Guidelines alternative equivalents for assessment

Given the exceptional circumstances, we have to move from regular on-site exams to alternative online/ from-home assessment. As a result, proposed alternatives are different from the original assessment. Therefore, an extra investment in time and resources seems inevitable. With this document, we hope to provide a short list with plausible alternatives for regular on-site assessment. Though we realize that the alternatives might alter reliability as well as the validity of the original assessment, we urge you to keep assessment in line with the Intended learning Outcomes of the course as much as possible. Please choose wisely and keep a keen eye on the feasibility of the proposed change. Consult your Board of Examiners before communicating new assessment approaches to students.

When thinking about alternative forms for assessment, the following should be taken into consideration:

I. Conditions for equivalent alternative assessment.

II. Alignment with the Intended Learning Outcomes.

III. Additional challenges for skills, requiring physical presence.

I. Conditions for equivalent alternative assessment

What conditions does the alternative have to meet in order to count as equivalent? Since group activity is not possible, many courses will likely end up with (a version of) a take-home exam as alternative to a sit-in exam.

The disadvantage of a take-home exam is twofold:

1. you cannot guarantee the student's identity with a take-home exam, and
2. you cannot check the use of textbooks, internet, and other forms of support. A sit-in exam cannot simply be replaced by a take-home exam.

Guaranteeing the student's identity (1)

First and foremost, we should not forget that most students simply want to find out how well they are doing, and thus have no intention to cheat. Having said that, it is impossible to guarantee the student's identity with a take-home exam, but it is relatively easy to reduce the risk of identity fraud.

Honesty

One way to plea for trustworthiness is by drawing up an explicit statement appealing to students' honesty to take the exam alone. In return for relying on such an honour policy, the penalties for getting caught cheating will be severe. SafeAssignment can be used to statistically analyse the answers of all students to detect cheating patterns. Just the threat of doing this might be sufficient to keep students from being dishonest.

Time constraints

Timed exams, i.e. allowing students to work on the exam for a limited number of hours (e.g. the normal duration of the original sit-in exam), is an easy way to reduce the risk of identity fraud (see below).

Controlling the use of support (2)

If you want to measure students' capability to apply their knowledge/ competencies, or to analyse, synthesise or evaluate information (i.e. the four upper levels of Bloom's taxonomy; see figure 1), the use of textbooks, internet, and other forms of support is less relevant. This is because this knowledge and these competencies ask for insight and less for 'simple recall'. In contrast, the use of a textbook in case of recall (i.e. the two lower levels of Bloom's taxonomy; remember and understand) is much more problematic.

Note that in case of *understanding*, different levels of difficulty are possible. If students are required to combine concepts, constructs, or relationships and, for example, have to explain or interpret the implications of something that cannot literally be found in a book or on the internet, then it is certainly possible to test understanding online. So in proposing alternatives, keep in mind the cognitive domains that the original assessment targeted, and provide an argument that the alternative equivalent assessment does the same.

Time constraints

Timed exams, i.e. allowing students to work on the exam for a limited number of hours (e.g. two hours, as the original sit-in exam would also take), avoids unwanted cooperation between students. It reduces the chance of students working together and/ or making use of illegitimate sources, such as the support of or input from an expert. A limited duration in combination with the task-demand makes cooperation a costly activity for students, because it requires contacting each other, discussing possible options, formulating two different answers (to avoid plagiarism), etcetera. Students should be warned that speed is essential and should be told how many questions there are in the exam and whether any are open/essay questions that may take more time to complete. Students with reading disabilities should of course be routed to a separate version of the exam with more time available.

In order to determine whether the number of questions is not too small or too large, one could have an expert (a colleague who is not involved in the course/ module) colleague take the exam in advance and time it. Though this will probably go a little faster, it will a good way to assess whether the questions are difficult and how much time is needed to read and answer them.

When giving students a limited amount of time to finish and upload the take-home exam, you may want to expand the time by 15 minutes to avoid 'upload-stress'. In addition, allowing them to send the answers per email in case uploading via the Student Portal is unsuccessful (we have no idea whether the system can deal with high numbers of students using SafeAssign simultaneously). Make sure to set a deadline to this option as well (i.e. within 15 minutes).

It may be good to consider whether all students should take the exam at the exact same time. If students are spread across multiple time zones, and cannot all be online at the same time, it might be an idea to allow them to make the exam at their own preferred moment. For support on this, please check https://tutorials.library.maastrichtuniversity.nl/Tool_Wheel/ (*produce*).

