Phrasing Learning Objectives

Why and what?

This guideline will help you phrase learning objectives to make expectations and goals transparent.

Learning goals and learning objectives

"Learning goals" describe general skills and competencies students are expected to have acquired by the end of your course. They are broad and not necessarily measurable (e.g. "students know how to read a scientific article"). However, a well-phrased learning *objective* makes your expectations for student activity and results more transparent (Wunderlich, Szczyrba, 2016).
Thereby, learning goals and objectives direct learning activities and examinations: What is being described in a learning goal, thus, also needs to be taught in your course and the actual learning outcome evaluated.

Why do I need learning objectives?

Clear learning objectives help you to make meaningful decisions for content presentation, course structure, assignments and learning tasks.
A purposefully designed course supports student engagement, knowledge retention and the acquisition of academic skills. Students will learn reading, contextualizing, analyzing, evaluating or creating papers and reports within or about the scientific discourse through different activities and need guidance to direct their attention (Ollermann, 2020).

How do learning objectives help my students learn?

Students use actionable learning objectives to assess their own learning progress, instead of mindlessly memorizing the material, because they *know what to strive for*. This helps them to take responsibility for their own learning. *Well-phrased learning objectives make expectations of experts transparent, creating a clear understanding of what would make good graduates of a subject (Wunderlich, Szczyrba, 2016).* In order to enable students to acquire academic skills and to engage in higher-order cognitive processes, learning objectives should indicate which activities students need to engage, in order to reach the learning goals (Wunderlich, Szczyrba, 2016; Ollermann, 2020).

Learning objectives—a means against memorization ?

Typically a university course is called something like"Introduction to Python" or "Neuroinformatics" and the individual units may have titles, such as "Bayes' rule" or "Motifs in graphical networks". These terms imply different levels of complexity that are clear to experts, but not to novices—your students: They will ask themselves "What will we do? Do we have to learn new terms? Understand formulas? Apply formulas? Analyze a problem and create a solution?" (Wunderlich, Szczyrba, 2016).

Students usually do not know the criteria for assessing the level of complexity at which they are being asked to perform. Therefore, they look for safe harbor: memorization. Both parties experience a very unsatisfying gap between (implicit) expectations and reality. Students ask for scripts and "correct solution" to a problem, while instructors provide more and more detailed slides, which explain the solution in more depth, hoping to enable students to think critically and acquire

skills as modelled on the slides. Students, however, are overwhelmed with the expectation to infer from the slides at which level of complexity they are supposed to perform and study (Wunderlich, Szczyrba, 2016). Hence, learning objectives must address *subject matter AND the knowledge dimension.* Even though every course has a few brilliant minds who can learn no matter what, this makes up—speaking from your experience—only 5 to 10 % of your students (Wunderlich, Szczyrba, 2016). Table 1 delineates the major types of knowledge. Further, students want and need to learn how to put knowledge into practice. *Thus, learning objectives need to be skill-oriented*. The cognitive process dimensions delineate a continuum of increasing cognitive complexity, as shown in Table 2.

Table 1

The Knowledge dimensions

concrete knowledge → abstract knowledge			
factual	**conceptual**	**procedural**	**metacognitive***
knowledge of terminology knowledge of specific details and elements	knowledge of classifications and categories knowledge of principles and generalizations knowledge of theories, models, and structures	knowledge of subject-specific skills and algorithms knowledge of subject-specific techniques and methods knowledge of criteria for determining when to use appropriate procedures	strategic knowledge knowledge about cognitive tasks, including appropriate contextual and conditional knowledge self-knowledge

Note. From *A Model of Learning Objectives–based on A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives* by Rex Heer, last accessed on 23.04.2021, Center for Excellence in Learning and Teaching, Iowa State University (https://www.celt.iastate.edu/wp-content/uploads/2015/09/RevisedBloomsHandout-1.pdf).

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