

Standards for Learning and Teaching at UTN (in German: Leitbild Lehren/Lernen)

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Part A - Summary

1. Executive Summary

Good teaching and learning, in general, and at the University of Technology Nuremberg (UTN), acts as a catalyst, not only propelling students toward a path of knowledge and proficiency but also cultivating an atmosphere that nurtures intellectual growth and fosters academic triumph. It empowers teachers to unlock their fullest potential, enabling them to witness the remarkable growth and development of their students while simultaneously strengthening their own reputations for excellence in education. UTN stands to gain immensely from a commitment to exceptional teaching to attract aspiring students.

1.1 Purpose of this document

The purpose of this document is to outline the core values and beliefs that shape the identity and culture of learning and teaching at the University of Technology Nuremberg and to inform teachers and students of the standards (in German: Leitbild Lehren/Lernen). The term *standards* for teaching and learning refers to a statement or set of principles that guides the actions and decisions of an individual or organization toward a specific goal or purpose. This document serves two goals:

- First, it introduces quality standards and compliance of effective teaching and learning.
- Second, it shows the reader that the standards are based on scientific results and empirical studies from learning sciences including the research fields of instructional design and educational technologies.

As such, this document contains scientific references and has deliberately been written as a scientific paper. By treating teaching and learning at UTN with scientific principles, we can make theories and underlying assumptions visible, thus allowing for the (re)design of learning experiences that are effective, efficient, and appealing (enjoyable) (Reigeluth, 1983; Honebein & Honebein, 2015). This approach also allows for the evaluation of those learning designs to determine if they meet the set criteria of intended learning outcomes.

1.2 Summary and take-home messages

UTN is striving to create a learning environment that prepares students for success in a rapidly changing global environment, and encourages them to become responsible leaders who positively impact their communities and the world. At UTN, students are at the center of all teaching and learning and are actively encouraged to assume ownership of their learning journey, while instructors are equipped with essential support and resources to deliver exceptional education and settings in which students can grow intellectually and personally while cultivating awareness of their social and professional responsibility.

UTN emphasizes academic excellence, innovation, diversity and inclusion, community engagement, global citizenship, and empowerment. By prioritizing these values, UTN continually works to prepare students and graduates to develop skills and to become leaders in their fields who are committed to making a positive impact on society and who are prepared to tackle the challenges of the future. To achieve these goals, UTN believes in a

shift in focus from teaching to learning, which requires educators use active-meaningful learning strategies (including collaborative learning) on all levels.

We understand that achieving these goals is a collaborative effort that requires everyone to be involved. We invite all UTN members, including students and external stakeholders, to be part of this journey together. By openly communicating and encouraging everyone to apply the standards outlined in this document, we can transform higher education and ensure that all graduates are equipped to make a positive impact on society. (See Section 2 for details.)

Learning Experience Design with Active Learning as Foundation

As a university, we aim to design for effective learning experiences and argue this is crucial to fostering student engagement and enhancing learning outcomes. Learning experience design (LXD) has emerged as a valuable tool in higher education, allowing us to create appealing and memorable experiences for our students. LXD focuses on using digital technologies to design, develop, and evaluate learning experiences that are both engaging and effective. Through methods such as online and blended learning, LXD can facilitate student collaboration, support self-paced learning, and create positive emotions. Active learning strategies are key components of LXD, and we encourage our educators to incorporate them to help students engage and learn. We know from research that active learning strategies improve learning outcomes and higher-order thinking skills (see Section 3.1 for details). It is important to note that active learning can be designed on a continuum from teacher-centered to learner-centered, and research results show that the latter is more effective in promoting engagement and learning. At UTN, we use the term Active Learning as an umbrella term that includes a range of strategies, such as research-based, project-based learning approaches (Jenkins & Healey, 2010).

We also understand the importance of the three dimensions of LXD: technological, pedagogical, and social. (See Section 3.2 for details.) Capturing students' interests, valuing their diverse cultures, providing opportunities for interaction, and tailoring learning experiences to individual needs, allows educators to create positive and enjoyable experiences that help students learn and succeed in their academic pursuits. Research into topics of diversity, equity, and inclusion forms an integral part in our course design approach to foster an inclusive learning environment that facilitates student success and in which students feel a sense of belonging. As such, we encourage our educators to incorporate LXD principles into their teaching and learning design practices and to continue to explore new ways to enhance the learning experience. In the same vein, we use various methods to evaluate and measure to what extent the learning experiences are indeed effective, efficient, and appealing (see Section 3.3 for details).

The UTN Action Framework

The UTN Action Framework is designed to provide interdisciplinary, international, and digital learning experiences to students, with the aim of giving them a global perspective and the skills required to become successful role models and leaders in a rapidly changing economy and global market. The framework emphasizes learner-centered course designs (teaching), participatory learning formats, teacher-student interaction, and small class sizes. It also stresses the importance of interdisciplinary, transformative learning, which challenges existing perspectives through confronting inconsistencies or contradictions and seeking

alternative viewpoints. The framework is based on constructive alignment, which aligns learning outcomes with learning activities (through assignments) and assessments (with rubrics).

To achieve these goals, UTN uses the Digital Didactical Design (DDD) framework. (See Section 4 for details.) The DDD framework uses five components (Section 4.1) that help foster active-meaningful learning activities (Section 4.2), formative and summative assessment (Section 4.3), social presence and interactions (Section 4.4), and technology use and online phases (Section 4.5). Clear, measurable learning outcomes are crucial to the UTN approach as they provide a clear picture of what students need to do to succeed in a course, improve motivation, and help both students and teachers to see the student learning progress throughout the course.

Active-meaningful learning activities engage learners (through the design of assignments) and empower them to make sense of the information and context. Appropriate formative and summative assessment methods are used so students get continuous feedback from the instructors. Assignments and assessments are aligned with the learning outcomes and document the learning progress (from lower-order cognitive thinking skills to higher-order competencies). Furthermore, establishing a learning community and an environment conducive to learning requires a social presence from both instructors and students as well as interactions between and among them to foster collaboration, creativity, and critical thinking. The use of technologies aims to extend cognitive functioning, to engage learners in cognitive operations, and to construct knowledge they would not have otherwise. The framework promotes the development of competencies and emphasizes the importance of providing effective, efficient, and positive (enjoyable) learning experiences.

Rights and Responsibilities of All Parties

Achieving the goal of improving higher education requires collective participation and adherence to ethical, professional, and legal standards. It is a task that requires the involvement of all parties, and UTN recognizes this by outlining specific rights and responsibilities for the institution, teachers, and students. UTN is committed to creating an environment that supports the successful implementation of the guidelines outlined in this document. As an institution, UTN has a responsibility to provide necessary resources, ratify regulations, and offer support and practical advice to both learners and teachers. The Digital Learning Experience and Active Design Lab, in short Digital LEAD Lab, supports teachers in designing courses, provides training and workshops, and procures modern technologies (Section 5.1).

Teachers, in turn, are expected to transition from traditional teaching methods to new learning design practices, as outlined in this document, and participate in onboarding and training activities (Section 5.2). Students have a responsibility to embrace their role as learners and to actively participate in the new teaching and learning formats (Section 5.3). In exchange, students can rely on a solid support structure. Both teachers and students are also expected to engage in quality management measures and evaluation processes to ensure that the learning experiences are effective, efficient, and appealing.

UTN reserves the right to enforce the guidelines, which are reviewed and adjusted in consultation with internal and external stakeholders. By working together and upholding

ethical, professional, and legal standards, the UTN community can create effective, efficient, and appealing learning experiences for all.

Part B -Details

2. UTN's Teaching and Learning Vision

UTN is built on the three pillars of being *digital, interdisciplinary, and international*. These also apply to both teaching and learning. Being digital means our teaching and learning concept includes online phases and uses technology for learning. To be interdisciplinary, our study programs incorporate the knowledge of various disciplines and make use of interdisciplinary courses or projects. Our programs are international in that UTN seeks high-quality students from all over the world to join us in Nürnberg.

