

Improving Instruction

WHILE PRESERVICE TEACHER education programs often focus almost exclusively on preparing teacher candidates to cope with the challenges faced during their first year in the classroom, many master's-level programs for teachers emphasize improving instruction. Teachers who enroll in such programs are encouraged to accept the reasonable assumption that all teachers, including the professors in the program, are not perfect in their practice, and that all can improve. Some programs, such as the Master of Instruction program at the University of Delaware, require candidates to write personal goals having to do with improving their instruction as a consideration at the admissions point into the program. This emphasis certainly begs the question: What counts as improved instruction? Stated somewhat differently, if instruction were improved, how would we know it?

What Counts as Improved Instruction?

One answer to this question is reflected in the Carroll (1963) model of school learning.¹ This model posits that student learning is dependent on two variables: the amount of time a student spends learning a task and the amount of time a student *needs* to spend on the task in order to learn or master it. Thus, the amount of learning varies di-

rectly with the first variable (time on task) and inversely with the second (time needed to learn). This formula can be written in shorthand form as follows:

Learning = Time on task/Time needed to learn

Carroll's model, so simple and obvious, spawned a great deal of research in the decades after his essay was published. Within the context of the Carroll model, the following can be taken as evidence that instruction has improved:

1. If the amount of learning that takes place in a class increases, all things being equal, then one might reasonably infer that instruction has improved.
2. If students increase their time on task within a lesson or a unit of study, all things being equal, then one might reasonably infer that instruction has improved.
3. If the time students need to learn the objectives of the lesson or unit is reduced because of teacher interventions (e.g., scaffolding), all things being equal, then one might reasonably infer that instruction has improved.
4. If the complexity of the objectives addressed increases across lessons or units, all things being equal, then one might infer that instruction has improved.
5. If the activities assigned to students and the assessments given to students are more closely

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aligned with a lesson's or unit's objectives, all things being equal, then one might reasonably infer that instruction has improved.

Certainly there may be other ways for improving instruction. Examples would include engaging students in increasingly more worthwhile educational experiences; increasing the dispositions of the teacher to convey caring attitudes toward students; linking the topics and objectives of one unit with those of others within the curriculum; and matching instructional activities to learner characteristics (such as cognitive styles). Of course, the Carroll model is so encompassing that even these alternatives can be easily subsumed by the variables within it. Being more caring, for example, could help increase students' time on task. Similarly, providing students with more worthwhile educational experiences could increase students' motivation. Finally, matching instructional activities to students' cognitive styles might reduce the amount of time students need to meet the lesson or unit objectives. The point here is that the Carroll model is only one way to derive conceptions of what counts as instructional improvement.

How Does the Revised Taxonomy Help?

There are at least two ways the revised Taxonomy can help teachers who are interested in improving their instruction and who adopt the Carroll model and the inferences derived from it as described above. The first is to align activities and assessments with objectives. The second is to raise the learning targets themselves.

Aligning objectives, activities, and assessments

As we met to plan and carry out our work on the revised Taxonomy, we soon accepted Benjamin Bloom's assessment that very few people actually read the book in which the original Taxonomy appeared. Instead, they read about the categories of the original Taxonomy in secondary sources, such as methods texts or assessment texts, where the framework is reproduced. We wanted our revision to be read. There was a consensus among us that by including annotated descriptions of teaching to highlight the general propositions found in the revised Taxonomy, we could increase the likelihood that the book would be read. Shortly thereafter, we

set about to collect appropriate descriptions of teaching. We were not seeking descriptions of excellent teaching or descriptions authored by teachers who were considered "master teachers" or "national board certified teachers" (although our teachers may well fit into these categories). Rather, we wanted teachers whose descriptions of their everyday teaching could be used to clarify the categories and classifications of the revised Taxonomy.

As we collected the drafts of the vignettes, we found two interesting phenomena. First, as teachers cited their unit's goals, they wrote down activities, not objectives. For example, for a unit combining the Parliamentary Acts (ca. 1770) with persuasive writing, Ms. Gwen Airasian, a fifth grade teacher, wrote as one of her goals "Students will write persuasive editorials stating their opinions about the Parliamentary Acts." We presumed that the actual objective of the unit would be reflected in her answer to the question "What do you want students to learn as a result of writing these editorials?" In short, her *real* objective is more tacit than explicit. It became apparent to us that implicit objectives make the assessment phase of teaching more difficult.

