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A Ten-Step Process for Creating Outcomes Assessment Measures for an Undergraduate Management Program: A Faculty-Driven Process

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Abstract

The article recounts in detail the process used to include all department faculty members in the design of outcomes assessment measures for the management major, basing these on broad learning outcomes which the department had previously identified. While other literature has described the outcomes assessment design process in broad terms, the current article relates specific steps used to produce test questions. The article incorporates theory from the outcomes assessment, human resource development, and the organizational behavior literatures.

Keywords: Outcomes Assessment; Evaluation; Group Conflict

A Ten-Step Process for Creating Outcomes Assessment Measures for an Undergraduate Management Program: A Faculty-Driven Process

The first push to conduct outcomes assessment in higher education came from the U.S. Department of Education in 1988, which began requiring accreditation organizations to gather outcomes data. Specifically, accreditation agencies should evaluate, "whether an institution or program—(1) Maintains clearly specified educational objectives that are consistent with its mission and appropriate in light of the degrees or certificates awarded; (2) Is successful in achieving its stated objectives" (U.S. Department of Education, 2007, 602.17). Within three years, The Association to Advance Collegiate Schools of Business (AACSB) began requiring institutions to demonstrate educational outcomes in order to gain and maintain accreditation (Palomba & Palomba, 1999).

In addition, the passage of the No Child Left Behind Act led to an increase in assessment of student learning outcomes in higher

education (Hickok, 2006). Like grade schools and high schools, colleges and universities in every state are devoting financial and human resources to this task (Smith, Szelest, & Downey, 2004). Research shows that higher education faculty members spend the majority of their time teaching (Peterson & Wiesenberg, 2006), so it is important to know whether students are learning what is taught. At the higher education level, many publications which guide the outcomes assessment process include charts, grids, grading rubrics, goals, etc.—each full of words—but these publications do not describe the specifics of how these words were derived (e.g., Bresciani, 2002).

For example, the set of books, *Assessment of Student Learning in Business Schools* (Martell & Calderon, 2005) contains many articles on the outcomes assessment design process. In the set, one article gives some procedural details, but it primarily describes a top-down, Dean- and curriculum-committee-driven process and does not state specifically how all faculty members were involved (Anderson-Fletcher, 2005). Other articles generalize about gathering student and employer opinions, but again, these do not contain sufficient detail for their processes to be replicated (e.g., Bauer, 2002; Kretovics & McCambridge, 1999). Indeed, most outcomes assessment articles discuss theory and generalities but lack discussion of specific practices.

In many areas of research, such as the field of human resource development (HRD), a recurring theme is the need to bridge the gap between research and practice (Torraco, 2005). The primary goal of the current paper is to bridge this gap by documenting the outcomes assessment creation process that was designed to overcome two major obstacles. First, there is a lack of published guidelines on the specific steps to take to create outcomes assessment measures. The current paper documents the steps that were taken to design the outcomes assessment measures, and these steps can be used by other researchers and by practioners when creating learning evaluation instruments. Second, in the academic department included in the study, there has historically been a very low level of participation in decision-making by some faculty members. This low level of participation may have been due to their belief that their input had been dismissed as unimportant in earlier department projects. The current paper documents the steps that were taken to ensure that all faculty members were given the opportunity both to participate and also to see that all of their input was included in the final outcomes assessment measures.

In sum, the goal of the current paper is bridge the gap from research to practice by documenting a theory-based set of practices that can be used both to create outcomes assessment measures and also to include all department members in the decision-making process.

Research shows that organizations perform better when employees are encouraged to participate in decision-making (Goldstein, 2005). We used a critical reflection process (Van Woerkom, 2004) so that the content of each step of the process was derived from the content of the previous step. In each subsequent step, each faculty member saw how his or her input was included in the assessment project. No input from any faculty member was discarded, which helped maintain a high level of participation (Van Woerkom, 2004). Studies show that the process for developing evaluations is equally as important to participants as the type of evaluation developed (Sloman, 2004). The process of developing evaluations helps professors rethink what they do in their courses and why (Sloman, 2004).

The process we used was based on the outcomes assessment, organizational behavior, and human resource development (HRD) literatures. The outcomes assessment literature was used as the foundation for creating measures in the Management major. The organization behavior literature was used as the basis for managing teamwork among faculty members. The HRD literature was used as the basis for writing reliable and valid test questions based on a given body of knowledge.

In the following sections, we begin with a description of the College. Next, we discuss the

outcomes assessment and related literatures. These are the foundation for the third section, which is a description of the steps used to write the instruments.

