

Assessing Student Learning: Applying Bloom's Taxonomy

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Abstract

Bloom's taxonomy is a tool that can help human services educators broaden the depth of their students' learning. The challenge with the taxonomy is developing assessments that measure each of the six levels. In this paper, the six levels of Bloom's taxonomy are presented. A discussion of developing assessments and rubrics to measure student learning follows. Examples are provided.

The use of Bloom's Taxonomy (Bloom, Engelhart, Furst, Hiss, & Krathwohl, 1956) has been shown to enhance student mastery of skills and concepts and critical thinking (Bissell & Lemons, 2006). The challenge has been developing assessments to measure student learning and critical thinking within the six stages of the taxonomy. Crooks (1998) suggests that most college testing simply involves recalling memorized facts. Such tests only address the first level of learning. Because Bloom's taxonomy is based on higher order thinking and facilitates academic rigor, it becomes important to assess how well students are able to master the information within the other five areas in the taxonomy.

Before the topic of assessment based on Bloom's taxonomy can be addressed, it is imperative to examine the use of the taxonomy within the classroom. In one light, it makes sense that most college testing involves recalling memorized facts. Instructors most frequently conduct classroom instruction at lower levels of cognition (Whittington & Newcomb, 1993). In this situation, any assessment aimed at measuring student learning across the higher levels of cognition becomes invalid (Airasian & Miranda, 2002; Wiggins, 1990). This is due to the fact that if students are not given an opportunity to learn within the higher levels of cognition, it does not make sense to test them in that area. It would be similar to giving a physics test in a chemistry class. Therefore, we will have a brief discussion about the use of Bloom's taxonomy in the classroom. A more in-depth presentation is available elsewhere (see Anderson, 1999).

Bloom's Taxonomy

Bloom's taxonomy (1956) consists of six levels of abstractions that occur in education settings. The graduated levels are: knowledge, comprehension, application, analysis, synthesis, and evaluation. Later,

the levels were renamed remember, understand, apply, analyze, evaluate, and create (Anderson, 1999).

Remember. This level involves retrieving information from memory, known as rote memory. Learning at this level builds a foundation for the remaining levels of cognition. It involves learning facts, knowledge of major ideas, and memorizing. In the field of human services, an example might be an instructor lecturing on 26 different microskills throughout the semester. Students would be required to memorize the definition of each.

Understand. When incoming knowledge is integrated with existing cognitive frameworks, this level has been achieved. Cognitive processes in this level include interpreting, illustrating, classifying, summarizing, and comparing. Continuing with the microskills example, students would describe, differentiate, and discuss their knowledge of each skill.

Apply. This level consists of two cognitive processes. The first is executing, which is when the task is an exercise familiar to the learner. The second is implementation, which occurs when the learner is unfamiliar with the problem. In our experience it is important for students to experience the first process followed by the second. For example, students would role play the various microskills. For the second process, students would be given a detailed vignette and must choose which microskills are appropriate for the example and then role play them.

Analyze. This level involves breaking material into its constituent parts and determining how the parts are related to each other and to an overall structure. This level includes debating, organizing, and attributing. In the microskills example, students would analyze and debate skills such as reflection of feeling vs. reflection of meaning. They would state when one skill would be more appropriate to use than the other.

Evaluate. In order to master this level, students must make judgments based on criteria and standards. This phase includes monitoring, testing, judging, pointing out consistencies, and utilizing critical thinking. In the classroom, a student observer would critically evaluate a fellow student in his or her role playing of microskills. Students would be given specifics to evaluate, such as attending skills (visual/eye contact patterns, body language, movement harmonics, and vocal qualities).

Create. This final level requires students to put together elements to form a coherent or functional whole. Students produce a product by implementing three parts: 1) Students understand the task and generate solutions; 2) The student devises a workable plan; 3) The student carries out the plan. Using the microskills example, students would be given various client vignettes and would be instructed to understand what the client needs, generate solutions on what they can do to assist

the client, and devise a plan of what microskills are needed and demonstrate an ability to carry out this plan. The third part of this level is generally the most difficult to implement within a classroom setting. Internship, however, is one class in which this entire level can be mastered.

