Choosing Teaching Methods Based on Learning Objectives: An Integrative Framework

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ABSTRACT: This paper develops a comprehensive framework for choosing teaching methods in accounting courses. Since teaching methods vary as to the conditions they can create and different types of learning objectives require different conditions for achievement, the premise guiding the framework is that the choice of teaching methods should be based primarily on the type of learning objective. The development of the framework yields two important conclusions. First, a single teaching method typically cannot create all the conditions necessary for a given learning objective. Second, learning objectives involving complex skills require teaching methods that promote active learning on the part of students, while learning objectives involving simpler skills can be achieved with more passive teaching methods. In practical terms, an accounting instructor needs to carefully employ multiple teaching methods to achieve all the learning objectives of a given accounting course, since these objectives likely encompass the full range of types of objectives.

INTRODUCTION

Advocates for change in accounting education argue that accounting professors must change both the content of their courses and their teaching methods if students are to meet the demands faced by practicing accountants today (AAA 1986; AECC 1990; *Perspectives* 1989). Although these suggestions for change imply that certain teaching methods are better suited for certain types of learning objectives, little guidance for choosing teaching methods based on learning objectives exists (for exceptions, see Ainsworth and Plumlee 1993; Campbell and Lewis 1991; Kimmel 1995). Instead, several articles provide in-depth discussions of individual teaching methods such as cases (cf. Knechel 1992; Libby 1991). Many of the articles about specific methods discuss nontraditional methods, consistent with changes toward nontraditional course content.

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This paper develops a comprehensive framework for choosing teaching methods based on learning objectives. The premise underlying the framework, that teaching methods should be chosen *primarily* on the basis of learning objectives, derives from two key factors. First, a large body of research shows that instructors need to create different conditions to achieve different types of learning objectives (see Anderson 1995; Driscoll 1994; Gagné and Medsker 1996; Gredler 1997; Schunk 1996 for overviews). Second, teaching methods vary as to the conditions they can create. The contribution of this paper is that it specifies which teaching methods instructors can employ to create the conditions needed for a specific class of learning objectives in accounting courses (cognitive skills). Specifically, each type of cognitive-skill objective requires a combination of teaching methods. Further, learning objectives involving complex cognitive skills require teaching methods that promote active student learning while learning objectives involving simpler cognitive skills can be achieved with more passive teaching methods.

The rest of the paper is organized as follows. The first section presents the framework for choosing teaching methods. Because this framework begins with the specification of accounting learning objectives, the second section of the paper discusses the choice of learning objectives. The third section of the paper discusses the next step in the framework, the classification of accounting learning objectives into generic types based on Gagné's taxonomy of learning objectives from educational psychology (Gagné and Medsker 1996). The fourth section describes the teaching methods that can create the conditions

necessary for achieving each of the types of learning objectives. The fifth section provides an example of the application of the framework, and the final section discusses the conclusions and provides suggestions for future research.

THE FRAMEWORK

Figure 1 presents an integrative framework for choosing teaching methods. An instructor begins by specifying accounting learning objectives.[1] Before proceeding from this first step, the instructor considers the skills that are prerequisites for these learning objectives (see figure 1).[2] For example, students learning about incentives for management to commit fraud first must know the definition of fraud. If students do not have the prerequisite skills, these skills should be included as learning objectives. Once the instructor specifies learning objectives, the next step is to classify them by type.
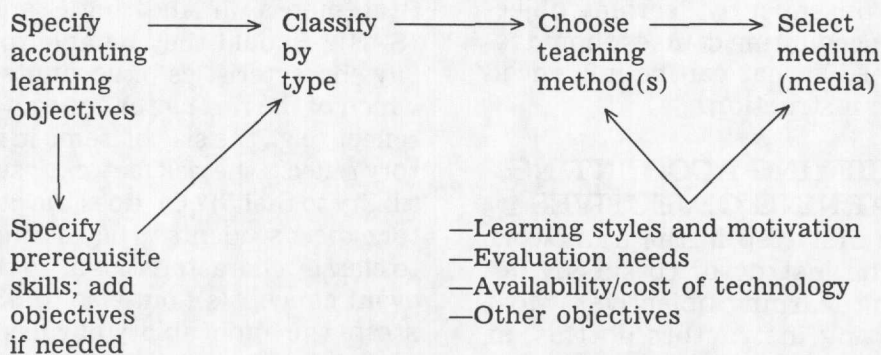
Then, teaching methods should be chosen primarily on the basis of the types of learning objectives because learning objectives vary as to the conditions necessary for their achievement. However, multiple teaching methods may be appropriate for creating a given set of conditions. To choose among appropriate methods, an instructor should consider other factors, such as the availability of the technology necessary to implement a particular method. Additional factors include student learning styles

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[1] Although this paper focuses on accounting skills, the framework can be applied to other objectives of accounting courses, such as communication skills and teamwork skills.

[2] The term "skills" is used to be consistent with the taxonomy on which this paper is based. However, it is meant to refer to what are commonly described as "skills and knowledge" in the accounting literature.

FIGURE 1

Framework for Choosing Teaching Methods

Specify accounting learning objectives → Classify by type → Choose teaching method(s) → Select medium (media)

Specify prerequisite skills; add objectives if needed

—Learning styles and motivation
—Evaluation needs
—Availability/cost of technology
—Other objectives

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and motivation. Certain teaching methods, such as the discussion among students that is part of co-operative learning exercises, may help motivate students (Cottell and Millis 1993) and may be more effective for certain learning styles. In addition, evaluation needs are important. Teaching methods like interactive lecture can address learning objectives *and* provide information for evaluating students. Finally, an accounting instructor may have additional objectives such as encouraging students to pursue accounting careers. Certain teaching methods may be better suited for these career-related objectives.[3]

As the final step in the process, the instructor selects the medium. For example, one can lecture using a board or overhead slides. Learning theorists stress that the choice of medium should be the last step in the process so that the learning objective—not the medium—drives the teaching method (e.g., Gagné and Medsker 1996). Thus, if an instructor prefers a certain medium that is used mainly for lecturing, he or she should not use the lecture format when another teaching method is more appropriate for a particular learning objective. The choice of medium also may be constrained by the availability of technology and other factors that affect the choice of teaching method.[4]

Before developing the framework, a caveat is in order. The framework is effective to the extent that instruction can improve student performance. Instruction cannot remedy all problems with performance that accounting students face in their post-graduation jobs, such as insufficient motivation or abilities.[5] Performance

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[3] The relative importance of these other factors is beyond the scope of this paper and, to some extent, dependent on institution-specific conditions. For example, technology constraints may be so severe in a particular institution that they override other factors. If such conditions are not a limiting factor, it seems sensible to consider student learning styles and motivation to be more important than other factors. Consideration of these issues allows the instructor to make a more informed decision about which of many appropriate teaching methods to employ.

[4] The choice of medium is not considered further, as the primary emphasis of this paper is the choice of teaching methods.

[5] The term "abilities" refers to traits that are formed by the time one is an adult, i.e., traits that are influenced mostly by genetic factors and by early childhood experiences (Carroll 1993).

problems caused by such factors are best addressed through other means, such as the admissions process or firms' hiring and promotion practices. Consequently, learning objectives in accounting courses should relate to skills that can be influenced through instruction.

SPECIFYING ACCOUNTING LEARNING OBJECTIVES

The first step in the framework is for the instructor to specify accounting learning objectives. Most accounting instructors do this, at least informally. That is, they have in mind the skills (and knowledge and attitudes) they want students to have in a particular field of accounting by the end of a term or a class session. Universities also expect specific outcomes from their programs. A learning objective is simply *a description of a desired outcome of the educational process.*

Good learning objectives break down a specific accounting topic into small, manageable components. For example, an auditing instructor first may break down the subject matter related to the audit risk model into the areas of inherent risk, control risk and detection risk. Then, he or she can break these topics down further, for example, by breaking down the inherent risk topic into elements such as the definition of inherent risk and factors affecting inherent risk.

