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PRACTICE ANALYSIS: BUILDING THE FOUNDATION FOR VALIDITY

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INTRODUCTION

A review of the literature associated with job analysis reveals two extremes of opinion as represented by the following provocative quotes:

Historically job analysis has been a relatively soporific area of industrial and organizational psychology, characterized by neither heated controversy nor prominent visibility in the research literature. (Harvey, 1991, p. 71)

Validation was once a priestly mystery, a ritual behind the scenes with the professional elite as witness and judge. Today it is a public spectacle combining the attraction of chess and mud wrestling. (Cronbach, 1988, p. 3)

Both our evaluation of practice analysis research and our professional experience with licensure programs indicate that practice analysis as a validation strategy is somewhere in between the two extremes described above.

Practice analysis:

- is a very important tool for validating licensing tests
- has become more interesting and visible than in the past
- can indeed provoke controversy (see Nelson, 1994; Schoon, 1985; Shimberg, 1990;)

DEFINITION OF PRACTICE ANALYSIS

Whether one views the process as soporific or a public spectacle, the fact remains that the systematic collection of data describing the responsibilities

required of a professional and the skills and knowledge needed to perform these responsibilities is the foundation upon which to build a viable and legally defensible licensure examination.

A variety of terms have been used to refer to the collection of this type of job-related data, including job analysis, role analysis, role delineation study, process analysis, and practice analysis. This chapter will use the latter term for several reasons. First, the term may be viewed as more accurately reflecting the comprehensive nature of professional practice, as opposed to the narrowly focused activities covered in a traditional job analysis (Smith & Hambleton, 1990). Second, traditional job analysis differs from licensure-related practice analysis, in that the former assesses responsibilities and knowledges necessary to successful job performance (McCormick, 1976), whereas the latter focuses on minimal though critical competencies required to protect the public (Kane, 1982b). Thus, when a practice analysis is conducted for purposes of validating licensure examinations, the professional responsibilities examined are those of an entry level, rather than advanced practitioner and these competencies may or may not be related to professional success.

LEGAL AND PROFESSIONAL STANDARDS PERTAINING TO PRACTICE ANALYSES

Professional licensure examinations are not developed in a vacuum. The increasingly heated political and legal climate in which these examinations are designed and administered demands knowledge of legal and professional standards and court decisions pertaining to the appropriate use of practice analyses.

Legal Standards

Uniform Guidelines on Employee Selection Procedures (1978). Although the *Guidelines* pertain to the use of job analyses in employment selection, these laws and the subsequent court cases based on them also are relevant to licensing because they characterize which types of procedures are viewed by the court as being appropriate for defining professional responsibilities and knowledges. The *Guidelines* clearly establish the importance of using job analyses to demonstrate the validity of selection procedures, but describe only in very general terms what constitutes acceptable job analysis methodologies. Any method of job analysis may be used if it provides information appropriate for the type of validity to be demonstrated (i.e., content-, construct-, or criterion-related validity). Procedures to be used for establishing each type of validity are outlined, again only in very general terms. With respect to establishing content validity—which is the goal of most practice analyses conducted within the context of licensure—the *Guidelines* require that the job analysis focus on observable work behaviors and tasks and work products, as opposed to personality and other individual characteristics that are not directly observable.

Professional Standards

Professional standards that pertain to practice analyses include: *Standards for Educational and Psychological Testing* (American Educational Research Associa-

tion, American Psychological Association, & National Council on Measurement in Education, 1985) and the *Principles for the Validation and Use of Personnel Selection Procedures* (Society for Industrial and Organizational Psychology, 1987). Although the *Standards* and *Principles* are not legal documents, they frequently have been used by the courts to determine the appropriateness of validation procedures (Harvey, 1991). Perhaps it is for this reason that many licensing agencies have elected to develop procedures that are in accordance with these professional standards, despite the fact that there have as yet been no Supreme Court cases regarding the validation of occupational tests.

Standards for Educational and Psychological Testing (1985). The *Standards* emphasize that job analysis is the primary basis for determining the content, and assessing the validity, of licensure examinations. Moreover, only responsibilities and knowledges crucial to protecting the public are to be included in licensing examinations. This, in turn, implies that practice analyses conducted in conjunction with licensing efforts also must focus on these minimal but crucial competencies. Responsibilities and knowledges important to successful job performance, but unrelated to protecting the public, are not appropriate to the domain of licensing.

Although the *Standards* stress the importance of conducting job analyses, no guidelines are provided for determining which procedures are appropriate for a given situation. These decisions are to be guided by professional judgement.

Principles for the Validation and Use of Personnel Selection Procedures (1987). The *Principles* also point out the importance of job analysis in establishing content validity, but like the *Standards*, do not specify when particular procedures should be used. However, some general recommendations are provided that would pertain to licensure-related practice analyses:

- sources of job-related information should be credible
- rating scales should have reasonable psychometric characteristics
- lack of consensus among subject matter experts regarding tasks, knowledges, skills, and abilities should be noted and carefully considered

Court Decisions Related to Practice Analyses

As noted previously, court decisions have helped to determine what does and does not constitute legally defensible practice analyses procedures. In their review of cases arising between 1971 and 1981, Thompson and Thompson (1982) state that a trend toward requiring job analysis has been evident beginning with the landmark case of *Griggs v. Duke Power Co.* (1971), which established the importance of the concept of job relatedness and thereby implied a legal need for conducting job analyses.