In case you offer an exam within a timespan, but not at a set time, it is possible that students share the questions. This is also why many coordinators consider an oral exam to be problematic (what if the first student shares the questions with the next?). To avoid this, the exam can consist of a multitude of randomised questions. This way, the second student will be confronted with different questions than the first. In case the exam is offered online, check whether the software used allows scrambling/randomizing of questions. Both Blackboard, TestVision and Canvas have that feature. That way, it becomes very difficult for students to cooperate on an exam, and yet they still get the same exam. Of course, if the scrambling feature is used, you cannot have groups of questions that are about the same stem text or that must be taken in order.

In a multiple-choice exam, time constraints can also be given to individual questions. To avoid students to consult each other by phone, additional measures can be taken: 1) randomisation of answer options, 2) different answers needed (e.g., in anatomy, students need to answer different parts, or in calculations, the assignment can use different numbers), 3) questions are provided in different blocks and students cannot go back to blocks of questions. The Cohen-Schotanus method[1] might be a good way to adjust for the time pressure and the inability of going back to questions.

Though randomisation is mostly used in multiple-choice exams, it is also applicable in exams with essay questions (closed or open). By mixing the order of the questions, students will be unable to cooperate, since their first question will not be the same as the first question of the other student.

[1] The Cohen-Schotanus method states that an absolute caesura is determined in advance, meaning that a candidate will get the maximum score (10) if s/he achieved the (theoretically) highest possible score (100% of the points to be obtained).

Additionally, indicating that grading will be done 'on the curve', i.e., where grades are adjusted to reflect the desired (normal) distribution of scores. This way the first students will be 'punished' for sharing the questions with later students, since those will have the advantage of being more prepared, and will thus likely perform better, leading to a lower grade for the first students, in order for the results to reflect the desired normal distribution[2]. Please keep in mind that this is a very tricky and potentially unfair manner to prevent the sharing of questions. It is difficult to provide evidence for fraud, e.g., by sharing exam questions – it will be impossible to tell whether the first group actually is a group of poor performing students, or whether exam questions were shared.

Online tools

Several exam software companies enable students to do exams from a distance. An overview of possible tools can be found on https://tutorials.library.maastrichtuniversity.nl/Tool_Wheel/ (select *produce* for tools concerning assessment)

In case of online assessment, students' internet connection should be good and stable (to take the exam, to upload the exam and/or to access additional resources if needed). This is the student's responsibility, but make sure to think of a 'plan B' in case students are unable to control the quality of the internet connection. E.g., think about the consequences in case an internet connection is interrupted during an oral exam – is the student allowed to reconnect?; if so, is there a time limit to reconnecting?; will the exam still be considered valid?; what if the connection on the side of the examiner fails?; etc.

II. Alignment with the Intended Learning Outcomes

In thinking about assessing students, Bloom's taxonomy (see figure 1) is very helpful. If you want to measure students' capability to apply their knowledge/ competencies, or to analyse, synthesise or evaluate information (i.e. the four upper levels of Bloom's taxonomy), the use of textbooks, internet, and other forms of support is less relevant. This is because this knowledge and these competencies ask for insight and less for 'simple recall'. In contrast, the use of a textbook in case of recall (i.e. the two lower levels of Bloom's taxonomy; remembering and understanding[3]) can be much more problematic.

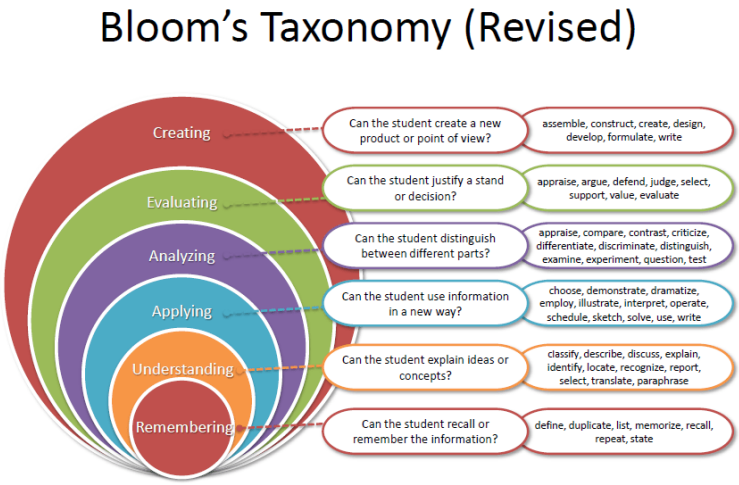


Figure 1 - obtained from https://www.unthsc.edu/center-for-innovative-learning/blooms-taxonomy-learning-objectives-and-higher-order-thinking/

[2] If necessary and required, the assessment experts of the different faculties can run these analyses on request.
[3] Requiring students to combine concepts, constructs, or relationships and explain or interpret the implications is certainly possible in an online test.

