Hochschule für
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Strategy paper
Digitisation 2021
at the HWR Berlin

Introduction

Digitisation is a progressive process driven by transformative technologies. It has also affected teaching and research for long. The COVID 19 pandemic and the associated temporary conversion of large parts of university operations - from courses to research activities through to administrative processes - to digital formats has accelerated this process on the one hand, but on the other hand, it has also made the challenges affecting digitisation even more visible than before.

The highly dynamic nature of digitisation creates a considerable sense of urgency for the various areas of responsibility and work units of the HWR Berlin, also due to justified expectations of members and cooperation partners of the university. Funding opportunities provide incentives to invest in digitisation. In this situation, a strategic alignment is indispensable in order to make the best possible use of the opportunities that present themselves. Only a strategic approach can ensure that the full potential of digitised teaching, research and administration is available to all members and operational areas of the university. However, the risks of digitisation must also be taken into account.

The following guidelines and overarching strategic objectives are of central importance:

- Digitisation should not simply be accepted as an inevitable development. It must also be actively shaped.
- Digital platforms and technologies must be available for use to as many members of the university as possible for learning, teaching and research as well as for administrative tasks.
- Investments in digitisation must exploit synergies. In particular, interoperability that avoids media disruptions and duplication of efforts, must be ensured. Digitisation is supposed to facilitate the ability of the university to cooperate with other scientific institutions and practice partners.
- Students from all degree courses should be prepared as optimally as possible to face the challenges of an increasingly digitised world of employment.
- The quality of jobs at the university is expected to increase through digitisation, for example by providing support for monotonous, repetitive tasks.
- All members of the university should be enabled to recognise and employ the potential of digitisation, to include its opportunities and risks in making decisions on action and to deal responsibly with digitisation and its consequences.
- Sustainability[1] is also a central, strategic goal for digitisation, for example through the use of sustainably produced, versatile and energy-efficient technologies.

A strategic approach to digitisation is also a central element of the fundamental orientation of the university: To what extent should digitised forms of learning, teaching and research replace traditional approaches to teaching and research, to what extent do old and new elements complement each other in a university, where non-digital social togetherness will and should continue to play a significant role?

The digitisation strategy of HWR Berlin follows the platform concept with regard to the procurement, development and design of any Information and Communications Technology. All services and applications that are available for the different usage scenarios are conceived together. The digitisation platform is based on fundamental infrastructure technologies (hardware, software and networks), which are necessary as basic services in order to make digitalisation a reality at all. It also includes IT protection, IT security and data protection as elements of a holistic approach.

There are three specific strategic fields - interconnected in many ways - which must be examined in more detail: the **strategic framework conditions of university digitisation** (section A), the

[1] Insert link to the sustainability paper as hyperlink

strategies for the digitisation of services for teaching, research and knowledge transfer (section B) and **strategies for the digitisation of processes and structures for the administration and management of the university** (section C).

A. Strategic prerequisites for the digitisation at HWR Berlin

1. Networked digital platform

The HWR Berlin is seeking a networked digital platform. In this platform, existing and future basic digital services and digital applications and services built on them are networked in such a way, that synergies can be used and media disruptions can be avoided. In perspective, this platform can offer all students, teaching staff and employees of the university equal access to the use of services and applications. These cover the various usage scenarios of a digital university, such as teaching, research and study, as well as administration and management, in a target group-oriented manner. They enable an automated or semi-automated realisation of all necessary processes and structures of the university and at the same time offer innovative ways to redesign, especially for digital teaching and research and the digitisation of central administrative tasks. In case of decision-making processes on further digitisation investments, attention should be paid to compatibility with the networked platform; stand-alone solutions should be avoided as far as possible.

2. Strategic options through factual trend towards digitisation

Learning, teaching and research at the HWR Berlin have already developed greatly since the early 2000s, as has university administration, due to the progressive trend towards digitisation. This results in interesting options for strategic shaping of further development.

The current state of digital platforms for teaching - including the learning platform Moodle, which is based on an Open Source concept - offers a variety of connecting points for strategic orientation. The networked IT infrastructure has been expanded considerably, also within the framework of the German National Research and Education Network. This development was recently accelerated by the responses to the COVID 19 pandemic.

The importance of computer science at the HWR Berlin has grown considerably over the past 20 years, both in terms of curricular content and in terms of skill requirements related to digitisation. As a result, several departments recruited additional professional expertise in computer science and other subject areas related to digitisation within the framework of new denominations of professorships. Numerous research projects at the HWR Berlin deal with digitisation topics from a variety of professional perspectives.