Overview of the College

The College is a public institution, founded in the mid 1800s, which enrolls approximately 9,100 students. Within the College, the School of Management has 29 faculty members and more than 1,100 students enrolled in its six majors, within three academic departments: Management and Marketing; Accounting and Information Systems; and Finance and Economics. The Department of Management and Marketing offers two degrees: Bachelor of Science in Management and Bachelor of Science in Marketing. Within the Management major, the department offers four concentrations: general management; operations; human resources; and international. The Management major is a junior- and senior-level program—students may not enroll in the Introduction to Management course (i.e., the gateway course) until they have attained junior-level status. In January, 2006, when writing began of the outcomes assessment instruments for the Management major, the department had 11 faculty members and 625 students enrolled in its two majors (approximately 70% of these were enrolled in the Management major).

Impetus for Conducting Outcomes Assessment

As a public institution, the College operates under the auspices of the State Board, which requires the public colleges in the state to conduct outcomes assessment of student learning. Each academic department has autonomy to set learning outcomes for its majors and to design its outcomes assessment measures. This is typical of the assessment process in higher education in the United States (Peterson & Augustine, 2000b).

The College supports the development of the outcomes assessment process and measures by giving each academic department the equivalent of one course of release time (three credits) to be distributed to one or more faculty members, as the department deems appropriate. The College also appointed one of its full professors to the position of Assistant Vice President for Academic Affairs to be an internal consultant in guiding outcomes assessment development, which mirrors the approach of other colleges (St. Ours & Corsello, 1998; Willard, Dearing, & Belair, 2004). In addition, the College hired an external consultant as a subject-matter expert in outcomes assessment to provide guidance to departments. It is common for master's level colleges to have college-wide support for assessment (Peterson & Augustine, 2000b). The College required each academic department to report data on student learning outcomes by July 1, 2007. Therefore, time was of the essence given that the department had only 18 months to write the measures and to gather, analyze, and report data. Time limitations can be beneficial, however, by increasing faculty members' involvement in the process (Haessig & La Potin, 1999).

Overview of Development of Broad Learning Outcomes

In October, 2004, the members of the Department of Management and Marketing participated in a School of Management off-site retreat, during which department faculty members developed broad categories of learning outcomes for the Management major—knowledge areas in which department members agreed students should be proficient upon graduation (e.g., forecasting, ethics). A brainstorming process was used (Thompson, 2003), within which all faculty members of the department gave suggestions regarding potential topics. Six broad areas were identified: (a) quantitative analysis and decision-making; (b) production and operations management; (c) management/interpersonal; (d) legal framework of management; (e) financial analysis and control; and (f) strategic management. Subtopics were suggested for each of these six broad areas, and this list of 86 subtopics served as the basis of the outcomes assessment measures. Although the scope of this list may appear to be broad, it was designed to include content from each of the four management concentrations mentioned earlier (i.e., general, operations, human resources, and international).

Theory Supporting the Instrument Development Process

The department designated one faculty member to be the point person to develop the outcomes assessment measures for the Management major. (The measures for the Marketing major were developed by a different point person.) We chose a faculty member—rather than an administrator—to lead the process because assessment results are more tangible and useful to faculty members and the college when faculty members lead the process (Haessig & La Potin, 1999; Jonson & Calhoun, 2002). The point person's task was to translate the 86 subtopics into measures that could be administered to students.

Using Pre-Packaged Tests Versus Creating Program-Specific Tests

Many pre-packaged instruments are available for measuring student learning in business school programs (AACSB, 2006). We chose, however, to write our own measures rather than use pre-packaged measures from organizations such as Educational Testing Service (ETS) for the four reasons provided below.

Measuring program-specific constructs. First, we wanted to measure the body of knowledge we had decided is important for our students' post-graduation success based on our 86 learning outcomes. Pre-packaged assessments might lack generalizability across institutions, meaning they might not have equal validity and reliability across populations and curriculum (Lohman, 2004). Using pre-packaged tests would tell us whether our students learned *something*, but it might not tell us whether our students learned what we taught (Rotondo, 2005). We created our own instruments instead because it is critical for instruments to have validity to measure the relevant constructs (Carter, 2001).

Avoiding teaching to a test. Second, we want to be able to use the data gathered from outcomes assessment to improve our curriculum to enhance our students' learning. We do not want to use data to alter our program so that we "teach to a test," which could be the case if we chose a pre-packaged test. Research has shown that linking curriculum to evaluation helps organizations meet their strategic goals by focusing attention on course objectives (Allen, 2004; Kirkpatrick & Hawk, 2006).