When designing questions for take-home exams, keep in mind the cognitive domains you want to assess. Given that the answers to 'remembering' and, to a certain extent, 'understanding' questions are relatively easy found in textbooks or on the internet, a well-designed take-home exam refrains from the use of action verbs listed in these categories (see figure 2). Note that in case of *understanding*, different levels of difficulty are possible. If students are required to combine concepts, constructs, or relationships and, for example, have to explain or interpret the implications of something that cannot literally be found in a book or on the internet, then it is certainly possible to test understanding online. Bear in mind that a take home exam is only valid, if it still tests the majority of learning outcomes that would be assessed in the original exam.

REVISED Bloom's Taxonomy Action Verbs

Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	• Choose • Define • Find • How • Label • List • Match • Name • Omit • Recall • Relate • Select • Show • Spell • Tell • What • When • Where • Which • Who • Why	• Classify • Compare • Contrast • Demonstrate • Explain • Extend • Illustrate • Infer • Interpret • Outline • Relate • Rephrase • Show • Summarize • Translate	• Apply • Build • Choose • Construct • Develop • Experiment with • Identify • Interview • Make use of • Model • Organize • Plan • Select • Solve • Utilize	• Analyze • Assume • Categorize • Classify • Compare • Conclusion • Contrast • Discover • Dissect • Distinguish • Divide • Examine • Function • Inference • Inspect • List • Motive • Relationships • Simplify • Survey • Take part in • Test for • Theme	• Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Criteria • Criticize • Decide • Deduct • Defend • Determine • Disprove • Estimate • Evaluate • Explain • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Opinion • Perceive • Prioritize • Prove • Rate • Recommend • Rule on • Select • Support • Value	• Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Delete • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Happen • Imagine • Improve • Invent • Make up • Maximize • Minimize • Modify • Original • Originate • Plan • Predict • Propose • Solution • Solve • Suppose • Test • Theory

Anderson, L. W., & Krathwohl, D. R. (2001). A taxonomy for learning, teaching, and assessing, Abridged Edition. Boston, MA: Allyn and Bacon.

Figure 2 Bloom's taxonomy action verbs – do not use the action verbs of level I. Remembering and level II. Understanding in a take-home exam.

Open-book exams vs. factual knowledge exams

Offering timed exams in open-book style is not necessarily problematic. Because it is timed, students have limited time and cannot take forever to look up stuff. Adding one or two short essay questions provides an additional verification that students are not cheating by cooperating. Especially questions that require genuine understanding and analysis, the answer of which one cannot simply look up, allows for distinction between levels of knowledge and competencies between students. Also, comparable cases or problems with different details (e.g., names, products, figures, etc.) will prevent students from cooperating in answering the question.

To avoid that students only using the internet (e.g., Google) in an open-book exam, students can be asked to refer to the pages in the book, articles, etc. where they found the concepts and issues used in their answer.

III. Skills trainings / practical sessions

Programmes with skills, which require physical presence, such as laboratory skills, have an additional challenge to conduct education as planned. In a sequential programme, you can assume that practical skills developed in year one, are required, and will be reassessed in year two. This implies that first year students have two more years to compensate for the lost skills. The more advanced the student, the less time remains to compensate, which is why it is more essential for later/last year skills to be offered in this semester.

If possible, meaningful digital alternatives are planned with the same learning outcomes. Alternatively, skills are postponed. Since it is highly likely that all education for the remainder of the year will have to be offered online/ remotely, postponing to one of the remaining periods of this year is not possible. Alternatively, skills can be postponed to the next academic year. Important is to avoid study delay, so makeup skills would be either on top of regular education, or should be combined with already planned skills. What helps is for 'follow-up skills' to very clearly and in detail describe what competencies are required for students to successfully participate in the skills. This helps to define what skills students lack, and thus what needs to be offered in addition to or as part of skills trainings later in the programme. For students not being able to catch-up next year (graduating, abroad, etc.) a tailor-made alternative would be needed.

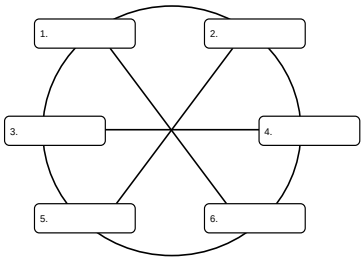
Some additional thoughts

In case of large groups of students (say 30+), it makes sense to create multiple versions of the take-home exam with similar, but not identical questions/assignments. E.g., use different numbers in calculations, different examples or ask a question from another angle, etc.

Possible alternative forms of assessment

Coordinators who are in need of examples or who are wondering whether a form of assessment is a suitable alternative can contact the assessment expert of their faculty.