Subsequent cases (e.g., *Albermarle Paper Co. v. Moody*, 1975) found that validation procedures that did not include job analyses were insufficient. A more recent review, examining court cases dating from 1982, suggests that the courts have continued to point out the necessity of conducting job analyses and that emphasis on adherence to professional testing standards has increased (Kuehn,

Stallings, & Holland, 1990). This review identified three requirements for job analysis that have emerged in court cases during the last decade:

1. Job incumbents are knowledge specialists and should be part of the job analysis (Gillespie v. State of Wisconsin, 1985).
2. Performing an adequate job analysis does not ensure test validity. The failure to demonstrate a link between job analysis tasks and test content also can result in invalid tests (United States v. City of Chicago, 1984).
3. Regional or job context variability must be considered and, therefore, the incumbents sampled in the job analysis must be representative (Burney v. City of Pawtucket, 1983; Allen v. Issac, 1988).

It can be concluded that measurement experts and the courts are in agreement with the position taken in the *Standards* that content validity is the type of validity that is most relevant to licensure testing (Council on Licensure, Enforcement and Regulation, 1993). This type of validity, which can be established through practice analysis studies, provides a strong underpinning of quality and defensibility for assessment for licensure as well as meeting testing industry standards. Although other types of validity studies, such as those demonstrating construct- or criterion-related validity also may be relevant, they rarely are required as evidence for validity.

Other Legal and Professional Considerations

Smith and Hambleton (1990) have noted that the criterion by which the courts have assessed validation procedures for licensing examinations is not as rigorous as that of the *Standards*, creating a climate in which a licensing board can develop a licensing exam that is legally defensible, but does not meet testing community standards. They conclude that it is professionally inappropriate to maintain that legal defensibility can serve as the sole basis for developing and validating licensure examinations, but remark that:

except for the legal and political pressures created by social systems, sponsors of licensure examination programs are under no obligation to conduct validation studies or to make public the results of their investigation . . . In today's litigious society, sponsors of licensure examination programs seem to feel that they must estimate the dangers associated with conducting, or not conducting, various kinds of validity investigations. (Smith & Hambleton, 1990, p. 8)

Members of the testing community have pointed out that despite the existence of legal and professional standards and a substantial number of court cases elaborating on the importance of job analyses, there still remains a certain degree of ambiguity regarding appropriate practices for validating assessment procedures. Shimberg (1990) laments that the *Guidelines* and *Standards* do not give test developers and users sufficient guidance in assuring valid and fair assessment and suggests that the regulatory and testing community take a proactive stance. One positive approach has been developed by Madaus (1988). He proposes the creation of a non-governmental, self-regulatory agency to establish standards and monitor testing practices within the testing industry. Under such a plan, testing agencies would voluntarily seek to be "accredited."

PRACTICE ANALYSIS METHODOLOGIES

A variety of methodologies are available for conducting job and practice analyses. This section outlines the most frequently used methodologies and discusses their applicability within the context of licensure.

Functional Job Analysis

The Functional Job Analysis (FJA) (Fine & Wiley, 1971) methodology has been used by the United States Employment Service to categorize jobs for the *Dictionary of Occupational Titles* (U.S. Department of Labor, 1977). The first step taken in conducting a FJA is defining the purpose and goals of the occupation. A trained job analyst then identifies what must be done to accomplish the purpose and goals, by determining what the worker does (i.e., processes or procedures used to perform a task) and how it is done (i.e., physical, mental, interpersonal skills required during the processes and procedures). Job information is obtained through interviews with job incumbents and supervisors and direct observation of job-related activities. The goal of FJA is to analyze an occupation in terms of the degree to which it deals with data (e.g., numbers, narrative information), people (e.g., customers, co-workers), and things (e.g., computers, machinery).

Considerations. The FJA involves a very fine-grained analysis of occupational responsibilities and far exceeds the level of specificity required to describe a profession for licensing purposes. Indeed, by describing a profession in terms of data, people, and things, one may lose the essence of the profession and critical responsibilities and competencies may be overlooked.

Position Analysis Questionnaire

The Position Analysis Questionnaire (PAQ) (McCormick, Mechem, & Jeanneret, 1977) was developed to compare job characteristics across occupations. The questionnaire categorizes job activities into six major areas: Information Input (how job-related information is received), Mediation Processes (decision-making, reason and judgement, and planning), Worker Output (activities performed to accomplish a task), Interpersonal Activities (communication and interpersonal relationships), Work Situation and Job Context (physical working conditions and social environment), and Miscellaneous (methods of pay, type of work schedule, etc.). The questionnaire is completed by job incumbents or a trained job analyst.