Bloom's Taxonomy and cognitive development. In order for students to gain more from their education, it is important to also consider where students are in terms of cognitive development. The use of Bloom's Taxonomy fits well into theories of cognitive development. For many models of cognitive development (e.g., Erikson (1968), Kohlberg (1969), and Perry (1970)), in order for a student to reach a higher level of development, a moderate level of discomfort must be felt with his or her current level of functioning (Evans, 1996). Marra and Palmer (2004) examined graduating students with both high and low levels of cognitive development based on Perry's (1970) model. Students at both levels valued learning experiences that departed from the traditional instructor lecture. Such experiences included the ability to think independently and challenges to think through the material, not just memorizing. These experiences are built in to Bloom's Taxonomy and help the student to progress through higher levels of cognitive development.

Assessment Using Bloom's Taxonomy

Although teaching using Bloom's taxonomy requires careful planning, developing the assessments can be a straightforward process. This is particularly true when the instructor uses Bloom's taxonomy in the classroom. The assessment can flow naturally from what the instructor has done in class. To discuss creating assessments based on Bloom's taxonomy, we will be using the framework provided by Eber (2007). A condensed version, along with additional examples, can be found in Table 1. Each level requires the use of specific language. These are listed as potential activities and verbs to use in assessments (Table 1). By using this language, the assessment is measuring at the associated level.

On paper-based assessments using Bloom's taxonomy, items can take a variety of formats including multiple choice, true/false, matching, short answer, and essay. It is important to note that assessments can take multiple forms from paper-based assessments to group work to final papers. Notice in the assessment example for the level "evaluate" (Table 1), students are participating in a group activity that requires them to present their findings to the class.

In order to ensure accurate measurement of student achievement, it is important to assess the student across each of the six levels at some point within the framework of the curriculum. In part, this can be accomplished while measuring the higher levels. Frequently, operating

at the higher levels requires the use of principles from the lower levels. For example, the second sample assessment for the create level (Table 1) also measures remember, understand, apply, analyze, and evaluate.

Designing and implementing an assessment is only the first step of measuring student mastery. Developing a scoring rubric is also a key. Rubrics can improve student performance and can help students become thoughtful judges of the quality of their own and other's work (Andrade, 2005). When assessments are based on Bloom's taxonomy, rubrics become of particular importance. While the lower two levels, remember and understand, generally produce right or wrong answers (e.g., multiple choice or true/false), the remaining levels produce degrees of proficiency. It is possible, however, at all levels to assess using degrees of proficiency. Table 2 provides an example of a rubric at the remember level that assesses degrees of proficiency.

When measuring students on the higher levels, as we mentioned previously, it is possible that the assessment is not paper and pencil based. When developing a rubric at these levels, it is important for the instructor to consider key areas in which to measure students. Table 3 is a rubric for an activity which involves placing the students in groups of three to practice microskills covered in class. In this activity, two students practice the microskills while one observes.

When working with students, it is of little benefit to tell them that they are simply right or wrong on an assessment. What is important is to let them know where they fall on the continuum in order to know where they are and where they need to be. Designing assessments and rubrics to measure degrees of proficiency provides this type of feedback to students. While rubrics may be time consuming to develop, they are well worth the investment in benefits to students. Additionally, for the instructor, rubrics can reduce the time spent on evaluating student work (Andrade, 2005) and facilitates objectivity (Brualdi, 1998).

