

Alternatives to classroom teaching

Asynchronous and Synchronous Online Teaching

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Are you wondering how you can conduct a lecture, exercise or seminar partially or completely online in the coming summer semester? Are you looking for pragmatic ideas for the design of your online teaching? In this handbook, we will give you an overview of your options.

We distinguish between synchronous and asynchronous online teaching. With synchronous online teaching, teaching and learning take place simultaneously, for example in a live stream or live chat. Synchronous online formats require a good Internet connection and well-scaled software systems. Due to the current high demand, we expect these systems to be overly strained. **We therefore recommend a predominantly asynchronous teaching strategy for the summer semester 2020, supplemented by synchronous elements.**

In this handbook you will find the following contents:

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If you are in a rush, just read the [strategic considerations and examples](#), to get a compact introduction to online teaching. You can use the remaining pages as a book of reference.

We will continue to supplement this document and adapt it to new developments; you will always find the latest version on our [website](#).



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Information: What you can expect in the summer semester 2020

- **We do not expect classroom teaching to be possible in the summer semester 2020.** The signals from the university presidium are quite clear on this point. To get the most recent information on this matter, please check the [central information page](#) of the Technische Universität München.
- **Instead, in the summer semester 2020, online teaching will be used as much as possible.** Many teachers are already in the process of converting their classroom teaching to improvised online teaching (adapting learning outcomes, producing material, testing software). Courses that cannot be easily converted (such as excursions or lab sessions) should be switched with courses in the winter semester. The coordination is carried out at the faculties by the dean of studies and the coordinators of the various study programmes.
- **The Academic Affairs Board, headed by the Vice-President for Studies and Teaching, will coordinate this process at the university level.** Here, issues such as the crediting of student grants to the Ministry, the creation of new tools and special rules for the entire university will be drafted and discussed. This will allow the legal, organisational and technical support for the creativity and improvisation needed in the coming summer semester. The deans of studies and student representatives are involved in this process.
- **The didactics for online teaching are demanding.** Teaching on the screen is very different from teaching in person. Normally, the conception of online teaching would require a lot of planning and preparation time. We hope that the current crisis situation will increase the willingness on all sides to take the step into online teaching with patience, creativity and responsibility. We will all be able to learn a lot in this coming semester.
- **We recommend a predominantly asynchronous teaching strategy, supplemented by a few synchronous elements.** We expect that by the beginning of the 2020 summer semester at the latest many systems and networks will be overly strained, and that a predominantly synchronous online teaching strategy will therefore be difficult to implement. Additionally, asynchronous elements are more resistant to errors, as they can be prepared and tested in advance. Therefore, we recommend the use of [synchronous elements](#) only in very specific situations.
- **Establish a central contact point for your course at an early stage.** Communicate to your students as early as possible that they will find all the important information on the course page in Moodle. Make sure that this page is always up-to-date. This way you can get your students on board early and prevent rumours from spreading.
- **Do not prepare too much material.** It is sufficient if you have enough material for the first two to three weeks of lectures. Then let the many new experiences you will make in the first two weeks flow into the production of the other teaching materials.

Strategy: How to design your online teaching

In most cases the rough framework of your teaching strategy is already given by teaching formats (e.g. lecture with exercises and a written exam; e.g. a seminar with a term paper; e.g. a project with an accompanying lecture and an oral exam).

To derive a **teaching strategy** for online teaching from an existing classroom course, you should

- **identify** the didactic functions that, consciously or unconsciously, ensure that your teaching is successful in your traditional classroom teaching.
(see [next section: Didactic functions](#))
- clarify how you want to **reproduce** these functions **online** and link them with each other in order to teach effectively even without classroom instruction.
(see [\(see section after the next\): Strategic considerations for online teaching](#))
- consider how you can **implement** these functions effectively and in a resource-saving manner using new methods and tools.
(see [next section: Construction kit for online teaching](#))

To end this chapter, we have put together some [examples](#) for you. These give you a quick impression of what pragmatic online teaching can look like, and are a good starting point for planning your own teaching strategy.

If you're in a hurry:

Read the first 11 pages of this document to get a compact introduction to online teaching. You can use the remaining pages as a reference book if required.

At the very least, please read the section [Strategic considerations](#).

It is not easy to convert classroom teaching to online teaching, especially in such a short time. The didactics of digital university teaching are demanding. Take advantage of the experiences that others have already made and summarized for you in compact form.

Let us help you! In the section [Support Offers](#) you will find our various services.

Didactic functions

To make it easier for you to identify the didactic functions that define your existing classroom teaching and to reproduce them in your online teaching, we have compiled a selection of typical functions for you:

Function	Typical examples
<p> Provide orientation: Making learning outcomes transparent to students; presenting the examination format; clarifying the organisational framework (incl. technical requirements) and rules of the course; explaining the individual elements of the course (e.g. videos, tasks, e-test) and their interaction; introducing the teaching team and clarifying their different roles; presenting a timetable; establishing a central contact point</p>	<p><i>First lecture or seminar briefing; module description; course website</i></p>
<p> Clarify technical and organizational questions: To give the students the opportunity to clarify technical and organizational questions and to close knowledge gaps.</p>	<p><i>Office hours; following a lecture or seminar unit</i></p>
<p> Clarify personal questions and problems: To give students the opportunity to clarify personal questions and receive individual advice and feedback.</p>	<p><i>Office hours; following a lecture or seminar unit</i></p>
<p> Strengthen learning motivation: Address students directly; increase their interest in the topic; clarify relevance and practical relevance; promote group dynamics and a sense of community that is conducive to learning; introduce yourself as a teaching personality; give feedback in order to enable students to experience competence.</p>	<p><i>Start of a lecture or seminar unit</i></p>
<p> Include previous knowledge: To reactivate students' previous knowledge and create points of contact in order to prepare them to absorb new knowledge; to assess students' previous knowledge in order to adjust your teaching activities accordingly (in the most extreme form: just-in-time teaching)</p>	<p><i>Start of a lecture or seminar unit</i></p>
<p> Give input: To give students an overview and a systematic approach of the topic, to fill this framework systematically, to convey knowledge and theories and to clarify and deepen them with examples and applications, to establish cross-references, to summarize knowledge (e.g. take-home messages, summaries) and to prioritize. Dive deep into the course content.</p>	<p><i>Heart of a lecture; but also: accompanying seminar to the lecture; excursion; lecture or guest lecture</i></p>
<p> Demonstrate the use of knowledge: To show students how the imparted knowledge can be used to solve domain-specific problems.</p>	<p><i>Lecture; demonstrations</i></p>
<p> Encourage students to process the input: Ask the students questions during and after the input or get them to ask questions themselves,</p>	<p><i>Lecture; demonstrations</i></p>

search for and discuss examples and counter-examples with the students, give the students tasks and discuss their solutions, discussions on the basis of guiding questions.

-  **Enable students to deepen/process the input:** Giving students the opportunity to use the acquired knowledge under expert supervision (e.g. feedback, impulses, encouragement) to solve domain-specific problems independently and to acquire competences (problem-solving competence usually includes not only professional application but also other skills such as persistence, patience, adaptability, learning from mistakes).

