The R.I.S.E. Guide to Beyond Recall and Understanding: Assessing Cognitive Complexity

Introduction

Assessing student learning is a fundamental necessity of any course, and it is one of the main ways to enhance rigor in course design. While instructors often focus on the format of their assessments (e.g., multiple-choice quiz, 5-page essay, midterm exam, project, etc.), at times, little attention is given to the types of questions and prompts used to measure student learning. As a result, many instructors assess one or two types of knowledge without pushing students to do more with the course material.

Consider the questions below regarding the concept of rigor. What type of knowledge do Questions 1 and 2 assess? What type of knowledge is being assessed with Questions 3 and 4? Do the questions require different levels of thinking? Do the questions require different levels of effort to answer them? Do they require different kinds of engagement with the concept of rigor?

1) What does rigor mean?

2) Can you explain why we should enhance rigor in the classroom?

3) How would you design a rigorous course?

4) Do you feel that it would be easy or difficult to design a rigorous course? Why?

If you said that Questions 1 and 2 require a different level of cognitive effort than Questions 3 and 4, you are correct! Instructors must remember to assess student learning at various levels of cognitive complexity, especially cognitive levels beyond remembering and understanding if they want to create a rigorous learning experience for students.

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- [Bloom's Taxonomy Revised for 21st Century Learners](#) (University of Utah)
- [Bloom's Taxonomy](#) (Vanderbilt University)
- Revised Bloom's Taxonomy

If you have any questions or wish to discuss this teaching strategy in more depth, please contact your R.I.S.E. Scholar or the Learning Academy.

Let's practice!

Using the example prompts below, please take a few minutes to consider how you could assess your students' learning at various levels of cognitive complexity. Using an existing or future course topic or concept, write 2-3 prompts that assesses student learning at lower levels of cognitive complexity and 3-4 prompts that assess student learning at higher levels of cognitive complexity.

Example prompts to assess lower levels of cognitive complexity (remembering and understanding)

- What is a thesis statement?
- What's the difference between occupational therapy and physical therapy?
- What is the primary role of an Artistic Director?

Example prompts to assess higher levels of cognitive complexity (applying, analyzing, evaluating and creating)

- Can you identify the thesis statement in this essay? Is it a good one? Explain.
- How do the benefits of occupational therapy compare to those of physical therapy?
- Create a detailed job posting for an Artic Director for the Winter Dance Concert.

We hope that the information on this teaching strategy encouraged you to include assessments that measure student learning at higher levels of cognitive complexity in your courses as a way to enhance rigor and, ultimately, improve student learning. If you have any questions or wish to receive feedback on your ideas for the practice activities, please contact your R.I.S.E. or scholar the Learning Academy.

References and More Resources on Assessing Student Learning at Higher Levels of Cognitive Complexity

Anderson, L., Krathwohl, D.R., Airasian, P., Cruikshank, K., Mayer, R., Pintrich, P., Raths, J., & Wittrock, M. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives.* New York: Longman.

DeJarnette, A. F., Wilke, E., & Hord, C. (2020). Categorizing mathematics teachers' questioning: The demands and contributions of teachers' questions. *International Journal of Educational Research, 104*, N.PAG. https://doi.org/10.1016/j.ijer.2020.101690

Feng, Z. (2013). Using teacher questions to enhance EFL students' critical thinking ability. *Journal of Curriculum and Teaching, 2*(2), 147–153.

Radmehr, F., & Drake, M. (2018). An assessment-based model for exploring the solving of mathematical problems: Utilizing revised bloom's taxonomy and facets of metacognition. *Studies in Educational Evaluation, 59*, 41–51. https://doi.org/10.1016/j.stueduc.2018.02.004

Renaud, R. D., & Murray, H. G. (2007). The validity of higher-order questions as a process indicator of educational quality. *Research in Higher Education, 48*, 319–351. https://doi.org/10.1007/s11162-006-9028-1

Rentmeester, C. (2018). Adding academic rigor to introductory ethics courses using Bloom's taxonomy. *International Journal of Ethics Education, 3*, 67–74. https://doi.org/10.1007/s40889-017-0047-x

Samson, G. E., Sirykowski, B., Weinstein, T., & Walberg, H. J. (1987). The effects of teacher questioning levels on student achievement: A quantitative synthesis. *Journal of Educational Research, 80*(5), 290–295. https://doi.org/10.1080/00220671.1987.10885769