Differences between previously technical and non-technical universities are narrowing as a result of digitisation. This is reflected at HWR Berlin, among other things, by an increased significance of computer science degree programmes - in addition to diverse technology and digitisation-related content in many other degree programmes and in research.
This initial finding leads to the strategic goal of further intensified internal networking of digitisation skills and infrastructure. Goals should be strategically translated into “road maps" and synergies between digitisation approaches and projects should be taken up.

3. Transformative key technologies

Digitisation is driven and implemented by transformative key technologies. Universities should also strategically orient their teaching and research towards key technologies that are already being used and developed at present. That is because such technologies will foreseeably shape the professional lives of students, and they are at the same time the subject and technical basis of diverse innovative research approaches. Key technologies already available today are in particular Artificial Intelligence (AI), Smart Devices, the Internet of Things (IoT), and Robotics. AI often acts as a bracket between these transformative key technologies because the Intelligent Network, which forms the basis for the Internet of Things and Smart Devices, produces very large quantities of data whose immediate and automated processing to generate derived knowledge is strategically preferable to storage in Data Lakes, also in the interest of data protection.

Robotics applications are already being used for teaching and research in some areas of the HWR Berlin. In the course of application-oriented teaching and research, new fields of application can be determined, simulated and tested in practice. The technical infrastructure already in place and to be obtained in the future for this purpose, as well as its maintenance and use, must be coordinated across departments and locations. Insofar as robotics infrastructure can be obtained, for example within the framework of funding tenders, it should be possible for as many members of the university as possible to use it; synergies in procurement and maintenance should be utilised.

With a view to the future, due to its multidisciplinary orientation in research and teaching, the main focus of HWR Berlin is on determining a university-wide technology strategy that includes the following elements:

- Literacy in the field of transformative technologies, i.e. relaying skills and knowledge, and also the development of modern concepts for efficient dissemination of this new technology literacy as a social task to reduce barriers
- Transformative technologies as a research object, especially their expansion, simulation, and practical evaluation
- Transformative technologies as a working tool for teaching and administration.

4. Data protection compliant, barrier-free and discrimination-free digitisation as a strategic advantage

The strategic orientation of university digitisation is already largely shaped by legislation. Implementation oriented towards high standards offers the university strategic advantages, for example with regard to acceptance of digitisation decisions and cooperation with practice partners, who value high standards.

As a state-owned university, HWR Berlin enables all students to participate in digital courses without discrimination. Students are provided with access tools that make implementation of the data protection requirements of the EU General Data Protection Regulation (GDPR) an actual practice. Integration of people with disabilities requires a networked digitisation platform, whose offers can basically be found, accessed and used without outside help. The accessibility of the platform is also a strategic goal defined by law. The strategic orientation of digitisation with legislative provisions necessarily takes place in all phases of the digitisation process: from conception to concrete design and use.

5. Supporting measures for the digital transformation of the university

Part of the digitisation strategy of HWR Berlin is also measures, which positively support the necessary cultural change on the path of digital transformation, and thus ensure the realisation of strategic options. These include measures such as:

- Target group-oriented communication about the digitisation strategy, the associated visions and goals
- Participatory involvement of the central groups of users for the application fields of the digitisation strategy to ensure feasibility and acceptance
- Support in the process of transformation to empower all groups of users in the use of digital and networked technologies
- Strengthening the central IT tasks in the university for economically tenable management of the applications and services in operation and development, as well as for the further expansion of basic services (IT infrastructure)
- Further strengthening of the e-learning infrastructure.

Digitisation can only succeed if changes are shaped positively. The implementation of a networked digital platform is linked to specific preconditions such as consideration of diversity[2] and inclusion of all staff and students in terms of access to and use of the platform, open science, sustainability[3] and ecological use of technologies, as well as the avoidance of dependencies on specific technologies and providers.

B. Digitisation in teaching, research and knowledge transfer

1. Opportunities and risks of digitisation in teaching

Digitisation is understood as a continuous process to develop new methods and technical instruments for teaching and learning, to pick up on trends and also to introduce digital teaching-learning concepts, which have already been successfully practised at the university, into the scope of university teaching.

The strategic orientation of digitisation should enable all those involved to make use of the opportunities offered by digitisation and to deal competently with its risks.