The teaching and learning vision of the University of Technology Nuremberg (UTN) is to create a world-class institution that empowers students to become innovative thinkers, role models, and leaders who make a positive impact on society and share their visions and initiatives for a better world. UTN, and teachers at UTN, are responsible for providing experiences where students can grow in their intellectual and personal development and gain an awareness and understanding of their social and professional responsibility. Teachers at UTN can unleash their full potential and deliver exceptional education. Our University will provide a transformative educational experience that prepares graduates for success in a rapidly changing global environment.

At UTN, we will prioritize and emphasize the following principles:

Academic Excellence and Professional Development. Our faculty will be experts in their fields, and our curriculum will be rigorous and challenging. We will foster an environment of intellectual curiosity and critical thinking, which encompasses social responsibility as well as physical and mental well-being.

Innovation. We will be a hub for innovation and entrepreneurship. We are convinced that the basis for innovation and creative entrepreneurial action is, first, disciplinary knowledge, second, the awareness of diverse possibilities of technology, and third, knowledge of liberal arts, such as humanities or social sciences. Our students will have access to cutting-edge technology and resources as well as a plurality of cultural and historical perspectives and approaches. They will develop and launch their own ideas and businesses and will contribute to a more just and sustainable society.

Diversity, Equity, and Inclusion. We will be committed to creating a sense of belonging for all students, and a diverse and inclusive community that values and respects all individuals. We will provide opportunities for all students to engage with and learn from people with different backgrounds, experiences, and perspectives.

Community Engagement. We will actively engage with the regional community and work to address local and global challenges. Our students will be encouraged to participate in service projects, internships, and other community-based initiatives.

Global Citizenship. We will prepare our students to be global citizens who are equipped to understand and navigate cultural differences as well as to work collaboratively with people from around the world. We will provide opportunities for international study and research.

Empowerment. We will support students in becoming responsible people who contribute to respectful coexistence in society and who respect nature and the environment. It is, after all, part of the traditional concept of the *artes liberales* to enable people to live truly free and lead self-determined lives through their good sense while, at the same time, contributing to humanity and society. In other words, only when one has learned to recognize the world with reason (in German: *Vernunft*) in a differentiated way and to make decisions accordingly, can one truly think and act freely. Self-determination and responsibility go hand in hand and are not contradictory.

Through this vision, our University aims to offer education to students, doctoral researchers, and postdocs, who will have the opportunity to become responsible role models and leaders in their respective fields, who will be committed to making a positive impact on industry, economy, and society, and who will be prepared to meet the challenges of the future.

To achieve that at UTN, learning and teaching takes on new forms. Research has shown that a shift in focus from teaching to learning is a fundamental factor in enabling individuals to achieve meaningful learning (Section 3). We view the University as a place for lifelong learning. Collaborative or mutual learning must take place on all levels and lays the foundation for synergy between teaching and research from undergraduate studies through graduate programs and programs for young researchers and beyond (life-long learning). We commit ourselves and all members of UTN to the standards of lifelong learning and transforming higher education outlined in Sections 3–5.

Successfully implementing this vision relies on the collaboration of everyone involved and is accompanied by individual rights and responsibilities so students can benefit from effective, efficient, and appealing learning experiences. All members of UTN are expected to work with the standards outlined herein, and the University reserves the right to ensure compliance.

We at UTN are convinced that designing learning according to the scientific standards as outlined in this document has the potential to transform higher education. This is an ambitious endeavor that can only be achieved collaboratively. We are inviting all UTN members, including students and external stakeholders, to be part of this learning journey.

Another purpose of this document is to openly communicate with and to encourage everyone to apply the framework to meet UTN's learning and teaching objectives.

3. Learning Experience Design as Objective

To achieve the teaching and learning visions, as described in Section 2, our objective at UTN is to design for active-meaningful learning experiences with technologies. Details will be described in this section.

At UTN we define teaching as the activity to design learning experiences for students, in short, learning experience design (LXD). LXD emerged from the field of instructional design and educational technologies (Schmidt et al., 2020). It focuses on the idea that traditional instructional design or learning design lacks the design for *enjoyable* or *memorable experiences*. A learning design is usually created with goals in mind and is constructively aligned with activities and assessment (Biggs & Tang, 2011). When adding the viewpoint of *experiences*, a design also ensures students experience something special, something they will not forget, or something that leaves an impression on them. This is called a *memorable experience*, which involves something being remarkable in a positive way, and it is tied to a positive emotion (see Pekrun, 2014). The field of LXD is useful in designing for positive learning experiences and offers important answers by providing methods for design, development, and formative evaluation of such designs. Learning experiences developed this way are enhanced with digital technologies. Digital, online, or co-located settings provide opportunities for learning that create and use positive emotions. They support interactions between students and teachers and can foster student collaboration anytime, anywhere. They can also support self-paced learning, which makes it easier for students to learn in their own way.

In essence, we at UTN define a digital learning experience as a learning experience supported with digital technologies, such as learning in a digital environment (e.g., online, blended, or HyFlex learning modes). These learning experiences should be enjoyable, attractive, appealing, or even memorable. In short, a (*digital*) *learning experience design* is defined as the design act to make (digital) learning experiences happen.

3.1 Active-meaningful learning with technologies as the foundation

Learning experience design is built on the concept of active learning through technology-supported solutions (Saçak, Bozkurt, & Wagner, 2022). *Active learning* is an umbrella term referring to a group of pedagogical strategies that the instructor applies to help students engage and learn. Its premise is that learners do not learn because the instructor performs an activity, but learners learn through their own activity (Jonassen et al., 2003). Active learning has many facets and can be applied in all disciplines. It facilitates the learner's interaction with the course material as well as with peers, instructors, and others. Whereas in traditional settings, students might learn about a new topic by reading a text, watching a video, or attending a lecture (all forms of relatively passively consuming someone else's activity), in active learning settings, students learn through their own activity. They are introduced to new knowledge and concepts through learning materials, such as texts or videos, but the crucial aspect lies in applying the new knowledge in specific tasks (either alone or in collaboration with others), thus demonstrating whether they have learned and understood the new content.

At UTN, such *active learning* is not limited to independent practice. Instead, we understand active learning as *guided practice*, meaning that active learning methods or strategies are supported and accompanied by the instructor, who applies such methods and provides help and feedback. It is, therefore, key that teachers at UTN apply active learning methods with guided practice (Deslauriers et al., 2019).

At UTN, we focus on active learning strategies. Research has shown that learners learn better when they are actively engaged in the learning process than when they are passive observers of lectures. For example, active learning increases positive learning outcomes, such as learning performance, grades, and higher order thinking skills. Numerous research studies support active learning, particularly in science, technology, engineering, and mathematics (STEM) education (e.g., Freeman et al., 2014, Deslauriers et al., 2019; Fraser et al., 2014; Hake, 1998).

Rather than being a dichotomy of active versus passive, active learning can be seen (and designed) on a continuum from teacher-centered to learner-centered. An active, teacher-centered design includes characteristics of interaction; learners are encouraged to think or participate, but the teacher determines the time and pace of the interaction. Examples include lectures that are enhanced with interactive questions or comments. Such formats lend themselves to lower-order learning (e.g., understanding, memorizing, or getting an overview). On the other side of the continuum is the active, student-centered learning design in which learners use digital technologies to develop artifacts and show what they have learned, and, in so doing, they learn. They become prosumers, producers, or digital makers. Learners control the time and pace of the learning process, although there might be milestones or due dates set by the instructor. Examples include students applying new knowledge or creating short podcasts or digital games. We at UTN want all educators to strive toward the active, student-centered model. This also includes new roles for the teacher. For example, in this design model, the instructor serves as an experienced role model and provides perspective-rich thinking in the pursuit of emotionally positive learning experiences. In other words, the teacher role is shifting to become a partner and learning-companion in active learning.