Considerations. Because it was designed for the purpose of making comparisons across occupations, the items on the PAQ are very general and consequently, responses to the items may not accurately profile the unique aspects of the profession under study. The generality of the questionnaire also may make it difficult for respondents to determine how the items might apply to the specifics of their own professional activities (Landy, 1989). Another consideration is the large number of items on the PAQ that pertain to machine and equipment use. It has been suggested that because of this emphasis, the instrument may not be appropriate for analyzing professional, managerial, or some technical jobs (Cornelius, Schmidt, & Carron, 1984; DeNisi, Cornelius, & Blencoe, 1987).

Critical Incident Technique

During the first phase of the critical incident technique (CIT) (Flanagan, 1954), job incumbents or supervisors are asked to provide examples of actions they have engaged in or witnessed that were especially effective or ineffective in carrying out the responsibilities of the profession. These “critical incidents” include descriptions of the setting in which the action occurred, the specifics of the action itself, and the positive or negative consequences that occurred as a result of the action. The incidents are obtained via structured questionnaires or individual or group interviews conducted with incumbents, and sometimes, supervisors. Generally, hundreds of incidents are needed to accurately describe a professional’s role.

In the second phase of the process, the critical incidents are examined to derive categories of behavior or job dimensions into which the incidents can be classified. Subsequently, a panel of subject matter experts (SMEs) sorts the incidents into the newly created categories. Taken together, the classifications and critical incidents provide a composite of professional practice. Primoff (1975) found that CIT yielded job analysis data of a higher quality than FJA, PAQ, or standard task analysis and that the methodology was particularly useful in developing performance measures.

Considerations. The critical incident technique is a highly labor intensive, and thus costly, methodology that may not completely capture the full breadth of professional practice. No matter how many incidents are developed, some information regarding the profession may be omitted. Furthermore, the data collected via critical incidents often cannot be replicated, due in part to the fact that professionals performing the same responsibilities may have different ways of correctly and incorrectly engaging in these activities (Harvey, 1991). For these reasons, the role of critical incidents in licensure-related job analyses may best be limited to that of supplementing information previously obtained through SME panels and surveys of incumbents (Harvey, 1991; Robinson, 1981). Using this approach, critical incidents could be developed for each of the specific responsibilities, rather than being used as the basis for determining these responsibilities a priori.

DACUM (DEVELOP A CURRICULUM)

A structured brainstorming process, led by a trained facilitator, is at the core of the DACUM (Norton, 1985) method for conducting practice analyses. A panel of 8–12 expert professionals, representing the range of specialties within a field, is assembled to provide practice-related data through participation in the brainstorming process. To reduce potential bias, the panel facilitator should be an individual who has had no experience with the profession. Initially, the brainstorming process emphasizes doing rather than knowing or understanding (Faber, Fangman, & John, 1991; Norton, 1985). That is, task statements focus on observable behaviors.

Once the general responsibilities of the profession are identified, the panel develops task statements for each duty. Panelists then order the statements in a learning sequence, based on which responsibilities are learned and performed first

on the job. The process of identifying responsibilities is completed when the panelists reach consensus regarding the accuracy and sequence of the task statements produced. Typically, a DACUM process will result in 8–12 responsibilities and 50–200 tasks. After this has been accomplished, panelists proceed to generate lists that identify knowledge and skills, traits and attitudes, and tools and equipment necessary to the performance of the identified tasks.

Considerations. To date, DACUM primarily has been used to develop training programs for workers and professionals. As such, the information obtained is generally broader than what is required for licensing (i.e., minimal competencies). In its standard form, the usefulness of DACUM for deriving content validation data for licensure examinations may be limited, because the process is time-consuming and the information obtained comes from only a small sample of incumbents. However, the procedure could be adapted for licensure purposes by changing the focus of the brainstorming process to the critical knowledge, skills, and abilities necessary for competent practice and using this information to create a survey to be distributed to a larger group of incumbents.

A GENERAL METHODOLOGY FOR LICENSURE-RELATED PRACTICE ANALYSES

In response to increased concern regarding legal issues pertaining to validation and emphasis on adherence to professional standards, we recommend a general methodology for conducting licensure-related practice analyses that has the potential of providing defensible documentation and meeting legal challenges that may arise. We use the word “potential” because the methodology itself is not what assures a valid and defensible approach to the development of licensing specifications. Rather, it is the manner in which the methodology is executed that will provide the assurance that licensing boards seek. In addition to addressing important legal considerations, this practice analysis methodology is:

- relatively easy to conduct
- more cost effective than other approaches
- easily replicated as occupational and professional knowledge and competency requirements change
- useful for obtaining “buy-in” from key stakeholders in the licensing process

This is not to say that the methodology outlined below should be the model of choice for all licensing agencies. In some circumstances, it may simply be used as a point of departure for boards charged with the important function of establishing the validity of their assessment procedures. The methodology includes a number of processes and procedures that are important to developing defensible licensure procedures, regardless of which practice analysis technique the board ultimately chooses to utilize. Many components of the methodology can be combined with other practice analysis procedures, such as those mentioned previously, to create a practice analysis study that is tailored to the specific needs of the licensing board and the profession it represents.