Maintaining focus on our college mission. Third, we are willing to sacrifice the ability to benchmark our outcomes against the outcomes of other schools (i.e., external validity) in order to more closely measure what is taught in our courses (i.e., internal validity) and to maintain the ability to tailor our program to meet our College mission. Using pre-packaged tests would essentially allow an outside organization to determine what content areas should be emphasized in our curriculum without regard to our College mission.

Outcomes assessment can be viewed as being a form of training evaluation, which seeks to determine whether training goals were met (Alvarez, Salas, & Garofano, 2004). We assume that content areas are taught, and seek only to know whether our students learned and retained that content. Class sizes are limited to 30 students, and faculty members are expected to have one-on-one interactions with students and to know which pedagogies are most effective to increase students' knowledge, skills, and abilities. The results of outcomes assessment, in conjunction with our knowledge of our students, can guide individual faculty members in making changes to their courses if they wish to do so. Outcomes assessment data is often used in this manner (Peterson & Augustine, 2000a).

Meeting accreditation standards. Fourth, the College is accredited by the New England Association of Schools and Colleges (NEASC), a regional accrediting agency, which requires outcomes assessment, but which does not require use of pre-packaged tests (Mundhenk, 2005; Whittlesey, 2005). Further, the School of Management may seek AACSB accreditation, which also does not require use of a pre-packaged test, but which does require colleges to involve all faculty members in the outcomes assessment process (Anderson-Fletcher, 2005). It is common for master's level colleges to cite accreditation as the impetus for assessment (Peterson & Augustine, 2000b).

In the past, accrediting agencies focused on measuring educational inputs, such as budgets, number of faculty, course content, etc. (Henniger, 1994). Today, however, there is a greater push to measure outputs, that is, student learning, as per U.S. Department of Education requirements. In conducting outcomes assessment, our goal is to measure student performance, not faculty performance. It is common for measuring student performance to be the case (Peterson & Augustine, 2000a; St. Ours & Corsello, 1998). This is but one of many possible uses of assessment data from which we could choose (Bober & Bartlett, 2004). It is, however, an important goal because students actively and frequently seek feedback on their performance (Kuchinke, 2001). In addition, student learning is the primary goal of education, and many business programs focus on its measurement within the outcomes assessment process (Apostolou, 1999; Cherry & Dave, 1997; Kretovics, 1999).

Potential Difficulties in Gaining Consensus

As is common in many colleges, faculty members were encouraged, but not required, to participate in the process (Dooris, 1998). Therefore, the department chose to designate a single point person in order to expedite the process and to diminish the impact of four potential difficulties in gaining consensus of department members. It is important to be aware of potential sources of faculty concerns prior to beginning assessment design (Haessig & La Potin, 1999).

The need for outcomes assessment. First, in many academic departments, some faculty members wholeheartedly embrace the need to conduct outcomes assessment while others are opposed (Grunwald & Peterson, 2003; Martell, 2005). Our department is mandated to conduct outcomes assessment by the State Board, and using a single point person could ensure that the project was completed even if there had been the type of opposition within the department which could derail the functioning of a committee. In addition, the point person could emphasize to faculty members the specific benefits to them of assessment, which could foster their participation in the process (Grunwald & Peterson, 2003).

Development methods. The second potential difficulty is that among those faculty members who embrace the need to conduct outcomes assessment, some will prefer to use one method to create the measures (e.g., brainstorming) while other faculty members will prefer to use an alternate development method (Camacho & Paulus, 1995). Using a single point person could ensure that all department members help to design the outcomes assessment *measures* while avoiding the potential difficulty that large amounts of time would be used to design the outcomes assessment *creation process*. As mentioned, we used a critical reflection process. This was conducted in a method similar to the Delphi technique (Van de Ven & Delbecq, 1974). Members were given written questions and asked to respond in writing. These responses were compiled and resubmitted to members. A meeting of the entire group was held only at the end of the process.

Types of outcomes. The third potential difficulty is faculty members at many colleges often disagree about the type of outcome to be measured, such as facts versus skills (Rotondo, 2005). For example, one college struggled with this issue when creating measures of interpersonal skills (Bommer, Rubin, & Bartels, 2005). Specifically, they wondered whether assessment should measure the *facts related to* interpersonal skills or the *use of* interpersonal skills. Another college chose to measure both knowledge and skills in its marketing program (Davis, Misra, & Van Auken, 2002),

In employee training, we label these outcomes as knowledge (i.e., facts) and behavior (i.e., applying the facts to behavior on the job), according to Kirkpatrick's (1998) model of training evaluation. The U.S, Department of Labor (2006) emphasizes that successful job performance requires employees to possess three characteristics: knowledge (i.e., facts and principles); ability (i.e., ability to learn, improve or reason); and skill (i.e., ability to perform a task).

