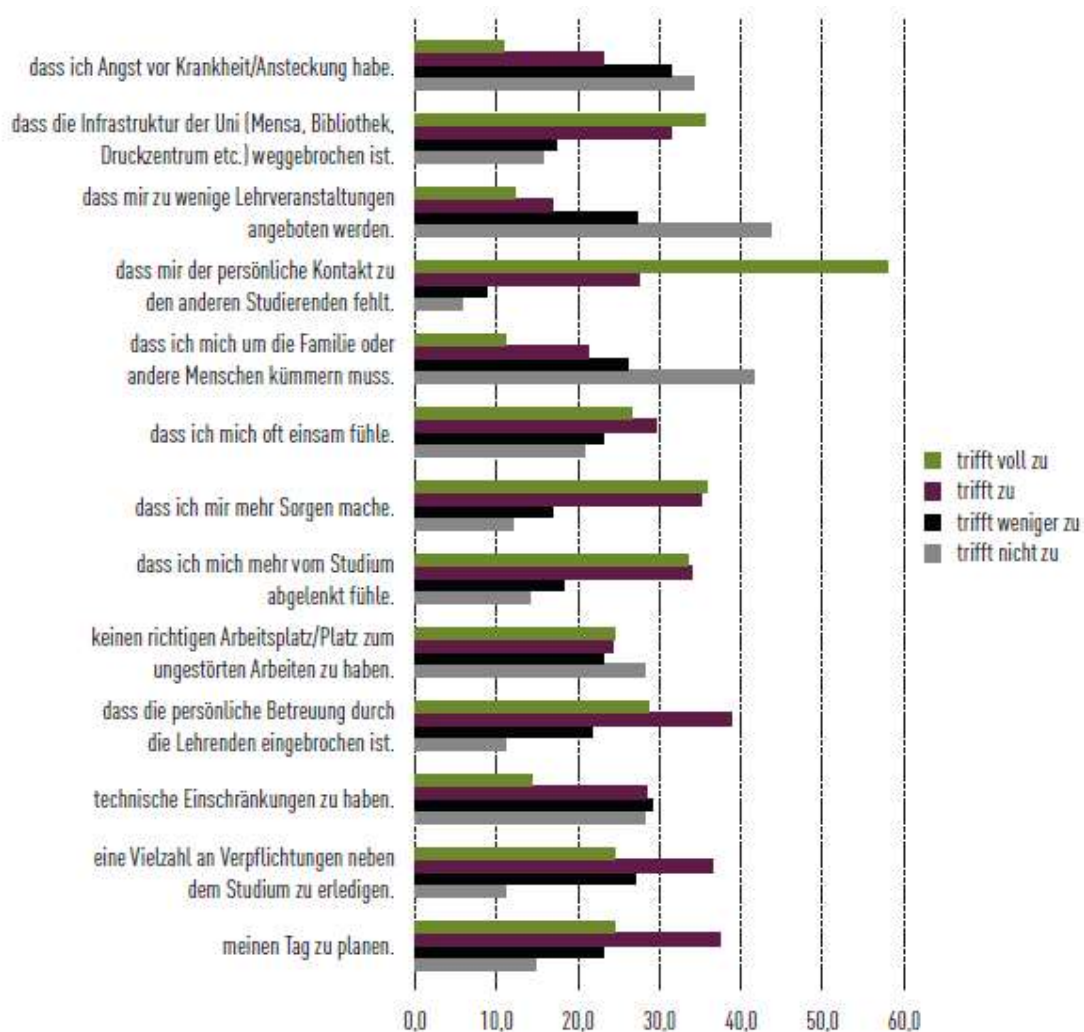
Tabelle 3: Gründe für weniger Lehrveranstaltungen

On the other hand, 15% of total respondents said that they attended more classes than the previous semester, with the most common reasons including increased flexibility during the day (50% of this respondent group); reduction in commuting time (47% of this respondent group) and lack of other activities such as sports, jobs, parties, etc. (25% of this respondent group).

