

Outcomes Assessment of Computer-Assisted Behavioral Objectives for Accounting Graduates

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Accounting educators face difficult choices in attempting to respond to changes in the environment in which accounting is taught and practiced. The amount of material to teach increases, but the time to teach it does not. Integrating computers and technology into the curriculum is also necessary in today's environment, placing additional demands on the faculty (Benke & Hermanson, 1991). Both practitioners and academics must rethink curriculum and pedagogy (Bedford, 1986; Kullberg et al., 1989; Siegel & Sorensen, 1994).

To satisfy accreditation bodies and state legislatures, assessment of the effectiveness of accounting programs must be performed differently (Baker, Bayer, Gabbin, Izard, Jacobs, & Polejewski, 1994; Bayer, Clark, Herring III, & Thomas, 1994; DeMong, Lindgren, & Perry, 1994). Previously, assessment efforts focused on the inputs to the educational process, under the assumption that high quality inputs (students, faculty, and materials) would guarantee high quality outcomes. This assumption no longer satisfies state legislatures or accreditation bodies. Instead, we as educators need to focus on the students and the capabilities they can master.

ABSTRACT. This article presents behavioral objectives, based on those identified by the Accounting Education Change Commission (AECC) and the American Accounting Association (AAA), for accounting graduates. These objectives may be taught with or augmented by the use of computers in an undergraduate accounting curriculum. An outcomes assessment plan for these behavioral objectives is presented, that is based on a mission statement regarding student computer competencies. A series of assessment tasks to support each objective is included, as well as the type of software required. A discussion of design considerations for assessment tasks completes the article.

A useful framework for evaluating the objectives of accounting education exists in the capabilities required of its graduates (Siegel & Sorensen 1994; Heagy & Gallun, 1994; Siegel & Kulesza, 1996; Kullberg et al., 1989; Accounting Education Change Commission [AECC], 1990). A surprising number of those capabilities are linked to mastering the computer as a professional tool. To assess how well we prepare students, we can rely on outcomes assessment, which "... focuses on the outcomes of the educational process, rather than on the inputs or on the

learning environment" (Baker et al., 1994, 108).

In this article, we intend to (a) provide an additional dimension of outcomes assessment, (b) identify behavioral objectives of the AECC and AAA that may be taught with computers, and (c) suggest a plan for outcomes assessment of those computer-based competencies.

Components of an Assessment Plan

Assessment plans typically have several components: standardized exams, portfolio analysis, student surveys, alumni surveys, surveys of employers or recruiters, and interviews (DeMong et al., 1994). We can gather richer assessment data, however, by assessing students' attainment of computer-assisted behavioral objectives, including effective communications, information technology and library competence, and problem-solving and quantitative analysis skills. This approach can depict a student's computer literacy in a manner relevant to his or her professional area by specifying a series of tasks required by, and performed using software typically found in the practice of accounting.

Computer-Assisted Behavioral Objectives

According to the AAA, an accounting program mission statement should identify program objectives. Several specific objectives whose attainment can be measured by outcomes should be developed from this statement (Baker et al., 1994, p. 107). The objectives may be cognitive, behavioral, or affective. The committee's definition of behavioral objectives suggests several skills that can be taught or enhanced with computers and related technology:

Behavioral objectives generally include some of the so-called "softer" skills, and encompass the following: critical-thinking skills, problem-solving ability, effective writing, effective oral communication, including both listening and speaking skills, quantitative analysis, leadership skills, team-building skills, computer literacy, library and information-technology competence, and values awareness. (Baker et al., 1994, p. 107)

After identifying these behavioral objectives, a skill is pinpointed that will represent each, and a specific task required that a student may master. We consider five steps in developing an assessment plan for behavioral objectives.

An Outcomes Assessment Plan

The criteria for developing a mission-driven assessment plan are provided in Bayer et al. (1994, p. 116). They include identification of student competencies, selection of a valid assessment instrument, integration of assessment and the instructional process, determination of the level at which assessment occurs, and attribution of student improvements to the curriculum program. Next, we explore how these five design criteria are met.