Tutorial exercise; homework; project; accompanying project to the lecture or seminar; internship
-  **Moderating learning processes:** Accompany and support the students in active learning, e.g. moderating, structuring and summarising discussions, giving impulses for discussion, asking questions, distributing roles and assignments, giving feedback, initiating peer feedback, contributing your own experiences, supplementing technical terms.

Seminar, problem-oriented learning
-  **Support self-learning:** To systematically give students opportunities (e.g. tasks, group work), incentives and resources (e.g. materials, but also support and feedback) for self-learning (alone or in groups), and to feed back the results into their own input (feedback). Let the students develop, deepen and present the contents (e.g. seminar lectures, project reports).

Lecture; seminar; solving calculation exercises in front of the class (demonstrative practice calculation); tutor exercise; homework

Strategic Considerations

Basic strategic considerations for your lectures:

- With an online course you need a **central point of contact** for your students; at the Technische Universität München this is usually a [Moodle course](#). Please announce this contact point as early as possible.
- We strongly recommend to design your lecture mainly **asynchronously**, i.e. not to rely on live streams, but to instead provide videos, slides, scripts or an e-book and to supplement these with short questions and tasks.
- At the moment, students and teachers are unsure what exactly their courses will look like in the summer semester. Avoid rumours by **communicating early on** in your Moodle course what you currently know about your upcoming course - and also what is currently unclear. Let your students know until when they can expect new information. This will help your students to better deal with the unclear situation. In the meantime, you may also be able to give your students tips on what previous knowledge is required for the course, and how they can best refresh this knowledge.
- Get your Moodle course online early, but **take the time** to set it up. You can take the time to experiment since you can decide when to make which elements of your course visible to your students. It is sufficient if you have enough material for the first two to three weeks of lectures. Then let the many new experiences you make in the first two weeks flow into the production of the remaining teaching materials. At first you might only have a welcome message and a text page with news. Next, you can add a welcome video and organizational information as well as a forum for questions.
- You can **structure** the Moodle course into chapters (in Moodle: "sections"), just as you would do with an ordinary course. Ideally, your sections should correspond to the learning volume of one week (standard structure of a Moodle course). Make it clear to the students what amount of time they are expected to spend on each section.
- You can decide whether you want **to make** all sections **visible** from the beginning ("self-paced") or whether you want to make the sections visible one by one during the semester ("instructor-paced"). We recommend the second option: it gives you the possibility to finish material gradually; and you can structure your teaching and learning in a collaborative rhythm (facilitates your management, promotes social learning).
- A section consists of **elements** ("materials" and "activities"); these elements should not be stand-alone, but should be connected to form **learning paths**. The principles by which you design these learning paths form the core of your teaching strategy.

- Decide how demanding your online teaching should be - and could be. The starting point of your teaching strategy will probably be the strategic approach [Emergency Remote Teaching](#), which aims to make a course available online one way or another as soon as possible. Exemplary strategies for this are:
 - **Strategy „Replication“:** The classroom lecture is reproduced by showing the lecture as a video (live stream or lecture recording). For this strategy we have developed an example below.
 - **Strategy „Self-Service“:** A self-service approach relies heavily on independent and self-directed learning by students ("moderated self-study"). We have also developed a prime example of this strategy below.
- With Emergency Remote Teaching you create teaching materials that may only be reusable to a limited extent (for the time after the corona crisis) and that do not exploit the actual potential of Online Learning (the many additional possibilities) - and that are only partially effective: teaching on the screen differs significantly from classroom teaching. Therefore, we also present some principles of advanced online teaching (**Online Learning** strategy approach), which you may be able to incorporate into your teaching strategy:
 - **Learning paths:** If your students are expected to sit at home alone in front of their computer screen and learn efficiently, explicit activation is particularly important. For this reason, input elements (in Moodle: "materials") such as videos or texts are usually always linked with interaction elements (in Moodle: "activities") to form a learning path. For example, you can add a short activity on motivation or prior knowledge before your video, and an activity with questions or tasks after your video to give students the opportunity to actively process what they have learned.
 - **Task-oriented approach:** While a knowledge-driven approach is often used in face-to-face teaching (students are offered information units followed by tasks that help them to check their understanding, deepen their knowledge and practice the application), in professional online teaching a task-driven approach is more widespread: students are given a competence-oriented task, which the students solve step-by-step by completing sub-tasks; the necessary knowledge is acquired or conveyed along the way.
 - We also have examples of such approaches below.
- In addition to well-structured and well-prepared teaching content, the **learning atmosphere** is also an important component of an online teaching strategy ("social learning"). The feeling of social community, relevance of content and the presence of a competent teaching personality help your students to learn well. In a traditional classroom setting this learning atmosphere is usually automatically created e.g. through contact with the teacher and his or her direct approach, through the sense of community, through the rhythmic and disciplining effect of regular meetings, and through interaction and feedback loops between students and teacher. In the case of a pure online event, you should therefore take care to effectively substitute these functions. Here, for example, directly addressing students in videos, contacts in the discussion forum or by e-mail, community experiences in live chat, but also well-maintained sections in the Moodle course

("News") can be helpful. Our experience with pure online courses (e.g. Massive Open Online Courses) has shown us that this aspect is essential for a successful online course. And this aspect is also the reason why synchronous elements like live streaming are so popular and (despite their technical and didactic challenges) so important. However, synchronous elements should only be used in a very targeted and dosed way, as the current situation pushes most video conferencing systems to their limits.

- We recommend to not use live streams for lectures. However, in order to promote a collaborative rhythm and communal learning, you may consider offering a regular, short synchronous unit for exchange ("**campfire**"), e.g. a unidirectional ten-minute live stream with live chat at the end of the week in which you recap the week, add a few personal words and wish your students a nice weekend. Don't expect all students to take part; but those who are looking for social inclusion will be happy to take advantage of this offer. Depending on how relevant the content of your speech is to the course, you can make the content available later as a recorded video.
- **Feedback** is an important success factor for good teaching. The feedback you receive from your students helps you to adapt your teaching to their learning progress. With online teaching, the indirect feedback (faces, participation, questions) that you usually receive in the lecture hall is only available to a very limited extent; therefore, you should actively collect feedback and involve students in the process of designing and developing your online teaching.

On the other hand, the **feedback** that students receive from you helps them to reflect on their learning progress and not to feel left alone. Think about the occasions on which you want to give feedback to your students and which tools you want to use to do so. For large events you should scale feedback, e.g. by automating feedback (e-tests) or by encouraging students to give each other feedback (peer feedback), e.g. by using guiding questions, feedback rules, criteria lists or sample solutions.