Good learning objectives also are very specific about the desired outcomes related to these individual topics. Specific objectives use precise terms (see table 1 for examples of terms, and Granger [1996] for more discussion). For example, an instructor might want his or her students to understand the factors affecting inherent risk. The term *understand* does not convey the specific outcome(s) the instructor has in mind. Should students be able to *state* the risk factors as listed in the Statements on Auditing Standards (SAS)? Should they be able to *classify* characteristics of accounts as to which of the risk factor concepts they reflect (e.g., the size of items in inventory reflects the risk factor of "susceptibility to theft")? Or, does the instructor expect students to be able not only to classify characteristics as to the relevant concept(s), but also to *demonstrate* the applicability of rules relating to those concepts? For example, does the instructor expect that students will be able to determine whether a certain type of inventory has high or low inherent risk based on the size of items and the consequent susceptibility to theft?

Developing good learning objectives is not a trivial task. Many accounting textbooks provide specific learning objectives that break the topic area into small, manageable parts. For example, Arens and Loebbecke (1994) provide auditing learning objectives such as: "define and explain auditing" and "select the most appropriate analytical procedures from among the five major types." If good learning objectives are not available in textbooks, an instructor can draw upon his or her previous teaching experience, work experience and the expertise of colleagues.

Once the instructor specifies learning objectives, the next step entails classifying learning objectives by type. This is perhaps the most important step in the process, as the type of learning objective strongly influences the choice of teaching method(s). The next section discusses this step.

TABLE 1
Gagné's Taxonomy of Learning Objectives*

Type of Learning Objective	Specific Verb(s) Used to Describe	Example of Accounting Learning Objective
Verbal Information	State, describe	State the definition of an asset
Intellectual Skills:		
Descrimination	Discriminate	Discriminate among models of personal computers included in inventory.
Concepts	Identify, classify	Classify a transaction as being a revenue or an expense
Rules	Specify, demonstrate	Specify the conservatism convention and demonstrate its application to accounts receivable.
Higher-order rules	Generate, use	Generate and use a rule to determine if a particular company has a going-concern problem.
Cognitive strategies	Adopt	Adopt the "sales cycle analogy" strategy when remembering purchases cycle flows and controls.

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* Gagné's taxonomy also includes attitudes and motor skills. Only cognitive skills are shown here. See footnote 7.

CLASSIFYING ACCOUNTING LEARNING OBJECTIVES BY TYPE

Classifying accounting learning objectives by type requires a taxonomy of learning objectives. Several taxonomies of learning objectives are available in educational and cognitive psychology. Perhaps the most widely accepted of these taxonomies are by Bloom (Bloom et al. 1956), Gagné (1968, 1984; Gagné and Medsker 1996) and Anderson (1976, 1990). All three taxonomies include several categories of cognitive skills and motor skills; Bloom's and Gagné's also include attitudinal outcomes. All three taxonomies, at least in part, order cognitive skills hierarchically, from least complex to most complex. More complex skills require less complex skills as prerequisites, and are more difficult to acquire. For example, it is easier to restate factual information than to apply a rule to a novel situation.

This paper uses Gagné's taxonomy[6] and focuses on cognitive

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[6] Hereafter, Gagné's taxonomy refers to Gagné (1968, 1984) and Gagné and Medsker (1996).

skills.[7] I chose Gagné's taxonomy be-
cause it integrates basic psychology
research on learning. In particular,
Gagné incorporates fundamental
cognitive processes such as encoding
and retrieval into his discussion of the
conditions necessary for acquiring
the skills included in the taxonomy.
This provides for a clearer matching
of teaching methods and learning
objectives. Although Gagné's tax-
onomy is useful, it is not as widely ap-
plied in accounting as is Bloom's tax-
onomy (Bloom et al. 1956). Thus, to
facilitate comparison, appendix A
provides a mapping of Gagné's tax-
onomy to Bloom's taxonomy (see
Driscoll 1994, 334–340), as well as to
Anderson's taxonomy.

The cognitive skills included in
Gagné's taxonomy appear in table 1,
along with specific verbs that can be
used to describe the learning objec-
tives related to these skills.[8] Table 1
also includes accounting examples
for each type of learning objective.
There are three general categories of
learning objectives for cognitive
skills: verbal information, intellectual
skills and cognitive strategies. Verbal
information is simply the factual con-
tent of a particular area of knowledge.
The outcome associated with this
type of learning objective is that stu-
dents are able to *state* or *describe* the
factual knowledge in essentially the
same form as it was originally pre-
sented to them. Students are not
asked to apply the knowledge, rather
just retrieve it from memory.[9] An ex-
ample of a verbal information objec-
tive in accounting is: "state the defi-
nition of an asset."

The next type of learning objec-
tive in Gagné's taxonomy is intellec-
tual skills. The key challenge with
regard to intellectual skills is for stu-
dents to be able to apply these skills

to novel situations. Intellectual skills
are ordered hierarchically, meaning
that lower-level skills serve as pre-
requisites for higher-level skills. The
lowest level skill is discrimination.
Students who have acquired this
skill can *discriminate* among physi-
cal phenomena based on observable
features. Because accounting mostly
involves abstract issues, discrimina-
tion skills are not particularly rel-
evant in accounting courses. After
graduation, however, students may
need discrimination skills. For ex-
ample, a staff auditor observing in-
ventory in a company that manufac-
tures a variety of parts for personal
computers needs fairly sophisticated
discrimination skills to distinguish
among the various parts. Neverthe-
less, university programs do not im-
part these skills because they tend
to be firm- and industry-specific. In-
stead, accounting firms instill them
through on-the-job training and
experience.

The next level of intellectual skill
in the taxonomy is concepts. Stu-
dents who have achieved this learn-
ing objective are able to *identify* or
classify a phenomenon as being a
member of a category by using the

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[7] Clearly, motor skills are not of much import
in accounting, but nonskill factors such as at-
titudes can be. Many accounting courses deal
with attitudinal issues, such as those related
to ethical behavior. The discussion here is
limited to cognitive skills for purposes of par-
simony, but can be extended to determine
teaching methods appropriate for attitude
learning objectives (Gagné and Medsker
1996).

[8] For terms that relate to the categories in
Bloom's taxonomy as well as accounting ex-
amples, see Granger (1996).

[9] Retrieval of information from memory gen-
erally takes one of two forms: recall, in which
students are asked to reproduce the infor-
mation; and recognition, in which students
are asked to respond to already reproduced
information.

critical features of the category. Gagné distinguishes between concrete concepts (those involving physical phenomena such as food and animals) and defined concepts (abstract concepts created by man). If the concepts involved are concrete, the learning objective involves identification, and discrimination among phenomena is a prerequisite skill. If the concepts are abstract, the learning objective involves classification, and discrimination is not a prerequisite skill (i.e., no physical phenomena are involved). In accounting, most concepts are abstract. For example, a financial accounting professor might expect students to be able to classify a certain transaction as being a revenue or an expense.

Rules follow concepts in the hierarchy of intellectual skills. If a rule learning objective is achieved, students can *specify* relationships among concepts and *demonstrate* the applicability of those relationships (i.e., use the rule). Since concepts are embedded in rules, concept learning is a prerequisite for rule learning. Rules can be stated in "if, then" form where the "if" portion refers to the presence of certain conditions and the "then" portion specifies what to do. An example of an accounting rule—the conservatism convention—could be stated as follows: "If an item is an asset and there are multiple methods of accounting for the asset, then choose the method with the smallest positive effect on net income." Students who have learned the conservatism rule would be able not only to specify the relationship above, but also be able to apply the rule to determine a conservative value for a given asset.