In the test development literature, two well-known taxonomies of learning outcomes were developed by Bloom (1956) and Gagné (1985). Bloom's taxonomy includes knowledge, comprehension, application, analysis, synthesis, and

evaluation. Gagné's taxonomy includes intellectual skills, cognitive strategies, verbal information, motor skills, and attitudes (Shrock & Coscarelli, 1996). Given that there is a wealth of outcome types from which to choose, using a single point person could ensure that all appropriate outcome types are measured by incorporating ideas from each department member.

Type of assessment. The fourth potential difficulty is that faculty members often disagree about the type of assessment method that should be used (e.g., multiple-choice, case study, oral presentation). Studies show that the type of outcome measured should dictate the type of assessment used (Melancon & Williams, 2006). In addition, assessments should use multiple assessment methods for results to be reliable and valid (Melancon & Williams, 2006; Riggio, Mayes, & Schleicher, 2003). Again, using a single point person could ensure that all necessary assessment methods are used by incorporating ideas from each department member.

In summary, although on its face using a single point person seems to imply that the measures were designed unilaterally—and could therefore lack comprehensiveness—in the current case, using a single point person ensured that each faculty member's input was given equal weight and that the measures were constructed in a timely manner.

Specific Steps Used to Create the Instruments

In this section, we describe the process that was used to meet the two goals of the project: create outcomes assessment measures and include all department members in the process. The process is described in detail to enable other researchers and practioners to mimic this process when writing their own evaluation instruments.

The process of translating the 86 subtopics into tests questions was conducted between February and May 2006. The process consisted of 10 major steps, most of which invited direct, written input from all department faculty members. As stated earlier, the two primary goals of this project were to create outcomes assessment measures and to include all department members in the decision-making process. Each of the following 10 steps was conducted to meet either one or both of these goals. The steps began with a literature review, continued with a comparison of the six broad learning outcomes and 86 subtopics to course syllabi, and ended with writing the test questions. These steps are based on guidelines for creating outcomes measures in the training evaluation literature (e.g., Kirkpatrick, 1998).

As stated, the College provided release time from teaching to the point person to allow time to conduct the project, and appointed an internal consultant and an external consultant to guide the process. The point person met with the internal and the external consultants on five occasions from February to May to ensure that the project was progressing appropriately.

1. Literature Review

The point person reviewed relevant literature from AACSB, ETS, the U.S. Department of Labor, peer-reviewed journals, and relevant books regarding outcomes assessment in the management discipline, training evaluation, and test development. This was done to ensure our process and our product are aligned with these organizations' standards. A portion of this literature was cited above. This phase of the project was conducted between February 1 and April 8.

2. Review of Learning Outcomes

The point person merged the list of learning outcomes that was produced by department faculty members during the October 2004 off-site retreat with learning outcomes lists that were developed during other Management department meetings in prior years. This task entailed deleting duplicate items and inserting remaining items from one list into relevant categories on the other list. The goal was to ensure that the list used at the beginning of the outcomes assessment project contained all the learning outcomes that had been identified. (It was assumed that the final outcomes assessment instrument would measure only a subset of the list, and include only the most critical learning outcomes, as per guidance of the internal and external consultants.)

This resulted in a single list of 86 learning outcomes based on the list of 86 subtopics (see Appendix). The point person used Microsoft Excel to create a grid of the 86 learning outcomes (rows) versus the 34 courses required (columns) for the management major. This phase of the project was conducted between February 5 and 8.

3. Review of Course Syllabi

The point person reviewed Management course syllabi for the 18 Management courses that are required for the Bachelor of Science in Management to determine which of the 86 learning outcomes are taught in which of the 18 courses. At this time, the list of courses was shortened from 34 to include only the 18 taught in the Management department because the department cannot control what is taught in courses offered by other departments, such as Math and Accounting. As stated earlier, the department is conducting outcomes assessment only to measure whether students learned what was taught in Management courses.

An "X" was placed into the grid if a topic was covered in a course. In creating a grid, some departments use a Likert-type scale ranging from 1 to 3 to indicate the extent to which a topic is covered in a course. In our department, it was not possible to determine from syllabi the extent of topic coverage, so the grid was limited to indicate only whether a topic was covered at all. This phase of the project was conducted between February 5 and 8.