Additional strategic considerations for your **seminars**:

- In seminars, the interaction between you and your students usually plays a greater role than in a lecture, for example. Due to a smaller number of participants, you have the possibility to use **synchronous teaching elements** such as a webinar, in which you and your students can have live presentations, discuss, exchange previous knowledge and experience, and work together. In Zoom and Adobe Connect, you can also organize live small group work by using "breakout rooms".
- With synchronous teaching elements, it is possible that students cannot enter the virtual seminar room for technical reasons and therefore may miss the teaching unit. You can offer a **second channel** (e.g. chat) so that students can at least report that they cannot participate. You can arrange with your students to have the webinar recorded. You can also give the students the responsibility for the **documentation of your seminar** (e.g. rotating protocol, e.g. collaborative protocol in Etherpad).
- Since it is unclear whether the systems, and especially the networks, will be able to cope with the increased demand in the summer semester, it is advisable to have a **backup strategy** for synchronous seminars. Such a backup can be, for example, the switch to times when the networks are not so heavily loaded, or the switch to asynchronous teaching elements.
- For example, you can have students work on a task in the **preliminary stage** in (virtual) small groups (e.g. create a presentation, solve a task, carry out research). This enables a more flexible organization of teaching and learning in terms of time and space, promotes media competence as well as communication and social skills, and also increases motivation through social contacts and a stronger sense of community. The results of this small group work can then be presented and discussed synchronously; or you can do this asynchronously: e.g. small groups upload results in the form of pictures, texts, videos, slides, the whole group can then exchange information in the forum or chat; you can moderate, structure or control this exchange and discussion, e.g. by setting discussion questions or evaluation criteria.
- Especially in seminars, students often have a teaching role (e.g. when they prepare a paper, a poster or a wiki entry for the other students). In order to ensure that the other students do not only consume but also actively participate in such units, you could, for example, demand that the presenting students have to activate the other students in addition to their presentation (e.g. task). Or you could give the listening students observation requests or tasks.

Additional strategic considerations for your **demonstration exercise** ("Zentralübung", "Vorrechenübung") or **tutor exercise**:

- If necessary, please write to info@prolehre.tum.de, then we will complete this section. Or have a look at our [website](#), maybe there is already a new version of this document.

Additional strategic considerations for your **office hours**:

- In order to relieve your workload, you can **streamline** students' questions and - as far as possible – make answers available to all students (e.g. in a FAQ, in a discussion forum, using sample solutions).
- In order to relieve your workload and promote student learning ("learning by teaching"), you can encourage students **to answer each other's questions** (e.g. in a discussion forum/wiki; this also strengthens the sense of community, especially if you also moderate and motivate the forum).
- Please ask your students not to ask questions by individual mail, but to post them in the forum instead. Although a forum must also be supervised, this streamlining can lead to a noticeable relief for you, especially in the case of mass education events in the Bachelor's programme with many questions.

The more you streamline the subject-related inquiries, the more room you have to respond to **individual concerns** of your students.

Some examples of online courses

The following examples are intended to show how online teaching can be implemented pragmatically. Usually you cannot simply adopt these examples, but must adapt them to your teaching situation. We would be happy to support you in this transfer.

- [Example 1: The asynchronous video lecture](#) (recording in advance)
- [Example 2: The synchronous video lecture](#) (live stream)
- [Example 3: The Self-Service Seminar](#)
- [Example 4: A task-driven teaching unit](#)
- [Example 5: The demonstrative practice calculation](#)
- [Example 6: The tutor exercise](#)
- Example 7: The webinar seminar

Example 1: The asynchronous video lecture (recording in advance)

Starting point

You already have a ready-made lecture (e.g. 90 minutes weekly) with a corresponding PowerPoint presentation.

Emergency Remote Teaching (Strategy: Replication)

Give a 90-minute PowerPoint presentation at home and record your voice (PowerPoint already has this feature built in). Since you do not have direct interaction with your students in this presentation, you can include rhetorical questions and breaks to structure your explanations. Try to express your personality through your voice and interspersed anecdotes in order to be more than a robot-like voice from offstage. Due to the lack of response from students, there is a danger that you will speak too quickly; consciously keep a reasonable pace. Upload this lecture recording weekly in Moodle as a replacement for face-to-face lectures.

Variations

- *Screencast*: Explain the teaching content on your computer (e.g. with slides, with an editor, in a programming environment, with graphics, with an interactive board) and record the content of your desktop and your voice.
- *Experimental lecture*: Get recorded in an empty lecture hall while you conduct your experiments there.

Recommended upgrades for high-quality online learning

- *Partitioning*: Do not give a 90-minute lecture, but divide your lecture into shorter sub-units (in classroom teaching we recommend 20-minute sub-units, in online teaching 6-8-minute sub-units are often recommended). For example, instead of one 90-minute video, you could create five 20-minute videos, or ten 10-minute videos, depending on how large the sub-units

are. Each sub-unit has a topic, which you formulate at the beginning of the sub-unit, e.g. in the form of a guiding question or a learning outcome. At the end of each sub-unit there is a short summary or take-home message, ideally followed by a final conclusion with questions that students can use to test their understanding.

- *Questions for understanding:* In your Moodle course, create a question forum where students can discuss questions about the lecture material with each other and with you. In addition, you can also set up a chat channel for your lecture, where students can exchange views on your lecture around the clock; you can also offer an occasional chat session in which you can answer live questions about the lecture.
- *Gleanings:* You can collect content-related questions from your students (e.g. in the question forum, in the chat or by e-mail) and then answer selected questions in a livestream at a set time. You can upload the recording of this later in the Moodle course.
- *Learning paths:* Provide additional material (e.g. a script, the set of slides, excerpts from a textbook) in addition to your video on a weekly basis and offer activities (e.g. homework, e-tests, discussion forums) and point out in your instructional videos how this learning path can help your students prepare for the exam in the best possible way. A learning path consists of professional input (learning materials), e.g. in the form of instructional videos, screen-casts, slides, scripts, graphics, slides with sound track, external videos, scanned book chapters, and e-books. These inputs are framed by learning activities to prepare and follow up the content and to provide feedback on the learning progress (e.g. questions to reactivate prior knowledge, guiding questions to focus attention in the following input, an e-test with reflection questions or comprehension questions or tasks or the invitation to discuss answers after the input, examples or solutions in a forum).
- *Trailer:* Create a motivating video for the first week of lectures in which you look directly into the camera and address the students while motivating them for the lecture topic, presenting the learning outcomes and deriving the content structure (content chapters) and methodological framework (how you want your students to use the teaching material) of the lecture.
- *Weekly motivation:* Create a short motivational video for each week of lectures, looking directly into the camera and addressing the students while presenting the topic and learning outcomes and deriving the teaching units for today. You can also reactivate the relevant previous knowledge of the students with rhetorical questions or a short repetition.

Example 2: The synchronous video lecture (live stream)

Starting point

You already have a ready-made lecture (e.g. weekly 90 minutes) with a corresponding PowerPoint presentation.

Emergency Remote Teaching (Strategy: Replication)

Start a live stream at the specified lecture time. Usually a window of your screen (e.g. PowerPoint or AcrobatReader) and your face will be visible and your voice will be audible. Now give your lecture. Include rhetorical questions and breaks to structure your explanations. Give students the opportunity to speak and ask questions – either throughout the entire stream or at specific times. You can also record a stream and upload it as a video to your Moodle course.

Variations

- *Questions via audio:* In some systems (e.g. Zoom Webinar) students can ask questions by virtually raising their hand. You then activate the students' audio, listen to the question and can answer it directly.
- *Questions via chat:* Alternatively, you can also let your students ask questions via chat; in this case it is recommended that an assistant keeps an eye on the chat for you and passes on the questions to you in a bundled form at appropriate times.