A second phenomenon we observed in the vignettes (and one typically related to the first) was a misalignment within the planning and delivery of the unit between the unit objectives, the instructional activities, and/or the ways in which teachers assessed student learning. Ms. Margaret Jackson's teaching vignette concerning *Macbeth* illustrates this situation. Our analysis found that "although most of the instructional activities emphasize *Conceptual Knowledge*, they differ in the cognitive processes they demand from students. In many cases these demands are beyond *Understanding*, which is the target of the second objective" (Anderson, Krathwohl, et al., 2001, p. 149). Similarly, despite this emphasis on *Conceptual Knowledge*, Ms. Jackson felt compelled to administer a traditional *Factual Knowledge* unit test because of district grading requirements.

The preceding observations have two lessons for potential users of the revised Taxonomy. First, it is critically important to distinguish between objectives and activities. Without this distinction, it is difficult to know what precisely is to be assessed at the end of the unit and how instructional

activities and assessment tasks are distinct, yet complementary. Second, it is important to align instructional activities and assessment tasks with objectives, whether they are implicit or explicit. Only with proper alignment, is the efficacy of instruction likely to be optimized.

Teachers interested in improving their instruction can use the Taxonomy Table (which is reproduced on the inside front cover of the revised Taxonomy) to review their plans to assure that their objectives, activities, and assessments are properly aligned. Suppose a teacher holds as an objective that students will learn to rigorously apply state rubrics to their own writing samples. He or she will need to plan the instruction so students have the opportunity to do this. The instructional activities might be organized in a way to scaffold the learning process. For example, the rubrics can be applied to pieces of writing the teacher has selected to illustrate various dimensions of the rubric. Or students can be assigned the responsibility of applying only one dimension of the rubric at a time until all of the dimensions have been understood. To the extent this is done, the activities are more likely to be aligned with the stated objective.

Furthermore, if a teacher wants to assess the extent to which students have acquired the objective, he or she will need to have ways of assessing the rigor with which students apply state rubrics to their own writing samples. When this is done, the alignment puzzle becomes complete; that is, both activities and assessments are aligned with objectives. And, as the Carroll model suggests, when instruction is aligned with the objectives, students will need to spend less time learning the objective. Thus, all things being equal, instruction will have improved.

Raising learning targets

One inference that can be derived from the Carroll model is that the learning target itself can be raised. It is on this particular point that the revised Taxonomy can be of assistance to teachers. In combination, the vignettes contain examples of the range of objectives that can be pursued in schools and classrooms. In the previously mentioned *Macbeth* vignette, Ms. Jackson had two objectives. The first was for her students to remember

important details about the play, (e.g., specific events, characters, and their relationships). In contrast, the second objective was for students to understand the meaning and significance of classical literature in their own lives. It is not that remembering things is not important (see Mayer, this issue). It is that remembering things is not sufficient for being a truly educated person—a person who can use what he or she has learned previously to learn new things and to solve a variety of academic and nonacademic problems.

In this regard, the revised Taxonomy gives us two ways in which the learning target can be raised. The first is to focus on increasingly more complex cognitive processes, particularly *Analyze*, *Evaluate*, and *Create*. For example, rather than being satisfied with being able to remember or understand “tourists,” “migrants,” and “immigrants” as individual concepts, teachers may consider whether students should learn to

- analyze concepts such as these in a larger context (e.g., rights and obligations of nonresidents or noncitizens);
- evaluate proposals for dealing with a variety of social problems (e.g., illegal immigrants or unschooled migrants); or
- create policies that solve specific social problems without causing other problems (e.g., dealing with immigrants without negatively impacting on tourism).

A second way the learning target can be raised is to move beyond the three traditional academic types of knowledge (e.g., factual, conceptual, and procedural) and consider objectives that emphasize metacognitive knowledge (see Pintrich, this issue). One of the primary benefits of metacognitive knowledge is that it “connects” students to academic learning. That is, armed with metacognitive knowledge, students can see how academic learning relates to them and how they, in turn, relate to academic learning. Through metacognitive knowledge, they gain knowledge of strategies they can use to learn science, mathematics, foreign language, etc. They gain knowledge of subjects in which they are and are not interested.

Regardless of how this issue is addressed, one implication of the Carroll model is that as

teachers are able to raise the learning target of a particular lesson or unit, it can be argued that instruction has improved.

