Digitalization Strategy for Teaching of RWTH Aachen University
The Second Phase 2018 - 2023

Background

In the first phase of the digitization strategy for teaching (2014 - 2017), the rectorate provided funding for the faculties to test teaching, learning and examination formats and to expand the internal services that support innovative digital technologies in teaching. The faculties were autonomous in their decisions regarding which formats or methods they explored.

The faculties actively took up the challenges of digitalization in teaching. Many individual activities were implemented. Examples include a total of 88 successful Exploratory Teaching Space projects (ETS), individual approaches related to subject-specific issues, and faculty-wide approaches such as the widespread use of electronic exams. Care was taken to ensure that all activities met the subject-specific requirements. During this phase, the faculties and departments explored a broad spectrum of innovative digital technologies for teaching.

This process created a "culture of enablement" in which the faculties were motivated to try out diverse digital technologies in teaching and learning.

This approach is referred to as the "Aachen Way": the rectorate enables the transformation process and provides guidelines for the university; the faculties and departments actively take up these opportunities and fine-tune them as appropriate to their specific subject area.

The activities of the first phase were so successful that RWTH is currently considered a national leader in the development and implementation of a digitalization strategy in teaching, as was demonstrated, for example, at the final conference of the Higher Education Forum on Digitization (HFD) at the end of 2016.

In light of this, RWTH sees not only the benefits of extending the current digitization strategy in terms of time and content, but also the need to do so in order to reap these benefits. In its 351st meeting on December 20, 2016, the Rectorate decided to support a second phase of the digitization strategy for teaching.

The overarching goal of the second phase is to establish ideal and sustainable conditions for excellent teaching and learning at RWTH. The full spectrum of didactically sound and appropriate blended learning formats will be fostered in all RWTH faculties.

In the context of the digitization strategy, blended learning is understood as combination of traditional instructor-centered teaching and self-paced, time- and space-independent learning with the support of digital technologies. This combination is always individually balanced and

depends on subject-specific requirements as well as the preferences and competences of the instructors.

Instructors at RWTH Aachen University motivate and support students in their individual learning process, which should include all taxonomy levels. In accordance with the individual preferences of the instructors, the target group, the learning content and the logistical and legal possibilities, instructors provide their students with a diverse array of optimized learning opportunities. Students are thus given the chance to learn the subject material from multiple perspectives.

Instructors are responsible for developing teaching activities that support the individual learning process and success of the students.

Students are responsible for learning the course content and achieving the learning outcomes using the offerings best suited to their personal learning styles.

The second phase will cover the period from 2018 - 2023. The end was deliberately set for 2023, since the financial framework is clearly defined up to this point. For the second phase, the rectorate has set aside a budget of 6 million euros to support blended learning projects in the faculties as well as additional funding to support the internal service providers in the area of teaching.

The second phase of the digitization strategy will be discussed and agreed upon by consensus with all groups at RWTH. The goal is to have a coordinated strategy by the end of the summer semester 2017 and to adopt it in the committees of RWTH.

The deans of studies of all faculties have been informed about the upcoming second phase of the digitization strategy during their annual meeting in Simonskall. They developed the following vision and mission statements, which were positively received and approved by the rectorate:

Vision Statement

RWTH Aachen is committed to excellence in teaching. The use of digital technologies is firmly anchored in its teaching strategy in order to help students develop their full potential and specific skills as effectively as possible.

Mission Statement

By 2023, RWTH Aachen aims to have an extensive offer of courses, which, when deemed appropriate, are supplemented with digital tools in order to meet students' needs for flexibility and increase their study success.

On the one hand, digital formats will be used to enhance teaching in the classroom and on the other hand, to make it easier for students to autonomously acquire specific skills.

Digital technologies will be an integral part of the teaching and learning environment in all faculties. Studies will be conducted to determine which blended learning formats are most suitable for the individual needs of the students while taking into account the conventions and specific demands of each individual faculty or department. The goal of these studies is to systematically improve the quality of teaching and learning.

RWTH Aachen supports its teaching staff by offering further training on new educational technologies and funding central service units that help with their implementation.

Target groups of the strategy

The following target groups are defined for the digitization strategy.

1.   Prospective students

Prospective students are offered concrete opportunities to orient themselves (online, presence or mixed formats) before starting their studies at RWTH. In addition, this target group should be able to participate in examinations, e.g., via the International Academy or the edX offerings of RWTH. These examinations will be credited following enrollment in the corresponding study program of the RWTH.

The aim is to address particularly gifted students and first-generation students who are unsure as to whether or not they should enter a study program at university.

2.   Bachelor students

RWTH provides blended learning offerings to support its bachelor students in their self-paced acquisition of skills and competencies. These offerings, some of which are mandatory, support the entire range of university formats from traditional lectures to virtual courses. These offerings serve to increase the flexibility in the study plans of Bachelor students and thereby support different study speeds.