3.2 Three dimensions of learning experience design

While online or digitally enhanced learning offers promising benefits, such as flexibility regarding time, location, and learning pace, students may encounter challenges with lack of engagement and may drop out of the course (Houlden & Veletsianos, 2019). It is therefore important to ensure a positive or enjoyable learning experience, a *memorable learning experience*, in the learning process that captures students' interests and keeps them motivated to engage. To meet the challenges of self-organized learning, we at UTN design memorable learning experiences through the combination of digital, collaborative, and socially interactive learning designs.

To enable such positive and memorable learning experiences, methods from user experience (UX) can be applied to digital learning. The goal of UX is to evaluate ease of use, user-friendliness, and usability. UX studies focus on attractiveness, user satisfaction, and efficiency, or, how well the technology is designed for the user to interact with it to reach a certain goal in an appropriate timeframe (Pangestu & Karsen, 2016; Santoso et al., 2016).

However, UX focuses on learning systems and does not sufficiently address the learner’s interaction with the pedagogical design, the sociocultural dimension, and the diversity of learners (El-Masri & Tarhini, 2017; Gan & Balakrishnan, 2016; Jahnke et al., 2020). In designing learning experiences, it is necessary to consider the sociocultural dimension and diversity of learners (and teachers). Therefore, the design and development of digital learning experiences requires an approach that considers the learner’s interaction with the pedagogical design where learning occurs (Schmidt et al., 2020) and focuses on all three dimensions of learning experience (Jahnke et al., 2020): technological, pedagogical, and social. Figure 1 illustrates these three dimensions of LXD.

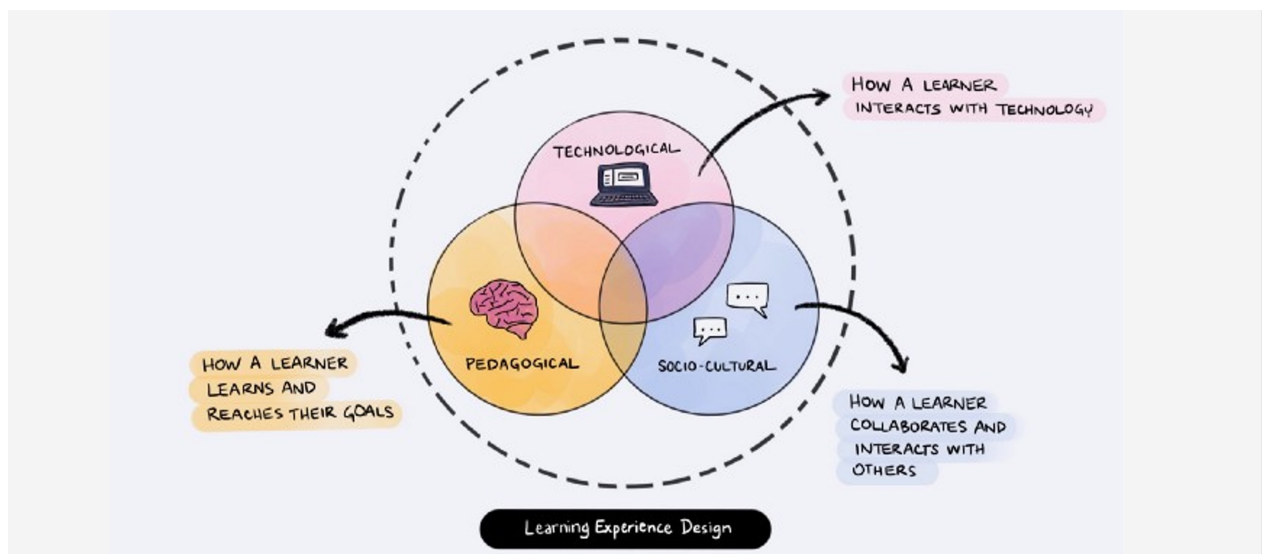


Figure 1. Three dimensions of LXD (Earnshaw et al., 2021)

Note. Research has shown that neither pedagogy nor technology comes first, but the elements are entangled; wherever the instructional designer starts with the learning design, it will affect the other elements. Rather than the elements themselves, the relationship between them is what should be designed in a meaningful way (Fawns, 2022, “Entangled Pedagogy”).

In summary, we at UTN strive for the most appropriate, meaningful design of digital learning experiences that consider different pedagogical methods, different sociocultural dimensions, and interactions between learners and technologies. It encompasses aspects of sociotechnical-pedagogical usability, such as the learner’s engagement with the social dimension (e.g., peers and instructors), the learner’s interaction with the pedagogical elements, and the learner’s interaction with digital technology, service, or space.

3.3 Quality and evaluation of learning experiences

Good learning designs are effective, efficient, and appealing. To assure that students experience active-meaningful learning that stimulates and challenges them according to their individual capabilities, the learning experience design needs to be efficient, effective, and positive because negative emotions may hinder learning. (See, for instance, Pekrun, 2014 for effects of emotions on learning.)

- Effectiveness refers to how well the design affects the learning process and outcomes. In other words, is the design effectively supporting learning growth?
- Efficiency focuses on the time it takes to complete a learning task (time-on-task). Are the learning activities designed in a way that makes them too time-consuming? Do students get bored? Is the workload just about right for the majority of students?
- Enjoyable or appealing design refers to whether students like or dislike certain elements, such as learning content or activities and teacher presence, and to what extent they are able to use the technology (usability).

LXD is the foundation of UTN course design. To achieve the quality we expect, continuous formative and summative evaluation is necessary to reassure design choices and to ensure learning efficacy. Research has shown that what students think they learned and how they evaluate the course does not always match what they actually learned (Deslauriers et al., 2019). Therefore, the iterative evaluation process at UTN consists of both subjective and objective measures.

The iterative process of designing and evaluating will be conducted for all new courses in the first, second and third semester in which the courses take place. Accordingly, these courses are revised twice after creation. Later, such iterative design and evaluation procedures for existing courses take place every two to three semesters of these courses being taught. However, in each semester there will be early or midterm student feedback surveys (EFS) and end-of-term student feedback surveys (SFS)¹.

To measure whether, and to what extent, the learning experience is effective, efficient, and appealing, we use methods from the field of LXD. Table 1 provides a summary of the three dimensions that need to be designed and evaluated (Schmidt et al., 2020; Li et al., 2021). (See Appendix 1 for details.)

The Digital LEAD Lab will work closely with professors and instructors in preparing and conducting the data collection and analysis (Section 4.1). In addition to supporting the evaluation of the learning experience design, teachers participate in regular peer evaluations at least every other year to receive feedback and ideas from other teaching staff.

¹ <https://lx.uts.edu.au/collections/interpreting-student-feedback>

Table 1. Three dimensions of design and evaluation of learning experience design

Dimension	What is measured	Details	Methods
Technological	Efficiency	Satisfaction and efficiency in interacting with the digital tools or platform (Sharp, Preece, & Rogers, 2019)	<ul style="list-style-type: none">• UX instruments (System Usability Scale, task-based think-alouds, follow-up interviews, etc.)• Learning analytics from learning management system (LMS)
Pedagogical	Effectiveness	To what extent students are able to achieve the learning outcomes; how well learners understand the learning objectives and assignments and how they are assessed (constructive alignment; Biggs and Tang, 2012)	<ul style="list-style-type: none">• Pre- and posttests, learning growth targets for learning objectives• Course evaluation
Social	Enjoyability	How well a supportive learning community is established (cooperative/collaborative activities, sociocultural or social interaction, and social presence) (Jahnke, Riedel, Singh & Moore, 2021; Jahnke, Schmidt, Pham & Singh, 2020).	<ul style="list-style-type: none">• Course evaluation• Focus groups

4. UTN's Action Framework

To reach the goals (Section 2), we at UTN set the stage for interdisciplinary, international, and digital learning experiences. We combine and interlink engineering studies with other areas of society and provide all UTN students with a global perspective and the skills to be successful on a global stage. In other words, we prepare people to be active and responsible leaders in a changing economy, society, and global market. Therefore, English is the language of instruction for all courses. Moreover, digital technologies are essential for providing effective, efficient, and appealing learning experiences (Section 3.5).