Strengths/weaknesses of the format

The experience of other universities suggests that students prefer synchronous live streams with focused interaction (questions) if they are made available afterwards as video. However, it is currently unclear whether the systems, networks and network transitions will be able to cope with the high volume of live streams happening at the start of the semester. You therefore need to consider the risk that this instrument will not be available at all.

Recommended upgrades for high-quality online learning

- *Backup:* Provide a second channel in addition to the live stream where students can inform you if they cannot see the stream or if there are issues relating to the video and sound quality. This can be a chat or a forum within the Moodle course.
- *Interaction:* Ask your students questions (e.g. via live voting services like Pingo or Tweedback) or give them short tasks to be completed from home. Voting is a good way to reactivate previous knowledge at the beginning of the lecture. You can view and comment on the evaluation of live polls directly in the stream. You can also ask students to write answers in the chat or email you photos of their solutions; then you can take a short break in the stream and then read out selected answers or show and comment on photos.
- *Learning paths and feedback:* Make your live stream part of a learning path by providing preparation material or activities before (e.g. e-test) and also providing material afterwards (e.g. a script, the set of slides, excerpts from a textbook) and linking it to activities (e.g. homework, e-tests, discussion forums). Discuss the participation in the activities (how many students participated) and discuss selected results of the activities (e.g. particularly interesting solutions, common mistakes).

Example 3: The Self-Service Seminar

Starting point

You have a course in which students normally engage in a very self-guided learning process, e.g. a seminar where students prepare and give lectures which are then discussed in the group.

Emergency Remote Teaching (Strategy: Self-Service)

Formulate clear, competence-oriented learning outcomes and use them to derive tasks that students should work on and solve independently. Then leave it to the students themselves to acquire the necessary knowledge while they solve the tasks. You evaluate the students' solutions using a criteria grid that you have previously announced together with the learning outcomes.

Variations

- *Provide material:* You provide students with supporting materials (e.g. script, links, articles, digital semester apparatus, e-book).
- *Developing material on their own:* You give the students some basic material to start with and some tips for research, and the students develop the remaining necessary material on their own.

Recommended upgrades for high-quality online learning

- *Learning portfolio:* At the end of the seminar, students deliver not only a product (e.g. an article, a video of a lecture, a program), but also a process documentation (e.g. description of the product development process, reflection on the process at different milestone dates, reflection on the learning success, top 5 tips for subsequent students).
- *Process control and feedback:* You define milestones with fixed dates on which students must present interim results (e.g. sketch, set of slides, prototype, text, source list). You provide feedback on these intermediate results. You can also get students to give each other feedback ("peer feedback").
- *Group dynamics and feedback:* You let your students form tandems that discuss and support each other regularly in pre-defined periods of time (e.g. in zoom rooms). The minutes of these appointments or a reflection of these appointments can be part of the learning portfolio.

Example 4: A task-driven teaching unit

Starting point

You want to create a fully-fledged teaching unit regardless of the original format.

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At the beginning of the course unit, you present the learning outcomes and derive from them a challenging task which you could use to assess whether your students have achieved the learning outcomes. You then guide your students through a learning path consisting of activities and materials

(usually sequential) that support them in solving the task; required knowledge is acquired along the way (within an activity) or imparted (through material).

A typical task-driven learning path could look like this, for example: Start with an introduction of and motivation for the leading task, e.g. in a short introduction video. Then mention required prior knowledge, combined with the possibility for the students to test whether they are ready for the upcoming section (e.g. review, e-test, brainstorming, reflection), combined with links on how to make up for missing prior knowledge. Afterwards, the leading task is broken down into subtasks which your students solve step by step (by themselves) and are taught the necessary knowledge and skills in the process (e.g. through upstream input, through downstream feedback, through their own trial and error and exploration). At the end of the section there is an explicit repetition of essential content (e.g. summary, take-home message, reflection on the learning outcome or the learning process) and optionally a second larger and more challenging task, which the students should now be able to solve independently (e.g. as a starting point for an exercise, or as an example for an examination question).

Variations

- *Path control:* You can make the learning paths completely visible and thus allow students to deviate from the planned sequence; or you can activate the next path element only after the previous one has been completed.
- *Intensity of feedback:* You decide how intensively you want to accompany and support the students in solving the subtasks (e.g. chat consultation, video consultation, interim assessments, maneuver criticism, mail feedback, question forum), and how strongly you want to get the students to support each other and give feedback (often peer feedback is an essential part of the learning path – to promote social learning and to relieve the teacher).

Recommended upgrades for high-quality online learning

- *Adaptive learning paths:* Depending on the intermediate results of an individual student, you can enable branches in the path (making certain activities and materials visible or invisible), thus enabling your students to follow individual learning paths.
- *Gamification:* You can use people's play instinct to motivate your students, e.g. by making certain optional subpaths available only at certain times or for a certain duration (e.g. "Quests"), and by making certain achievements visible (e.g. "Score Boards"). By using a variety of criteria, you can spread the rewards (e.g. "Badges") widely (e.g. fastest solution, most efficient solution, most original solution, bravest solution). Make sure that social behaviour is part of the criteria to prevent students from hindering each other.

Example 5: The demonstrative practice calculation

Starting point

You have a lecture in which you impart knowledge. In an accompanying practice calculation you will demonstrate in more detail how this knowledge can be used to solve problems (usually practice calculations). This demonstration should lead to a later tutor exercise, where the students solve problems (usually practice calculations) themselves.

Emergency Remote Teaching (Strategy: Replication)

Even though the content of the exercise differs significantly from a lecture, it is methodologically very similar to a lecture. Accordingly, you can implement it as described in [Example 1](#) or [Example 2](#). Even more so than in a lecture, it is important to have an appropriate tempo, to ask rhetorical questions to structure the explanations, to address typical mistakes, and to manage students' questions.

Variants

- *Synchronous*: The lecturer gives a live demonstration of how to solve tasks, students can report live and ask questions (audio and/or chat). For this purpose, you should call in a second person to manage the questions in the chat (to collect, bundle, and pass them on to the lecturer, but also to prioritise, put them on hold or answer directly via chat).
- *Asynchronous*: The teacher records the solution of a task in a video and uploads it to the Moodle course. Students can ask their questions via a question forum in Moodle; the students should reference the task number and the position in the video in their question ("I didn't understand task 5 at position 4:30...") and can also upload photos or their own short videos to clarify their question. The students can answer these questions mutually, the teacher can correct wrong answers and add own answers.

Recommended upgrades for high-quality online learning

- *Gleanings*: You can collect particularly important content questions from your students (e.g. from the question forum) and then answer selected questions in a livestream at a set time. You can upload the recording of this later in the Moodle course.

Example 6: The tutor exercise

Starting point

You have a lecture in which you impart knowledge, and a practice calculation in which you demonstrate how this knowledge can be used to solve problems (usually practice calculations). In a tutor exercise, the students are expected to solve exercises themselves, usually supervised by a student assistant (tutor) and in small groups to enable intensive supervision.