From the **learner's perspective**

- Digital skills prepare students for transformative digital change in the world of employment. Lifelong learning is of particular relevance against the backdrop of further advancing digitisation.
- Digitisation-related skills of students are strengthened through manifold and diverse transformative (educational) technologies. Precisely the weighing up and trying out of very different digital formats open up diverse perspectives on a learning subject. The experience, that problems are socio-technically pervaded, enables the recognition of diverse - context-related - solution strategies.
- Participative digital learning and teaching opportunities move the boundaries between teaching staff and learners and open up new inter- and transdisciplinary fields of research and employment. In this way, digital actors can be recruited from widely different disciplines. The thematisation of opportunities and risks of digitisation is experienced as an active participatory process. HWR Berlin will find new ways and broaden promising paths, which will help overcome

[2] Insert link to diversity paper as hyperlink
[3] Insert link to the sustainability paper as hyperlink

gaps between students and their individual learning success. Digitisation facilitates and enables the variety of methods also offered in classroom teaching. It offers excellent starting points for strengthening the success conditions for learning identified by the learning psychology, such as the development of a stable and intrinsically anchored motivation to learn, the awakening and inclusion of emotions or the transformation of diverse life and work experiences into a meaningful resource for the learning process.

From the **teaching staff's perspective**

- The digitisation strategy takes into account the heterogeneity of teaching staff in terms of age, gender, and cultural, social and professional context. A versatile - preferably customisable - digital continuing education programme and degree programme of continuing education is necessary in order to provide all teaching staff with broad access to digital teaching - in all facets. In order to do justice to the diverse learning types of students, diversity-oriented[4] dimensions must be systematically integrated in addition to didactic aspects.
- Teaching staff must not only deal with a comprehensive digitisation strategy and "only" transfer their teaching into a digital format, but also rethink or adapt parts of their content in an interdisciplinary and at the same time transdisciplinary way. The thematisation of opportunities and risks of digitisation should be integrated into this.

Digital skills, which students need in a society and world of employment that is becoming more digital, must be demonstrated in examination formats and procedures that are close to reality. In addition to advantages in accessibility, efficiency and traceability, digital examinations offer the opportunity to orient university examinations towards digital skills. They are part of a digitised teaching and learning process, promote learning success and take into account a modern understanding of teaching and learning.

Digital mobility[5] is an important aspect and opens up new perspectives for internationalisation. Learning centres and globalised teaching cooperations are also moving closer together with the possibility of a deeper dovetailing of theory and practice as well as knowledge transfer.

A reflected digitisation strategy also includes the strategic handling of risks of digitisation for teaching staff, learners and the university as a whole:

- Participative approaches ensure digital sovereignty and digital participation.
- Health risks due to the (often monotonously designed) digitised work are taken into consideration when implementing the digitisation strategy.
- The digitisation strategy takes into account risks that result from the fact that not all students and teaching staff have the same technical qualifications (Digital Divide) and aims to overcome the resulting individual disadvantage.

2. Strategic role of digitisation in the development of degree programmes

Today, digitisation is relevant even for professions that were strongly characterised by the analogue world in the past. Graduates of HWR Berlin therefore not only need the skills to use digitised applications, but also to critically reflect on digital technologies used in their professional field.

This results in new requirements also for the further development of existing degree programmes and the development of new ones. The guiding principle for studying and teaching[6] at HWR Berlin emphasises the need to address issues of digitisation in the curriculum in an appropriate form. As part of a strategic further development and new development of study programmes, the digitisation-

[4] Insert link to diversity paper as hyperlink
[5] Insert link to internationalisation paper as hyperlink
[6] Guiding principle for studying and teaching

related competence requirements of the respective occupational fields should be systematically recorded and implemented in suitable teaching and learning forms.

Digital skills education and the further development of the skill objectives are closely interlinked with the quality processes and goals of the university. Digitisation in society and the world of employment must be taken into account in the further development of curricula (as a subject of teaching, anchored in study and examination regulations). The European Reference Framework for Digital Competences (DigComp)[7] describes the necessary skill areas for competent, problem-solving, critically reflective and security-conscious action in a digital environment. The digitisation strategy of HWR Berlin is oriented towards this.

3. Digitisation as a research topic

Digitisation generates diverse research needs in all disciplines represented at the HWR Berlin. In research, it has developed into an interdisciplinary issue that has long since also encompassed disciplines that were previously far removed from technology. With its multidisciplinary orientation, HWR Berlin has a good starting position for research on digitisation topics, which must be used strategically and developed further. This applies equally to technical aspects of digitisation and to risks of digital transformation, which should be thought of together in research (as well as in teaching) and brought together in interdisciplinary structures.