Establishment of a Practice Analysis Advisory Committee

Perhaps no step in the practice analysis process is as critical to achieving credible and rigorous evidence for content validity as the appointment of an advisory committee of experts to assist in the implementation of the study. The members of the committee must be licensed individuals, recognized by their peers as qualified practitioners in the field, and whose licenses are valid and reputations unblemished by consumer complaints. If the program is new and there are as yet no licensees, the committee should consist of leaders in the field, who are active in the professional community and recognized by their peers for their expertise. At times, it may be appropriate to have other groups, such as consumers and educators (as opposed to practitioners), represented on the committee.

The overall role of the advisory committee is to guide the entire practice analysis process and to recommend the responsibilities, skills, and knowledges necessary for competent practice and the protection of the public from financial or physical harm. More specifically, committee members, usually with the assistance of a technical consultant:

- provide references and other documents as needed to develop the lists of responsibilities, skills, and knowledges related to the practice of the profession or occupation under consideration
- assist in the design of a survey instrument
- advise on sample selection and ways of reaching the population under study
- review all materials developed for, and data resulting from, the practice analysis study

Committee members must be willing and able to commit sufficient time to participate actively in the process. This participation includes attending several days of meetings, engaging in work assignments as preparation and follow-up to meetings, and providing technical and political and professional support for the entire research process.

Advisory committees typically comprise 12–15 members. This number is necessary to obtain the diverse representation required for broad input from the field and to develop the consensus necessary for the advisory process. The literature of group process suggests that an 8-to-10-member committee is optimum for a working committee; however, in the case of practice analysis committee work, it is important to balance the need for appropriate representation with the ability of the group to work together. In fields in which there is little variability in theoretical orientation or professional practice (e.g., hearing aid dispensers) 10 people may be excessive, whereas, in other more diverse fields (e.g., psychology), that number may be barely enough.

Literature/Document Review

One of the first responsibilities assigned to the advisory committee is to supply the technical consultant with documents and materials related to the profession. These materials might include any or all of the following: competency statements,

training curricula, job descriptions, results of manpower studies, research reports, journal articles, specifications of previous examinations, previous state practice analyses, and studies conducted in other states or by national agencies. The document review helps the technical consultant to:

- learn how others expect individuals to practice
- become familiar with the language and vocabulary of the occupation or profession under study
- develop a preliminary list of responsibilities, skills, and knowledges without using the committee members' valuable time

These materials will serve as a resource for determining whether the board should build on previous work that has been done in its home state, in other states, or by a national organization.

At this stage of the practice analysis process, the goal is to obtain a comprehensive picture of the profession and, therefore, all information relevant to professional practice is included in the document review and development of a preliminary list of responsibilities, skills, and knowledges. During later stages of the process, advisory committee members and other subject matter experts narrow the list of responsibilities, skills, and knowledges considered to those critical to competent performance, based on survey data and their professional experience.

Because the document review process can be time-consuming and the materials for some disciplines can be quite extensive, it is suggested that advisory committee members and/or the technical consultant first evaluate the usefulness of the materials collected by the committee. Criteria for determining which documents are critical include (Wolf, Wetzel, Harris, Mazour, & Riplinger, 1991):

- Is the document recent?
- Is it clearly written?
- Can essential information be uncovered easily?
- Has it been useful to the audience for which it was intended?
- Has it been used to develop test specifications?

Not all occupations and professions have a foundation of previous work and information of the quality and rigor required by boards. If the review of existing materials does not reveal an appropriate content validity alternative, the next step is to develop a survey to be administered to a group of incumbents. Even when there exists adequate documentation regarding the profession, the advisory committee may choose to conduct a survey of incumbents to confirm and supplement the information produced in the document review.

Practitioner Interviews

A first-hand verification of what tasks an incumbent actually performs, obtained through telephone or face-to-face individual interviews, is an essential part of the practice analysis process and the first step in developing a practice analysis survey (Blum & Naylor, 1968). Typically, 5–10 practitioners should be interviewed. The size of the sample is dependent on the diversity in the field, the

degree of the relationship of the scope of practice to related disciplines, and the number of practicing incumbents in the state.

The interview questionnaire is based on information gathered from the literature/document review process described above. Although the technical consultant has acquired knowledge of the field through the document review process, it is important that he/she not impose any biases regarding the inclusion of various responsibilities, knowledges, and skills and the organization of this information. Consequently, interview questions are open-ended and general. However, knowledge of the field is helpful in understanding the interviewee's responses and may assist the consultant in formulating any probes necessary to elicit further elaboration or clarification.

During the interview process, particular care is taken to discern the major practice dimensions of the role of the practitioner and the tasks that would be subsumed under these dimensions. Then information is gathered about the knowledge, skills, and abilities required to perform these tasks. Where possible and appropriate, interviewers may observe the practitioner performing on the job (e.g., delivering client services, performing engineering or construction tasks, handling real estate transactions).

Draft Survey Instrument

Following completion of the practitioner interviews, the technical consultant develops a preliminary list of: the major responsibilities of the profession, the tasks subsumed within these responsibilities, critical skills required to carry out the tasks, the major knowledge areas required for competent performance of critical skills, and the specific knowledges included in these areas. A survey instrument is drafted based on these lists.