4. Request Course Content Detail from Faculty Members

The point person requested course content details from professors whose syllabi lacked the required level of specificity. For example, if a syllabus listed the topic, "ethics," subtopics could include names of specific theories (e.g., Principle of the Double Effect) and philosophers (e.g., Machiavelli). This information was entered into the grid. Most faculty members readily provided detail when shown examples of what was requested. Faculty members were invited to participate, but were not required or pressured to do so. Some faculty members chose to refrain from providing detail in this stage. This phase of the project was conducted between February 9 and 10.

5. Request Feedback from Faculty Members on the Match of Subtopics to Course Content

The point person distributed copies of the grid to faculty members and requested their feedback regarding its accuracy in matching content areas to specific courses. Nearly all faculty members returned their copies of the grid and included additional "Xs" or, in rare cases, asked that an "X" be deleted from the grid. The point person revised the grid as requested and resubmitted it to faculty for feedback. This phase of the project was conducted between February 10 and April 1.

6. Condense List of Subtopics

The point person condensed the list of subtopics in the grid. The list was reduced from 86 to 14 subtopics based upon the criterion that a topic should appear in at least three required courses. This is to ensure that a student is exposed to the topic multiple times to increase long-term knowledge retention. The topic could be taught in three of the five courses that all Management majors must take. Alternately, the topic could be taught in two courses that all Management majors must take and at least one course in each of the four Management concentrations (i.e., general, human resources, operations, and international). The grid is shown in Table 1. This phase of the project was conducted between April 5 and 6.

7. Generate List of Facts for Subtopics

The point person generated a list of facts for each of the 14 subtopics based upon course syllabi, the point person's own course notes, and relevant textbooks. For example, under the subtopic "goal setting and planning" facts included "Gantt charts" and "PERT charts." This phase of the project was conducted between April 7 and 10.

8. Request Feedback from Faculty Members on List of Facts

The point person distributed copies of the condensed grid in Table 1 and a separate list of the 14 subtopics and facts for each subtopic to department faculty members. Faculty members were asked to add and delete facts from the list, and most faculty members returned their copies of the list with additions.

Table 1
Grid of Outcomes Assessment Content Areas and Required Management Courses

	Courses and Concentrations within the Bachelor of Science Management Degree																		
	All Concentrations					Gen	Gen-HR		HR				Interna.		Operations				
Core content in Management Area	*249	301	341	348	461	329	320	322	423	424	425	428	342	345	335	347	355	455	
1. Quant. analysis & decision-making																			
Statistical presentations	x				x		x		x	x				x			x		
2. Production and operations management																			
Forecasting	x			x	x									x				x	
3. Management-interpersonal																			
Strategy formulation		x	x	x	x	x	x		x				x						
Managerial decision-making		x	x	x		x							x						
Organizational goal setting & planning		x	x				x		x	x			x				x		
Leadership		x	x		x			x				x	x				x		
Communication processes within org's		x	x			x	x	x					x						
Definition and importance of mgt		x	x					x					x	x					
Managing in a global environment		x	x			x	x	x	x	x			x	x		x			
Managing teamwork & group dynamics		x		x			x	x	x			x	x		x				
History of management thought		x	x				x	x		x			x				x		
4. Legal framework of management																			
ethics		x	x			x	x	x		x	x	x							
5. Financial analysis and control																			
None																			
6. Strategic management																			
Strategic management model		x			x	x			x		x								
Strategic mgt in global business env.		x			x	x			x				x			x			

Note: The numbers correspond to course numbers for management courses. The course names are as follows: 249 Quantitative Business Analysis II; 301 Introduction to Management; 341 Business, Government, and Society; 348 Operations Management; 461 Management Seminar; 329 Organizational Theory; 320 Human Resource Management; 322 Organizational Behavior; 423 Compensation and Benefits; 424 Labor Relations; 425 Recruitment and Selection; 428 Training and Development; 342 Comparative Management; 345 International Business; 335 Process Analysis; 347 Supply Chain Management; 355 Quality Assurance; and 455 Strategic Operations Management.

Faculty members who did not return a list after several days were sent an email with the statement, "If you would like your input to be included, please send your list to me." This statement let faculty members know that their participation was strictly voluntary, that the project would continue whether or not they participated, and that their ideas would definitely be included if they did participate. Several professors sent in their lists following this request. It was critical to have involvement from as diverse a group as possible to maximize face validity of the instruments (Manyon, Feeley, Panzarella, Servoss, 2003). In addition, faculty involvement is critical to ensuring meaningfulness of the test results (Gerretson & Golson, 2004). This phase of the project was conducted between April 10 and April 15.