The multidisciplinary perspective inherent in the structure of HWR Berlin is a good prerequisite for research on technologies that are only at the start of their development or are even unknown today - with interdisciplinary perspectives on opportunities and risks. Multidisciplinary perspectives on technology development can be networked in-house and incorporated into diverse research projects. The dynamic development of research into transformative key technologies, which is already reflected in diverse research activities at HWR Berlin, is an important example of this. The IT and research infrastructure must be strategically developed in such a way that the HWR Berlin can maintain and expand its position as a research institution for digitisation-related future topics.

As part of its further strategic development, HWR Berlin needs an attractive research infrastructure for interdisciplinary research on digitisation topics and for participating in research associations (including DFG, BMBF and EU programmes). Specialist research skills on digitisation topics should be networked more strongly in-house with regard to joint research. The departments and research institutes of the university play an important role in this. They are key players in the use of synergies as well as in the identification of digitisation-related future topics and their anchoring in the research and teaching portfolio of the university.

Innovative multidisciplinary research on digitisation is also of great benefit to students: Innovative research approaches radiate onto the teaching content. In the course of teaching research projects, students can acquire qualifications in innovative fields relevant to research.

4. Open Science: Making research results and knowledge digitally usable

With its Open Access strategy,[8] HWR Berlin aims to make research results more visible and usable, within and outside the university. This strategy is an element of an Open Science approach, with which HWR Berlin, in association with other scientific institutions, is pursuing the strategic objective of making research results from the university available in digital formats for research-based teaching, for specialist communities and for all interested members of the public. The university library, together with the researching and teaching academics, can play a central role in the strategic development and implementation of an Open Science strategy. While protecting the

[7] https://ec.europa.eu/jrc/en/digcomp, last retrieved on 21.04.2021
[8] Open Access at HWR Berlin

interests and rights of authors, barrier-free dissemination of research findings takes precedence over interests of commercial utilisation. This is notably true for research services that are financed from public budgets.

Against this background, HWR Berlin is pursuing the strategic objective of expanding and modernising its digital infrastructure for access to research content. HWR Berlin already has a research database, which meets documentation requirements but falls short of its present potential. An integrated research information system is being implemented as a central element of the future digitisation platform with the strategic objective of further professionalising the documentation and management of research projects and activities on the basis of technical innovations. A future-oriented research information system should not only effectively support the planning, controlling and reporting processes of the university and ensure the quality of the information. It also serves as a tool for public relations work, so that the university can promptly and comprehensively inform a wide variety of target audience in politics, administration, business and civil society about research activities. A future-oriented digital research infrastructure promotes connectivity of the university to the digital infrastructure of other scientific institutions, for example through complete mapping of the Core Data Set for Research (KDFS) developed by the German Council of Science and Humanities, and through secure long-term documentation of research metadata with a differentiated concept of visibility and rights. Researchers at HWR Berlin should be supported in making their research services visible in the digitised world. To do this, the internal research information system must be networked with external systems like online publication databases, library systems and standardised identification systems such as the Digital Object Identifier (DOI) for publications or the ORCID ID for publishers. Each data object should be recorded only once, but should be usable multiple times. In addition, the university, together with other scientific institutions, needs technical solutions integrated into the digitisation platform for archiving research data securely and in accordance with scientific standards.

A digital research infrastructure and Open Science approaches that are part of a networked digital platform, in perspective, not only promote future research, but can also be used in many ways for research-related teaching and learning.

5. Knowledge transfer: University digitisation in cooperation with science and practice

Digitisation has also become a central topic of research and knowledge transfer. Already nowadays, entrepreneurships supported by HWR Berlin are quite predominantly based on digital components. This trend is expected to intensify further and in perspective will require the usability of the university's own digitisation platform for research and knowledge transfer as well. Entrepreneurships on digitisation topics should continue to be supported. Students, teaching staff and graduates of HWR Berlin should be even more involved here.

In the course of the further strategic development, the multidisciplinary skills of HWR Berlin in the field of digitisation must be made more visible for decision-makers in application practice, for example through the research information system and its networking with online offers. The diverse transfer partners of HWR Berlin in business, administration and civil society should be strategically networked more systematically with the fields of expertise and research activities of the university.