Conclusion

Bloom's taxonomy has been used in many areas, particularly in the field of education. Although little, if any, of the human services literature addresses Bloom's taxonomy, it is of particular importance to this field. When our students are working with clients, it is imperative that they be able to quickly analyze, create, and apply what they have learned. In many of the situations our students will encounter, remembering facts and definitions will be of little use. It is the responsibility of the instructor to not only introduce higher order thinking, but to integrate it into their personal and professional philosophy and perspective. Bloom's taxonomy offers a framework for instructors to do this.

All subject areas in human services can benefit from Bloom's taxonomy including the introductory courses, skills courses, and practicum and internship. While using Bloom's taxonomy in the classroom and with assessments requires a time investment, students frequently comment on enjoying the classroom activities, the challenge, and the depth of their learning. Although sound theoretically, research needs to be conducted on the effects of Bloom's taxonomy being used in the classroom on field experience and job performance.

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Table 1
Condensed Framework for Designing Assessments

Level	Verbs to Use in Assessments	Potential Activities	Possible Assessment
Remember	Choose, define, describe, match, distinguish, label, locate, recall, recite, record	Definition, fact, fill in the blank, label, list, true/false, workbook	1. Define bootleg reinforcement. (short answer) 2. Match the listed theories with the associated theorist. (matching)
Understand	Identify, explain, give examples, classify, compare, contrast, extrapolate, illustrate, locate, outline, summarize, translate	Differentiate, debate, distinguish, dramatization, story problems, recitation, label, summary	1. Given an example of a directive. (short answer) 2. Identify what type of boundary a healthy family system has. (multiple choice)
Apply	Calculate, demonstrate, illustrate, interview, practice, solve, draw, exhibit, interpret, produce, experiment, teach, sequence	Design, simulation, relate, diorama, illustration, interview, journal, photograph, poster	1. You discover your client has a lifestyle contrary to your core values and you find you are having difficulty being objective. Relate how you would solve this dilemma. Refer to the Code of Ethics, demonstrate which codes you based your answer on. (vignette and short answer)

Analyze	Analyze, appraise, categorize, compare, debate, differentiate, distinguish, examine, point out, question, research, separate	Categorize, conclude, illustrate, list, outline, report, summary, survey	<ol style="list-style-type: none"> 1. Differentiate between inattentive attention deficit disorder and hyperactive attention disorder. (short answer) 2. Compare a law and a regulation. (short answer)
Evaluate	Choose, defend, determine, evaluate, judge, justify, predict, rank, recommend, reject, select, support, validate	Debate, investigation, judgment, opinion, panel, report, survey, verdict	<ol style="list-style-type: none"> 1. In groups of three, evaluate and debate the following topics. Select and then report at least two positive and two negative attributes of each: 1) abortion, 2) capital punishment, 3) the war in Iraq, and 4) affirmative action. (group work)
Create	Compose, create, design, develop, generate, plan, predict, role-play	Invent, plan, project, song, story	<ol style="list-style-type: none"> 1. Design a shaping program to teach 5-year old Jacob how to write his name. (essay) 2. Each student will pick a disorder and compose a story of a fictional client. Describe your client, including: background, psychosocial history, diagnosis, possible treatments, and prognosis. (final paper)

Table 2
Rubric for Level 1—Remember

Assessment Item	Exemplary	Accomplished	Developing	Beginning	Score/Comments
Define Bootleg Reinforcement	Definition is correct, clear, and includes all details	Definition is mostly correct but lacks details	Definition is vague and lacks details	Definition is not correct	

Table 3
Rubric for Level 3—Apply

	Exemplary	Accomplished	Developing	Beginning	Score/Comments
Group Role Duties	Performs all duties of assigned group role	Performs nearly all duties	Performs very little duties	Does not perform any duties of assigned group role	
Participation in Activity	Offers a fair amount of important information — all is relevant	Offers some information—most is relevant	Either gives too little information or information which is irrelevant	Does not speak during the interview	
Apply Microskills	Excellent ability to apply microskills in appropriate situations	Is able to apply microskills in most situations	Inconsistently applies microskills in needed situations	Does not apply microskills in appropriate situations	

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