The highest level intellectual skill in Gagné's taxonomy is higher-order rules. The learning outcome for this skill is that students can *generate* a new rule by combining old rules and use the new rule to perform a task. Again, students must learn rules as a prerequisite because they must understand simple rules before they can combine them. An example of a higher-order rule might be the following rule related to going-concern problems. Suppose students have learned the following simple rules: "If the current ratio drops below 2.0, a company in this industry probably has financial weaknesses" and "if the company's debt/equity ratio is greater than 0.7, it has violated a debt covenant." Putting these two rules together, students might generate and use the following higher-order rule: "If the current ratio is below 2.0 and the debt/equity ratio is above 0.7, then this company has a going-concern problem."

The last category of cognitive skills in Gagné's taxonomy is cognitive strategies.[10] Cognitive strategies can be either task-dependent or task-independent. These strategies are used to control one's learning (including the learning of verbal information and intellectual skills), remembering, thinking, and problem solving. The outcome associated with this learning objective is that students *adopt* an appropriate strategy. Adopting an appropriate strategy means choosing one that is both effective and efficient; some learning scholars also consider the creativity exhibited by the strategy to assess its

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[10] Cognitive strategies are similar to "critical thinking" skills. For example, Halpern (1997, 4) describes critical thinking as "the use of those cognitive skills or strategies that increase the probability of a desired outcome. It is used to describe thinking that is purposeful, reasoned, and goal directed...."

appropriateness (Driscoll 1994). An example of a simple, task-independent strategy for remembering is the use of mnemonics. Accounting students might develop the acronym "APE" to remember that one should *accrue* a liability if it is *probable* and *estimable.* An example of a task-independent strategy for problem solving is working backwards from a goal.[11] In accounting, the goal might be provided in the form of a check answer. Finally, an example of a task-dependent strategy in accounting would be to analogize from the sales cycle to the purchases cycle when learning and remembering the functions, documents and internal controls applicable to the purchases cycle. Accounting courses are beginning to incorporate more task-dependent cognitive strategies such as those relevant for conducting research on a financial accounting issue.[12]

Classifying learning objectives into types is not a trivial task. Textbooks that use precise, standardized terminology in their learning objectives facilitate this process. Recall Arens and Loebbecke's (1994) learning objective that students are able to: "define and explain auditing." This learning objective likely is a verbal information objective. Another example objective was: "Select the most appropriate analytical procedure from among the five major types." This could be either a higher-order rule or a cognitive strategy.

CHOOSING TEACHING METHODS BASED ON TYPES OF LEARNING OBJECTIVES

Once accounting learning objectives are classified by type using a taxonomy such as Gagné's, the next step is to select teaching methods. This section begins by noting the

teaching methods available to the accounting instructor. Next, it describes the conditions instructors need to create to achieve various types of learning objectives. Finally, this section relates teaching methods to learning objectives by considering which teaching methods can create the conditions necessary for achievement of the objectives.

Available Teaching Methods

The accounting instructor has a wide variety of teaching methods available.[13] These methods vary on many dimensions, particularly the degree of active student learning. This section describes teaching methods based on what students do, e.g., reading text or working problems. Note that using the student activity as the basis for describing methods does not preclude overlap among the teaching methods on the list. The list serves to organize the material related to the choice of teaching methods based on learning objectives. Table 2 lists the methods described below.

Most instructors have students *read text*, either in or outside of class. Text can include textbooks, other books, official pronouncements, journal or newspaper articles, teaching

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[11] These task-independent strategies for problem solving often are referred to as "weak methods" because they do not take into account the unique characteristics of a given task (Newell and Simon 1972). Thus, they have somewhat limited usefulness.

[12] This paper uses the term "research" to refer to investigations conducted by accounting practitioners to address a specific accounting, auditing or tax issue rather than empirical studies undertaken by academics (Weirich and Reinstein 1992).

[13] The discussion in this paper is restricted to teaching methods that can be used in a classroom setting (or as homework for class). Thus, teaching methods such as community projects are not included.

TABLE 2

Teaching Methods Avaliable to Accounting Instructors

1. Read text

2. Read worked-out example problems (or objective questions)

3. Listen to lecture/watch video

4. Watch demonstration

5. Listen to and participate in interactive lecture

6. Answer short objective questions

7. Write and answer questions

8. Work short numerical problems

9. Work longer, unstructured cases and problems

10. Discuss issues with other students

11. Conduct research

12. Make oral presentations and answer questions

13. Participate in demonstrations (role playing, simulation games, experiments)

notes or other sources such as those available on the Internet. In addition to reading text, students may *read completed example problems or objective questions.*[14] These problems can be included in a textbook, a study guide, or another source such as a computer-intensive aid (e.g., Kachelmeier et al. 1992). Another traditional method is having students *listen passively to a lecture or watch a videotape* (or something similar, like a live broadcast). The instructor, a guest speaker or another student in the class may conduct the lecture. In this situation, students ask the speaker questions, but the speaker typically does not ask the students questions.

An accounting instructor also may ask students to *watch demonstrations* of the workings of something physical (or something that can be represented physically, e.g., an information processing system). Although demonstrations are more common in the physical sciences, they can be useful in illustrating accounting concepts. For example, students may travel to manufacturing facilities so that they will better understand production processes and related cost concepts.

[14] The term "problems" refers to numerical problems that have a well-defined solution, compared to "cases" that have ill-defined and, thus, multiple solutions. The term "objective questions" refers to short questions that have one correct, nonnumerical answer.

Another common teaching method is to have students *listen to and participate in interactive lectures*, in which the instructor questions students in addition to students asking questions of the instructor. Students also can be required to *answer short objective questions*; these questions may be multiple choice, matching, fill-in-the-blank, true-false or short discussion. Students can be asked to *write* (and prepare answers for) *questions* about some subject matter. This technique is part of some cooperative learning exercises.[15] The questions can be distributed to other students who are expected to answer them or students can write and answer questions primarily for their own benefit.

In accounting courses involving numerical material, students can *work short problems*. In addition to working short well-defined problems, students can *work longer, unstructured cases and problems*. Cases often incorporate shorter numerical problems as implicit or explicit requirements.

Further, cases incorporate other activities that may stand alone as teaching methods. First, the "case method" normally includes a great deal of *discussion among students*. However, student discussion can occur outside of cases and can vary in form and amount of preparation required. For example, discussion, when used as part of cooperative learning exercises, may not require the substantial preparation required for case discussions. Second, cases may require *research* to identify, for example, the financial accounting standards that would govern a particular situation. Research can be a teaching method on its own, however. For example, an instructor may give students general

research assignments that are not part of specific cases. Third, as part of teaching with cases, students may be asked to *make oral presentations* to their fellow students and the instructor. However, presentations can take place outside casework (for example, after cooperative learning exercises or a research project) and vary in form. Typically, an instructor requires that students answer questions as part of a presentation.

Finally, in addition to actively working on cases, students can actively *participate in demonstrations*.[16] Like discussions, students may prepare for these activities outside of class, but may be called upon to participate with only brief in-class preparation. One type of demonstration is a role-playing activity (e.g., Craig and Amernic 1994; Haskins and Crum 1985). For example, students in systems or auditing classes may be asked to assume the roles of various individuals who process documents related to a particular transaction cycle and demonstrate document flows and internal controls. Another type of demonstration is a simulation game (Albrecht 1995; Knechel 1989). Finally, an experimental market is a recently introduced demonstration technique

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[15] This section does not discuss cooperative learning exercises as a separate teaching method. Instead, it incorporates cooperative learning exercises by discussing, as teaching methods, the activities that are part of such exercises. These activities include answering questions, working problems, doing cases, discussing issues with other students, writing questions and so forth. For a discussion of cooperative learning exercises and how they incorporate these activities, see Cottell and Millis (1993).