Emergency Remote Teaching (Strategy: Replication)

Use already existing exercise groups or create exercise groups within the Moodle course (see [instructions](#)). Distribute the exercise sheets in the form of a weekly download. You can refer to the exercises in the corresponding lecture video. Students work on the exercise sheets at home and have the opportunity to ask the tutor questions via live video conference during a fixed time slot. Explanations and questions can be visualized via webcam or by splitting the screen.

Variations

- *Homework with corrections:* Students upload homework as a file (mostly PDF, but also e.g. videos are possible), which is corrected (annotated) by the tutors and reported back to the students via Moodle ("Task" activity); this feedback can be the student's annotated file, or a new file (e.g. video feedback).

Recommended upgrades for high-quality online learning

- *Personal learning atmosphere:* At the beginning of the week, the tutors can introduce the tasks to their students in a short video, and summarize the required knowledge from the lecture again. Due to the small group size, the tutors can also address their students directly, e.g. if they refer to results from the previous week. Depending on how intensively and individually the tutors supervise their students, we can create Moodle courses for each exercise group from the Moodle course for your lecture.
- *Continuous learning support:* Enable students to receive support more than once a week in a one-hour time slot, e.g. through additional open video consultation hours, chat consultation hours of student assistants, or mutual support in a forum. Make sure that only small individual impulses are given as support, not complete solutions - otherwise your students will not learn to solve tasks themselves, but only to follow the solutions of others.
- *Peer feedback of homework:* Provide a sample solution at a specific time for all students who have uploaded their own solution. Distribute the student solutions among the students in order to allow the students to correct each other (activity "Mutual Assessment"); this correction is done according to criteria you define, but can optionally be supplemented by the students with their own file upload (e.g. video feedback). Usually one student corrects the answer of several students, so that the students receive several feedbacks/corrections. You can specify that only students who have uploaded their own solutions are included in this peer feedback. Be available as second level support for questions that your students cannot answer on their own.

- *Homework correction in the screencast:* The tutors can correct all or selected tasks in the screencast ([video feedback](#)).
- *Review in the screencast:* You or your assistants can evaluate the students' questions and problems and publish a screencast at the end of the week in which you discuss selected problems in more detail, demonstrate solution strategies in more detail, uncover misconceptions.
- *Simulators:* You can provide your students with programming tasks (activity "Test" with question type "Coderunner"), simulators, [RemoteLabs](#) or similar interactive systems where students can try things out for themselves and get immediate feedback from the system. However, providing such systems is usually complex and/or expensive and requires preparation.

Construction kit: These methods, media and tools are at your disposal

This is a first selection of building blocks from which you can construct your online event:

- [Moodle course page](#)
- [Provide teaching materials](#)
- [Create instructional videos](#)
- [Integrate external teaching material](#)
- [Collaborative teaching material](#)
- [Unidirectional live teaching: live streaming](#)
- [Bidirectional live teaching: webinars](#)
- [Bidirectional live teaching: video consultation](#)
- [Chat](#)
- [Discussion forums/questions/news forums](#)
- [Votes](#)
- [Frequently Asked Questions](#)
- [Tasks](#)
- [E-Tests](#)
- [Feedback/consultation by e-mail](#)

You will find tips on these building block on the following pages. We have structured the description of the blocks as follows:

					
Name of the building block	Function of the building block	Recommended tools	Scaling Performance	Experience and tips	Instructions and links

Moodle course page [back to the building block overview](#)



Course page: Establish a central contact point for your course where students can find all necessary information.



- Communicate up-to-date information about the course
- Make learning outcomes and expectations transparent
- Clarify the organizational framework and rules
- Explain elements of the course and how they complement each other
- Introduce teaching team, clarify roles



Recommended tool: Moodle

moodle.tum.de



Asynchronous – We do not expect any performance restrictions.



- If you create your Moodle course from TUMonline at the [push of a button](#), all your students will automatically be enrolled in this Moodle course. You then have to [manually register your team of staff and assistants as lecturers/tutors](#) in the Moodle course. You can email all your students from within Moodle and establish the course page as a central contact point. You can form [groups](#) within the course (e.g. practice groups, learning groups).
- Structure the Moodle course in sections. The first section is usually an organisational section, e.g. greeting (text and/or video), rules and framework (people, role, schedule, office hours, contact details), current information/news, and a forum for students to introduce themselves.
- The second section is usually an introduction to the topic, e.g. goal of the course (desired learning outcomes), relevance of the contents, preliminary questionnaire (previous knowledge, expectations of the seminar, personal information about the students), and an overview of the chapters to come.
- The following sections are mostly the content chapters structured according to the weeks of the semester. Each chapter usually correspond to the learning volume of one week (standard configuration of a Moodle course).
- You can decide for yourself when to unlock which sections and which individual elements of a section. In most cases we recommend that you unlock the materials and learning activities at a certain rhythm ("instructor paced"): this makes it easier for you and your students to learn together and benefit from a sense of community. You can also program sections to be automatically unlocked on specific dates.



[Overview of the features of Moodle](#)

Provide teaching materials [back to the building block overview](#)



Teaching material: Moodle distinguishes between "material" and "activities". Typical materials used in online teaching are [instructional videos](#), slides, scripts, textbooks, profiles, cloze texts, lists of questions or tasks, and infographics. You can also provide interactive teaching material (simulators and business games, programming environments, RemoteLabs). You do not have to develop everything yourself - you can also integrate [external material](#).



- Create motivation
- Provide input
- Show or enable application of learned material
- Give and receive feedback



Recommended tool: Moodle (e.g. file upload, text fields, text pages, linking)
moodle.tum.de



Asynchronous – We do not expect any performance restrictions.



- In your Moodle course, fill the sections with different teaching materials, either directly (e.g. uploads) or indirectly (e.g. links).
- Always link your material to activities (to prepare for the input, or to follow up and deepen the input), and in this way create learning pathways. Usually, learning materials build on each other ("sequential arrangement"); however, you can also offer different learning materials as alternatives to each other ("parallel arrangement").
- Teaching materials are usually provided through the Moodle course. However, you can also provide material in other ways, e.g. by sending letters by email (consisting e.g. of direct contact with the students, teaching content, control questions and homework).
- If you have previously worked with handwritten notes and blackboard pictures, you can digitize them (via scanner or apps like [CamScanner](#)) and make them available to your students.
- In addition to organizational information and subject-related content, you can also provide your students (especially at the beginning of the bachelor's degree) with meta-information, e.g. about learning strategies, learning techniques, scientific work, but also about the correct use of the included technologies. You can also refer to us for this: we compile appropriate [learning tips for digital teaching](#), especially for students.
- If you are brave and have some time, you can take a look at [Jupyter](#), which allows you to create interactive worksheets.



[Moodle documentation: Functional description "Upload files"](#)

Create instructional videos [back to the building block overview](#)



Instructional videos: Produce instructional videos in which you convey the core elements of your teaching. Depending on your objectives (e.g. motivation, input, feedback), decide on the most appropriate form and length of the video. You can also use publicly accessible and free videos for your teaching (see section [external material](#)) or let students create their own videos on specific topics. The latter is an exciting method, especially for seminars, to encourage students to deal with certain content in greater depth (see section [collaborative material](#)).