For licensing purposes, the survey instrument is typically designed so that the responsibilities, skills, and knowledges are targeted for the entry-level practitioner. In some cases, a board may wish to distinguish between the types of practitioners in a profession (i.e., nurse aide vs. nurse assistant vs. LPN vs. RN) by conducting a role delineation study. These studies are designed to tease out the scopes of practice for various levels of responsibility while at the same time disclosing any common job content across these levels.

Occasionally, boards question the need for conducting a document review and practitioner interviews prior to devising a draft of the survey instrument. They consider the review and analysis and synthesis of information by technical consultants to be time-consuming and expensive and instead, offer the alternative of the board or a committee nominated by the board sitting down at a meeting to develop the list of responsibilities and knowledges *in vivo*. However, there is empirical evidence that without the impartial and objective preparatory work of consultants, the phenomena of selective perception, beliefs, and value systems will subvert the "expert judgment" of the most well-meaning group of professionals (Pottinger, 1979). That is, no matter how large the size of the committee, how professional the members are, or how broad the diversity in viewpoints represented, the group may still fall victim to subjectivity.

Upon completion of the draft survey, committee members are brought together to review the document. They are asked to consider the responsibilities, skills, and knowledges included in the draft survey and determine if terminology is used correctly and whether any deletions or additions are needed. The instructions for completing the survey are evaluated for clarity and rating scales (e.g., importance, frequency, and criticality) are selected. Having a draft inventory prepared in advance for committee review reduces the amount of time needed for the meeting and the amount of bias that might emerge if the instrument were created on the basis of committee input only.

The advisory committee also selects survey items that will be used to determine the demographic characteristics (e.g., age, gender, education, years of professional practice) of the survey sample. Obtaining a profile of the sample allows the board to determine the extent to which the sample responding to the survey is representative of the licensing population at large. If the sample size is large enough, respondent characteristics also can be used as analytic categories for determining if any meaningful differences occur between and among the various subgroups.

Following the review of the document, the committee determines how practitioners will be sampled for the survey. It is important that individuals selected for the survey sample are licensed incumbents in good standing. Other subgroups that might be included in the survey sample are educators, consumers, and incumbents in a related discipline. Educators are one of the most common subgroups selected to participate in the survey because education requirements typically are part of the candidate eligibility process. Analyses comparing the ratings of practitioners with educators will assist the state and educational institutions in ensuring that critical practice requirements are included in training and educational offerings.

Pilot Test of Draft Survey

After the survey instrument has been revised, based on the comments and suggestions of the advisory committee, it is sent to advisory committee members for review and approval for the pilot test. Subsequently, the survey instrument is piloted with a small sample of professionals recommended by the committee or the board. The pilot sample should consist of practitioners who have not been involved in the development of the survey. Sample size for the pilot depends on the number of professionals in the field. For fields in which there are a large number of practitioners (500–1000), a pilot test of as many as 30–40 professionals can be conducted. However, there are many professions, particularly those that are highly specialized, in which the number of practitioners is relatively small (100–200). In these situations, a smaller pilot sample (e.g., 10–15 professionals) can be used.

The individuals in the pilot sample are interviewed to discuss their reactions to the survey, whether the directions and items are clear, and if the survey content is both accurate and complete. This feedback is discussed with the advisory committee and the final revisions to the survey instrument are made.

Administration of Practice Analysis Survey

Upon the final approval of the advisory committee, the survey is distributed to the survey sample. The survey is accompanied by a cover letter explaining the

purpose of the practice analysis and requesting the cooperation of the addressee. Typically, the letter is signed by the chair of the board and perhaps a well-regarded leader in the profession who might be known to licensees in the state or across the country.

Analysis of Survey Data and Preparation of Practice Analysis Study Report

Data analyses are designed to identify the core tasks and core knowledge areas judged to be most critical to competent performance. If the sample is large enough, subgroup analyses can be performed using the demographic variables selected by the committee. These analyses will assist the committee in determining whether there are significant differences in responses among various subgroups. If any response biases or differences are revealed, the committee will be advised to take this information under consideration when interpreting the survey data.

After the data analyses are conducted, a meeting of the advisory committee is convened to review the results of the practice analysis study. At this time, decision rules are formulated for determining which responsibilities, skills, or knowledges can be eliminated. Kane (1984) suggests that the specification of content for licensing tests does not require an exhaustive listing of the knowledge, skills, and abilities required to practice. Instead, the advisory committee should focus on selecting those skills and knowledges most critical to competent entry-level performance, based on their professional judgement and data from the survey. In other words, the key objective is to select those knowledge and skill areas that are “need to knows” rather than “nice to knows.” Rationales for all decisions made by the committee are documented.

The final phase of the practice analysis is the drafting of a report, describing the methodology of the study, the data analyses, and the decision-making rules used by the advisory committee to select the critical responsibilities, skills, and knowledges. After the draft is reviewed and revised by the advisory committee, a final report is issued to the board by the committee. The report provides a solid foundation for both the development of assessment procedures and the documentation of a content-valid licensing process.

DEVELOPMENT OF SPECIFICATIONS FOR ASSESSMENT PROCEDURES

Conducting a practice analysis is not sufficient for ensuring the content validity of a licensure examination. The manner in which the survey data are used to develop specifications for assessment procedures also is crucial to validation efforts. This process begins with the selection of a specifications development committee with essentially the same characteristics as those of the advisory committee described previously. Although this committee should be independent of the advisory committee, it is advisable to have some overlap in members. This allows the new specifications committee to benefit from the expertise and lessons learned by the advisory committee, while opening up the process to another set of expert judgements that can confirm and expand upon previous efforts.