[16] There may be an overlap of teaching methods here. For example, Craig and Amernic (1994) describe role-playing demonstrations as being very similar to having students do cases.

(Berg et al. 1995; Frischmann 1996). Frischmann's (1996) market exercise, for instance, is designed to help students understand implicit taxes, tax clienteles and similar issues.

This section has presented a list of teaching methods available to the accounting instructor. The next step is to consider which teaching methods are appropriate for a given type of learning objective. The key to choosing teaching methods based on learning objectives is to understand the conditions necessary for achieving each type of learning objective. The next part of this section describes these conditions for each of the types of learning objectives discussed previously (except discriminations and concrete concepts, since these skills are rarely applicable in accounting courses). The final part of this section notes which teaching methods can create those conditions.

Conditions Necessary for Achieving Learning Objectives

This section describes the five conditions necessary for achieving each type of learning objective. These conditions are derived from a large body of research in educational and cognitive psychology (for discussions of the original research, see Anderson 1995; Driscoll 1994; Gagné and Medsker 1996; Gredler 1997; Schunk 1996) and presented in the sequence suggested by this research (see the leftmost column of each panel of table 3 for the conditions). The first and last conditions for each type of learning objective are similar. The first condition is to inform students about how they are expected to demonstrate that they have achieved the learning objective. The last condition is to elicit the expected demonstration

of achievement, and to provide reinforcement so that students can improve and retain the skill. Thus, the second, third and fourth conditions are those that differ most across types of learning objectives.

Verbal Information

Recall that a verbal information objective requires students to restate factual information. The first condition necessary for achieving this objective is to describe it to students, e.g., that they will be expected to state the definition of an asset.

The principal challenge with verbal information is retrieval of material from memory. Implicit in students being able to retrieve information from memory is that they have encoded the information (created a record of the item in memory) and retained it until they are asked to retrieve it. The second, third and fourth conditions relate to helping students encode, retain and retrieve verbal information.

The second condition is for the instructor to facilitate students' recall of a previous well-organized knowledge base to provide a meaningful context for the upcoming verbal information.[17] This condition helps with encoding, retention and retrieval. For example, prior to covering inherent risk, it would be helpful for auditing students to recall the audit risk model. The previous knowledge provides students with a meaningful "slot" in memory into which the new information can be placed. The "slot" is meaningful because it exists within

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[17] It seems feasible, and perhaps more efficient, to have the second condition occur before the first condition (for verbal information and other types of learning objectives). That is, instructors could have students recall previous material before stating the current learning objective.

a knowledge base that is organized around some fundamental principles of the topic and because the new material is related to the previously acquired material. Students are more likely to encode items in memory if these meaningful "slots" exist (e.g., Ausubel 1963). Clearly, meaningful links also aid retention, and retrieval is facilitated by placement into a framework because students may be able to retrieve the framework, then reconstruct the new material, as an alternative to retrieving the new material directly.

The third condition is that the material is delivered in a meaningfully organized manner.[18] This condition helps with encoding of verbal information because of short-term memory limitations. People can hold only about seven items of information in short-term memory (Miller 1956). If material is organized into meaningful "chunks" of several items apiece and students place the "chunks" in short-term memory, the amount of information that can be encoded increases. Delivering meaningfully organized material also may assist with retention and retrieval, as described above.

The fourth condition is that the instructor facilitates elaboration of the material by relating it or having students relate it to examples, explanations or other topics.[19] Part of this elaboration is achieved by the initial recall of a meaningful framework or context. However, additional elaboration after the initial recall is helpful in that it provides more retrieval cues. This is the primary purpose of elaboration—to provide students with multiple pathways by which they can get to material in memory in order to retrieve it (Anderson 1976). For example,

an instructor who is covering internal control concepts in an auditing class could facilitate elaboration by asking students to think about the types of internal controls important to financial reporting and managerial accounting. These additional links would give students many different ways of remembering the concepts. Because the initial recall of a meaningful context is a form of elaboration, elaboration can be helpful with encoding and retention as well as retrieval.

The final condition, as mentioned above, is to elicit the expected performance from students, here to have students state verbal information. In addition, to help students retain the information, it is important to provide practice stating the information. Spacing this practice over time tends to assist retention more than does "massed practice" (a great deal of practice concentrated in a short amount of time) (Anderson 1995). Students ought to receive feedback about whether their answers are correct. Formal grading may not be necessary to provide this feedback if, for example, a textbook provides check answers.

Intellectual Skills—Defined Concepts

Learning objectives involving concepts require students to classify

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[18] Clearly, an instructor must understand the manner in which students have organized their previous knowledge to deliver new material in a meaningful way. An instructor may wish to directly evaluate students' organization of prior knowledge by using techniques such as card sorting (Shavelson 1974).

[19] Several studies in accounting have examined the effects of elaboration on learning (Choo and Tan 1995; Hermanson 1994; Schadewald and Limberg 1990).

phenomena into categories. The first condition for achieving a concept learning objective is to describe and demonstrate the performance that would achieve the objective. For example, students would be informed that they should be able to read descriptions of transactions and determine whether those transactions are revenues or expenses. Then, they would be shown examples of the classification of transactions into revenue and expense categories.

The second, third and fourth conditions relate to the challenge in achieving learning objectives related to concepts, and intellectual skills in general. This challenge is for students to be able to apply their intellectual skills in novel situations. Recognizing that concepts build on other concepts, the second condition requires the instructor to facilitate recall (or learning) of prerequisite concepts. For example, students need to understand the concept "asset" before moving on to the concept "current asset."

The third condition is to provide a definition of the concept and, in so doing, specify its distinctive features. Specifically, educational psychologists suggest that students need a verbal definition of a concept, followed by verbal specification of its features. So, for example, to learn the concept "current asset" requires a definition like "an asset that will be turned into cash or expire (be used up) within the longer of one year or the operating cycle" (Libby et al. 1996, 735). The distinctive features to be made explicit are that a current asset: (1) will be turned into cash or expire and (2) will do so within the longer of one year or the operating cycle.

The fourth condition is for students to go through multiple examples

and nonexamples of the concept, and to compare and contrast related concepts if they are being learned at the same time. It is important for students to interact with the examples, so that they actually attempt to apply the skill. Further, nonexamples should have some overlap of features with the examples, so that they are not obvious. In the current asset example above, students would read or hear descriptions of items and be asked to classify them as current or noncurrent assets; some of the noncurrent assets should be ones that can be converted into cash, so that they have at least one overlapping feature.[20]

Gagné and Medsker (1996) suggests that the sequence of the third and fourth conditions is critical. That is, practice with examples should *follow* information about the concepts. To acquire intellectual skills, students should have some framework before practicing with (experiencing) examples. This idea is consistent with previous arguments describing the benefits of providing a framework through lecturing (e.g., Bamber and Smith 1995) and with accounting research demonstrating that having a framework prior to experience makes learning from experience more effective (Bonner et al. 1997; Bonner and Pennington 1991; Bonner and Walker 1994).

Finally, the fifth condition reminds the instructor to ask students to classify items, so he or she can determine if the learning objective is achieved. Again, part of the fifth condition is to provide practice

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[20] Consistent with this, Hite and Parry (1993) found that nonexamples somewhat increased accounting concept (and rule) learning.

classifying items, spaced over time, and to provide students with feedback about whether their answers are correct.