Criterion 1. Identification and Definition of Student Competencies

Approximately 30 educational objectives are found in the AECC's *Objectives of Education for Accountants: Position Statement Number One* (1990). We superimposed the AAA's classifications (cognitive, behavioral, and affective) on the AECC objectives (see Table 1). This provided a series of behavioral

objectives that may be incorporated into an assessment plan, and that are not directly measurable. One or more skills that are representative of each behavioral objective are presented, with each representative skill having its own assessment task, to be performed by a student to demonstrate mastery of a given objective. The tasks are intended to cover those that an accounting graduate would encounter in professional employment. The choice of representative skills ought to be determined at the local program level and should tie closely to the stated mission of the program.

Criterion 2. Selection of a Valid Assessment Instrument

Authentic assessment refers to the testing of students' mastery of content by actual performance—or "demonstration of mastery" (Wiggins, 1989, p. 42). This makes it possible to directly observe the process used in solving a holistic problem and the effort expended in developing a solution.

Authentic assessment has the following characteristics: (a) actual performances are the basis of testing of a complete problem or content area, focusing on answer, process, and effort; (b) the student is active, not passive; (c) criteria for success are public knowledge that promotes practicing for the assessment exercise; and (d) faculty are more involved in coaching as part of the learning experience.

The assessment task the student is to perform ought to meet the following rules, according to Wiggins (1989) and Hawkins, Frederiksen, Collins, Bennett, & Collins (1993). The first rule is that the task represents an actual accounting application. The assessment tasks in Table 1 are the kind that a student would encounter in practice, and they are complete tasks in and of themselves. The second rule requires that the task can be solved with different approaches. This dimension may vary somewhat. For example, there appear to be few ways to construct an amortization table for a bond issue; GAAP requirements dictate few choices in a disclosure exercise. The third rule requires that the task can be reliably scored. This is not so much a function of the computer but of the

human scorer or assessor who observes the performance. It is necessary to determine in advance what constitutes acceptable performance. Training of the scorers would be required for agreement on acceptable quality and to achieve consistent scoring across time and faculty. The last rule is that it must be possible to collect records of a student's performance. Here the computer can help, by saving the files of each performance and later assembling them into a portfolio for the student.

For an assessment plan to succeed, it should provide a series of tasks that represent the objectives (outcomes) being tested. Representative examples of acceptable work should be available to students. The scoring criterion for each task has to be established.

Criterion 3. Integration of Assessment and the Instructional Process

In Table 1, we provide discrete assignments that can be related to each accounting class in a typical undergraduate accounting curriculum. This would provide evidence of computer use across the curriculum for accreditation purposes, as well as a reasonable way to distribute among the faculty the time to teach the necessary software.

Criterion 4. Determination of the Level at Which Assessment Occurs

By linking assessment tasks to specific skills, the data in Table 1 demonstrate that it would be feasible to perform the assessment at the highest level class in which a particular skill is taught. This provides students with the opportunity to learn and master the assessment task before taking the class in which the assessment is conducted. However, assessment can be done at either the level of program completion or the class level.

Because computer-based tasks are directly observable, there are two complementary means of assessment. Performance assessment is achieved through the observation of a student manipulating a program and data to reach a desired outcome. Portfolio assessment plans require that a student maintain, and submit for evaluation upon approach of