The first step in the development of examination specifications is a review of the advisory committee's report on the practice analysis process and study findings. The specifications committee then proceeds to confirm and refine the most critical responsibilities, skills, and knowledge to be examined based on the results of the practice analysis, the advisory committee's recommendations, and their professional experience.

Although the practice analysis data play a key role in guiding decisions regarding the critical responsibilities, skills, and knowledges, the consensus of the subject matter experts represents "the last word" on the matter. For example, an emerging knowledge area in the field may receive low importance ratings, but if the committee believes the knowledge to be critical to competent professional practice in the future, they may elect to include the knowledge area in the examination specifications. Also, it must be kept in mind that for licensure purposes, the responsibilities, skills, and knowledges selected to be measured by the assessment procedures must be critical in the sense that they have a significant impact on client outcomes. In other words, the relationship between that which is measured and client outcomes should be explicit (Kane, 1982b).

After determining the most critical responsibilities, skills, and knowledges, the committee links each specific knowledge and skill to the appropriate responsibility area, thereby producing a specifications matrix (see Figure 1).

This is accomplished by determining, through group consensus, whether the knowledge or skill is crucial to competent performance of the responsibility.

A key decision to be made by the committee regards the form the assessment procedures will take (i.e., written, oral, and/or performance examinations). The

Figure 1. Example of a test specifications matrix.

	I	II	III	IV
I. SOCIO-CULTURAL SYSTEMS (35% of exam)				
A. Language/Language Use (20% of exam)				
Aspects of English language:				
1. Structural properties (e.g., grammar, semantics, pragmatics)	1 item	2 items		1 item
2. Socio-linguistic factors (e.g., register, dialect variances, context)	1 item	2 items		1 item
Aspects of American Sign Language:				
3. Structural properties (e.g., grammar, semantics, pragmatics)	1 item	4 items		1 item
4. Socio-linguistic factors (e.g., register, dialect variances, context)	1 item	4 items		1 item

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Note. Knowledge areas are listed on the vertical axis; responsibilities are listed on the horizontal axis. For responsibilities, I = Preparation for Service Delivery, II = Provision of Service, III = Post-Service Closure, and IV = Professionalism.

most common form of assessment for licensure is the written multiple-choice examination. The assumption is that this format is the most reliable, valid, and cost-effective. Although used much less frequently, clinical simulations (i.e., case scenarios that branch into different questions depending on the answers given for previous questions), performance testing (i.e., trained assessors evaluate the candidate's performance of critical professional tasks) and other written test formats, such as matching and multiple true-false, also are promising formats.

In the 1980s, many agencies dropped performance testing because of the expense associated with it and the high correlation between performance scores and scores on written tests. However, Hambleton and Rogers (1986) believe there is validity evidence to support the added utility of performance examinations. Indeed, in recent years, there has been an increasing trend toward adding performance testing to licensing and credentialing procedures (e.g., teacher certification, nurse aides, massage therapists).

Schoon (1985) provides a framework that specifications development committees may find useful when evaluating which assessment procedures should be used for licensure. He argues that professions should be analyzed and classified according to a continuum that is anchored at one end by purely cognitive skills (e.g., philosopher) and by manual skills (e.g., meat packer) at the other end. Competency measures should reflect the profession's position in this continuum. On a less theoretical level, the committee should also be guided by their response to the following question: "What critical factors would the performance test, oral examination or other techniques measure that cannot be measured effectively with more cost-efficient examination formats?"

Once a determination has been made regarding the assessment procedures to be used, the committee must decide on the relative weights of the various competencies to be measured by each procedure. It is important to recognize that the weighting of various components should not be based solely on importance or frequency ratings derived from practice analysis data. There may be a number of problems that fall into the "uncommon, but harmful if missed" category that should be given greater emphasis than might be indicated by the study data (Rakel, 1983).

The final phase of specifications development is the formulation of operational definitions for the responsibilities, skills, and knowledges to be measured by the assessment procedures (Yalow & Collins, 1985). These definitions expand upon the specifications by citing the actual situations and knowledge to be tested and will serve as detailed guidelines for item writers and test developers. Operational definitions also provide a framework for assessing the content validity of the examination (Hambleton & Rogers, 1986).

FREQUENTLY ASKED QUESTIONS BY LICENSING BOARDS

Who should be involved in overseeing the practice analysis process?

Pottinger (1979) has branded the expert consensus validation technique as the most dangerous approach for defining competence. Although this may be true when it is used as the sole method of validation, this is not the case when experts are used as part of a broader validation strategy, which also involves the collection of survey

data. Indeed, the appointment and active participation of subject matter experts is an essential part of a comprehensive practice analysis study.

Aside from being licensees in good standing or in the case of new programs, leaders in their field, committee members should represent diverse settings and interests. Most important to industry standards of quality and fairness, committee members should be representative of diversity in the profession in terms of geographic region, ethnicity, educational and experiential backgrounds, and practice settings. The recent passage of the Americans With Disabilities Act points to the importance of also including on the committee individuals who represent practitioners with disabilities.