Intellectual Skills—Rules and Higher-Order Rules

This section discusses the conditions necessary for achieving learning objectives related to rules and higher-order rules, as the conditions for achieving these objectives are similar. That is, higher-order rules are just sophisticated combinations of rules. A rule learning objective requires students to specify relationships among concepts and to demonstrate the applicability of those relationships. A learning objective classified as a higher-order rule requires students to generate a new rule by combining old rules, then to use the new rule to perform a task. The first condition for facilitating rule learning objectives is just to describe and demonstrate the expected performance for students. So, for example, an instructor would inform students that they should be able to apply the conservatism convention in different situations, then provide an example application.

Again, the second, third and fourth conditions relate to aiding students in applying rules in novel situations. The second condition is to facilitate recall of prerequisite rules, as well as the concepts that are an integral part of rules. For example, when learning the conservatism convention, students must first recall concepts like "asset" and "net income."

The third condition is to provide a verbal explanation of the rule or higher-order rule and demonstrate how it is used. As was the case with concepts, a verbal explanation is important for rule learning. In the conservatism convention example, the instructor might simply state the rule, then provide further examples of its application.

The fourth condition is for students to interact with several examples of application of the rule. Again, it is critical for the fourth condition to follow the third condition, so that students have a framework that makes learning from examples more effective. The examples should be in different contexts so that students will learn a generalizable form of the rule (one that can be applied in novel situations). For instance, students might first see the conservatism convention applied to the accounts receivable of a wholesaler. If this were the only example, students might learn a rule like the following: "If it is difficult to estimate the bad debts allowance for the receivables of a wholesaler, use the worst-case scenario in which the maximum estimated number of customers fail to pay their bills." Multiple examples allow students to generalize from receivables to assets, from the difficulty of estimating bad debts to general concepts of uncertainty, and from using the maximum bad debts figure to creating the least positive effect on net income.

Finally, the fifth condition is to ask students to demonstrate the expected performance, i.e., to state the rule (or higher-order rule) and apply it in new contexts. The instructor also should provide practice over time and feedback about correct application.

Cognitive Strategies

The last category of learning objectives is cognitive strategies, which are either general or task-dependent methods for controlling one's learning,

remembering, thinking, and problem solving. As always, the first condition is to describe and demonstrate what students will be expected to do (know and use a strategy). As an example, an instructor might describe and demonstrate the task-dependent strategy of analogizing from the sales cycle to the purchases cycle for use in learning controls of the purchases cycle.

Because cognitive strategies may incorporate concepts and rules, the second condition is to facilitate recall of prerequisite rules and concepts. Having students recall similar tasks and the strategies used in those tasks may help them devise appropriate strategies for the task at hand. For the strategy described above, the instructor would ask students to recall concepts and rules related to sales cycle controls.

The third condition is to either provide a verbal description of the strategy or demonstrate its use. For very simple, task-independent strategies (e.g., the use of mnemonics), a description is sufficient. It is unclear whether description or demonstration helps students learn more complicated task-independent strategies. Instead, students may have to discover these through extensive practice. Task-dependent strategies appear to require demonstration by the instructor (Gagné and Medsker 1996). Thus, for the strategy described above, the instructor should work through, and explain in detail, several examples of analogizing from one cycle to the other.

The fourth condition requires students to go through examples of strategy application. Simple strategies may require only a small number of examples. For more complicated task-independent or task-de-

pendent strategies, students must apply the strategy in several different settings. For the sales cycle-purchases cycle analogy strategy, the instructor could require students to list controls for the entire purchases cycle.

Finally, unlike learning verbal information and intellectual skills, immediate and extensive feedback seems to be necessary for learning cognitive strategies that are not very simple (Gagné and Medsker 1996). Feedback for the other learning objectives is quite straightforward—answers are either correct or incorrect. For cognitive strategies, students need to learn whether they are adopting not only effective, but efficient (and, perhaps, creative) strategies when confronted with novel situations.

Choosing Teaching Methods to Create Conditions Needed for Achieving Learning Objectives

The last step in the process is to choose teaching methods that can create the conditions necessary for achieving a given type of learning objective. This section summarizes the appropriate methods. In most cases, multiple teaching methods are able to create any given condition, but none is able to create all the conditions needed for a particular type of learning objective.

Verbal Information

As mentioned previously, table 3 presents the conditions needed for achieving the different types of learning objectives, along with available teaching methods. Panel A shows the teaching methods that can create the conditions for verbal information objectives. The first condition is to describe the information students will be

TABLE 3
Teaching Methods that Create Conditions Needed for Achieving Learning Objectives

Panel A: Verbal Information

Conditions necessary for achieving learning objective	Read text	Read worked-out problems/questions	Listen to lecture/ watch video	Watch demonstration	Listen to and participate in lecture	Answer short objective questions	Write and answer questions	Work short numerical problems	Work longer cases and problems	Discuss issues with other students	Conduct research	Make oral presentations and answer questions	Participate in demonstrations
1. Describe expected performance	■	■	■	■	■								
2. Facilitate recall of well-organized knowledge base	■	■	■	■	■	■	■			■			■
3. Deliver meaningfully organized material	■		■		■	■	■						
4. Facilitate elaboration of material										■			
5. Elicit expected performance; provide practice						■	■						

TABLE 3 (Continued)

Panel B: Intellectual Skills—Defined Concepts

Conditions necessary for achieving learning objective	Read text	Read worked-out problems/questions	Listen to lecture/watch video	Watch demonstration	Listen to and participate in lecture	Answer short objective questions	Write and answer questions	Work short numerical problems	Work longer cases and problems	Discuss issues with other students	Conduct research	Make oral presentations and answer questions	Participate in demonstrations
1. Describe/demonstrate expected performance	■		■	■	■								
2. Facilitate recall of prerequisite concepts	■	■	■	■	■	■	■			■			■
3. Provide definition and distinctive features						■							
4. Work examples and nonexamples										■			
5. Elicit expected performance; provide practice						■							

(Continued on next page)

TABLE 3 (Continued)

Panel C: Intellectual Skills—Rules and Higher-Order Rules

Conditions necessary for achieving learning objective	Read text	Read worked-out problems/questions	Listen to lecture/ watch video	Watch demonstration	Listen to and participate in lecture	Answer short objective questions	Write and answer questions	Work short numerical problems	Work longer cases and problems	Discuss issues with other students	Conduct research	Make oral presentations and answer questions	Participate in demonstrations
1. Describe/ demonstrate expected performance	■	■	■	■	■								
2. Facilitate recall of prerequisite concepts/rules	■	■	■	■	■	■	■	■	■	■			■
3. Explain/ demonstrate application	■	■	■	■	■				■	■			
4. Work examples in different contexts						■		■	■	■	■		■
5. Elicit expected performance; provide practice							■	■	■		■	■	

TABLE 3 (Continued)

Panel D: Cognitive Strategies

Conditions necessary for achieving learning objective	Read text	Read worked-out problems/questions	Listen to lecture/watch video	Watch demonstration	Listen to and participate in lecture	Answer short objective questions	Write and answer questions	Work short numerical problems	Work longer cases and problems	Discuss issues with other students	Conduct research	Make oral presentations and answer questions	Participate in demonstrations
1. Describe/demonstrate expected performance	■	■	■		■								
2. Facilitate recall of concepts/rules, similar tasks/strategies	■	■	■	■	■	■	■	■	■	■	■	■	■
3. Explain or demonstrate strategy use	■	■	■	■	■				■		■	■	
4. Work several examples								■	■				■
5. Elicit expected performance; provide practice and feedback						■	■	■	■	■	■	■	■

expected to state. This simple description can be accomplished by having students read text or via passive or interactive lecture. Further, students can read already-answered questions.

The second condition is to facilitate students' recall of a well-organized knowledge base to provide a meaningful context for learning. In general, being reminded of the information facilitates recall. Teaching methods that remind students of verbal information include reading textbooks, listening to a lecture, watching a video, and writing and/or answering questions about material contained in textbooks. An instructor also can require students to watch or participate in a demonstration related to previously learned concepts. Finally, students can be asked to participate in discussion related to the previous knowledge base, with attention given to the manner in which the facts fit together. The instructor may prefer teaching methods that not only remind students of information but also require them to use it further (e.g., writing and answering questions) because these methods strengthen retention of the information.