- Create motivation
- Provide input
- Show or enable application of learned material
- Give and receive feedback



Recommended tools for production: see [manual for instructional videos](#)

Recommended tools for deployment: Since the video server of the LRZ has been switched off, we are currently in the process of setting up our own high-performance video server with the help of an external partner. Feel free to produce your own videos, but please wait with the upload until the server is ready. [Further information in the instructional video manual](#).



Asynchronous – We don't expect any performance limitations as long as you upload the videos to specialized video servers rather than Moodle.

Alternatives as long as the recommended video server is not yet available (effective but not cleared due data protection regulations): YouTube, Vimeo



- If the video is meant to motivate, we recommend short videos where you look into the camera and address the students directly.
- If videos are meant to deliver input to your students, we recommend medium-length videos in which you present teaching content, e.g:
 - PowerPoint presentation with one audio track
 - Screencast, in which you demonstrate something on your screen
 - Use the tablet like a blackboard and record your blackboard picture and spoken explanations
 - an interview and record it or you can read
 - Read and answer students' questions
- You should generally not see videos as a single element but as part of a learning path within a chapter (e.g. introductory video - text with guiding questions and learning outcomes – instructional video – test – text with summary).



[ProLehre ProLehre manual for instructional videos](#)

Integrate external teaching material [back to the building block overview](#)



Integrate external teaching material: There is already a lot of excellent teaching material available, from publicly available and freely usable videos, slides, articles, podcasts, animations, data sets and case studies, questionnaires, e-books, and graphics all the way to RemoteLabs and simulators.



- Generate motivation
- Provide input
- Show or enable application
- Give and receive feedback



Recommended tool: Linking or file upload in Moodle
moodle.tum.de



Asynchronous – We do not expect any performance restrictions.



- Linking to external material is generally unproblematic from a copyright point of view, but you risk that the link could eventually expire. If you want to save external material and upload it to your Moodle course instead, make sure that you are allowed to ([legal information](#)); look for Creative Commons licenses or a marking as Open Educational Resource (OER), which are a good sign.
- Always explain how students can or should use the material, e.g. as a main source, as a source of in-depth information, as an example or counter-example, as a basis for critical discussion, as a basis for a work assignment.
- Frame external material by classifying it beforehand (e.g. introduction, term synchronization, guiding questions) and discussing and evaluating it afterwards (e.g. collecting impressions, discussing the content, debriefing the guiding questions).
- Instructions for the service [Digital Course Reserves](#) of the TUM library.
- We are in the process of creating a list of high-quality content that you can incorporate into your teaching. [You can find this list in the forum.](#)
- The exchange of educational material is a constant give and take; consider whether you too can make a contribution by making parts of your own material available to colleagues.



[ProLehre list of content resources for online teaching](#)

Collaborative teaching material [back to the building block overview](#)



Create collaborative teaching material: Take advantage of the opportunity to have your students write texts, shoot videos or draw graphics. This allows your students to deepen their knowledge ("learning by teaching"), and the quality of the materials gives you feedback on your students' current learning progress.



- Deepen contents
- Activate students
- Give and receive feedback



Recommended tools: Moodle (Wiki, Etherpad), TUM Wiki, Padlet
moodle.tum.de | wiki.tum.de | padlet.com



Asynchronous or synchronous. It is rather unlikely that there will be a performance degradation when using these services; so far, this has not occurred.

Alternatives if the recommended tools are overloaded (effective but not cleared due data protection regulations): Google Docs, Microsoft Office 365



- Let your students create learning materials together (e.g. summaries or infographics for a chapter, presentation or seminar paper, short videos, [cheat sheet](#)), of which you then correct and supplement a random sample and make this sample available to the rest of the class.
- In Moodle you have the possibility to work together on texts ("Etherpad"), a wiki, a table ("database"), a glossary. You can also link to external tools such as a virtual pin-board ("padlet").
- Create a script together with your students. Or offer your script in the Wiki and allow your students to add examples and explanations themselves. With the function "Observe" or "Recent Activities" (Wiki) you can follow the students' contributions and, if necessary, take corrective, encouraging or praising action.
- Distribute a list of topics, questions or articles to your students for which they need to summarize or assess. Explain the scope and level of detail of each paper. Divide students into groups. These papers are then prepared by the students at predefined times (synchronously) or in their own time (asynchronously). The quality assurance can be done in one step (by you) or in two steps (first peer correction by the students based on a manual from you, and then your correction).
- Depending on the material to be created, a predefined structure, e.g. in the form of an example page, outline and information about the form/scope of the content may be helpful.
- Here it is important that the students work in a motivated and honest way (avoid plagiarism), ideally they are intrinsically motivated, because creating learning materials themselves can be very helpful for the later exam.



[Moodle documentation: Functional description „Workshop activity“](#)

Unidirectional live teaching: live streaming [back to the building block overview](#)



Live streaming: Strengthen the sense of community and increase the rhythm of your online course by having students meet regularly, for example by live streaming one of your lectures.



- Provide input
- Create motivation
- Strengthen group dynamics and sense of community, campfire
- Give feedback



Empfohlene Werkzeuge: Pexip | Zoom | optional plus Tweedback, RocketChat, Padlet
my.conf.dfn.de | zoom.us | tweedback.de | chat.tum.de | padlet.com



Synchronous – Performance can decrease if this service is used heavily.

Alternatives in case of overload of the recommended tools (effective but not cleared due data protection regulations): YouTube, Twitch



- Only you are transmitting video and audio; you do not see your students and you do not know if and how many are participating in the live stream.
- You can use an accompanying chat (either the one integrated in the streaming tool, or an external one like RocketChat or the chatwall in Tweedback)
- You can also use a virtual pinboard etc. (padlet) in addition to or as an alternative to the chat, where you or your students can visualize impulses.
- It is not really possible to teach in the live stream and at the same time keep an eye on the chat; you can therefore use staff or assistants to moderate the chat.
- Structure your live lecture e.g. as follows: be online a few minutes before the start of the actual lecture and go live into the chat; clarify problems with image/sound etc.; present greetings, motivation, goals and agenda; reactivate previous knowledge by repeating or asking rhetorical questions, if necessary use the chat for student answers; do not give more than 20 minutes of input, then ask questions and/or give room for student questions (in the chat); after that, possibly give another input of up to 20 minutes; to conclude, perhaps use a flashlight or one-minute-paper on chat, then summarise; refer to next steps (next stream, next chapter etc.), thank for participation, say goodbye and finish.



[ProLehre Manual Synchronous Online Teaching](#)

Bidirectional live teaching: webinars [back to the building block overview](#)



Webinars: In a webinar, individual seminar sessions (if there are few participants also suitable as an accompanying seminar to a lecture) are held online via a video conference system. It is suitable, for example, for an introduction to a seminar by the teacher, for teaching content in the form of presentations and demonstrations, for having students give lectures, for holding discussions in the whole group and for clarifying questions. If the webinar is recorded, it can then be made available to students who could not attend.



- Provide input
- Create motivation
- Strengthen group dynamics and sense of community
- Give and receive feedback



Recommended tools: Zoom, Adobe Connect

zoom.us | webconf.vc.dfn.de



Synchronous – The performance depends on the videoconferencing system used and its load.

