macmillan
learning

Devising Effective Learning Objectives

Goal, Overview, and Application

Goal

At Macmillan, our goal is to drive better learner outcomes. A fundamental part of our approach is to apply findings from the Learning Sciences to product design, improvement, implementation, training, and support.

Overview

Here we provide an evidence-based Learning Objective Strategy derived from a synthesis of the learning science literature. We begin by discussing the benefits of using learning objectives to drive learning experience design, then outline a research-based approach to the design of learning objectives.

Application

This Learning Objective Strategy underpins how we're developing next-generation learning products. However, this strategy may also be applied by institutions, instructors, and instructional technologists to their own learning experiences.

Research Foundation and Process

Foundation

This strategy is based upon a thorough literature review of educational and measurement research, and instructional design best practice by learning researchers.

Process

This strategy was developed through a rigorous and comprehensive ten-step research and refinement process that included:

- Primary and secondary literature review and synthesis by Macmillan Learning Research team
- Design of principles by Macmillan Learning Research team
- Internal review by 4 Macmillan Learning scientists
- External review by 7 students
- External review by Macmillan Learning's Learning Research Advisory Board

All of these researchers, contributors and reviewers are listed to the right.

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The Value of Learning Objectives

Establishing sound, evidence-based practices for the design and articulation of learning objectives is critical to improving student learning and measuring the effectiveness of course design because they:

1. Enable instructional alignment across all instructional *and* assessment content/components via backward design
2. Drive assessment task development and implementation
3. Enable high-quality, targeted reporting of learning progress and performance for learners, instructors, institutions, and meet accreditation and employability requirements
4. Facilitate personalization and adaptive learning capabilities

Learning Objective Design

Learning objectives best support learner engagement and improve learning outcomes when they are designed to positively impact all of the following.

Instructional design can be improved by implementing LOs that are:	Self-regulated learning can be bolstered with LOs that:	Assessment practice can be enhanced with LOs that:
- Derived from relevant Frameworks (standards, competencies, broad learning goals/categories) from educational and/or professional bodies - Comprehensive and appropriate given the nature of the learning experience	- Clearly and concisely describe criteria for success - Provide transparency into all aspects of the learning experience to all stakeholders involved (e.g., learners, instructors, institutions) - Challenge learners, but also provide the appropriate level of scaffolding to achieve broader, more cognitively complex learning goals	- Are measurable and support creation and implementation of high-quality assessment tasks - Facilitate formative and summative assessment best practices, including alignment between the two, targeted feedback, and learning-objective-driven progress and performance reporting - Support interventions whereby instructors and students can remediate gaps in understanding

FRAMEWORKS

Learning Experience OBJECTIVES

FRAMEWORK #1:

e.g., Domain-specific: Vision & Change in Biology

FRAMEWORK #2:

e.g., General: Partnership for 21st Century Learning (P21)

FRAMEWORK #3:

e.g., General: ETS Critical Thinking in Higher Education

THE RELATIONSHIP BETWEEN FRAMEWORKS AND LEARNING OBJECTIVES

Relevant Frameworks should help inform learning objectives for any given learning experience.

When available and appropriate, multiple Frameworks can be referenced and leveraged in the process of developing learning objectives.

Learning objectives can align to multiple learning goal statements or categories that exist in relevant Frameworks, thus allowing for insights to be derived against a specific learning objective through to a Framework.

Learning Objective Strategy

Instructor and Student Feedback

"Starting a course with clear LOs helps students anchor the lecture and are useful for instructors to stay on track providing only the most pertinent information." - Student Codesign Group Member

It is helpful to think of frameworks in a broad way to include internal documents as well as external frameworks." - Dr. Thomas

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Learning Objective Strategy

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Learning Objective Strategy

"Sometimes instructors start with assessments and backward-design the learning to fit the assessment. But the good way to go about it is what you have here: you figure out what you want the learners to do, then you figure out the assessments to align with that." - Dr. Dede
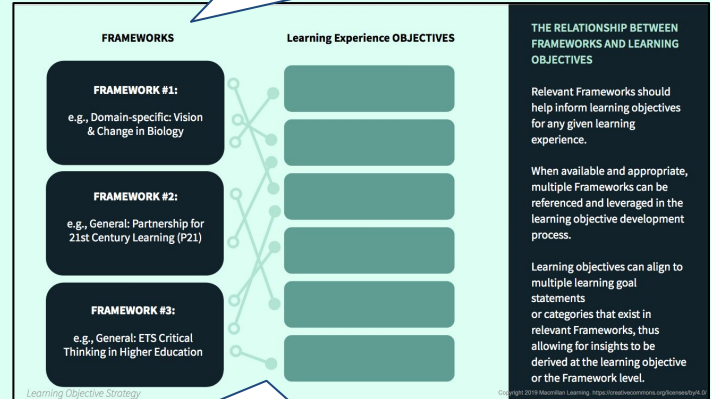
"I like this visual for thinking about the relationships between frameworks and objectives. I think it is especially valuable for identifying 'hubs' or objectives that align with multiple frameworks of interest (i.e., more important or reflecting greater consensus), which may help instructors to prioritize." - Dr. Dolan

References

Anderson, L. W. (2001). *A taxonomy for learning, teaching, and assessing: a revision of Bloom's taxonomy of educational objectives* (Complete ed.). New York: Longman.

Burton, S. J., Sudweeks, R. R., Merrill, P. F., & Wood, B. (1991). How to prepare better multiple-choice items: Guidelines for university faculty.

Clark, R. C., & Mayer, R. E. (2011). Applying the Coherence Principle. *E-Learning and the science of instruction: proven guidelines for consumers and designers of multimedia learning* (3 ed.). San Francisco, CA: Pfeiffer.

Cohen, S. (1987). Instructional alignment: Searching for a magic bullet. *Educational Researcher*, *16*(8), 16–20.

Dick, W., Carey, L., & Carey, J. (2015). The Systematic Design of Instruction (8 ed.). New York: Pearson.

Fullan, M. & Langworthy, M. (2014) A Rich Seam: How New Pedagogies Find Deep Learning, London: Pearson.

Hattie, J. (2009). *Visible learning: a synthesis of over 800 meta-analyses relating to achievement*. London: Routledge.

Marzano, R.J. (1998) *A theory-based meta-analysis of research on instruction.* Aurora: CO: Mid-Continent Regional Education Lab.

Mayer, R. E. (2009). Multimedia learning. Cambridge University Press.

Mayer, R. E. (2011). Applying the science of learning. Boston, MA: Pearson/Allyn & Bacon.

Messick, S. (1989). Meaning and values in test validation: The science and ethics of assessment. *Educational Researcher*, *18*, 5-11.

Middle States Commission on Higher Education. (2007). *Student learning assessment: options and resources* (2 ed.). Philadelphia, PA: Middle States Commission on Higher Education.

National Research Council. (2001). *Knowing What Students Know: The Science and Design of Educational Assessment*. Washington, DC: The National Academies Press. https://doi.org/10.17226/10019

Nicol, D. J., & Macfarlane-Dick, D. M. (2006). Formative assessment and self-regulated learning: a model of seven principles of good feedback practice. *Studies in Higher Education*, *31*, 199-218.

Sadler, D. R. (1989). Formative assessment and the design of instructional systems. *Instructional Science,18*, 119-144.

Wiliam, D. (2007). Five "key strategies" for effective formative assessment. The National Council of Teachers of Mathematics. *Assessment Research Brief*, 1-4.

Wiliam, D. (2007). What does the research say the benefits of formative assessment are? The National Council of Teachers of Mathematics. *Assessment Research Brief*, 1-3.