The third condition is to deliver meaningfully organized factual material. To ensure that material is presented in an appropriately organized fashion, the instructor should control its organization by his or her choice of text or via a passive or interactive lecture.

The fourth condition is to facilitate students' elaboration of the material. Because elaboration requires that each student actively relate the to-be-learned material to other information, only a few methods are appropriate. Students can be asked to answer short objective questions,

participate in discussions, or write and answer questions.[21] Anderson (1995) notes that the last method is a particularly effective elaboration technique.

The last condition is to ask each student to state the verbal information.[22] This can be accomplished by having them answer short objective questions.

Intellectual Skills—Defined Concepts

Panel B of table 3 shows the teaching methods that are appropriate for creating the conditions needed for concept learning. The first condition is to describe and demonstrate the classification of items into conceptual categories. Reading a text or already-answered objective questions that provide examples of classification can create this condition. An instructor also can create this condition through lecturing.

The second condition is to facilitate recall of prerequisite concepts. As discussed previously, facilitating recall (reminding) can be accomplished by having students read text, listen to a lecture, or watch a video. Students also can be asked to write and answer, or just answer, questions about the material. The instructor

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[21] Accounting research has found that student-generated elaborations lead to better learning than instructor-provided elaborations (Choo and Tan 1995; Hermanson 1994; Schadewald and Limberg 1990).

[22] The fifth condition for each type of learning objective could be relaxed so that the instructor does not require *each* student to demonstrate that he or she has achieved the objective. Instead, the instructor could create a situation where there is simply some probability that each student will be required to demonstrate the expected performance. In this less restrictive setting, other teaching methods such as interactive lecture also would be appropriate.

can demonstrate or have students demonstrate the concepts, e.g., the "pull" production system concept. Finally, students can discuss the concepts with each other.

The third condition is to provide a verbal definition and to specify the distinctive features of the concept. Although people tend to think of "verbal" as being synonymous with "oral," this is not technically the case (Reber 1995, 839). So, although a verbal definition can be provided through the reading of a text, an instructor may prefer to reinforce this information orally through lecture. Also, some concepts, like those related to production processes, can be defined via demonstrations.

The fourth condition is for students to actively experience both examples and nonexamples of the concept. Other methods that encourage active student learning include discussing concepts with other students and writing questions. To ensure that students experience both examples and nonexamples, the instructor may want to control the situation by providing the questions to answer.

Finally, the fifth condition is to simply ask each student to classify items into concepts so that the instructor can observe the learning outcome. The only method for creating this condition is having students answer short objective questions.

Intellectual Skills—Rules and Higher-Order Rules

As shown in panel C of table 3, the first condition for learning rules is to inform students that they will be expected to both state and apply a particular rule. A reading assignment or lecture can convey this description. The instructor can illustrate application of the rule by having students read worked-out problems. The instructor also can work problems as part of his or her lecture. Having students work problems at this point would not be appropriate given that learning has not yet occurred. Finally, if the rule relates to concepts that can be illustrated through a physical demonstration, e.g., transaction processing, having students watch a demonstration would be appropriate.

The second condition is to facilitate recall of prerequisite rules and concepts. The instructor can remind students of concepts using the same methods described above, i.e., reading text, lecture, watching or participating in demonstrations, answering questions, writing and answering questions, and having discussions with other students. The instructor can remind students of rules by many of these methods as well. However, since problems require rules for solution, the instructor may prefer that students read worked-out problems or work short problems that involve the prerequisite rules. Finally, analyzing cases may require students to recall prerequisite concepts and rules.

The third condition is to provide an explanation and demonstration of the rule and its application. As with the third condition for concepts, this condition can be created through reading text or lecture. Since many rules in accounting are related to numerical problems, having students read worked-out problems can assist with a demonstration of the applicability of a rule.[23] Again, it is possible that students can see the application of certain rules to accounting by watching demonstrations.

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[23] Kachelmeier et al. (1992) found better learning of pension accounting rules with worked-out examples than with lecture.

The fourth condition is for students to apply the rule in several different settings. This can be accomplished by working short problems or answering short objective questions. To learn higher-order rules, doing cases (and ill-structured long problems) and conducting research are probably more appropriate than short problems because, generally, they require students to create higher-order rules (see Campbell and Lewis 1991; Knechel 1992; Libby 1991). Further, demonstrations like experimental markets can help students practice applying rules.

The fifth condition is to have students demonstrate their knowledge of the rule by applying it in new contexts. Thus, except for demonstrations, the same methods used for the fourth condition can be used here (answering questions, working problems and cases, and conducting research). As Frischmann (1996) notes, it is important for students to be willing to take the chance of "failing" in demonstrations like experimental markets. Consequently, demonstrations are more appropriate for practicing rules than for being evaluated on them. Additionally, students can demonstrate their knowledge of rules by making oral presentations and answering questions.

Cognitive Strategies

Panel D of table 3 presents conditions and teaching methods for cognitive strategy learning. The first condition is to describe and demonstrate the strategy students will be expected to know and use. The methods that can help achieve this condition are the same as those for rules and higher-order rules since cognitive strategies and rules are illustrated by the working of problems. These methods consist of asking students to read text or worked-out problems and working problems while lecturing.

The second condition is to facilitate recall of prerequisite concepts and rules, and similar tasks and strategies. The methods used to remind students of concepts and rules are the same as those discussed above, e.g., reading text. Because many of the cognitive strategies used in accounting relate to conducting research, facilitating recall of similar tasks and strategies might entail having students conduct research.

The third condition is to describe the strategy (for simple strategies) or demonstrate its applicability (for more complicated strategies). A description can be provided by an example in a text or by worked-out problems. A demonstration can be provided by a lecture that involves explicit explanation of the strategy while the instructor is using it; this is referred to as "cognitive modeling" (Gagné and Medsker 1996).

The fourth condition is for students to practice using the strategy in several different situations. The teaching method here depends on the kind of cognitive strategy involved. A simple strategy for remembering information can be applied by answering short objective questions. A more complicated strategy needed for problem solving can be applied by working problems or cases, or participating in demonstrations. Students also can conduct research to practice the important task-dependent strategies related thereto. Finally, discussing strategies with other students can be helpful (e.g., Schunk 1996).

The fifth condition is to require students to show that they can choose and apply strategies. They can evidence this by answering questions,

working problems or cases, and conducting research. Students can be asked to give oral presentations that demonstrate their ability to apply certain types of thinking strategies. Again, although it is possible to elicit performance by having students participate in experimental markets, it would be a bit difficult to use this for evaluation purposes.

Summary of Choice of Teaching Methods

The analysis of teaching methods summarized by table 3 yields two important insights. First, none of the types of learning objectives can be achieved completely with a single teaching method. This is because no single teaching method can create all five conditions necessary for acquiring a certain type of skill. In particular, the first three conditions for all the types of learning objectives can be achieved by more passive methods such as listening to lecture, as well as by more active methods. On the other hand, more active methods are necessary for achieving the last two conditions for each type of learning objective. Students ultimately have to experience the material to acquire it fully.