9. Write Test Questions for Each Fact

The point person created 14 tests, one for each subtopic. Each test contains at least one question for each fact that faculty members identified. The tests are relatively short, approximately one page each, and contain 5 to 20 questions each. An example of test questions is shown in Table 2. We chose to create 14 short tests rather than one large test to mirror the concept of *testlets* (also known as *scalets)*. A *testlet* is a short test measuring a single construct that is used to minimize students' interpreting questions in the wrong context (Pike,

2005). Testlets tend to have high validity and reliability, and can be used effectively with small samples of students (Pike, 2006). In addition, they help faculty members match test results to their course material.

The questions were taken from the point person's own final exams and midterms, when possible, or were written based on the facts identified and based on informal conversations with faculty members that had occurred during earlier phases of the project. It is crucial that test questions be matched to specific facts or skills (Manyon et al., 2003). For example, throughout the project, several faculty members requested that we measure knowledge, skills, and abilities, so questions were written to measure each type of learning outcome. Table 2 contains a sample of questions regarding groups and group decision-making that measure knowledge (facts) and abilities (thought processes related to groups). This phase of the project was conducted between April 15 and May 9.

10. Request Feedback from Faculty Members on Test Questions

The point person distributed the revised list of 14 subtopics and facts to faculty members and distributed the 14 tests to faculty members. All faculty members met as a group to discuss the tests. Faculty members who expressed concern with the topics of some specific questions or with the high degree of specificity of questions were reminded that each question was based on a specific fact that they had identified or approved in a previous step. At this meeting, the point person requested that, during the summer, faculty members examine the questions for validity and reliability, add and delete test questions, and return the tests in September. This meeting was held on May 10.

Note that this was the first time the department members met as a group to discuss the project. Between February and May, the point person met only informally with individual faculty members to discuss the project. Waiting until the test questions were written before holding a group meeting to discuss the test questions ensured that each faculty member's input was given equal weight in the content of the test questions. It also ensured that faculty members did not become sidetracked from the task at hand. For example, early in the project, some faculty members wanted to design the logistics of outcomes assessment (e.g., types of questions, dates of testing, location of testing). The point person was able to make note of these concerns for future use and to ask that faculty members remain focused by saying, "You are on step 9, but I am still on step 3. Let's do this step first, and then we can figure out that step based on what we do in this step." This statement let faculty members know that their concerns would definitely be addressed, but at a later date. In addition, keeping faculty members focused on one step at a time helped to simplify the process for them, which is important in maintaining participation (Dodeen, 2004).

Table 2
Sample of Outcomes Assessment Questions for Group Decision-Making

1. Give four reasons why people join groups.
2. Name and define four of the five stages of group development.
3. What is an advantage of group decision-making?
4. What is a disadvantage of group decision-making?
5. When is better to use a group with 10 members rather than a group with 3 members?
6. If a group has high cohesiveness, and its goals are not aligned with organization goals, what is the effect on group productivity and why?

Administering the Tests and Remaining Steps

The instruments were pilot tested in December 2006. Approximately 10 students took each test and indicated the courses they had completed. In January, 2007, the department faculty members were given a report of the test scores and met to discuss the results. Most questions that no students answered correctly were then deleted because faculty members realized that this material was not covered in any courses (e.g., the statistical concept "kurtosis"), so that even those students who had taken the courses could not have given the correct answer. The department members decided to

meet at a later date to discuss whether this material should be added to courses.

A small percentage of other questions were reworded to make their meanings clearer. In addition, questions that were deemed too difficult because they were two-part questions (e.g., "What is a group and why is it used?") were split into separate questions (e.g., "What is a group?" and "Why are groups used?") The modified tests were administered in May 2007 (these tests are available from the author upon request). Several faculty members suggested that the data would be more valid if the sample size were larger, which is supported by the literature (Wood & Conner, 1999). Therefore, this time, approximately 20 students completed each test, and results were submitted to the faculty members and the College administration in June 2007. Faculty members met to discuss the results in September, 2007.

The larger sample sizes of the second round of testings allowed further analysis of the validity and reliability of the tests. For example, we could compare test scores across semesters to determine whether each sample of students performs equally. We were constrained, however, from conducting traditional test-retest reliability analysis due to the limitations on the amount of time that can be taken from classes to conduct outcomes assessment.

