

Formulating exam tasks

Competence-oriented exams in an aligned, competence-acquisition course are built off a timeline, working backwards from the last element. From a conceptual perspective, the last element should be the first step in planning: What should students be able to do at the end of the course and in which test setting can they put these skills to the test? If you can answer these questions before the beginning of the course coordinate and fine tune the Learning Rooms and exam according to the constructive-alignment model of the Learning Outcome.

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The process to conceptualize assessment
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*We are happy to answer your questions or
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Exams: valid, reliable, fair, and economical

For competency-oriented courses you need exam tasks that require actions based on [Learning Outcomes](#). The demands of exams are not without reason high: They form the link between university and the professional world and therefore are (rightly) a priority for students. Exams must therefore meet certain standards. Ask yourself the following questions about your exams: Are they...

- ... valid (i.e., do they describe what constitutes the acquired competencies, as written in the Learning Outcomes)?
- ... reliable (do you grade exams in different semesters for the same course using the same criteria)?
- ... fair (do the tasks test competencies that students can acquire during the course)?
- ... and are they – and this is on a different plane from the first three points – economical (that is, can you as a teacher manage the amount of work)?

In some cases it will be difficult to achieve all four demands. Particularly in very large courses with 150 or more students, economy will play a major role. This situation also has consequences for the [Learning Outcome](#): There can be no competencies addressed there that cannot be tested under the given conditions.

The "arc" of the [Constructive Alignment](#) should be retained, even if the course is taxonomically less demanding. To correct the situation in such cases, changes should be made at the conceptual level: form small groups, distribute the material over several semesters, reduce the amount of content in favor of transfer and deep learning.

An example

In many courses, students ask for a complete set of lecture notes to be made available. In these notes, the main content (formulas, definitions, diagrams, etc.) is summarized. They often include all of the slides used in lectures, additional literature, or exercises. Whoever can memorize the notes is successful. After all, this is the learning strategy most students have used since their school days.

During the course, students' views are confirmed. Again and again teachers tell them that memorization is not enough, but through repeated experience in lectures where the slides or notes are more or less read word-for-word, students ignore their teachers or don't take this admonition seriously. Furthermore, the [Learning Outcome](#) promises that students will "learn the basics" and offers no specification of actual skills to be gained.

In the exam, students suddenly find out that memorization is not enough: that it involves knowledge transfer, independent thinking, and problem-solving. Students find such exams hard and after receiving their grades, they come into office hours and ask why they got "only a 3." They don't understand what teachers mean when they say "think for yourself" because they have had too few opportunities to replace their traditional learning strategy with the new experience of concrete strategies.

From an exam-theory perspective, there are two possibilities in this case:

1. Memorization is anchored in the [Learning Outcome](#), in which the competencies to be acquired are written as "can repeat and reproduce" or "can name/identify." Then in the [Learning Rooms](#) of the course these repetitions and reproductions are practiced and students prepare for the exam. Taxonomically these types of courses are placed on level 1 or 2, which is unsatisfactory for the expected level of higher education.
2. The [Learning Outcome](#) aims to be at least on taxonomy level 3 (application). If so, then the course needs [Learning Rooms](#) that practice "application" through repeated exercises on the topic, with a change in the level of difficulty throughout the course, from easy to complex, from "with the help of" to "self-reliant." Course notes and content memorization is then potentially misleading: better to have notes with application scenarios or open-ended questions. The exam may then include application tasks that can only be correctly completed if the competencies of lower taxonomy levels are used (that is, when terms are used properly or concepts are described in detail). In such a case there would be sufficient opportunities for students to understand and practice the "application" of this subject.

Examples of exam questions/tasks

Texonomy levels

Level 1: Remembering/recalling

Define the five fundamental concepts A, B, C, D, and E.

Level 2: Understanding

Describe the diagram using the five fundamental concepts A, B, C, D, and E.

Level 3: Application

Consider Scenario X.

Indicate which of the five fundamental concepts has which significance.

Level 4: Analysis

Consider Scenario X.

Analyze the situation using the fundamental concepts you consider appropriate.

Level 5: Synthesis

Keeping in mind the fundamental terms A to C, develop a concept for Situation X.

Level 6: Evaluation

Assess which of the fundamental concepts in Situation X would be most helpful. Justify your assessment.

Taxonomy levels

Level 1: Remembering/recalling

What is formula XYZ?

Level 2: Understanding

Describe the diagram using formula XYZ.

Level 3: Application

Given the values of A, B, and C, calculate D.

Level 4: Analysis

Given Scenario 123, analyze which formula you need to use.

Level 5: Synthesis

Develop a formula for Scenario 123. Explain your ideas.

Level 6: Evaluation

Evaluate whether Scenario 123 is better for Situation X than Scenario ABC.



Developing competency-oriented exams

When developing a competence-oriented exam, follow a few ground rules:

1. Demanding Learning Outcome – demanding exam tasks

The more sophisticated your [Learning Outcome](#) is, the higher it is on the taxonomy scale, and the harder it will be to divide the exam outcomes into separate steps. This means that for a taxonomically challenging test you prepare fewer tasks, but for these fewer tasks you require multiple steps that add up to a complete action – the complexity of which requires a certain amount of working time.

2. Choose the exam form

It follows that some [Learning Outcomes](#) cannot be tested in an exam because an exam must only test the required action that has been formulated in the Learning Outcome and that describes the competencies required. If, for example, the Learning Outcome states that students must be able to check a company's balance sheet, then the exam must do exactly this. There is generally a lot more latitude in competence-oriented exams than is commonly assumed compared to those on the lower taxonomy levels. For this reason, a clear decision about the taxonomy level and ability is required so that tasks are not set at on a lower taxonomy level.

3. All exam tasks are on one taxonomy level

Exam tasks on different taxonomy levels make little sense. "Easy" questions on taxonomy level 1: remembering and recalling, and 2: understanding can – at best – serve as an aid to help nervous students in an exam situation. For the grading it makes no difference, but it is not possible to have a precise assessment of the level of competence acquired. If students are in a course on taxonomy level 3: analysis, and the exam tasks are on level 2: application, the exam reveals nothing about the quality of analysis.

4. Transparency I: Communicate the exam tasks at the beginning of the course

Exam tasks in competency-oriented courses should be made transparent at the beginning of the course. Competence cannot be acquired by "remaining passive during the semester" or "cramming just before the exam." When, for example, you want a driver's license, you already know before you begin the driving lessons what you will be able to do at the end. It can't be otherwise. Knowledge is not ability! This is precisely the difference a competency-oriented exam aims to address, and a competency-oriented exam must address this difference.

5. Transparency II: Regular feedback

In order to allow students to be individually responsible for acquiring their competence, they need transparency. One aspect of this transparency is by announcing the [Learning Outcomes](#); another is by making available the exam tasks at the beginning of the semester. In addition, students need the opportunity to practice elements of the Learning Outcomes during the course in order to identify what they have to or want to work on. Ideally, if possible, in the last [Learning Room](#), they have the opportunity to practice a very similar exam task, receive feedback, and be able to independently assess their performance.