An angry failing candidate will not only subject the test construction and administration procedures to question and scrutiny, but also may request the names of individuals who have been involved in the process. If these individuals are not respected, do not represent various subgroups within the profession, or are not active practitioners, the validity of the examination could be called into question.

Can the results of national practice analyses be used as validation for individual state licensure examinations?

Each jurisdiction granting licensure is legally responsible for determining examination content; however, this does not mean that each state must conduct a unique practice analysis. Many national organizations have assumed the burden of content validation, test construction, and administration. Although this has been at the cost of states giving up some control over content or jurisdictional issues, these boards have not lost the opportunity to participate in the process and ensure that the national procedures are valid for their jurisdiction. State boards can fulfill their legal responsibilities by reviewing the final practice analysis report for appropriateness to their jurisdiction, setting their own passing scores, or having practitioners from their jurisdiction included in the practice analysis used to develop the national examination (Smith & Hambleton, 1990). If desired, a jurisdiction also can conduct its own practice analysis and compare findings with the national study. The involvement of national organizations has improved the quality and consistency of state licensing efforts and encouraged reciprocity, thereby enabling licensees to move more freely across borders to pursue their careers.

One example of the successful involvement of a national organization in licensure and certification is that of The Council on National Certification of Massage Therapists, which was formed to provide a national voluntary certification program for massage therapy. The foundation of the program was a national practice analysis that involved a large nationally representative sample. Even prior to the inaugural administration in 1992, several states were reviewing the practice analysis and the examination specifications to determine whether they would adopt the program for use in their licensing process. To date, six states have adopted the new program.

Another example of states using practice analyses conducted by national organizations comes from the activities of The National Council of State Boards of Nursing (NCSBN), which is charged with the responsibility of developing licensure examinations for its state member boards. Each year, the program licenses

approximately 170,000–180,000 nurses. The foundation of this program is a series of national role delineation studies that are conducted periodically by the NCSBN. These studies are major endeavors; they are costly, require over a year to conduct, and typically, are performed by a respected technical consulting firm. The NCSBN provides state boards with a quality service that is more cost-effective than performing validation studies in-house. Such a service also assures reciprocity for licensed individuals and allows for the mobility needed in the highly dynamic healthcare environment.

In some cases, national testing agencies have developed testing programs for licensure. The testing agency assists states in adopting the program by conducting validity studies. States can then determine if the program and its offerings meet their needs and regulatory requirements.

What rating scales should be used in the survey?

Ratings of frequency of task performance, amount of time spent engaged in a task, and the importance and criticality of a task, knowledge, or skill are the most commonly used scales on practice analysis surveys (see Figure 2 for examples of rating scales).

In selecting the rating scales to be used, it is important not to have too many ratings per item on the inventory. Using more than two ratings for each item (e.g., frequency and importance) is tedious and confusing for the survey taker. This is likely to decrease both the response rate and the accuracy of the data collected.

Figure 2. Examples of practice analysis rating scales.

EXTENT OF COMPETENCE AT LICENSURE

- 0 Not performed
- 1 Competence not essential at time of licensure
- 2 Some degree of competence essential
- 3 Full competence is essential

TIME SPENT ON RESPONSIBILITY

Taking into account all of the things you do on the job during the course of a year, what is your best estimate of the amount of time spent dealing with this responsibility?

- 0 I do not have this responsibility
- 1 I spend very little time on this responsibility
- 2 I spend some of my time on this responsibility
- 3 I spend a lot of my time on this responsibility

EXTENT OF COMPETENCE AT ENTRY-LEVEL

- 0 Not necessary for a beginning practitioner
- 1 Not necessary—is learned on the job
- 2 Desirable but not necessary
- 3 Some degree is necessary, however, performance should improve on the job
- 4 Full competence is necessary for a beginning practitioner

Figure 2 (continued)

IMPORTANCE

Regardless of the amount of time you spend, how important is this responsibility to your practice?

- 0 I do not have this responsibility
- 1 Of little or no importance
- 2 Moderately important
- 3 Very important
- 4 Of extreme importance

CRITICALITY

How important is competence in this responsibility for an entry-level practitioner if he or she is to adequately serve and protect the public?

- 0 Of no importance
- 1 Of little importance
- 2 Moderately important
- 3 Very important
- 4 Extremely important

EXTENT OF KNOWLEDGE

To what extent must an entry-level practitioner master this specific knowledge if he or she is to adequately serve and protect clients?

- 0 NONE REQUIRED—Knowledge of this area is not required
- 1 BASIC CONCEPTS—Ability to understand basic concepts and information encompassed by the knowledge area
- 2 APPLICATION—Ability to use and apply concepts from the knowledge area to conventional practice situations
- 3 IN-DEPTH MASTERY—In-depth mastery of the knowledge area and the ability to apply it to complex or unique practice situations

The degree to which rating scales are redundant or highly correlated also must be considered. Research has shown that relative time spent and frequency ratings are highly correlated with importance ratings when both scales are applied to each item (Harvey, 1991). Similarly, Friedman (1990) found that time spent and importance ratings on a task inventory for managers were redundant. Thus, using highly correlated rating scales adds little additional information to the results of practice analysis and the subsequent development of test specifications, but may increase the burden on the survey respondent.