The Paradox of Simplicity Versus Complexity in Improving Instruction

There is a sense, akin to one of Murphy's Laws, that "nothing is simple." As we prepared the revised Taxonomy, the principles that emerged concerning the importance of distinguishing objectives from activities; aligning objectives, activities, and assessments; and raising the learning target by introducing more complex objectives are all logical, simple, and supported by a good deal of common sense. At the same time, they are somewhat problematic. Our collective experiences in preparing the revised Taxonomy (especially our analysis of the vignettes) caused us to stop and reflect on enduring classroom problems and their contributions to "complexifying" these principal ideas (see Anderson, Krathwohl, et al., 2001, chap. 14). In this section I would like to discuss a few of the issues that may cause one to pause when considering the ideas presented in this article.

The conflation of activities and objectives

Many teachers, including excellent ones, often conceive of their objectives as activities students are invited to complete during an instructional unit. One purpose of a unit on the American Civil War, for example, might be "Compare the resources of the North and the South prior to the outbreak of hostilities." Is this an objective or an activity? In my earlier discussion of Ms. Airasian's unit on the Parliamentary Acts, we classified a similar objective as an activity, and advanced our belief that to use the revised Taxonomy effectively, teachers should distinguish between objectives and activities. We learned, however, that this issue is more complex than we initially believed.

The conflation, or blending, of objectives and activities can be explained in part by teachers' beliefs, based on their experiences, in the educational value of particular activities. For example, the teacher of the Civil War unit may have learned that by conducting a comparison of prewar resources of the North and South in 1860, students acquire factual knowledge about the Civil War, gain

conceptual understanding of war and resources, and learn how to make comparisons in general. For this teacher, the activity statement may be a "shortcut" method of describing what is going on in class. This objective, while clear to the teacher, is implicit.

A second explanation for the conflation of objectives and activities is associated with the current push toward performance assessment (Wiggins, 1993). It is, in effect, mistaking the objective with its indicator. Teachers strive to have their students do well on a performance task. So, for example, writing an editorial, a task used to assess students' understanding, is transformed into the lesson objective.

The conflation of objectives and activities is seen as problematic to some supervisors and evaluators who expect teachers to make distinctions between their objectives and their activities (Popham, 1973). Some teachers write very specific behavioral objectives to accommodate the expectations of their administrators. Although this approach helps clarify the distinction between objectives and activities, it also tends to narrow the richness of the activities in which students are engaged.

Assumptions about the learning target

Researchers interested in studying teaching and administrators interested in evaluating teaching like to think they are able to gauge the cognitive challenge that particular assignments offer students. My application of the Carroll model is largely based on the assumption, made sometimes by teachers and often by evaluators, that if students are addressing an objective or are engaged in a task at the high end of the revised Taxonomy, they are being cognitively challenged. However, the "push-down principle," proposed by Merrill (1971), raises questions about the validity of this assumption.

The push-down principle indicates that complex tasks become simpler and more automatic with habit. In essence, it presupposes that students addressing complex, challenging problems seek ways to reduce the complexity and minimize the challenge. Suppose, for example, a student encounters a novel problem. Initially, she selects approaches or constructs strategies until she finds one that solves it. Subsequently, when she faces a similar

problem, one classified as similar in cognitive challenge to the first, the tendency is to use the same strategy or approach used the last time, thus diminishing the cognitive challenge of the problem. As Merrill (1971) pointed out, “Learners have an innate tendency to reduce the cognitive load as much as possible; consequently a learner will attempt to perform a given response at the lowest possible level” (p. 38). This is problematic for an observer watching students address a problem of apparently significant cognitive challenge who is unaware that students are actually working at lower cognitive levels. This problem is the major reason that we classify intended learning (i.e., objectives) rather than actual learning in the Taxonomy Table. Suffice it to say that as teachers attempt to improve their instruction by raising their targets, students may be working equally hard to “push down” the targets. Again, teaching is a complicated business.

Conclusion

With an eye on improving instruction, I have suggested at least two ways in which teachers might use the revised Taxonomy. The first is to properly align objectives, activities, and assessments. The second is to raise the learning targets in terms of cognitive complexity, type of knowledge (particularly metacognitive knowledge), or both. While both of these suggestions seem reasonable—almost

common sense—they are not so easy to implement. Somewhat paradoxically, the conflation of objectives, activities, and assessment tasks makes it difficult to properly align objectives, activities, and assessments. In addition, the best intentions may not result in expected learning, particularly of more complex objectives. Nonetheless, the revised Taxonomy helps us understand these potential problems and begin to resolve them.

Note

1. My colleague, Frank B. Murray of the University of Delaware, first pointed out to me the potential of Carroll’s formulation in this context. Of course, he is not responsible for my treatment of his original suggestion.

References

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