How can that be done? Teaching at UTN is based on research (scientific knowledge and methods). We use participatory research-based learning formats that actively engage students and do not use traditional lectures, which focus on the teacher lecturing. Additionally, courses are kept small (no more than 30 students) to ensure there is sufficient support and teacher-student contact. Teacher-student interaction is one of the central elements for effective learning (Garrison, Anderson, & Archer, 1999). The interaction between teachers and students plays a crucial role in facilitating students' cognitive, emotional, and social development. Research supports the importance of teacher and social presence in creating a positive and effective learning environment. Teacher-student interaction, and positive feedback (Hattie & Timperley, 2007), can contribute significantly to the quality of the educational experience for students. To foster interdisciplinary learning, UTN uses the concept of transformative learning that forms an integral part of all study programs, for instance, in the form of the Learning in Transformation project (www.utn.de/en/study/).

As this UTN approach shows, teaching is more than just sharing knowledge. Teaching is the design of activating learning processes and positive learning experiences that aim to develop students' competencies. It follows *constructive alignment*, a concept introduced by John Biggs in the 1990s (Biggs & Tagg, 2012), that has become a widely used framework in higher education. Constructive alignment builds on the premise that learning outcomes should be the starting point of course design and that teaching and learning activities or assignments as well as assessment should be aligned with these outcomes. This is also sometimes called *backward design* (Wiggins & McTighe, 1998). The alignment process involves several steps, including identifying the learning outcomes, selecting appropriate learning activities that support those outcomes, and designing assessments that accurately measure student achievement of those outcomes. By aligning all these elements, students are better able to understand what is expected of them and are more likely to achieve the desired learning outcomes.

To design constructively aligned active-meaningful learning experiences (Section 3.1), the Digital Didactical Design (DDD) framework can be used (Jahnke 2015). DDD comprises of the following five elements.

- Design of learning goals and student learning outcomes (SLO)
- Design of active-meaningful learning activities
- Design of formative and summative assessment(s)
- Design of social presence, roles, and interactions
- Design of technology use and online phases

Note that changes in one component will affect the others, so it is essential that they are aligned, both on a course level as well as on unit levels within a course.

The five components of successful learning experiences at UTN are detailed below, along with how to utilize them to create effective, efficient, and appealing learning experiences for students.

4.1 Learning objectives and outcomes

The UTN approach to learning is characterized by a learner-centered and competency-based approach. This requires that the competencies (student learning outcomes) that can be developed in the course are clearly defined.

As outlined above (and following the constructive alignment framework), every course design and redesign starts with identifying the desired learning outcomes. Learning outcomes should be operationalized in accordance with learning outcome frameworks (e.g., Bloom's Taxonomy, Bloom et al. 1956; Anderson & Kratwohl, 2001).

By having clear, comprehensible, and measurable learning outcomes, teachers can ensure that the goals of a course are explicitly outlined and that all course materials, tasks, and assessments are aligned with each other and effectively support achievement of those goals. In turn, students are provided with a clear picture of what they need to do to succeed in a course. This can improve student motivation, support students in making the best use of their study time, and help students to self-evaluate their learning progress throughout the course.

For maximum clarity and usability, all courses are required to include their intended learning outcomes in the syllabus on the learning-management system. It has also proven successful for teachers to outline the following information at the beginning of each learning unit: the learning unit's objectives, the necessary materials (e.g., readings, videos), and the learning activities, usually in forms of assignments (see, for example, Lee et al., 2021; Li et al., 2021).

Learning outcomes (Section 4.1) and assignments (Section 4.2) must be presented or described in the course syllabus and published two weeks prior to the start of the course. Rubrics (Section 4.3) must be presented in each assignment of each course. Significant changes to the course syllabus are prohibited during the duration of the course to uphold the principles of transparency, accountability, consistency, and fairness. This policy also enables a comprehensive evaluation of the course design. The syllabus acts as a kind of agreement between the teacher and students and outlines what the teacher promises to do and what students are expected to do.

4.2 Learning activities and assignments

Jonassen et al. (2003) presents 13 different definitions of what learning is and concludes that "we certainly cannot agree on what it means to learn" (Jonassen et al., 2003, pp. 5-6). Consequently, we propose that a learning design be aimed at engaging learners in active-meaningful learning, empowering them to make sense of the information or context. As such, we at UTN follow this understanding of active-meaningful learning, which includes that learning activities are designed according to the following five principles. For further information, we recommend "Meaningful learning with technologies" by Howland, Marra & Jonassen (2012), and "Meaning Online Learning" by Dabbagh, Howland & Marra (2019).

Active-meaningful learning is intentional (goal-oriented), active (manipulative, observant), constructive (articulative, reflective), authentic (complex, contextualized), and cooperative (collaborative, conversational). These principles are outlined in more detail below.

- **Intentional:** Learning activities are purposeful, that is, designed with the learning objectives in mind.
- **Active:** Learning activities include more than just reading, watching videos, or listening. They also involve, for example, engaging in online discussions, the application of new terms, creating videos, or working collaboratively on a solution to a problem.
- **Constructive (reflective):** Learning activities are designed to promote reflective thinking, allowing learners to evaluate their solutions or work and to become aware of their previous perspectives and how these may have changed throughout their learning process.
- **Authentic:** Learning activities are authentic to the learner. This means they are oriented to the learner's context, though not necessarily authentic from the teacher's perspective. Authentic also means incorporating real-world problems relatable to students to make the activity more meaningful and relevant to students.
- **Cooperative:** Learning activities foster collaboration and group work. To facilitate productive collaboration, especially over a prolonged period, it is beneficial to create a team contract that outlines everyone's expected contributions to the project to minimize potential issues in group dynamics.

The guiding design question for learning designers and teachers is to what extent these learning activities are designed to achieve the established learning goals. They need a meaningful balance between cooperative and individual activities, taking into consideration the specific nature of the desired learning outcomes. In the planning of the design, teachers formulate an idea (hypothesis) and test it in the course (see Bowen et al., 2020 for details about what they called “theory of change”), subsequently assessing whether the plan was effective and, if not, taking action to modify the learning activities partly or completely. In this vein, LXD course design follows principles of research (creating ideas and hypotheses) as well as evaluation (plan, do, check, and act).

In general, the learning units of a course are typically structured from general light activities to the consolidation and application of newly acquired knowledge, culminating in a project lasting two or more weeks in which learners demonstrate how they can apply the learned skills in their context and showcase what they have learned.

4.3 Formative and summative assessment

The alignment of learning outcomes with student activities includes the alignment with student assessment. In other words, appropriate assessment methods are chosen in accordance with the identified learning outcomes. Utilizing new forms of assessment (e.g., Maker Spaces, Online Labs, Simulations, AR/VR-experiences, e-portfolios) are encouraged. (For more information see *Allgemeine Studien- und Prüfungsordnung: ASPO*.)

Note that assessment and evaluation are two different things. We at UTN use *assessment* in terms of assessing student learning progress and *evaluation* in terms of evaluating projects (not people, such as teachers or students).

Assessment (i.e., feedback) should be designed as iterative and formative, or process based, providing learners with feedback on all their work, either through the teacher, peer reviews (or peer feedback), or guided self-reflection. Learning assessment necessitates the use of rubrics (assessment categories) to ensure learners understand the rules of the game (learning setting), so to speak, before they start playing (entering the learning process). Rubrics² are provided to learners prior to the learning activity and are used to provide feedback on their learning progress.

Especially in formative assessment, it can be helpful to include an iteration loop such that learners who do not yet have the full score can submit a revision once.

Summative assessments are usually applied at the end of courses. They are bigger projects used to showcase what one has learned and can be group projects. If students work in a team, the assessment must focus on individual reports of each team member; the report can include the process, role within the group, what one contributed, quality of the product, and reflection. Teachers should ensure that the rubrics are clear and included in the assignments.