Second, although there is some overlap of methods across learning objectives, there are important differences. In particular, the complexity of the skill involved in the learning objective is related to the level of active student learning required by the teaching method. For the relatively simple skills of verbal information and concepts, passive methods such as listening to lecture create many of the necessary conditions. In contrast, for the more complex skills of rules and cognitive strategies, more active methods such as working cases and conducting re-

search ultimately must be employed. Thus, calls for moving to these types of teaching methods likely reflect a desire to spend more time on higher-level skills. It is important to keep in mind, however, that higher-level skills cannot be acquired until lower-level skills are firmly in place. Additionally, active teaching methods like cases are not only inefficient for achieving simple learning objectives, they also are ineffective because they cannot create the conditions needed for those objectives (see also Campbell and Lewis 1991). The combination of these two insights suggests that the accounting instructor needs to employ several different teaching methods to achieve all the learning objectives of a given accounting course since these objectives likely encompass all the types in Gagné's taxonomy.

Finally, note that the availability of more than one method for creating a particular condition does not suggest that, once the method has been chosen, other methods do not provide incremental benefit. For example, several conditions can be created either by reading text or listening to lecture. Having students read text does not mean that lecturing on the same material does not facilitate learning. In fact, most instructors probably prefer some combination of methods to a single method (for a given condition) because each serves to reinforce the other.

APPLYING THE FRAMEWORK

This section provides an example of applying the framework to a specific topic from an accounting course—inherent risk assessment. Assessing inherent risk is an important topic in auditing courses because inherent risk is part of the audit risk

model that guides audit planning. Following the framework, the first step is to specify the learning objectives relevant to inherent risk assessment. The instructor needs to split this topic into its important components and specify precise learning objectives for each component. The important components of inherent risk assessment (stated in terms of objectives) could be: (1) state the definition of inherent risk; (2) state the procedures for assessing inherent risk;[24] (3) state and define the inherent risk factors specified by the SASs; (4) classify the characteristics of financial statement accounts and assertions as to the risk factors they reflect; (5) specify and demonstrate the application of rules for determining whether the characteristics of a given account or assertion reflect high, medium, or low risk for the risk factors determined from the previous classifications; and (6) specify and demonstrate the application of rules for combining the information about each risk factor into an overall assessment of risk for each assertion for each financial statement account.

The next step in the process is classifying the objectives by type. If objectives are stated precisely, as above, classification is not difficult. Part of the difficulty in specifying objectives is considering what types of objectives they are initially. The objectives for inherent risk assessment can be classified as follows. Objectives (1) through (3) relate to verbal information that the instructor expects students to be able to restate. Objective (4) is a concept objective; the instructor wants students to be able to classify characteristics into the appropriate risk factor categories. Objectives (5) and (6) relate to rules that the instructor

wants students to be able to apply in novel situations.

Finally, the instructor chooses the teaching methods for each of the objectives. Recall that each objective requires a combination of methods because each has several conditions necessary for its achievement. The verbal information objectives related to definitions and lists can be achieved easily through reading a standard auditing text and the SASs, and listening to lecture (or both for reinforcement), and either answering or both writing and answering short objective questions that ask students to define or list the required information.

The concept objective (classifying characteristics of assertions as to which risk factors they reflect) can be achieved with similar methods (reading text or questions, listening to lecture and answering questions). The instructor might develop two types of questions about specific characteristics of accounts and assertions, and their classification as to relevant risk factor(s). The first type of questions would present characteristics of accounts and ask students to determine, from a list, which risk factors are reflected by those characteristics. For example, one question might list the following characteristic: "Inventory consists of computer chips." Already-answered questions of this variety could be used to *demonstrate* the expected performance (the first cognitive condition for concept objectives). Unanswered questions of this variety could be used to *elicit* the expected performance

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[24] One procedure that can be used to assess inherent risk is preliminary analytical procedures. Neither this procedure nor prerequisite skills are discussed, for purposes of parsimony.

(the last condition for concept objectives). For the characteristic "inventory consists of computer chips," an appropriate answer might be that the characteristic reflects the inherent risk factor of "susceptibility of theft" because the characteristic relates to the size and value of the items in inventory. The second type of question would be similar to the above, except that the risk factor classifications would be provided in all cases, and students would determine if the classifications are correct or incorrect. For example, the characteristic "inventory includes items for which an appraisal is needed," paired with the risk factor "number of transactions in account," represents an incorrect classification. These questions would allow students to see both examples and nonexamples (the fourth cognitive condition for concepts).

Finally, the fifth and six objectives relate to, respectively, rules for determining whether each characteristic of an assertion represents high, medium or low inherent risk and whether the characteristics, when combined, create high, medium, or low risk overall. The first set of rules is relatively straightforward. That is, characteristics of accounts that indicate risk factors are present to a large degree typically indicate high risk, whereas characteristics that indicate that risk factors are absent to a large degree indicate low risk. Characteristics that are partially present indicate medium risk. To develop these rules, students need a prior set of rules that indicate, for example, what size and value of inventory have high susceptibility to theft vs. low susceptibility to theft. Rules like these can be described as "common sense," whereas other rules are learned in previous accounting courses.

For example, in financial accounting courses, students learn which accounts include estimates or complex calculations (two inherent risk factors). Because rules assigning a value for each risk factor based on the characteristics of an account are relatively straightforward (as are their prerequisite rules), relatively passive methods such as reading text, reading already-answered questions and listening to lecture likely will suffice to achieve the first and third conditions (describing the expected performance and delivering the material). To facilitate recall of the prerequisite rules from other courses (the second condition), the instructor should have students answer short objective questions.[25] For students to experience applying the inherent risk rules and demonstrate that they have acquired them (conditions four and five), the instructor can use short questions again. Questions would simply present a characteristic of an account, along with the related risk factor, and ask students to read or provide an answer about the level of risk for that particular risk factor indicated by the stated characteristic.

In contrast, rules related to combining information about all the risk factors into an overall assessment of inherent risk are more complex. For example, students might have to determine if inventory that requires many estimates (one risk factor) but has transactions that are individually small in amount (another risk factor) has high, medium or low overall risk. Although this overall assessment is somewhat subjective, students may

[25] Note that the instructor may wish to provide students with a simple cognitive strategy that reminds them to recall information from financial accounting courses when assessing inherent risk.

develop rules about the relative importance of various risk factors when they occur in different combinations. In the example above, students may note that, although the small size of individual transactions represents low risk in day-to-day transaction processing, errors in estimates made at the end of the year could have a material effect on the ending balance of inventory. In this case, they might conclude that inherent risk is high overall, even though one of the characteristics of this inventory account represents low risk. To ensure that students learn these complex rules, the instructor likely will employ more active teaching methods. For example, a lecture to demonstrate the expected performance and to explain application of the rules should include working out problems. To help students recall the prerequisite rules (those that determine whether a given characteristic of an account represents high, medium or low risk on a given risk factor), the instructor probably should use interactive lectures or ask students to write and answer more questions like those described above. Having students work examples in multiple contexts and demonstrate that they have acquired the skill (conditions four and five) will require the use of longer problems and cases and, perhaps, other methods like discussion. Problems and cases here would give students information about a specific situation (a company) and ask them to assess inherent risk for one or more accounts.

DISCUSSION

This paper uses research on learning to develop an integrative framework for choosing teaching methods. The main premise of the framework is that an instructor should choose teaching methods based primarily on the type of learning objective. The conditions needed for achieving objectives vary across the types of objectives, and teaching methods vary in the conditions they can create. The mapping of teaching methods to learning objectives based on the conditions they can create leads to two key insights. First, a single teaching method typically cannot create all the conditions necessary for a given learning objective. Second, learning objectives involving complex skills require teaching methods that promote active student learning, while learning objectives involving simpler skills can be achieved with more passive teaching methods.

This paper raises several issues for further consideration. First, the suggestions regarding teaching methods developed in this paper should be tested empirically. Second, the effect of factors such as student learning styles on the effectiveness of teaching methods should be explored further. Third, research on the incremental value of teaching methods when used in combination with other teaching methods would create additional guidance for choosing the "best" methods. Finally, there are multiple taxonomies of learning objectives that include different types of objectives. Some parts of each taxonomy are applicable to accounting. It may be useful to develop an accounting-specific taxonomy that incorporates the appropriate portions of multiple taxonomies.