Research cooperation between the university, companies, administrations and civil society on digitisation topics should be facilitated and expanded. The university can employ its multidisciplinary skills even stronger than before to expand innovative and practice-oriented education and training programmes. As part of a comprehensive research strategy, inter-university synergy effects should be achieved in the research and development landscape for transformative technologies be means

of grouping and interdisciplinary cooperation of many university lecturers involved. Such cooperation helps in expanding and strengthening the transdisciplinary interconnectivity of the university. For this purpose, special usage scenarios for transformative digitisation technologies can be developed together with companies, administrations and civil society.

C. Digitisation of administration, management and strategic development of the IT infrastructure

1. Optimisation of internal university processes through digitisation

Digitisation offers opportunities to develop university administration further in a modern and service-oriented manner. Ongoing projects, such as a standardised university campus management system and electronic file management, function in perspective as core elements of a networked digital platform.

Digitised administrative processes hold potential for relieving teaching staff, researchers, administrative staff and students of time-consuming and sometimes monotonous administrative procedures. For this purpose, HWR Berlin must use contemporary e-government tools for this purpose. Administrative processes should be mostly paperless; media disruptions and multiple inputs of data should be avoided. Accessibility and consistent implementation of service-oriented and user-friendly e-government approaches are of particular importance here. Services that can be used intuitively, data protection friendly technology design and implementation of transparency requirements should be combined here. It should be possible to generate data provided (e.g. grade overviews for students, third-party funding account balances for researchers or statistical overviews for management purposes of the central and decentralised work units of the university) automatically without special expertise and present it in an easily understandable manner.

The IT systems used for teaching, research and administration should be interconnected through variable interfaces. IT security and data protection requirements such as confidentiality and appropriation of data must not be implemented through media disruptions and separate data inventory, but rather in particular as part of technology design as well as through differentiated authorisation concepts, which are to be evaluated continuously, and through automated plausibility checks and deletion concepts.

2. Strategic further development of the IT infrastructure

The digitisation of teaching, research and administration requires the sustainable further development of the necessary and continuously growing IT infrastructure. The development of the infrastructure required for the digitisation platform of the university itself requires a holistic and strategic orientation, so that a complex and scalable hardware environment is available, which can be constantly expanded as needed. The consideration of IT security and data protection is also elementary here. The university IT needs a strategic orientation for this and must provide the technical framework, which enables the contemporary expansion of digitisation projects in teaching, research and administration.

Funds raised for infrastructure through digitisation projects must be used against the background of IT security and the strategic expansion of IT. Feasibility studies, economic feasibility studies and risk assessments must be taken into account at an early stage - during the planning of projects itself. Standardised and efficient testing processes must be established for this purpose.

Expansion of the IT infrastructure and development environments must enable work processes without media disruptions and facilitate synergies between the different departments, locations and operational areas of the university. The requirements of the Online Access Act (OZG) must be taken into account in the technical conception of the IT infrastructure.

Obstacles, which make it difficult to find IT specialists suitable for the public sector as guarantors of digitisation, must be strategically overcome at HWR Berlin, because IT specialists are rare and competition among universities is already fierce.
IT security must be fully developed for expanding digitisation at HWR Berlin. Processes and technical requirements must be implemented such that IT security can be guaranteed, permanently monitored and can be adapted at short notice. Every service, which is implemented digitally, leads to risks of failure and makes the university susceptible to threats. The data of teaching and administration as well as the results of research must be protected entirely, and risks must be continuously assessed and minimised.

D. Result and Vision Statement

The digitisation strategy of HWR Berlin understands digitisation as a holistic process that is necessarily intricately interwoven, encompassing teaching, research and administration as well as central and decentralised units in equal measure. With respect to continuing dynamic technology development, the university has the opportunity to strategically orient digitisation investments and thus create a networked digitisation platform in the longer term, which makes optimum use of synergy potentials on the basis of strategic planning and strategically aligns investments in technology, software, infrastructure, further education, etc. in a target-oriented manner. The digitisation strategy can and will only highlight perspectives, without providing concrete solutions. The concrete design and further development of digitisation in the specific case must - in order to avoid setting unnecessary limits to innovations - be reserved for future planning and must remain flexible. Digitisation leads to far-reaching transformation of the traditional work structures and processes of a university. Its strategic orientation enables the use of digitisation potentials and at the same time choosing platforms and solutions, which are participative, service-oriented, legally compliant, accessible and free of discrimination.

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