Alternatives if the recommended tools are overloaded (effective but not cleared due data protection regulations): [AlfaView](#), [MS Teams](#)



General information

- Announce the webinar dates in well in advance and in a central location (Moodle course). This also has the advantage that you can easily inform your students of any changes in the schedule.
- Clarify in advance which technical requirements are necessary for participation and inform your students about these.
- Pay attention to equal opportunities and accessibility: If there are students with disabilities attending your course, discuss with them what needs to be done to enable them to participate in the webinar.

Preparation:

- Test the videoconferencing system with which you would like to conduct the webinar in advance. There is usually a help section within the application with tips, first steps and instructions.
- Think about which functions you want to use, and when and how you want to use them. You can use a chat to answer questions and for discussions during and after a presentation. Depending on the system used, it is also possible to conduct surveys or short group work in different meeting rooms.
- If you want the students to give a presentation themselves, make sure that they have the necessary rights (depending on the system, e.g. as "co-host" or "moderator")

Implementation:

- Enter the web meeting room about 15-30 minutes before the event starts and prepare everything. For example, upload your presentation slides, create a chat room for questions and discussions. Test everything you need for your planned schedule.
- Since participants usually arrive in the meeting room one by one, greet them with a unique and short message in the chat and indicate the exact time when the webinar starts.
- If the webinar is to be recorded, indicate this and get all participants to agree before you start recording.
- When the webinar is over, stop the recording.

Follow-up:

- Once you have recorded the webinar, provide the access details in a central location such as a Moodle course.
- Discussion in the whole group via chat or tweedback by a second person (announcement of dates via Moodle course, clarification of technical requirements etc.).



[Webinars from ProLehre](#) (as an illustrative example)

[Webinars from ProLehre](#) (on the topic "Carrying out webinars")

[Article with tips on difficult situations](#)

[ProLehre Manual Synchronous Online Teaching](#)

Bidirectional live teaching: video consultation [back to the building block overview](#)



Video consultation: Offer students personal video or telephone consultation hours. Provide information on when and how you are available and establish a mechanism for scheduling appointments.



- Clarifying personal issues
- Give and receive feedback



Recommended tools: Jitsi Meet, Zoom

meet.lrz.de | zoom.us



Synchronous – Performance drops may occur with high usage of this service; these have not yet occurred.

Alternatives in case of overload of the recommended tools (effective but not cleared due data protection regulations): Google Hangout, Skype



- Students should be required to register for such consultation hours: compile a list of open slots where you or your staff are available for online consultation hours (e.g. in Moodle: Activity "Schedule", "Voting" or a table in "Etherpad"). Students can then register in this list.
- You can also use external tools for scheduling and resource allocation and link them in Moodle.



[ProLehre ProLehre Manual Synchronous Online Teaching](#)

[Anleitung Jitsi Meet](#)

Chat [back to the building block overview](#)



Chat: Strengthen the sense of community and exchange between students by creating a channel for your course in the university chat. There, your students can exchange information live around the clock. You and your staff or assistants can participate in the chat either occasionally or at set times.



- Coordinate and control work processes
- Exchange of knowledge, discussion
- Give and receive feedback
- Get personal support, answer questions
- Strengthening the sense of community



Recommended tool: RocketChat

chat.tum.de



Synchronous or asynchronous – If this service is heavily used, performance may decrease; this has not yet occurred.

Alternatives in case of overload of the recommended tools (high-performance but not released according to data protection laws): WhatsApp Group, Facebook Group



- There is also an app for RocketChat, so you can keep up to date on the go. The web interface makes typing easier for many people.
- Of course, RocketChat should be linked to your course page in Moodle, with an indication of the times when you or your assistants are present in the chat ("chat consultation hours").
- If you do not have time to attend to the chat yourself, have your assistants report to you regularly on the highlights and lowlights of the chat.
- Take up questions, topics, highlights from the chat and refer to them, e.g. in the discussion forum or in your videos ("feedback").
- You can also use the chat to discuss a specific topic within a given and limited time frame. In this case a clear moderation on your part is important:
 1. Opening the chat, welcoming all participants,
 2. Announcing the structure of the chat session, the topics and objectives
 3. Opening statements by the participants after being called on by the moderator
 4. Answering questions
 5. Input of new questions by the participants
 6. Answering questions
 7. Closing remarks from participants and the moderator, saying good-bye.



[Instruction RocketChat](#)

[Tips for e-moderation in forums and chats](#)

Discussion forums/questions/news forums [back to the building block overview](#)



Discussion forums and voting: Involve your students in decisions, offer them the opportunity to exchange information freely or on specific topics or to bundle and clarify important questions.



- Enable exchange of content
- Enable collaborative working
- Strengthening the sense of community



Recommended tool: Moodle activity "Forum"

moodle.tum.de



Asynchronous – We do not expect any performance degradation.



- Distinguish between news forum, discussion forum and question forum. In the news forum, only you can write, e.g. inform your students about short-term changes of dates or remind them of the submission of work results. In the discussion forum, your students can ask general questions about the course that you or the students themselves can answer. In the question forum, you can ask questions that you want your students to answer (students will only see the answers of others after they have given an answer themselves).
- Make it clear beforehand if a forum is meant to fulfill a certain aim.
- A forum will not run itself. Initiate, control or moderate discussions in the forum by giving input that encourages students to think and discuss.
- Regularly take time to maintain the forum: praise correct answers from students and, if necessary, add to them, give answers yourself or link to teaching material, ask new questions yourself. Reply to posts within two days if possible. Hire student assistants or staff members to do the first level support work for you in maintaining the forum.
- It is advisable to give further impulses (in the form of follow-up questions, links, expert comments and hints) from time to time to keep a discussion going. In slower groups, you can take the role of a student and set prototypical questions to spur the chat on.
- If the exchange in a forum does not start at all or only hesitantly, use our student "Hähbert" to break the ice. Hähbert is a dummy student who asks questions for you, which you can then answer. The access data for Hähbert's Moodle login can be obtained from our Moodle team via e-mail to lms-support@tum.de.
- You can also create votes, for example, on alternative dates, on specific topics requested by students or for a Best-Paper-Award (if students have provided summaries or something similar).
- If a discussion on a topic includes many contributions, create a summary of the most important aspects for easier reading.
- Take up frequent and/or interesting questions and answers in your course (feedback).



[Moodle documentation: Functional description "Forum"](#)

[Moodle documentation: Functional description "Voting"](#)

Frequently Asked Questions [back to the building block overview](#)



FAQ: Provide the answers to common (in your experience, expected) questions as Frequently Asked Questions (FAQ). You can do this in the form of a structured text, but also in the form of a video (e.g. read out and answer questions yourself).



- Clarify technical and organisational questions
- Fill knowledge gaps
- Clear up any ambiguities regarding the examination process



Recommended tool: Moodle material "Text page"

moodle.tum.de



Asynchronous – We do not expect any performance limitations.



- Make sure that the list of questions is well structured. Depending on subject and topic, questions can be sorted e.g. chronologically, alphabetically, thematically.
- You can transfer highlights from the question forum to the FAQ, or you can set up the FAQ as a forum.
- With a FAQ, you do not only have to react to questions from your students, but you can also enter questions yourself, which you then answer yourself. Perhaps you already know from experience which questions are frequently asked - or should be asked.
- You can also answer the FAQ in the form of short videos, e.g. by filming them together with a second person who reads the questions to you, which you then answer.