When asked how would the students find the idea of studying one more semester online, 59.4% said they would find this bad (36.5% very bad, 22.9% bad), 18.3% of respondents were neutral and 22.3% of students would find it good (11.5% good and 10.8% very good).

The study conducted by DigiTransformEdu project revealed that 60% of students surveyed believe their digital competencies are better now compared to pre-Covid time, while they 86% believe their lecturers digital competencies are better compared to pre-Covid times. Teachers/Trainers report also high levels of competence after Covid, though slightly less positive outlook compared to students. 71% of teachers/trainers believe their digital skills are now better than before Covid and 57% of them believe that digital skills of students are better than in pre-Covid times.

Looking at the student perspective and experiences of the online semester, it is evident that fully online semester led to several problems. One of the major problems outlined was the social isolation, decreased wellbeing and lack of human contact that made the fully online semester extremely difficult to carry out (See figure X (only in German)). Almost 60% of students in the Stu.diCo survey said they strongly agree that that they were missing personal contacts with other students. Almost 40% of students said they strongly agree that they worry more now than before. (University of Hildesheim, 2020) The same study also outlined further potential issue in digital studies that should be addressed in the didactical approaches, which is student self-regulation (how students manage their time and workload without external influence) with more than 50% stating they struggle in planning their day.



Infrastructure

The switch to the digital environment called for more investments into technical infrastructure and services. Big investments were made also into upskilling teachers into media technology. The Learning Centers gained more prominence and use of computers and software was accelerated with the introductions of e-assessments and online examinations. (Zawacki-Richter, 2021)

Some infrastructure problems were identified in individual studies that focused on how some university students were coping with the first online semester. At University Duisburg-Essen, for instance, 20% of students voiced they urgently needed specific devices to be able to effectively carry out their learning process. At the University of Göttingen, 16% of students stated they do not own devices to meet their needs to carry out the online semester. (Stammen, K.-H. and Ebert, A., 2020) What was further emphasized as the lack in the online semester in terms of infrastructure was the lack of resources such as printer and scanner (which were freely available in the premises of HEIs before the pandemic) which led to more challenges in carrying out the semester (ibid.).

In their address to the Federal Government, German Rectors' Conference stated the matter of digital transformation in German higher education goes beyond IT infrastructure. Of course, IT infrastructure is essential but it is not the only piece of the puzzle for smooth and sustainable digital transformation. They elaborate that a distinction can be made between digital generic IT services, digital scientific services and cloud services on one hand and a need to recruit staff for executing as well as maintain and developing further the services and provisions. They further make an important appeal to establishment of fail-safe backup structures for all services.

The survey conducted by DigiTransformEdu found that 93% of students are happy with the way exams were organised during the pandemic, while 71% of teachers/trainers reported their satisfaction. When asked about what their institution could have done better to respond to the pandemic in terms of online education, some of the qualitative answers from teachers/trainers reveal that there should have been better preparation, there could have been training to educators and more resources available. Some of the comments also noted that some of the platforms and IT solutions provided were not particularly user-friendly and tailored for the purpose.

VET

The COVID-19 crisis has shown that there is no digital inclusion without social inclusion when it comes to VET education in Germany. Looking into the results of CEDEFOP study, while digital education has been seen as a solution to continuing VET education in the face of adverse situation such as COVID-19, it is important to bear in mind that not all students have equal access to digital education. In particular, marginalised and vulnerable learners are less likely to be involved in distance learning procedures and disconnecting for a longer period may lead them to drop out from their VET programme. (CEDEFOP, 2020)

1. A bonus payment (EUR 2,000 per trainee) for SMEs which keep their apprenticeship placements stable in the next year
2. A bonus payment (one-off payment of EUR 3,000) for SMEs (economically affected by COVID-19) which increase their apprenticeship placements in the next year
3. Financial support to SMEs (economically affected by COVID-19) which continue in-company training without interruptions or reductions by keeping trainers and apprentices in full time employment
4. Financial support to SMEs or inter-company facilities that absorb trainees from other SMEs unable to maintain their training offers or collaborating in joint training initiatives
5. A bonus payment (EUR 3,000 per trainee) for SMEs which take over trainees from insolvent companies