TABLE 1. Objectives, Skills, Tasks, and Software

Behavioral objectives	Representative skills	Assessment tasks	Software required
<p><i>Effective writing and oral communication</i></p> <ul style="list-style-type: none"> • formal and informal 	<ul style="list-style-type: none"> • Communication with peers and faculty • Usage of accounting terminology • Proficiency in creating presentations, letters, and reports 	<ul style="list-style-type: none"> • Presentation of cases, reports, assignments, and group projects • Presentation of work projects 	<ul style="list-style-type: none"> • E-mail • Word processor • Presentation/graphics
<p><i>Library and information technology competence</i></p> <ul style="list-style-type: none"> • accessing and using information 	<ul style="list-style-type: none"> • Familiarity in locating and applying GAAP, tax law • Familiarity in locating and using databases of financial reports and print articles • Elementary use of Internet 	<ul style="list-style-type: none"> • Annual report analysis • Research on professional pronouncements • Summaries of applications articles • International accounting research • Tax research 	<ul style="list-style-type: none"> • GAAP database • Financial reports database • Print media database • Tax service
<p><i>Problem-solving and quantitative analysis</i></p> <ul style="list-style-type: none"> • Analyzing and reporting information 	<ul style="list-style-type: none"> • Use of analytic skill appropriate to the problem. • Learn required or effective means of presenting information 	<ul style="list-style-type: none"> • Financial statement preparation/analysis • Disclosure formats • Strategy and policy recommendations • Flowchart internal controls 	<ul style="list-style-type: none"> • General ledger • Spreadsheet • Presentation/graphics • Statistics • Word processor • Flowchart
<ul style="list-style-type: none"> • Accounting knowledge: Conceptual and procedural basis of attest services 	<ul style="list-style-type: none"> • Perform attest procedures for audit 	<ul style="list-style-type: none"> • Analysis of internal controls • Audit test procedures • Audit program • Simulated audit 	<ul style="list-style-type: none"> • Audit practice set • Statistics • Spreadsheet • Word processor
<ul style="list-style-type: none"> • Accounting knowledge: Concepts and principles of information system design and use • Learn to control accuracy and integrity of financial data 	<ul style="list-style-type: none"> • Use analytical skills and system design skills to automate an accounting system • Identify systemic strengths and weaknesses 	<ul style="list-style-type: none"> • System conversion • Documentation • Analysis of internal controls • EDP audit programs 	<ul style="list-style-type: none"> • Flowchart • General ledger • Statistics
<ul style="list-style-type: none"> • Accounting knowledge: Understand financial reporting for organizational operations • Identify information needs of decisionmakers • Understand process of analyzing and summarizing data 	<ul style="list-style-type: none"> • Ability to obtain data, verify, analyze, process, and present information appropriate to decisionmaker • Identify information available to solve problem 	<ul style="list-style-type: none"> • Preparation of journals, ledgers, and statements for various entities • Consolidated worksheets and statements • Inventory evaluation • Tax allocation • Trend analysis • Budgets • Cost-volume-profit analysis • Production reports • Integrated manufacturing causes 	<ul style="list-style-type: none"> • General ledger • Spreadsheet • Statistics • Financial reports database • Word processor • Management accounting simulation • Interactive tutorial

(Table continues)

TABLE 1. (Continued)

Behavioral objectives	Representative skills	Assessment tasks	Software required
<ul style="list-style-type: none"> Accounting skills: Ability to use accounting knowledge to solve real-life issues 	<ul style="list-style-type: none"> Apply tax knowledge to a computer-based filing system Work as a volunteer in the VITA program 	<ul style="list-style-type: none"> Tax returns for individuals 	<ul style="list-style-type: none"> Tax preparation program
Computer literacy	<ul style="list-style-type: none"> Entry-level proficiency with industry-standard software 	<ul style="list-style-type: none"> Production of the assessment task(s) above, using appropriate software 	<ul style="list-style-type: none"> Task dependent

graduation, a series of assignments, revisions, and final products. This portfolio would demonstrate skills in a number of areas. It could also include a student's commentary on what he or she has learned through the process.

The possibility of using performance assessment and/or portfolio assessment provides opportunities to observe the growth of the student as a professional. Bayer et al. (1994, p. 118) suggested that assessment done at the course level (performance assessment) would provide a series of observations, as opposed to a single assessment at the end of the accounting program. Assessment within the scope of a class allows the instructor to perform the assessment when the skill being tested is current. The assessment effort is less burdensome for all concerned because it could be allocated over a number of classes. Collection of these performance assessments into a portfolio of assessment materials would provide a picture of growth and development as a student matriculated.

Criterion 5. Attribution of Student Improvements to the Curriculum Program

If assessment is done by class, not program, it will be relatively easy to at-

tribute proficiency to the program. A program must be able to collect evidence of the level of achievement of its objectives (Baker et al., 1994, p. 107). Conducting assessment with computers makes it easier to collect and maintain performance records.

Conclusion

Assessment of student outcomes provides a definitive measure of a program's success in meeting the objectives described in its mission statement. In this article, we have presented a means of identifying those behavioral objectives that may be taught with or augmented by the use of computers. An outcomes assessment plan that measures student computer competencies was described, and issues of design and implementation were explored.

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