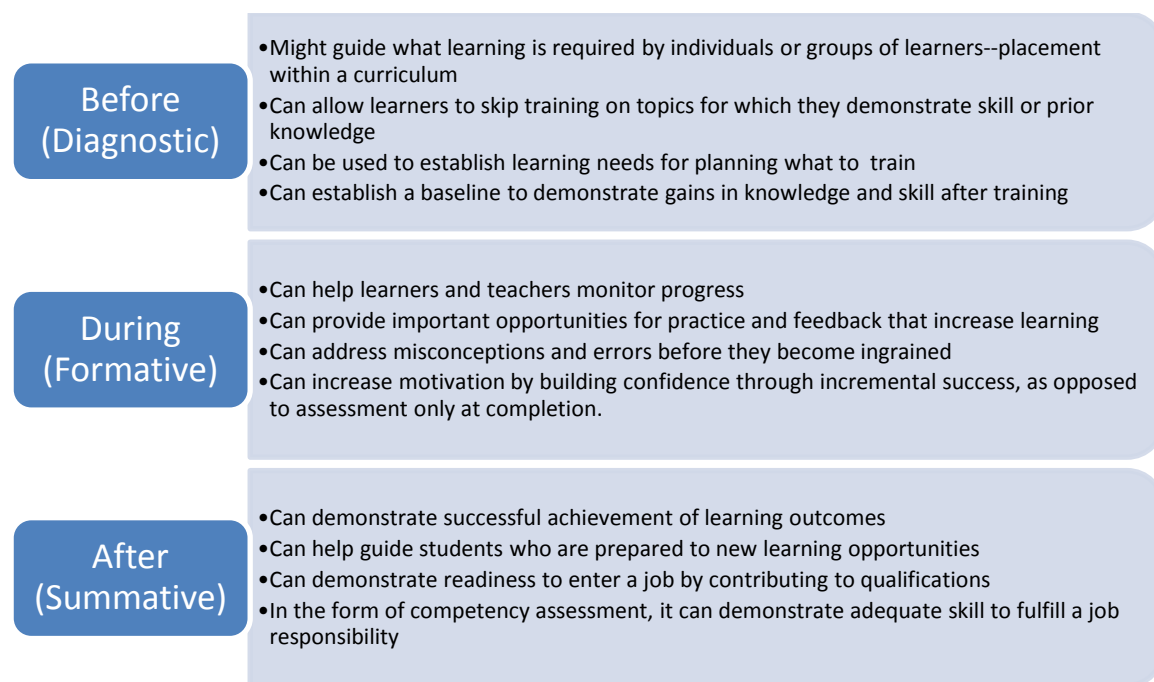# Principles of Learning Assessment

Assessment is an essential part of learning. Without it, learners do not know how well they are learning, and trainers do not know if their training is successful. And assessment does more as well. This resource looks at the fundamental qualities of assessment—including what makes it challenging.

Assessment is often stressful for both learners and teachers. No one likes being judged, and it can also be uncomfortable to judge others. Many trainers would say that assessment is the part of training about which they are least confident. In fact, in past WMO Courses for Trainers, they have said just that when they completed self-assessments of their competency as trainers.

However, assessment is a natural element of life. We learn by trying things out and seeing the results—in other words, through assessment. Natural assessment can be brutal and the results can be ambiguous. A teacher, however, can provide constructive feedback that might not happen naturally. In good practice, assessment could even be seen as a caring gesture from the teacher to the student. Let's try to look at it that way.

Uses of Assessment

Assessment can be useful before, during, and after training. It serves many purposes.

Before (Diagnostic)	• Might guide what learning is required by individuals or groups of learners--placement within a curriculum • Can allow learners to skip training on topics for which they demonstrate skill or prior knowledge • Can be used to establish learning needs for planning what to train • Can establish a baseline to demonstrate gains in knowledge and skill after training
During (Formative)	• Can help learners and teachers monitor progress • Can provide important opportunities for practice and feedback that increase learning • Can address misconceptions and errors before they become ingrained • Can increase motivation by building confidence through incremental success, as opposed to assessment only at completion.
After (Summative)	• Can demonstrate successful achievement of learning outcomes • Can help guide students who are prepared to new learning opportunities • Can demonstrate readiness to enter a job by contributing to qualifications • In the form of competency assessment, it can demonstrate adequate skill to fulfill a job responsibility

Alignment to learning outcomes

In some ways, learning assessment is simple. If you have established appropriate learning outcomes based on the goals of the training, your assessment is halfway done. If you know what outcomes learners should demonstrate, then you just need to set up the conditions that will allow them to demonstrate them.

As discussed in resources on Learning Outcomes, alignment of outcomes and assessment is a critical design element. Otherwise, you might be putting learners at a disadvantage. Your defined outcomes should not only guide what and how you teach, but also how you assess.