APPENDIX

Mapping of Gagné's Taxonomy to Bloom's* and Anderson's Taxonomies

Anderson	Gagné	Bloom
Declarative knowledge ⟷	Verbal information ⟷	Knowledge Comprehension
Procedural knowledge ⟷	Intellectual skills: • Discriminations • Concepts ⟷ • Rules • Higher-order rules ⟷	Applications Analysis Synthesis Evaluation
Metaknowledge ⟷	Cognitive strategies	

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* See Driscoll (1994, 334–340).

REFERENCES

Accounting Education Change Commission (AECC). 1990. Objectives of education for accountants: Position statement number one. *Issues in Accounting Education* (Fall): 307–312.

Ainsworth, P. L., and R. D. Plumlee. 1993. Restructuring the accounting curriculum content sequence: The KSU experience. *Issues in Accounting Education* (Spring): 112–127.

Albrecht, W. D. 1995. A financial accounting and investment simulation game. *Issues in Accounting Education* (Spring): 127–141.

American Accounting Association (AAA), Committee on the Future Structure, Content, and Scope of Accounting Education (the Bedford Committee). 1986. Future accounting education: Preparing for the expanding profession. *Issues in Accounting Education* (Spring): 168–196.

Anderson, J. R. 1976. *Language, Memory, and Thought*. Hillsdale, NJ: Lawrence Erlbaum Associates.

———. 1990. *Cognitive Psychology and Its Implications*. 3rd edition. New York, NY: Freeman.

———. 1995. *Learning and Memory: An Integrated Approach*. New York, NY: John Wiley & Sons, Inc.

Arens, A. A., and J. K. Loebbecke. 1994. *Auditing: An Integrated Approach*. 6th edition. Englewood Cliffs, NJ: Prentice Hall.

Ausubel, D. P. 1963. Cognitive structure and the facilitation of meaningful verbal learning. *Journal of Teacher Education* (June): 217–221.

Bamber, L. S., and E. D. Smith. 1995. Working with students and student organizations. In *Perspectives on Academic Careers in Accounting (Service Contributions to Teaching and Research): Essays in Honor of*

Thomas J. Burns by His Students, edited by D. L. Jensen. Columbus, OH: Ohio State University.

Berg, J., J. Dickhaut, J. Hughes, K. McCabe, and J. Rayburn. 1995. Capital market experience for financial accounting students. *Contemporary Accounting Research* (Spring): 941–958.

Bloom, B. S., M. D. Engelhart, E. J. Furst, W. H. Hill, and D. R. Krathwohl. 1956. *Taxonomy of Educational Objectives, Handbook I: Cognitive Domain.* New York, NY: Longman Publishers.

Bonner, S. E., and N. Pennington. 1991. Cognitive processes and knowledge as determinants of auditor expertise. *Journal of Accounting Literature*: 1–50.

———, and P. L. Walker. 1994. The effects of instruction and experience on the acquisition of auditing knowledge. *The Accounting Review* (January): 157–178.

———, R. Libby, and M. W. Nelson. 1997. Audit category knowledge as a precondition to learning from experience. *Accounting, Organizations and Society* (July): 387–410.

Campbell, J. E., and W. F. Lewis. 1991. Using cases in accounting classes. *Issues in Accounting Education* (Fall): 276–283.

Carroll, J. B. 1993. *Human Cognitive Abilities.* New York, NY: Cambridge University Press.

Choo, F., and K. Tan. 1995. Effect of cognitive elaboration on accounting students' acquisition of auditing expertise. *Issues in Accounting Education* (Spring): 27–45.

Cottell, P. G., Jr., and B. J. Millis. 1993. Cooperative learning structures in the instruction of accounting. *Issues in Accounting Education* (Spring): 40–59.

Craig, R., and J. Amernic. 1994. Roleplaying in a conflict resolution setting: Description and some implications for accounting. *Issues in Accounting Education* (Spring): 28–44.

Driscoll, M. P. 1994. *Psychology of Learning for Instruction.* Needham Heights, MA: Allyn and Bacon.

Frischmann, P. J. 1996. Real time classroom tax planning using experimental markets. *Issues in Accounting Education* (Fall): 281–296.

Gagné, R. M. 1968. Learning hierarchies. *Educational Psychologist* (Winter): 1–9.

———. 1984. Learning outcomes and their effects: Useful categories of human performance. *American Psychologist* (April): 377–385.

———, and K. L. Medsker. 1996. *The Conditions of Learning: Training Applications.* Fort Worth, TX: Harcourt Brace College Publishers.

Granger, P. 1996. You can improve your testing and assessment. *Accounting: A Newsletter for Educators* (Spring): 1–4.

Gredler, M. E. 1997. *Learning and Instruction: Theory into Practice.* 3rd edition. Englewood Cliffs, NJ: Prentice Hall.

Halpern, D. F. 1997. *Critical Thinking Across the Curriculum: A Brief Edition of Thought and Knowledge.* Mahwah, NJ: Lawrence Erlbaum Associates.

Haskins, M. E., and R. P. Crum. 1985. Cost allocations: A classroom role-play in managerial behavior and accounting choices. *Issues in Accounting Education*: 109–130.

Hermanson, D. R. 1994. The effect of self-generated elaboration on students' recall of tax and accounting material: Further evidence. *Issues in Ac-*

counting Education (Fall): 301–318.

Hite, P. A., and R. W. Parry, Jr. 1993. An investigation of how incorrect examples can enhance tax rule comprehension. *Journal of Accounting Education* (Fall): 227–241.

Kachelmeier, S. J., J. D. Jones, and J. A. Keller. 1992. Evaluating the effectiveness of a computer-intensive learning aid for teaching pension accounting. *Issues in Accounting Education* (Fall): 164–178.

Kimmel, P. 1995. A framework for incorporating critical thinking into accounting education. *Journal of Accounting Education* (Spring): 299–318.

Knechel, W. R. 1989. Using a business simulation game as a substitute for a practice set. *Issues in Accounting Education* (Fall): 411–424.

———. 1992. Using the case method in accounting instruction. *Issues in Accounting Education* (Fall): 205–217.

Libby, P. A. 1991. Barriers to using cases in accounting education. *Issues in Accounting Education* (Fall): 193–213.

Libby, R., P. A. Libby, and D. G. Short. 1996. *Financial Accounting.* Chicago, IL: Richard D. Irwin.

Miller, G. A. 1956. The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review* (March): 81–97.

Newell, A., and H. P. Simon. 1972. *Human Problem Solving.* Englewood Cliffs, NJ: Prentice Hall.

Persectives on Education: Capabilities for Success in the Accounting Profession (The White Paper). 1989. Arthur Andersen & Co., Arthur Young, Coopers & Lybrand, Deloitte Haskins & Sells, Ernst & Whinney, Peat Marwick Main & Co., Price Waterhouse, and Touche Ross. New York, NY.

Reber, A. S. 1995. *The Penguin Dictionary of Psychology.* 2nd edition. New York, NY: Penguin Books.

Schadewald, M., and S. Limberg. 1990. Instructor-provided versus student-generated explanations of tax rules: Effect on recall. *Issues in Accounting Education* (Spring): 30–40.

Schunk, D. H. 1996. *Learning Theories: An Educational Perspective.* 2nd edition. Englewood Cliffs, NJ: Prentice Hall, Inc.

Shavelson, R. J. 1974. Methods for examining representations of a subject-matter structure in students' memory. *Journal of Research in Science Teaching* (July): 231–249.

Weirich, T. R., and A. Reinstein. 1992. *Accounting & Auditing Research: A Practical Guide.* Cincinatti, OH: South-Western Publishing Company.