The courses for prospective students and bachelor students are mainly offered in German.

3.   Applicants for Masters Programs

Applicants to Masters programs are encouraged to get an overview of the academic standards at RWTH before starting their studies. To this end, RWTH provides modules designed for self-study. These include prerequisites for admission to various Masters programs.

The aim is to give prospective Masters students a realistic assessment of the academic requirements and at the same time to give them the chance to fulfill the requirements for admission.

The aim is to recruit both national and international applicants with high potential.

4.   Masters students

RWTH provides blended learning offerings which enable Masters students to independently acquire competencies in research and teaching. For this group, topics on research-based teaching, internationalization and subsequent entry into professional practice or an independent academic career are highly relevance.

The offerings for applicants and students in Masters programs are predominantly in English.

5. Instructors

Instructors select didactic formats that have previously proven or promise to be most effective to teach their subject material. Traditional and digital formats are considered as well as the specifics of the target group (e.g., prior knowledge, group sizes).

RWTH teachers are supported by infrastructural measures. Continued didactic training is supported by targeted service offerings. RWTH instructors contribute to the study success of students.

6. Central service facilities and university administration

The central service facilities and university administration, which are involved in the administration of teaching, are integrated into the digitization strategy. They provide an infrastructure and ensure the best possible and most uncomplicated support for instructors and students.

Goals of the digitization strategy

The overarching goal of the digitization strategy is to create the best possible conditions for excellent teaching and learning at RWTH Aachen University. This is realized through an appropriate mix of traditional, digital, individual, and cooperative elements in teaching, learning and examination formats.

Specifically, the digitization strategy aims to achieve the following goals:

- increase the individual academic success of students and reduce dropout rates while maintaining the same level of performance and an appropriate duration of study,

- further develop RWTH as a modern, innovative, future-oriented university with attractive teaching for national and international students alike,

- establish the use of efficient and effective digital formats for teaching, learning and examinations as a given in all faculties,

- promote cooperative learning in bachelor and masters programs,

- promote the continuous professional development of instructors,

- offer the entire range of formats and measures for the continuous education of instructors, from basic didactic principles to teaching with innovative digital technology,

- permanently guarantee the necessary service structures that support instructors and students,

- measure the success of the digital elements used and initiate improvements in curricula development with the help of the RWTH's quality management system.

Measures

The following measures are considered appropriate to achieve the objectives described:

A Culture of Enablement

- Providing funding and creating incentive systems to strategically promote subject-specific blended learning activities in all faculties. The incentives (e.g., teaching awards, support from internal service providers) are actively communicated within the faculties and their use is encouraged. Digital offerings are credited according to the regulations in the teaching obligation ordinance.

- Including teaching-related goals in the target and performance agreements of the faculties and newly appointed professors in addition to third-party funding and publication goals.

- Continuing funding for the successful ETS funding program which supports the development of innovative forms of teaching and learning until 2023. The existing funding priorities will be fine-tuned in consultation with the steering group and the faculties.

- Combining the service providers for teaching (MfL, CiL, ExAcT), which have so far been organized in different service units in a joint center, thus ensuring a permanent structure and sustainable funding.

- Specifying the responsibilities for supporting teachers and students in the service units and faculties according to the needs of the digitization strategy. The steering group will develop a proposal that will be coordinated with the faculties, deans of studies, representatives of the student body and the university administration.

- Establishing and financing a professorship for scientific research on blended learning activities at RWTH Aachen University on a permanent basis.

- Appointing digitalization delegates in all faculties and departments for the duration of the second phase. The digitization delegates support the respective deans of studies and act as central contact persons and advocates for blended learning initiatives in their respective faculty or department.

- Agreeing upon and permanently financing a concept for providing the necessary infrastructure for blended learning activities. This infrastructure includes existing and future lecture hall equipment, extensive WLAN coverage and necessities to conduct electronic examinations (hardware, installation, development, and operation of the Learning Management System (LMS) Moodle). It also includes systems required for specific modules, e.g., in the areas of simulation sciences and data analysis.

Teaching, learning and examination formats

- Defining specific requirements for teaching, learning and examination formats appropriate to the subject material and learning culture in the respective faculty. Focus is placed on blended learning activities that enable students to learn at their own pace and at the time and place of their choosing. The faculties will receive financial support to develop these teaching and learning materials. The central service units for teaching will provide the necessary training and support to implement digital formats.

- Further developing the existing e-examination formats to meet the needs of the faculties. The existing Dynexite tool will be expanded into a complete examination system.

- Implementing a concept for "examinations on demand" in a step-by-step manner in order to increase the flexibility of when students can take their exams.