4.4 Teacher and student roles and interactions

To foster effective learning, the cultivation of a community of learners, a social presence (also in the online environment), and a sense of belonging is essential (e.g., Dabbagh et al, 2019, Bangert, 2008). It creates a social space that encourages participation without fear of judgement and embraces potential failure as a natural part of the learning experience while also supporting mental well-being. It is important to note that this can be done both on site (on campus) and online (virtual). Studies have shown that a learning culture of participation is required for learners to feel part of that learning community (Lave & Wenger, 1991; Rovai, 2002). Establishing a learning community and an environment conducive to learning can be supported through small groups (no more than 30 students) as well as the course syllabus.

A syllabus functions as an agreement between teachers and students and outlines the objectives, grading procedures, and expectations; it also informs students that their own activities are the focus of the learning process. The Zone of Proximal Development is a study by Vygotsky (1978) that shows that learners need guidance from peers or teachers to expand their learning horizon as well as their personal and intellectual development.

The social dimension (e.g., social presence) is a key aspect of learning experience design (Garrison, Anderson, & Archer, 2000). During the learning experience design, it is important to co-create a social presence so that learners recognize themselves as part of a community, especially in the digital setting. This community can be fostered through various methods and must be revitalized throughout the course. Consequently, the teacher must consistently be engaged in the digital environment to establish a teacher presence. The concept of roles reminds the learning designer that instructors should purposely design a role transition, moving away from the I-present-myself-and-my-knowledge role (*sage on stage*) to the what-can-I-do-for-you role (*guide on the side*), so learning is experienced favorably, and individual learners are provided with individualized support.

² Details on rubrics can be found here: <https://teaching.berkeley.edu/resources/assessment-and-evaluation/design-assessment/rubrics>

Students, on the other hand, must learn to be active in such settings, which they may resist. As Deslauriers et al. (2019) show, students generally like entertainment lectures but do not learn from them, and students tend to dislike active learning settings even though students achieve more learning outcomes than in the lecture setting. To overcome that hurdle, Deslauriers et al. (2019) say teachers must explain the active learning classroom setting not just at the beginning of the course but also several times throughout so students understand why they should do what teachers ask them to do.

4.5 Use of technologies and online phases

Meaningful learning with technologies (Jonassen et al., 2003) aims to use them as cognitive tools (*mind tools*) that expand learners' thinking. The use of technologies aims to extend cognitive functioning and engage learners in cognitive operations, thereby constructing knowledge they would not have been capable of otherwise (Jonassen, 1996). In addition, digital or online phases can help students learn at their own pace. UTN is committed to utilizing digital technology to provide learners with an immersive and personalized positive learning experience. This includes the use of AI tools when considering fair and transparent utilization. Violations will be punished according to the policies of good scientific practice.

To create meaningful and engaging digitally enhanced learning experiences, course design and usability are essential. To streamline the learning experience, each course is represented in the UTN learning management system. For students, this is the first point of reference for information and content regarding the course (e.g., course syllabus, learning outcomes, learning material, assignments). For reasons of clarity and ease of use, all courses in the learning management system are structured into learning units. Each unit contains digital learning material (e.g., texts, short audio or video files, simulations) and student activities (e.g., quizzes, discussions, individual or group tasks, remote labs, online experiments) that are aligned with the learning outcomes of the course.

Learning and teaching at UTN does not entirely take place online. Instead, courses blend online and in-person phases to cultivate a collaborative learning environment. The distribution of these phases is determined by the desired learning outcomes and how they can most effectively be accomplished. There can be weekly in-person meetings of, for instance, 90 minutes with accompanying interactive online elements in the UTN learning management system or longer periods of online and/or independent work alternating with respectively longer in-person sessions. Both synchronous in-person activities and asynchronous online (or independent) work should each constitute a minimum of 30% of the overall course work. The rest of the 40% can be distributed freely between the synchronous and asynchronous activities. For example, this can result in a 50-50, 30-70 or other distribution.

Online phases are generally designed as asynchronous activities, allowing students to receive feedback from their teachers. Especially in online supported self-study elements, this social presence increases the interaction between and amongst students and teachers. Furthermore, asynchronous activities provide an opportunity for students to self-assess their learning and receive guidance on how to promote learning growth. In-person phases further deepen and expand the topics, tasks, and knowledge acquired in the online phase, thereby constituting a valuable enhancement to the learning experience. The in-person meetings

should also open new perspectives and questions that lead beyond the learned material or help to classify it.

4.6 Digital Didactical Design for planning and evaluating

How do we know when our learning design is on the right track and steering toward effective, efficient, and appealing/enjoyable learning experiences? The components of Digital Didactical Design (DDD) provide a framework not only for designing courses but also to reflect on and self-evaluate the design after courses have been tested in the field with real students, not just on paper. For both planning and evaluation, Jahnke (2015)³ created checklists as well as a scorecard that can be used during the design process (to capture a visualization of a first design draft) as well as after the course to self-evaluate how these goals were met. The Digital LEAD Lab initiates this evaluation and self-reflection as an integral part of its support in the course design and evaluation process.

Each DDD element can score between 1 and 5 points and each score includes a descriptor to help judge which score is most applicable, as seen in Table 2. The full scorecard is listed in Appendix B.

Table 2. Excerpt of the scorecard of DDD elements (adopted from: Jahnke, 2015)

DDD element	Description of the codes, 1 to 5
Teaching goals (expected learning outcomes)	1 = Goals are unclear and/or not visible; goals are not mentioned; there is no communication about outcomes
	2 = Goals are mentioned somehow (e.g., oral communication or white board) but students do not understand them
	3 = (in between)
	4 = Goals are mentioned somehow (e.g., oral communication or white board) and students understand them
	5 = Teaching goals are clearly documented (visible); students have access to them in an electronic format that students can access whenever they want; students know where to find the goals and students understand the goals; available from the start; students know the criteria/rubrics for learning success (optimal: co-aims of students included)

The scores range from 1 (passive learning methods) to 5 (meaningful practices). Applied to a spider chart (1 = inside; 5 = outside), this results in a visual overview that can be used for evaluation (Figure 2). Using the scorecard regularly as part of an agile development process shows how each of the five elements change with redesign and course adaptation and can help teachers to effectively improve their course design. After the course has taken place and gone through the evaluation process three times, further major changes are usually unnecessary. Figure 2 shows the five components and the five levels of quality.

³ More information is available online <https://www.isa-jahnke.com/teaching>

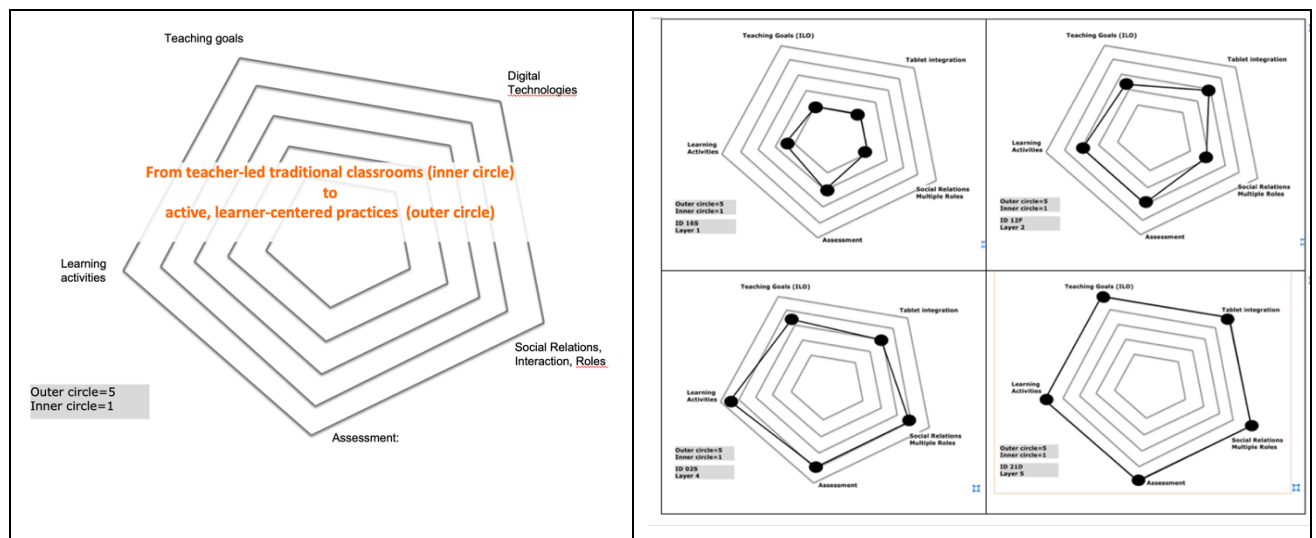


Figure 2. DDD framework as planning & evaluation tool in digital learning experience design