Concept mapping	Students need to create a drawing and explain the underlying relations between a (provided) list of concepts. Any of several forms of graphical organizers which allow learners to perceive relationships between concepts through diagramming key words representing those concepts. http://www.graphic.org/concept.html
Tic-Tac-Toe/ Think-Tac-Toe	A number of concepts is provided in the form of a x-square grid (e.g., nine, similar to a tic-tac-toe board). Students are given (individual) pincodes and are asked to explain the relationship between the concepts listed in the squares corresponding to their pincode. The activities vary in content, process, and product and can be tailored to address domain of knowledge levels. This allows students to demonstrate their understanding.

Wagon wheel	Provide a list of concepts and a wagon wheel with six boxes that are each linked to three other boxes. Ask students to select five concepts from the list and add one freely chosen concept to the sixth box. Students need to explain the relationship between the concept in a box and the concept in the linked boxes. They have to do this for all possible relationships. 
Peer review formative assessment	Students critically review a (scientific) article or each other's work, e.g. an advice to the 'editor'. Students learn to critically read and assess a paper. Requires guidelines against which the paper has to be reviewed (comparable to peer reviewed scientific journals).
Constructing a questionnaire[4]	By constructing a questionnaire, students learn to operationalise a research question.
Constructing an exam	By constructing an exam, students learn to distinguish between primary and secondary issues.
Constructing an exam question	Depending on the course objectives, students are asked to construct (an) exam question(s) with a model answer at a certain level (Bloom's taxonomy: understanding, applying, analysing, evaluating, creating)
Home-recorded presentation	E.g., PowerPoint with voice-over
Vlogs	By constructing a vlog according to content guidelines and assessment requirements
Poster	E.g., with a script of the presentation
Literature research	Students indicate what literature they have read in the context of the course. In doing so, they must indicate the quality of the texts and its relevance to education. Students learn to read critically and assess the relevance of texts.
Triple jump-test	The triple jump-test is an oral test consisting of three steps: 1. the examiner presents the problem; 2. the student thinks aloud how they would tackle such a problem and then looks for additional information to answer questions within a predetermined search time; 3. the student presents a synthesis of the problem and the answers/ solution.
One Minute Essay Quick Write	A one-minute essay question (or one-minute question) is a focused question with a specific goal that can, in fact, be answered within a minute or two (i.e. strictly timed essay questions).
	The strategy asks learners to respond in 2–10 minutes to an open-ended question.
Misconception Check	Present students with common or predictable misconceptions about a designated concept, principle, or process. Ask them whether they agree or disagree and explain why.

[4] This is just one out of several options. Students can also be asked to write a method section or describe the design of an experiment / study to answer a research questions. The selected method depends on the ILOs of the course.

Self-Assessment	A process in which students collect information about their own learning, analyse what it reveals about their progress toward the intended learning goals and plan the next steps in their learning.
A-B-C Summaries	Each student in the class is assigned a different letter of the alphabet and they must select a word starting with that letter that is related to the topic being studied and explain it.
One Sentence Summary	Students are asked to write a summary sentence that answers the "who, what where, when, why, how" questions about the topic.
Oral Questioning	How is X similar to/different from Y? What are the characteristics/parts of X? In what other ways might we show show/illustrate X? What is the big idea, key concept, moral in X? How does X relate to Y? What ideas/details can you add to X? Give an example of X What is wrong with X? What might you infer from X? What conclusions might be drawn from X? What question are we trying to answer? What problem are we trying to solve? What are you assuming about X? What might happen if X? What criteria would you use to judge/evaluate X? What evidence supports X? How might we prove/confirm X? How might this be viewed from the perspective of X? What alternatives should be considered? What approach/strategy could you use to X?
Likert Scale	Provide 3-5 statements that are not clearly true or false, but are somewhat debatable. Have students reflect on the statements based on their score. This forces students to analyse, synthesize and evaluate information).

In general, it should be clear to students what is expected from them, e.g., provide the front page of an exam in advance with clear instructions. The same applies to online instructions. Information should be sent well in advance and – if necessary – a mock exam/ pilot session should be scheduled (to check if everything works as intended).

Students can be assessed throughout the course – both formative and summative. Assessment formats as described above can be useful, but especially group work is also possible. For assessment during the course, examiners can opt to vary exams, as described before, and to make the exact topic known only when the timeslot to start working on group/individual assignments is opened. This way, students are encouraged to keep their knowledge up to date during the course. For assessment during the course, students can be asked to work on a continuously growing product, where not only the product itself will be assessed, but also the way feedback is incorporated and used in the next product.