We also could conduct inter-rater reliability studies of the test scoring. Internal consistency analysis (Cronbach's alpha) would not be appropriate for the tests, however, because each test measures multiple constructs and because question responses are scored dichotomously.

We intend to conduct additional analysis on the tests to compare the test scores with course grades. We will compare the mean test scores with mean course grades over the previous two semesters. For example, we will compare mean scores on the statistical tests with mean grades in the statistics courses. The comparisons will be guided by the course topic content grid mentioned earlier. We expect to find a positive correlation between mean test scores and mean course grades.

We have not designed long-term testing procedures. For example, we could administer one comprehensive test at the end of students' senior year, and if so, administer the test to all students or to a random sample of students. Alternately, we could administer shorter, topic-specific tests and, if so, we could embed these into courses or offer them at the end of courses.

We also are debating whether to administer the instruments so that scores count toward course grades. A body of literature indicates that students' motivation to perform well on tests is low if course grades are not at stake (Napoli & Raymond, 2004). This low motivation negatively affects test scores and reliability. If we build the test scores into course grades, then we will need to have a larger bank of questions that can be periodically rotated to reduce the chance of students sharing questions with other students. Currently, the students do not receive copies of the tests to keep, and we assume the likelihood is low that they would remember or share the questions with other students.

Last, we are debating whether to use time-series data gathering rather than cross-sectional data gathering. Results would be more meaningful if we could track changes in students' knowledge over time (Astin & Lee, 2003).

Conclusions

The current paper documented a process used to bridge the gap between research and practice in writing outcomes assessment instruments. We began with a review of the relevant literature (i.e., training evaluation, outcomes assessment, organizational behavior, management). Next, we designed a 10-step process based on this literature. This process can be used by other researchers and practioners to design training evaluation instruments. Using these steps can be especially beneficial when input from a large group is necessary, when there is opposition to the project from a few members, or when some members have not participated in previous projects because they believe their input had been treated as unimportant.

Limitations of the Project

Although the department succeeded in creating outcomes assessment measures, there were several

drawbacks to using the process described. First, the process was very time-consuming for the point person. It is doubtful that a faculty member would be able to manage this process without being given release time from other duties. Second, it is politically difficult to manage the process. The point person will necessarily be torn between wanting to discuss the project and obtain oral input whenever possible, and refraining from allowing randomly held conversations to take precedence over written input.

Third, members of the department can feel left out, even when providing written input. This is particularly the case in a department in which members see each other almost daily and are accustomed to discussing department projects. Their inability to discuss the project as a group might lead some members to feel alienated because they were unable to have give-and-take with other department members about the project during each of the steps. It is noted, however, that in the current project, group discussions were avoided to ensure that no member of the department could dismiss another member's input.

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Appendix

Core content in Management Area	Number of Courses*					
I. Quantitative Analysis & Decision-Making	All	Gen	HR	Int	Ops	Any
1 Statistical Presentations	2	1	3	1	1	7
2 Analysis of Business Data	2	0	0	1	1	4
3 Describing Business Data	1	1	3	1	1	6
4 Linear Regression and Correlation Analysis	1	1	2	0	0	3
5 Multiple Regression and Correlation	1	1	2	0	0	3
6 Probability and Probability Distributions	1	0	0	0	1	2
7 Sampling Distributions and Confidence Intervals	1	0	0	0	1	2
8 Hypothesis Testing with Various Distributions	1	0	0	0	0	1
9 Analysis of Variance	1	0	0	0	0	1
II. Production And Operations Mgt	All	Gen	HR	Int	Ops	Any
10 Forecasting	3	0	0	1	1	5
11 Inventory Management	2	0	0	1	0	3
12 Capacity and Location Planning	1	1	0	1	3	6
13 Quality Control	1	0	0	0	3	4
14 Product and Service Design	1	1	0	0	1	3
15 Production and Work Systems	1	0	0	0	2	3
16 Planning and Scheduling Techniques	1	0	0	0	2	3
17 CAD (Computer Aided Design)	1	1	0	0	0	2
18 CIM (Computer Integrated Manufacturing)	1	1	0	0	0	2
19 Historical Devel. of Modern Op's Management	1	0	0	0	0	1
20 Learning Curves	1	0	0	0	0	1
21 Productivity and International Competition	1	0	0	0	0	1
22 Product and Service Design: Tech & Automation	0	1	0	0	1	2
23 Project Management	0	0	0	0	1	1
24 Product and Service Design: Reliability, etc.	0	0	0	0	0	0
III. Management/Interpersonal	All	Gen	HR	Int	Ops	Any
25 Strategy Formulation	5	2	2	1	0	9
26 Managerial Decision-Making	4	1	0	1	0	6
27 Organizational Goal Setting and Planning	3	1	3	1	1	8
28 Leadership	3	1	2	1	1	7
29 Communication Processes Within Organizations	3	3	2	1	0	7
30 Definition and Importance of Management	3	1	1	2	0	6
31 Managing in a Global Environment	2	3	4	2	1	10
32 Organization Culture	2	3	5	1	0	9
33 Career Development Issues	2	2	5	2	0	9
34 Managing Teamwork and Group Dynamics	2	2	4	1	1	8
35 History of Management Thought	2	2	3	1	1	7
36 Persuasion and Impression Management	2	2	4	1	0	7
37 Managing Innovation and Change	2	1	0	2	1	6
38 Managing Diversity	2	2	2	2	0	6
39 The Four Management Functions	2	0	1	1	1	5
40 Organizational Politics (Power and Conflict Mgt)	2	2	2	0	0	5
41 Social Responsibility	2	1	0	2	0	5
42 Self-management	2	2	2	1	0	5
43 Current Trends (TQM, Self-directed Teams, etc.)	1	3	4	2	1	9
44 Basics of HR Mgt (Acquisition, Developing, etc.)	1	1	4	2	0	7
45 Approaches to Motivation	1	2	3	1	0	5