Evaluating the effectiveness of learning experience design

A number of evaluation techniques can be used to evaluate a learning experience design, including, but not limited to, pre- and posttests, standardized online questionnaires (with items that measure the learning outcomes), and concept mapping. Pre- and posttests help answer the question of whether the learning design is effective and are administered with an identical set of tasks (items) before and after the learning design. In the pretest, the learner's baseline knowledge is recorded; in the posttest, the difference between the pretest and posttest scores indicates the degree of learning gain. This technique is quick and easy to use; however, it is limited in that it can typically only measure lower order thinking skills, such as memorization/recall. For more complex, higher-order learning outcomes, such as synthesis or problem solving, other methods are more appropriate, such as collaborative design, simulation tasks, or more sophisticated pre- and posttests that go beyond simple recalling of information. For example, concept mapping allows learners to represent their understanding of concepts using line and node visualizations (Borrego et al., 2009). A concept mapping task might ask learners to map all the things they know about a particular content area, such as different types of poems or how the animal kingdom is classified. This is done both before and after the learning experience so researchers can compare the differences.

Evaluating the efficiency of learning experience design

Efficient learning design means having a course that requires just about the right amount of time to complete the assignments. If a learning design is efficient, it establishes a positive correlation between the time and workload for students, striking a balance that is neither excessive nor tedious. Learning analytics from the learning management system can help gather relevant data. Also, time-on-task relation can be measured with time-on-task methods from usability domain (see table below for details).

Evaluating the extent to which the learning experiences were appealing/enjoyable

Student evaluation can be used, in the form of online standardized surveys and interviews (individual or focus groups), to gather data on likes and dislikes, for example.

Combining methods

Concrete examples of how the pre- and posttest method and other previously mentioned methods, such as think-alouds, can look like in implementation as well as how they can be combined are described in work by various researchers, such as Lee et al. (2021) and Li et al. (2021). Appendix A provides an example of combining evaluation methods in three phases.

5. Rights and Responsibilities

Establishing a new way of learning at UTN depends on collective participation. Everyone has both rights and responsibilities. The rights and responsibilities for the institution, teachers, and students, as well as how they will be administered, are outlined in this section. We perceive the standards in this document as dynamic and evolving. Similarly, we extend an invitation to all stakeholders to actively participate in shaping the progression of these rights and responsibilities.

To enable us to cultivate a safe and productive learning environment that fosters mutual respect and facilitates academic excellence, everyone has both a right and responsibility to uphold the following ethical, professional, and legal standards.

Respect the rights and dignity of others. All students, faculty, staff, and visitors are expected to display respect and courtesy toward one another and to maintain an environment free from discrimination, harassment, and violence. The University will not tolerate any form of bullying, intimidation, or violence, and those engaging in such activities will be subject to disciplinary action. The University is committed to creating an inclusive and respectful community where everyone can learn, work, and grow.

Maintain the highest standards of academic and research integrity. All students, faculty, and staff are expected to adhere to the standards outlined in *Satzung zur guten wissenschaftlichen Praxis* and *Allgemeine Studien- und Prüfungsordnung (ASPO)* in all academic and research activities. It includes the responsible handling of data and applying standards of ethical considerations to preserve the safety and welfare of research subjects. In addition, academic dishonesty and research misconduct are prohibited and will be addressed appropriately. Measures may include disciplinary action, suspension, or dismissal from the University, depending on the severity of the violation.

Comply with rules of data protection, privacy, and copyright. All students, faculty, and staff must follow the applicable rules and regulations and comply with data protection, privacy, and copyright policies. All members of the UTN community must ensure they handle data, information, and works of authorship consistent with applicable laws. Any violation of the policies may result in disciplinary action, including the potential for suspension or expulsion from the University.

5.1 Rights and responsibilities of UTN as an institution

As a center for education and academic excellence, the University, as an institution, has a fundamental responsibility to ensure that effective teaching and learning can take place. The primary purpose of the University is to impart knowledge and skills to students and prepare them for future careers. Therefore, the University must create an environment that fosters and supports student learning, including providing qualified teachers, appropriate resources, and high-quality facilities (see Table 4 for more details). Moreover, the University must stay up to date with the latest developments in pedagogy and instructional technologies to improve the quality of teaching and learning.

A meaningful use of technology in learning and teaching necessitates certain requirements (Wissenschaftsrat, 2022, pp.67):

- less one-way knowledge-transfer, more active learning;
- a changed role of teachers (less teaching, more facilitating learning);
- a different use of personnel and resources (more support for teachers);
- new concepts of active learning spaces; and
- appropriate technical equipment and infrastructure (essential role of information technology center in providing support).

Table 3. Rights and responsibilities of the institution

Rights
<ul style="list-style-type: none"> ○ Enforce review and adaptation of the standards for learning and teaching at UTN.
Responsibilities
<ul style="list-style-type: none"> ○ Provide necessary resources, as defined by UTN teaching and learning concept and as agreed upon during program development (technical, personnel, and financial). ○ Ratify necessary regulations for the successful implementation of the UTN goals. ○ Provide support and practical information for teachers and learners as well as opportunities for continuous professional development. ○ Integrate digital teaching competency in appointment procedures. ○ Provide adequate learning spaces (online and physical). ○ Promote, incentivize, and reward excellent teaching.
Means of assuring implementation
<ul style="list-style-type: none"> ○ Utilize the quality management (QM) process of UTN. ○ Provide reports and reflection in various committees (e.g., steering committee, StaRs, founding committee). ○ Support quality through Digital LEAD Lab.

UTN pledges to create conditions conducive to the successful implementation of the guidelines in this document. This includes the provision of necessary technological, organizational, human, and financial resources as well the ratification of necessary regulations and incentive systems to achieve the goals of the University. UTN is also responsible for providing support and practical advice for learners and teachers and for providing opportunities for continuous professional development.

The Digital LEAD Lab is one tool UTN uses to effectively fulfill its obligations. It provides extensive support to teachers in creating and delivering exceptional educational experiences. It works closely with each member of the faculty and teaching staff, for example in 1:1 coaching or workshops, to facilitate effective, efficient, and appealing learning designs. It provides experimental spaces and supports teachers in designing their courses (e.g., mapping learning objectives with activities and assessment, creating digital content, applying constructive alignment). It also provides workshops and additional training, for instance, on suitable strategies and methods for online and on-site sessions. Additionally, the Digital LEAD Lab supports the procurement of the most modern technologies for teaching and learning, promotes exemplary practices throughout the University, and creates networking opportunities both within and outside the UTN.

To assure that the high standards of learning and teaching are met, UTN will only hire teachers who demonstrate evidence of adequate teaching skills. All additional expectations are documented in these standards for learning and teaching at UTN. UTN reserves the right

to enforce the guidelines of this document, which will furthermore be reviewed and adjusted in consultation with internal and external stakeholders (e.g., teachers, students, experts).

5.2 Rights and responsibilities of teachers

Transitioning from traditional teaching to new learning design practices requires an open mind and close support along the way. The Digital LEAD Lab provides teachers with the support they need to navigate this transition. Moreover, teachers can access a variety of technological and infrastructural resources, including services, equipment, and software, to facilitate successful implementation. To ensure everyone is on the same page and to create equitable conditions for successful implementation, teachers take part in onboarding and training activities. This includes an introductory course to teaching and learning at UTN by the Digital LEAD Lab (lasting 6-8 weeks and held mainly online and asynchronously) as well as a commitment to continuous professional development, for instance, through completing courses by the Digital LEAD Lab and/or participating in peer-to-peer teaching reviews (see Table 5).