If the defined learning outcome is complex, such as this one, "*Forecast precipitation intensity, onset, cessation, amount, type, and associated visibility for aviation operations,*" then you know that you have to assess skill in the ability to forecast each of these elements and produce forecast products that are useful to aviation customers. That is quite a task! You also know that much background knowledge underpins this capability—like knowledge of mechanisms that generate precipitation and the ability to analyze products for indications of the conditions for precipitation.

While trusting fully that someone has the ability to perform this forecasting task on the job for aviation customers requires a complex assessment or on-the-job observation over long periods of time, the building blocks of this performance can be assessed in less complex ways. For example, we can more easily assess the ability to analyze individual data products. With even more reliability, we can assess knowledge of precipitation formation mechanisms. In other words, a full assessment might utilize several formats.

We can use many forms of assessment to discover if learning has occurred. Well-written multiple choice questions in quizzes can go a long way to assess background knowledge and even more complex skills. Discussions can probe more deeply to diagnose what learners know. Short exercises can test whether learners have developed analysis skills. Simulations might demonstrate the entire set of skills implied in the learning outcome. The final section of this reading provides a list of forms of assessment that can be used.

Formative assessment

Unfortunately, the benefits of assessment for learning, or formative assessment, are often overlooked. Yet assessment done during the process of learning is one of the best opportunities to improve skills and correct misconceptions through practice, feedback and the accompanying self-reflection. Formative assessment can help students know where they are going, how they are getting there, and what they need to do next to get there (Hattie and Timperley, 2007). In addition, formative assessment can provide feedback to teachers on whether they need to spend more time on a topic or try other methods to help students learn.

One of the most important benefits of formative assessment is the opportunity it provides for feedback from the teacher. Some have suggested that effective teaching is much like a dialogue between a

teacher and students (Laurillard, 2002). Two-way communication should be stimulated during teaching, and formative assessment can be one stimulus, whether through tests, discussions, or practical exercises.

Who performs assessment

Assessment does not have to rely only on the teacher. Others might contribute equally. For example, self-assessment and peer-assessment can be highly effective. Students themselves, if given sufficient guidance in the form of assessment rubrics, can generate valuable formative feedback that stimulates reflection. Peer assessment also provides new opportunities for students to learn by reviewing the work of others to observe their strengths and weaknesses. It also increases responsibility, improves communication skills, increases feelings of autonomy and cooperation, and boosts confidence and motivation.

When multiple facilitators or teaching assistants are involved, standard rubrics also help to make assessment consistent and fair. Rubrics are a scoring scale to assess performance on a set of standard criteria. Criteria reflect the critical characteristics of good performance on a task. Usually, some scale is assigned (such as 1-3) that describes the degree to which the student has met a criterion, and descriptors tell both the assessors and students what is expected at each level of the scale. The WMO Online Course for Trainers uses rubrics for grading the Training Development Plans of course participants.

Finally, let us not forget that computer based assessment plays an important role in most contexts these days. Without complex algorithms, computer assessment is focused on objective questions, but as AI continues to improve, computers will also be used increasingly for grading essays and other complex forms of assessment. Computers already are pretty good at evaluating pronunciation in foreign language learning. Learning analytics tools are growing rapidly to contribute to assessment in universities around the world.

Qualities of good assessment

To be affective, assessment should maintain high standards. An institution that conducts a lot of teaching, especially formal teaching for certification, diplomas, or degrees, should have an assessment policy in place to guide teachers. An assessment policy might address the following standards. Assessment should:

1. provide equal opportunity for success (fair),
2. address the defined learning objectives (appropriate),
3. demonstrate achievement of the objectives (valid),
4. be consistent between students and assessment instances (reliable),
5. be clearly understood by learners (transparent),
6. be relevant to the working world (authentic),
7. be of the right scope for students and teachers (manageable),
8. encourage learners to invest the time (engaging).

Forms of assessment

A list of many forms of assessment is presented below. How many of these have you used in your training? Which types of learning outcomes do you feel might be effectively assessed through each form?

- Quiz items, including multiple choice, true/false, matching, fill-in-the-blank, short- or long-text answer, clickable hot spots on images or maps
- Written tests, essay questions
- Contributions to discussions
- Papers, reports, or projects
- Problems and exercises
- Student-created diagrams/illustrations / concept maps

- Interviews
- Observation of practice or work tasks
- Peer-assessment
- Self-assessment
- Role play
- Simulation or case study
- Real-time (actual) work
- Portfolios of collected student/employee work

Other resources are available through the WMO Trainer Resources Portal on using case studies and simulations for assessment purposes, and competency assessment techniques. Competency assessment is also one topic of the publication, Guide to Competency, WMO-No. 1205.

Hattie, J. A. and Timperley, H. The Power of Feedback. *Review of Educational Research*. 77(1), 2007. p. 88.

Laurillard, D. (2002). *Rethinking University Teaching. A conversational framework for the effective use of learning technologies*. London: Routledge. ISBN 0415256798