When it comes to digitalization and VET, the government provided the following alleviating mechanisms to tackle adverse effects of COVID-19:

- Funding of EUR 600 million for the expansion of IT infrastructure in the states

- (Länder) on top of the EUR 5 billion of the already existing programme “Digitalpakt Schule”
- Expansion of the “HPI-Schul-Cloud”, providing learning platforms during the lockdown, in particular for schools which lack digital infrastructure
- Extra funding of EUR 500,000 for German community college

(German Office for International Cooperation in Vocational Education and Training (GOVET), 2022)

All of this aimed to ensure “learning and training anywhere, anytime”, an idea central to the concept of lifelong learning, but often quite distant from traditional VET practices that are strongly rooted on the physical presence of the learner in a specific VET establishment.

In Germany, national teacher survey regarding the experience with distance learning has indicated that most schools were technically ill-prepared for the Covid-crisis in terms of digitalization. This was not only due to lack of necessary equipment and gadgets, but also due to lack of experience and knowledge in creating digital didactical content. (CEDEFOP, 2020)

3.2. Drivers and motivators

Guidelines: Reflect on your country’s Drivers and motivators in the context of digitalization in education during/after Covid-19

Drivers behind digitalizing higher and vocational education during/after Covid-19 were primarily need-based. Digital environment has been the only way to keep the educational provision alive. However, this is only one part of the story. Digitalisation was already on the agenda in the German context and it can be said that Covid-19 accelerated already existing drivers. To sum up, the following have been seen as a driving force behind digitalizing different aspects of education during/after Covid-19:

- Need for internationalization without being able to travel
- Need for assessments and examinations done online
- Need to provide more flexibility
- Need for different innovative tools to foster better pedagogy
- Need to have online administrative processes in place to enable smooth functioning of the educational system as a whole
- Need for fostering partnerships between institutions
- Need for carrying out apprenticeships and on-the-job delivery online
- Need for things such as simulators, augmented/virtual reality, artificial intelligence to emulate work done in physical environment
- Need for online platforms to teach particular skills not just for students, but also staff

DigiTransformEdu empirical research reveals that some of the main drivers for pushing online education are the facts that online education is more flexible; it is more time-saving and more productive.

3.3. Barriers and obstacles

Guidelines: Reflect on your country's Barriers and obstacles in the context of digitalization in education during/after Covid-19

There have been several barriers that precluded the successful digitalisation during and after Covid-19. Furthermore, the digitalization also raised some concerns on the pitfalls of digitalisations that should be taken into account. The following barriers/pitfalls have been observed in the context of education in Germany (both higher education and VET):

- Lack of appropriate digital infrastructure (stable connection) to carry out effective digitalization
- Lack of competence and skills on the part of staff implementing digital content
- Lack of time and motivation on the part of teaching staff to create attractive digital content and engaging educational content
- Lack of engagement of students to follow attentively the online lectures (particularly so if the lectures are not engaging)
- Lack of comprehensive methodology/approach to effectively convert non-digital content into digital content (often teachers merely created a pdf file of their lectures)
- Digital exhaustion and lack of focus, particularly after long-hours in front of the screen
- Increased workload for both students and staff
- Problems with inclusion: some students do not have appropriate devices and equipment for successful and positive online learning experience
- Lack of social contact and risk of isolation and loneliness
- Disruption of work-life balance
- Unsustainable funding models for digitalization
- Problems related to data privacy and protection
- Remote areas do not have adequate infrastructure for digital learning and teaching

DigiTransformEdu empirical research reveals that some of the main drivers for hampering online education are the facts that online education is more distractive it makes working with others more difficult and requires more personal workload. Further barriers included online fatigue, distraction, decrease in motivation and internet/technical problems.