To ensure everyone's voice is heard, teachers are encouraged to actively participate and collaborate in the development of this living document and the UTN's educational and instructional objectives.

UTN is convinced that designing learning according to the standards outlined in this document has the potential to transform higher education. This is an ambitious endeavor that can only be achieved collaboratively; therefore, teachers agree to implement the teaching and learning concept and to analyze their teaching (learning designs) according to the Scholarship of Teaching and Learning (SoTL)⁴.

⁴ For more information on SoTL, see for instance <https://www.centerforengagedlearning.org/studying-engaged-learning/what-is-sotl/>

Table 4. Rights and responsibilities of instructors/teachers

Rights
<ul style="list-style-type: none"> ○ Make use of available support by the Digital LEAD Lab. ○ Receive technical and infrastructural provision of services, equipment, and software. ○ Participate in the further development of UTN teaching and learning goals. ○ Receive a teaching workload that acknowledges interactive online phases. Teaching commitment will typically be two courses per teacher per semester. (Designing and implementing a completely new course counts as one course workload.) ○ Facilitate continued professional development by experimenting with new technologies and promoting their use in one’s own teaching. ○ Have the possibility of a teaching sabbatical to explore international learning designs. ○ Receive a teaching load that is not subject-bound but rather UTN-bound, such that courses offered in a different department can be accredited to the teaching load.
Responsibilities
<ul style="list-style-type: none"> ○ Implement the standards for learning and teaching at UTN (This includes the here described UTN concept of learning and teaching as learning experience design and iterative evaluation thereof.). ○ Participate in onboarding activities and training programs. ○ Implement active-meaningful learning design with student learning activities at the center (see Table 6). ○ Participate in a peer-to-peer teaching review, using the template by StaRs, at least once per year for tenure-track professors and at least once every two years for tenured professors. ○ Attend refresher courses at regular intervals. ○ Attend training on diversity, equity, inclusion (e.g., women in STEM). ○ Network with other UTN teachers and with external experts and present innovative teaching and learning at Digital LEAD events. (See more details in Scholarship of Teaching and Learning (SoTL)) ○ Exercise fairness. Teachers work as a team and share in the load of mandatory courses rather than only teaching their favorite courses.
Means of assuring implementation
<ul style="list-style-type: none"> ○ Utilize data from student evaluations for each course. ○ Ensure data collection from course evaluations using UTN’s evaluation concept (effectiveness, efficiency, enjoyability) is mandatory for each new course and is repeated every 2–3 years thereafter. ○ Include regular Digital LEAD Lab courses as part of the appointment commitment. ○ If quality standards are not met, the department chair, Vice President of Academic and International Affairs, or the President may be involved in a conversation and consultation.

The following guidelines (Table 6) serve as an overview of the standards for learning and teaching at UTN and as an aid for teachers as they put them into practice, thus helping to facilitate and smooth the transition from a more teacher-centered approach to a learner-centered approach.

Table 5. Summary of standards for learning and teaching at UTN and learning design

<p>1. Constructive alignment Start the design process by identifying the student learning outcomes (SLO). SLOs should range from understanding and applying to evaluating and creating (see Bloom’s taxonomy and lists of action verbs⁵). Align the learning activities and assessment to the SLOs.</p>
<p>2. Active-meaningful learning Implement active-meaningful learning design by focusing on student learning activities rather than lectures and by including group work and interactions, such as online discussion boards or project work.</p>
<p>3. Distributed and varied assessment Use cumulative assignments rather than one-time exams to support the learning process and utilize a variety of student assessments, as outlined in the <i>Allgemeine Studien- und Prüfungsordnung (ASPO)</i> such as maker space, creativity workshops, media exams, and e-portfolio.</p>
<p>4. Transparent learning outcomes and course requirements Make your learning outcomes, course requirements, and assignments (including assessment criteria) transparent in your syllabus, which must be published at least two weeks before the start of the course. (See policy called ASPO and “Syllabus Guidelines”).</p>
<p>5. Frequent formative feedback Apply formative, digital assessment (i.e., learning-oriented assignments, see also ASPO, include assignments in each learning unit (usually 1–2 weeks per unit) and give time-sensitive, formative feedback to each student individually through the learning management system. This will help students judge their own learning progress.</p>
<p>6. Added value of online and on-site Make sure online phases and in-person sessions are meaningful, alternate, and are aligned with each other.</p>
<p>7. Social presence and comfortable learning atmosphere Support the cultivation of a learning community and a culture of participation to enhance learning. For instance, engage and communicate in the learning management system.</p>
<p>8. Short and concise learning material Keep videos short (5–10 minutes) as learner concentration demonstrably wanes after 5-7 minutes with no activities.</p>
<p>9. Getting better Continuously improve your courses using triangulated data from a range of sources, including student evaluations, to measure whether the learning experiences are effective, efficient, and appealing.</p>

⁵ For a list of action verbs according to Bloom’s taxonomy, see for instance: <https://www.k-state.edu/assessment/toolkit/outcomes/verbs.html> or https://www.montana.edu/provost/assessment/blooms_action_verbs_for_learning_outcomes.html

UTN is neither a distance nor a purely online learning university. Instead, the online phases give students support to prepare for in-person sessions. UTN uses a learning management system (LMS) as the platform for all UTN courses and to support the online phases. In the LMS, each course is divided into learning units.

Each unit includes the following components:

- learning objectives (competency-based learning outcomes);
- digital material (e.g., text, short videos, audio, simulations);
- student learning activities called assignments (e.g., quizzes, online forums, remote labs, online experiments, group work);
- formative feedback to promote learning growth (assessment); and
- interactions with peers.

5.3 Rights and responsibilities of students

UTN promotes a learner-centered approach to education in which learners take responsibility for constructing new knowledge from their pre-existing knowledge, with guidance and assistance from their teachers and the institution. This competence-based approach to learning not only aims to impart scientific expertise but also core competencies that are essential and advantageous in the job market. Additionally, it helps students become valuable and responsible members of society and leaders in their generation. To ensure students have a successful and positive learning experience, UTN offers a range of technical and infrastructural resources, including services, equipment, and software. To promote a culture of participation and responsibility among students and to foster an environment of active and engaged learning, adherence to these rights and responsibilities will be monitored as part of the quality assurance measurements. Table 7 outlines the rights and responsibilities of students.

Table 6. Rights and responsibilities of students

Rights
<ul style="list-style-type: none">○ Make use of support offered by the UTN School of Students and Young Researchers (StaRs) and the Digital LEAD Lab.○ Use technical and infrastructural provision of services, equipment, and software.○ Receive comprehensive information concerning the usage of student data, in alignment with general data protection regulations (GDPR), as well as rights in relation to their own data (e.g., data privacy rules).○ Be involved in the development of UTN teaching and learning goals.○ Be involved as a student representative in one of the many UTN boards or committees.
Responsibilities
<ul style="list-style-type: none">○ Engage in learning by participating in class discussions, group work, and other activities.○ Prepare for class by reading the assigned materials and completing any pre-class activities.○ Take responsibility for one's own learning by asking questions, seeking clarification, and taking advantage of available resources.○ Work collaboratively with peers by sharing ideas, contributing to group discussions, and supporting one another's learning.○ Seek help when encountering difficulties with the course material by consulting with instructors or other means of support (e.g., StaRs).
Means of assuring implementation
<ul style="list-style-type: none">○ Students agree to the terms outlined in these guidelines when enrolling with UTN.○ Expectations and responsibilities are clearly communicated to students at the beginning of each course, and instructors provide ongoing feedback and reminders.○ Opportunities for self-reflection and self-assessment are applied to help students take ownership of their learning and recognize the importance of their responsibilities.

Learners are further encouraged to actively participate and collaborate in the development of this living document and the UTN's educational and instructional objectives to make this a transparent and inclusive process.

Transforming education often means breaking with familiar ways of doing things. Therefore, it is essential that learners approach this new way of learning with an open mind. Learners commit themselves to actively participate in teaching and learning formats and methods as well as in quality management measures and evaluation processes in order to not only enhance their own learning experience but also that of future generations of learners.