[Moodle documentation: Functional description "Text page"](#)

Tasks [back to the building block overview](#)



Setting tasks: Online teaching should not only consist of your input; students should tackle various types of questions and tasks online. This active involvement of the students ("activation") is one of the success factors for good teaching – whether face-to-face or online teaching.



- Delve deeper into the subject matter
- Activate students
- Give feedback on understanding and learning progress
- Get feedback on the learning progress of your students



Recommended tools: Moodle, Wiki and many others

moodle.tum.de | wiki.tum.de



Asynchronous/synchronous – Performance drops can occur with high usage of some services; these have not yet occurred.

Alternatives in case of overload of the recommended tools (performant but not released by data protection laws): Google Docs, Office 365, Dropbox Paper, Zoom, Google Hangout, Skype



- Use learning outcomes as a guide when designing tasks/work assignments – what should students be able to do at the end of the section, learning path, teaching unit?
- Possible tasks that can be included:
 - Joint brainstorming at the beginning of a new section, e.g. about associations to the topic, previous knowledge, own experiences
 - Answering questions asked within your teaching video or slides; or letting your students generate their own questions based on your teaching video or slide set (e.g. comprehension questions, application questions, potential exam questions)
 - Editing exercise sheets, formulating your own exercises, correcting the exercise sheets of other students ("peer feedback", if necessary with sample solutions or correction grids that you provide)
 - Individual or collective research of content or solutions; preparation of a presentation of results (e.g. PowerPoint slides, profiles, videos); presentation and discussion (e.g. webinar, online tutorial, discussion forum)
 - Creation of [collaborative teaching materials](#)
 - Creation of summaries of articles/texts
 - With hackmd.io students can work on collaborative tasks and create presentations.
 - Making sketches, mind maps, diagrams, code snippets, evidence sketches
 - Solving programming tasks ([Moodle Coderunner](#))
- Give clear task instructions (specific, measurable, attractive, realistic, scheduled) so that students know what tasks they have and when they have to complete them.

- Also be transparent how and from whom students will receive feedback on the assignments (feedback is especially important for online teaching; you can also give your feedback [as video feedback](#)). Use the opportunity for students to give each other feedback (e.g. [mutual assessment](#) function in Moodle).
- Vary whether the tasks are to be processed individually or in a group.



Would you like further support, tips, instructions from us? Write to us!

E-Tests [back to the building block overview](#)



E-Test: With online testing, you can give your students the opportunity to assess their level of knowledge and get feedback. The evaluation of participation and the results of the test allow you to draw conclusions about the motivation and learning progress of your students. You can then use this information in your teaching (feedback).



- Activate students and make them think
- Give feedback to students
- Get feedback from the students



Recommended tools: Moodle (Test, [Stack](#), [CodeRunner](#)), Tweedback, Pingo
moodle.tum.de | tweedback.de | pingo.coactum.de



Usually asynchronous. If this service is heavily used, performance can drop off; this has not yet occurred. For exam-relevant e-tests, which take place simultaneously for all students, we will set up a separate exam server.



- As a rule, e-tests do not have the character of a regular examination (no summative examinations), but are intended to help students to review and reflect on their learning process and to encourage them to reflect more deeply ("formative feedback"). You can make this goal transparent to your students in order to minimize fear and fraud attempts.
- When formulating the questions, make sure that they are also diagnostic/informative for the students (in terms of the learning outcomes of your course). Questions that require a deeper understanding are usually associated with more effort in their creation than pure knowledge queries.
- When using multiple-choice questions, the distractors (i.e. the wrong answer alternatives) should be as similar as possible in wording and complexity to the correct answer. Otherwise, students can guess the correct answer relatively easily and on the basis of the exclusion principle.
- In addition to the direct, automated feedback on the answer (correct, wrong), you can also give your students other learning hints (e.g. on the script, on comparable exercises, on sample solutions).
- Use the results of the e-tests to inform your teaching (e.g. in the discussion forum, or in a video), both the participation rate and the evaluation of the answers (here you can, for example, take up frequent mistakes or have them corrected by the study participants, discuss them, etc.).
- If possible, you can also use e-tests in the sense of gamification of your teaching by publishing certain achievements (possibly anonymised) and making them comparable (e.g. via high score lists).



[Moodle documentation: Functional description "Test"](#)

Feedback/consultation by e-mail [back to the building block overview](#)



E-mail (asynchronous): Answer questions by e-mail. Create a shared mailbox so that your employees can also answer the e-mails. Define rules to determine which questions you answer by e-mail and which questions must be clarified in other ways (e.g. technical questions only in the question forum) and who is responsible for answering them.



- Give and receive feedback
- Get personal support, answer questions



Recommended tool: TUMonline for creating the shared mailbox

campus.tum.de | mail.tum.de



Asynchronous – We do not expect any performance restrictions.



- In your Moodle course, offer to answer individual student questions by e-mail.
- Streamline these requests if necessary. For example, you can announce that technical questions will not be answered ("that's what the question forum is for").
- You can create shared mailboxes in TUMonline via "Function objects" (e.g. lectureXY@in.tum.de), to share the task of responding with employees.
- You can integrate the shared mailbox as an Exchange mailbox in Outlook or Thunderbird.



[Instructions: Creating a Shared Mailbox](#)

Support: How ProLehre helps and advises you

The suggestions and ideas in this handbook are only the first step on a challenging path.

The next step is for you to design your own teaching concept for your course and to consider how you can apply the impulses of this manual to yourself and your course.

We will not leave you alone with this and will gladly support you:

- On our website you will find **instructions and handouts** for the concrete technical and didactic implementation of online teaching. Do you think there is a topic missing? Let us know, we can create new manuals within the scope of our resource if required, and we will focus on your current needs.
<https://www.prolehre.tum.de/aktuelles/coronavirus>
- Do you have student assistants that you want to use for your support? For example, to edit and embellish videos, to implement your ideas for online elements, to moderate online tutorials? In our E-Scout-Academy we can get your assistants ready for these activities.
<https://www.prolehre.tum.de/en/programs-services/e-scout-academy/>
- Before the start of the semester, you can use one of the ten empty recording lecture halls to record lectures to have "in stock", or you can use the teaching video studio that we have set up at Barerstraße 21.
<https://www.prolehre.tum.de/en/news/coronavirus/>
- In a series of **webinars** you can acquire essential knowledge on selected topics.
<https://www.prolehre.tum.de/en/programs-services/courses-certification/>
- In the **exchange forum** you can ask questions and receive answers and assistance from us and experienced colleagues. In the exchange forum you can also request topics for upcoming webinars.
<https://wiki.tum.de/display/prolehreforum>
- For simple questions, you can also use our university chat channel, where we answer quickly and easily.
<https://chat.tum.de/channel/prolehre>
- But above all: Would you like to discuss your ideas, plans and teaching concept with an expert in peace and quiet? Write to us at info@prolehre.tum.de and we will arrange an **online consultation appointment** with you.