46	Managing Individual Differences	1	2	3	1	0	5
47	Coaching and Developing Others	1	2	3	0	0	4
48	Fundamentals of Organizing	1	1	0	0	1	3
49	Management Control Systems	1	0	0	0	0	1
	IV. Legal Framework of Management	All	Gen	HR	Int	Ops	Any
50	Ethics	3	3	5	0	0	9
51	Managerial Process and the Law	2	0	0	2	0	4
52	Consumer Protection	2	0	0	1	1	4
53	Employment Discrimination Law	1	2	4	0	0	5
54	Business and Dispute Resolution Processes	1	0	1	2	0	4
55	Business, the Constitution, and Gov't Agencies	1	0	1	1	0	3
56	Product Liability and Intellectual Property	1	0	0	1	0	2
57	Business and the Judicial Process	1	0	0	0	0	1
58	Labor Relations Law	0	1	3	1	0	4
59	Law of Contracts, Uniform Commercial Code, etc.	0	0	0	0	2	2
60	Managing with Tort Laws	0	0	0	0	0	0
	V. Financial Analysis & Control	All	Gen	HR	Int	Ops	Any
61	Analysis of Financial Statements	1	0	1	1	0	3
62	Cost of Capital	1	0	0	1	0	2
63	Cash Flow Management	1	0	0	1	0	2
64	Risk and Rates of Return	1	0	0	0	0	1
65	Capital Budgeting	1	0	0	0	0	1
66	Working Capital Management	1	0	0	0	0	1
67	Time Value of Money	0	0	0	0	0	0
68	Bond and Stock Evaluation	0	0	0	0	0	0
69	Capital Structure and Leverage	0	0	0	0	0	0
	VI. Strategic Management	All	Gen	HR	Int	Ops	Any
70	Strategic Management Model	3	1	2	0	0	6
71	Analysis of the Task and General Environment	2	1	3	0	0	6
72	Strategic Mgt in Global Business Environment	2	1	1	1	1	6
73	Environmental Scanning and Industry Analysis	2	1	2	0	0	5
74	Strategy Implementation: Organizing, Staffing, etc.	2	1	2	0	0	5
75	Hierarchy of Strategy	2	1	1	0	0	4
76	Internal Organizational Scanning and Analysis	2	1	1	0	0	4
77	Building Competitive Advantage	2	0	1	0	0	3
78	Designing Strategy Supportive Control & Rewards	1	0	2	0	1	4
79	Functional Level Strategies	1	1	1	0	0	3
80	Business Level Strategies	1	1	1	0	0	3
81	Value Analysis	1	0	0	0	1	2
82	Growth Strategies	1	1	0	0	0	2
83	Designing a Strategy Supportive Organization	1	1	0	0	0	2
84	Strategy Formulation: Situation Analysis & Strategy	1	1	0	0	0	2
85	Strategic Management of Small Business	1	0	0	0	0	1
86	Strategic Decision-makers	1	0	0	0	0	1

**Note:* All = courses that all management majors must take; Gen = courses that students with the general management concentration must take; HR = human resources concentration; Int = international concentration; Ops = operations concentration; Any = total number of course in which a topic appears.

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