6. Conclusion and Wrap-Up

The University of Technology Nuremberg (UTN) is at the forefront of a new era of teaching and learning. As a newly established institution in 2021, UTN has the potential to serve as a living laboratory for testing elements of higher education and science policy. In the long term, UTN can become a model for the German higher education system. However, achieving this ambitious goal requires the participation and buy-in of all stakeholders, who must be informed and engaged throughout the change process. Therefore, this document outlines the standard for learning and teaching at UTN and provides a scientific rationale for the proposed approach.

The standards emphasize the importance of designing learning experiences that improve student engagement and learning outcomes. This involves a focus on active-meaningful learning with technologies that makes optimal use of online and on-site opportunities (e.g., regular feedback and collaboration in person and via learning technology). The core of successful learning experiences lies in aligning learning outcomes with learning activities and varied forms of assessment. Learning experiences at UTN are designed with the learner at heart, and learning is viewed as a collective journey that considers social, teacher, and cognitive presence.

The standards also highlight the responsibilities of the University, teachers, and students in creating an effective and inclusive learning environment. The document outlines the rights and responsibilities of the University to pave the way for the desired change. This is done, for example, by creating favorable conditions, such as general regulations, infrastructure, and by providing human and technical resources to ensure necessary support. This document also provides detailed guidelines for teachers to implement active-meaningful learning design, apply constructive alignment, use formative assessment, and create meaningful online and in-person learning experiences. Similarly, students are given responsibility for their learning, such as being active participants in the learning community and taking ownership of their learning process. Quality assurance measures are outlined to ensure that these principles and responsibilities are carried out. These measures include faculty training, assessment of student learning outcomes, and feedback mechanisms for continuous improvement. The Vice President for Academic and International Affairs has the primary responsibility of overseeing the implementation of these standards and actively monitoring their adherence. In the event of any deviations or non-compliance, she possesses the authority to intervene and ensure corrective actions are taken. Furthermore, any concerns or issues related to the standards should be promptly brought to her attention.

Change thrives on agile adaptation, and, for this reason, input from all stakeholders is necessary. A commitment to rigorous evaluation and self-reflection is crucial. We view these standards as a living document that is constantly evolving, and we warmly encourage all involved parties to actively contribute to its ongoing development. This collaborative effort will ensure that everyone can identify with the principles and that the learning experiences at UTN are effective, efficient, and appealing.

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Further readings

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Appendices

Appendix A: Details on research metrics and methods

Table 7. Exemplary methods on how to measure effectiveness, efficiency, and appealing learning experiences (adopted from: Li et al., 2021)

Phase	Metrics Examples	Methods
Design is in its early stages (e.g., paper prototype)	<ul style="list-style-type: none"> • Diversity • Organization • Ease of use • Consistency • Relevancy • 	Heuristics evaluation (inspired by Nielsen, 1994)
Design is first draft ready as a digital prototype	<ul style="list-style-type: none"> • UX Efficiency • UX Effectiveness • Errors • User satisfaction • Appeal/subjective experience 	Moderated usability test with think-aloud protocol (Van den Haak <i>et al.</i> , 2003) including <ul style="list-style-type: none"> • Number of errors per task (Sauro, 2012) • Task-level effectiveness via SEQ (Sauro, 2018) • System Usability Scale, SUS (Sauro, 2018) • Session-level satisfaction via SUS (Sauro, 2011) • Follow-up interviews (e.g., likes/dislikes)
Design is already launched: Learner experience and learning efficacy	<ul style="list-style-type: none"> • LX Effectiveness • LX Efficiency • Learner satisfaction 	Pre- and posttests including <ul style="list-style-type: none"> • Nine-item true/false questionnaire (before and after completing the course) • Qualifier scoring (Barge, 2007) • Missouri Department of Education's Setting Growth Targets for Student Learning Objective (2015)

Appendix B: Scorecard of Digital Didactical Design

Table 8. Scorecard for Digital Didactical Design

DDD element	Description of the codes, 1 to 5
Teaching goals: intended learning outcomes	<p>1= Goals are unclear or not visible, goals are not mentioned; there is no communication about outcomes</p> <p>2= Goals are mentioned somehow (e.g., oral communication or white board) but students do not understand them</p> <p>3= (in between)</p> <p>4= Goals are mentioned somehow (e.g., oral communication or white board) and students understand them</p> <p>5= Teaching goals are clearly documented (visible) and students know and understand the goal; they have access to them in an electronic format, that students can access whenever they want; students know where to find the goals available from the start; students know the criteria/rubrics for learning growth (optimal: co-aims of students included)</p>
Learning activities: active-meaningful	<p>1= Students hear what teachers read from the textbook, but mostly listening, reading, watching w/o activities, e.g., remembering or repetition of facts; theoretical problems without connecting it to a real world problem</p> <p>2= (<i>shows indicators of 3 but not fully 3</i>)</p> <p>3= shows signs of meaningful learning: i.e., active, collaborative, authentic, goal-directed, and reflective) however, students are not as engaged as in 5; students have time for doing other things (e.g., being on Social Media), they are distracted in one way or the other</p> <p>4= (<i>shows indicators of 5 but not fully 5</i>)</p> <p>5= Clear meaningful learning activities: active, collaborative, authentic, reflective, goal-directed), engaged classrooms, collaboration with peers; activities are connected to the students world and include a real-world problem (e.g. everyday experience); a real audience, students produce something and critically reflect on it (e.g. evaluating/creating/making), they relate their knowledge to new knowledge; “organize and structure content into coherent whole” (Marten & Säljö, 1979), signs that students are engaged as reflective makers: using the Internet, or other sources beyond the physical school walls (signs of cross-actions)</p>
Assessment process-based	<p>1 = Feedback only at the end (summative feedback); character of the feedback is rather summative, not formative</p> <p>2= (<i>shows indicators of 3 but not fully 3</i>)</p> <p>3= Feedback during the class (not only technical help), but only by coincidence when students raise their hands; teacher only gives feedback when students ask for support</p> <p>4= (<i>shows indicators of 5 but not fully 5</i>)</p>

	<p>5= Criteria for a learning progress are visible for students from the beginning of the learning process; Feedback/feed-forward is mainly used as process-based assessment for learner’s growth; a plan exists for how the teacher creates formative assessment with rubrics; self-assessment; peer-feedback, and feedback by the teacher is used</p>
Interactions/Social relations	<p>1= Teacher is in the traditional role of the expert only; students are only seen as consumers (of solving closed questions and tasks where only one correct answer is possible) 2= (<i>shows indicators of 3 but not fully 3</i>) 3= Teacher is in multiple roles but spends majority of time as expert and content-giver; teacher does not support student engagement to be active 4= (<i>shows indicators of 5 but not fully 5</i>) 5= Teacher plays different roles such as expert, learning-companion, coach, s/he fosters the students to be in different roles such as consumers, producers, collaborators, critical reflectors, etc.; teacher engages the students; teacher activates the students to change their roles; students are in several roles, e.g. finding own learning aims, creating own learning tasks, etc., teacher supports the student reflection of roles and development of new roles. Teacher has applied teacher presence and social presence indicators (Garrison & Anderson, 2000)</p>
Use of Technologies	<p>1= Digital technologies are used as “substitution”; e.g, forms of drill and practice; students work primarily alone when using technology, not related to the real world (e.g., technology is substitute for pen and paper or existing tools) 2= (<i>shows indicators of 3 but not fully 3</i>) 3= Digital technologies are used as “augmentation” or “modification” (SAMR model, Puentedura, 2014) 4= (<i>shows indicators of 5 but not fully 5</i>) 5= Digital technologies are used to “redefine the entire learning process, e.g., signs of multimodality, such as writing texts, camera app, digital paintings, using apps for collaborative creation; students construct, share, create and publish their knowledge to a real audience; students use online resources, actively select topics beyond the limitations of even the best school library, etc. (redefinition of learning design through use of technologies)</p>