This quote captures qualitatively the struggles of German students in the digital semester of 2020:

"I can't understand at all why the studies should become digital. For me it's a disaster and it makes me really unhappy. I feel very lonely, isolated and have no motivation in digital. I

never say anything in digital classes, it's terrible. Schools are open, offices too, people travel and we're stuck in front of the laptop. It's so unfair." (Stammen, K.-H. and Ebert, A., 2020)

4. Future Outlook and Opportunities

Digitalisation in Germany has been on a thorny path, but it certainly has good prospects in the future. Irrespective of how COVID-19 pandemic ends, digitalization is here to stay in all levels of education. When it comes to the higher education, German Rectors Conference for instance logged a request to the German government that all universities get the so-called "digitalization allowance" to allow for stable investments in digital infrastructure at all universities. The amount requested is around 270 million per year for around 2.9 million students. It has been calculated that each university receives 92 euros per student per year for digitalization transition. For more details see appendix.

Researchers and practitioners have further asked for more comprehensive digitalization framework, which is at the moment lacking. So it is expected that this will be tackled in the near future as well.

It is expected that many teachers develop more digital skills and do so continuously to stay on the pulse with the latest trends. It is expected that there will be a push for this, but also that there will be a push-back from teachers, as a large number of them is expected to resist this.

5. Conclusion

Looking into the timeline from before Covid-19 to after Covid-19 pandemic, it is evident that there is acceleration in digitalization offerings and efforts in higher education and VET, which is in line with the trend evident in the rest of the EU. Specific efforts have been put in place both in higher education and VET prior to onset of Covid-19. The government has been making quite a push as part of modernization agenda, but the implementation was often sluggish and sporadic.

The push for digitalization in education through Covid-19 pandemic accelerated the process, but still many issues remain that hamper proper and comprehensive leveraging of digital potential. Often the underfunding is a problem, but also mindset and resistance to change and uptake of new skills. Digitalization also raises further issues such as ethics, privacy and social factor. While digitalization can be a rich space for education, it appears that the literature suggests that a balance between offline and online modalities may be a way forward. Sense of community and social connection may be challenging to recreate in the digital domain.



6.Apendix



	Proportion	Costs
Total sum		
Digitalisation allowance of €92 per student per year		€92
Number of students (press release 11/12/20)		2,891,547
Total digitisation allowance		€266,022,324
Basic amount	20%	€53,204,465
Number of universities		390
Basic amount per university		€136,422
Digitalisation allowance minus basic amount	80%	€212,817,859
Digitalisation allowance per student (reduced due to basic amount)		€74
Distribution among higher education sectors	100%	€212,817,859
Digital learning and teaching (40%)	40%	€85,127,144
Add-on for classroom teaching, asynchronous/synchronous digital teaching, blended learning (e.g. inverted classroom)		
Teaching of individual digital sovereignty (digital literacy)		
Digital literature for teaching and studying		
Interactive learning environments		
Learning and campus management systems		
Software licences, including licences for authoring systems		
Studios, makerspaces, real-world laboratories		
Cameras, whiteboards, notebooks		
Open educational resources, micro-degrees and badges, MOOCs (possibly on the basis of cooperation)		
Student life cycle: Information portals, e-assessment, study services		
Personnel for didactic support and further training (possibly on the basis of cooperation)		
Teaching support services (30%)	30%	€63,845,358
Remote access, bring your own device		
Sync and share services, web-based office tools		
Integrated communication channels for video conferences, chats		
Interactive websites and forums		
Institutional digital sovereignty (possibly on the basis of cooperation)		
Overarching services/platforms (on the basis of cooperation)		
Services for academic work		
Cloud services (possibly on the basis of cooperation)		
Personnel and material resources for development, provision and operation (possibly on the basis of cooperation)		
Teaching support infrastructure (30%)	30%	€63,845,358
Information infrastructure		
Comprehensive local WLAN coverage		
Increase in bandwidths		
High-availability server and storage infrastructure		
Cloud strategies and cloud services (possibly on the basis of cooperation)		
Information security: Awareness measures, personnel for computer emergency response teams (on the basis of cooperation)		
Material resources (including for licences)		
Personnel resources		

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