- Providing financial support to roll out measures (e.g., standardization of formats, transfer of existing content to the central LMS Moodle) that increase the reach of innovative teaching offerings in the faculties.

English-language Masters programs

- Increasing the international visibility of RWTH by expanding the selection of English-language courses with blended learning formats. Joint teaching activities with partner universities of the IDEA League is seen as an option.

- Identifying opportunities for transregional and international recruitment of bachelor graduates and masters students.

- Expanding English offerings of the Language Center as required to keep up with an increasing number of English-language masters programs. These include offerings for instructors.

Start of Study at RWTH

- Making learning material on prerequisite courses for credits, orientation courses in specific study programs and events that aid students at the start of their RWTH available digitally.

- Developing targeted measures to support and encourage students at the start of their studies and reduce entry barriers.

- Developing digitized formats to support students in planning their courses.

- Making modules that are prerequisites for admission to masters programs available in a digital format suitable for self-study.

Consolidation of successful measures

- Supporting the faculties and departments with project funds to implement the digitization strategy throughout their organizations. The faculties or departments decide autonomously which measures to continue given the culture and content in their subject areas. They are supported in their decision by the results of internal teaching and learning research.

Networking and communication

- Holding regular networking meetings across faculty boundaries to strengthen the internal and external networking and communication of good teaching practices (traditional and digital)

- Including discussions of their experiences and findings related to digitization of teaching once a semester during the meeting of the deans of studies.

- Expanding the central websites related to teaching so that successful activities of RWTH instructors are publicized both internally and externally.

- Extending ProfInfo which provides current information for professors and different university groups to include a permanent section titled "Teaching". Successful activities from the faculties will be presented in this section.

- Intensifying external presentation of successes in the digitization strategy for teaching at RWTH in cooperation with the press office.

- Creating a concept to ensure effective communication of the opportunities offered by digital technologies to students and instructors at RWTH Aachen University.

- Allocating a budget for continued didactic training to new professors during their appointment negotiations. If the budget is not used after a specified time, they will be invited to discuss this topic with the Prorector for Personnel.

Evaluation

- Establishing learning analytics as a tool to support instructors and students in evaluating the effectiveness of the measures implemented as part of the strategy. The insights will be used in the planning of future measures.

- Creating and using a framework to classify existing and new activities into well-defined categories (e.g., according to HFD learning scenarios).

- Organizing quality management and quality assurance for all processes regarding digitization of teaching across faculty borders.

Innovation und Future Direction

- Supporting developments in the teaching and learning culture with accompanying research activities, the results of which are communicated nationally and internationally. Their main purpose of these research activities however is to further develop the teaching and learning culture at RWTH.

- Not only following promising national and international trends in higher education, but also shaping these in meaningful ways.

Blended Learning Steering Group

The **Blended Learning Steering Group** is tasked with developing the digitalization strategy for teaching and organizing quality management of digitization initiatives within RWTH. The steering group bundles knowledge about the activities in the faculties. This enables targeted support for both internal and cross-faculty approaches and ensures that all activities are in line with the goals of the digitization strategy.

The steering group can consult subject-related experts regarding special technical or didactic features.

The Blended Learning Steering Group assumes responsibility for quality management of the internal service providers, insofar as their activities relate to the digitization strategy for teaching.

The Blended Learning Steering Group regularly coordinates with the Steering Group for the project "Reorganization of Examination Performance and Course Management Processes including the Introduction of an Integrated Software Solution" (PuL).

Current internal service providers in teaching.

To adequately support the target groups of this strategy, the services offered in teaching must have a sustainable infrastructure in terms of personnel and technical equipment. Instructors are supported in the implementation of teaching, learning and examination formats. This gives them the time and space to focus their energy on subject-specific and interdisciplinary content, as well as on themselves (authenticity), on their students (adaptation) and on the teaching-learning environment (fit).

1.   Media for Learning [MfL]

Media for Learning is a central service unit of RWTH Aachen University. It advices instructors on the use of digital technologies in teaching, didactic conception and implementation, and provides comprehensive technical support. The portfolio of Media for Learning is not static but is regularly adapted to the requirements of the university.

Currently, the four main areas of activity are the creation of video-based materials, the implementation of electronic examinations, the realization of web applications and serious games, and the lead implementation and quality assurance of all courses implemented on the MOOC platform edX. MfL currently operates two film studios, which are used by lecturers to create instructional videos. The materials created form the basis of complete Flipped Classroom scenarios, as well as all RWTH MOOCs. Furthermore, additional formats such as internship- and image videos as well as short videos for study orientation are produced.

MfL supports continuous learning of students by developing web supplication and serious games which allow students to practice their knowledge and by developing both formative

(semester-accompanying) and summative (final) electronic examinations. These electronic examinations are offered in a full-service model.

In cooperation with CiL, MfL's offerings are supplemented with insights derived from learning analytics. The aim is to use the insights gained for the automated generation of customized learning paths for students. The data also enriches the learning data visualizations of CiL and thereby helps students comprehensively reflect on their learning progress and behavior. At the same time, it provides teachers with feedback on the quality of their teaching materials and the performance level of their students.

2.   Center for Innovative Learning Technologies [CiL]

CiL develops the concept for the functional design of the teaching and learning platform, L²P, which is the central blended learning infrastructure of RWTH Aachen University. It works closely with the IT-Center on all issues relating to the planning, technical implementation, and operation of L²P extensions. It offers training and support materials for the safe use of the platform and provides didactic and conceptual advice and support to RWTH lecturers regarding the implementation of modern, innovative blended learning scenarios with L²P. It is also responsible for evaluating the platform.

CiL is currently working with the IT-Center to migrate from a SharePoint-based to a Moodle-based learning management system. This switch is targeted for the end of 2018. In addition, CiL is preparing to expand L²P to include Learning Analytics components. These will provide all university groups involved in teaching with easy-to-understand visualizations of learning data that comply with data protection regulations. The goal is to increase the transparency between students' learning behavior and their learning success. This should empower students to reflect on and take more control of their own learning. At the same time, the data will provide instructors with indicators of the effectiveness of their own teaching scenario and its individual elements. The data can also be used for the ongoing optimization of infrastructures and service offerings.

3. Center for Excellence in Academic Teaching [ExAcT]

ExAcT offers continuing education and qualification courses in teaching to instructors at RWTH. One of the focal points is providing media-didactic training for both beginner and advanced users. The aim is to identify didactic methods and approaches and to prepare instructors for the challenges of modern teaching as well as to seize the opportunities afforded by digitization. Specific courses are tailored to the needs of professors, research assistants and/or tutors.

4. IT-Center

Within the framework of the digitization strategy, the IT-Center is tasked with providing technical support for the learning management system L²P. It is responsible for further developing this learning management system as well as creating and operating the necessary support services for blended learning activities. By the end of 2018, the switch from SharePoint to Moodle as the basis for operating L²P will take place in coordination with CiL. In addition, the IT-Center is responsible for implementing targeted developments for the functional expansion of the Moodle system (plugin development) and the integration of existing RWTH services (RWTHonline, video streaming platform, Dynexite, edX, IdM, ...) as well as expanding teaching-related functionalities of the RWTH App. In addition, the IT-Center operates a video streaming platform for the internal provision of video materials in the L²P system.

Furthermore, the IT-Center manages the training program for the MedienMATSE, who actively support the faculties in their blended learning projects.

The IT-Center operates the campus management system RWTHonline and continues to develop the system support for the student lifecycle in cooperation with the students, faculties, and departments. In addition to developments in RWTHonline itself, e.g., mapping the requirements for masters programs or studying at different speeds, support of the student lifecycle is being expanded through applications for teaching evaluation, the doctoral process and quality management (data cockpit) in teaching. The IT-Center is responsible for technical coordination and implementation. Prioritization and commissioning are done by the steering committee.

The IT-Center provides 1st-level support for the above-mentioned areas.

In cooperation with the other service providers in teaching, the IT-Center ensures a smooth interaction between blended learning activities and other processes for organizing studies and teaching.

5. University Library [UB]

The University Library is responsible for cataloguing, indexing and when necessary, procurement and/or licensing from commercial and public providers. If desired, indexing includes the assignment of DOI (Digital Object Identifier) for the localization of digital objects (e.g., videos) as well as cross-media networking of teaching content.

6. Technical Facilities Management – Control Engineering - Lecture Hall Technology

Lecture Hall Technology is responsible for operating the current and future infrastructure in the lecture halls and seminar rooms. This includes actively supporting the users of the lecture halls. During execution of the digitization strategy, the steering group will develop

guidelines for the required equipment in lecture halls and event rooms and will implement closer consultation and coordination with the departments responsible for Lecture Hall Technology.

Establishment of a joint center for the service units in teaching

During the second phase of the digitization strategy, the different internal service providers in the area of teaching will be streamlined in order to optimize developments, bundle responsibilities, and create and ensure cost-efficient structures in the long term.

To this end, the three service providers MfL, CiL and ExAcT will be merged into a new, joint center that will take over the tasks of these three service providers. Completion is planned by the end of 2018.

In a first partial step, the structure of the new center will be defined in the course of 2017 (organizational structure, responsibilities, staffing, financing).

The other service providers IT-Center, University Library and Lecture Hall Technology will continue to operate within the existing structures.