Another factor to consider when selecting rating scales is the unique goal of a licensure examination—to protect the public from harm. Kane (1982a) recommends that practice analyses not depend solely on frequency data or even weight this data heavily. He argues that the gravity of the consequences to the public of an incompetent practitioner dictates that analyses of survey data should place the greatest emphasis on ratings of criticality or importance.

How should the sample for the survey be selected?

Farrell, Stone, and Yoder (1976) suggest that three basic factors be taken into consideration in any sampling design: (a) the sample should be representative of the population from which it is being drawn, (b) it should be as small as considerations of precision and dependability permit, and (c) it should be obtained by some systematic probability process (e.g., sampling every fifth name on the current membership list of a professional association).

Determining whether sufficient representation has been obtained in the sample is not as straightforward as it would seem at first glance. Ethnic/minority representation provides a good illustration of this point. Many records on licenses do not have ethnic information and answers to questions on the survey related to ethnicity are voluntary. If data on ethnic representation in the field are unavailable, boards must determine, based on their experience and best judgement, the approximate proportion of individuals in ethnic subgroups they believe to be practicing in the profession. If a professional association of minority practitioners exists, they should be contacted by the board to provide input on the matter.

When survey returns appear to fall short of estimates of representation by various subgroups within the profession, the board may wish to take additional measures to ensure input from these population segments. For example, in a national practice analysis of psychologists, it was found that the size of the overall survey sample and the low percentage of African Americans in the profession resulted in a very low number of African American respondents. A decision was made to oversample this segment by including the entire membership of a national association of African American psychologists in a special mailing of the survey. This procedure was successful in yielding a sufficient number of responses to provide adequate representation in the survey sample (Rosenfeld, Shimberg, & Thornton, 1983).

Characteristic patterns of responding by various groups within a sample also have a bearing on sample selection. Landy and Vasey (1988) found that the frequency ratings of experienced police officers differed significantly from less experienced officers; however, there were no differences between the reported tasks of white, black, and Hispanic officers and no differences were found when the educational levels of the incumbents were contrasted. These results were supported by a subsequent study in which ratings by subject matter experts varied depending on their job experience, but were only minimally affected by educational level and race (Landy & Vasey, 1991).

In contrast to the Landy and Vasey (1988, 1991) findings, research conducted by Schmitt and Cohen (1989) revealed ethnic and gender differences in the ratings of middle managers on time spent and difficulty scales for various job tasks. There is also some question as to whether job experience plays a significant role in ratings for all occupations. Silverman, Wexley, and Johnson (1984) found that job incumbent age and job experience did not affect the ratings of secretaries and clerks.

Given the mixed findings in research on respondent characteristics, it is recommended that the sample surveyed include the full range of professional experience and demographic characteristics in order to get an accurate picture of the

relative values for different scales used in the survey. It should also be noted that legal guidelines dictate that certain sample parameters must be adhered to, regardless of whether research findings indicate the absence of significant differences in ratings (e.g., ethnicity, gender).

The size of the sample required is a question frequently raised by boards. There is no magic number for the size of the sample necessary to obtain good data; however, it is clear from the discussion above that fulfilling the requirements of broad representation in the field is more important than sheer numbers. At times, because of controversy in the profession or a highly vocal subgroup, it may be important to survey the entire population so that each licensee has an opportunity to provide input to the process.

How can I ensure a high response rate for the practice analysis?

First, one must consider what an acceptable response rate might be for the survey. Unless the survey is large enough to allow a statistical determination of this number, the desired response rate will be determined subjectively (Fowler, 1988). Response rates for practice analysis surveys generally range from 20% to 60%, with most falling in the range of 25% to 35%. Rates of 50-60% are considered to be excellent. Nonetheless, the risk of bias with response rates of this size is high. With the guidance of the technical consultant, advisory committee members can assess potential biases by determining whether: (a) the sample was representative (based on demographic data on respondents) and (b) the results of the survey are consistent with their impressions of professional practice.

Boards must balance the desire for a high response rate with the limited resources (i.e., time, labor, and funding) available to devote to the project. However, there are a number of strategies that are easy to implement and can help to increase the return rate of respondents. Pilot testing during the earliest phases of the practice analysis improves response rates by eliminating potential sources of difficulty, such as poorly worded items, an excessive number of items, and confusing rating scales (Fowler, 1988). A compelling cover letter from a respected practitioner, asking for respondents' to provide their support and share their professional expertise can be very effective in boosting returns. Follow-up post cards are effective reminders to those who are slow to respond and have put the survey aside to fill out at a later date. Finally, in surveys that have relatively small samples, personalizing contact with respondents may optimize response rates. The board can contact a network of key professionals who in turn will enlist others to call incumbents and encourage them to complete and return their surveys (for further information on maximizing response rates, see Dillman, 1978).

What types of analyses should be performed on the data?

Sophisticated data analyses on practice analysis data are not required. A decade ago it was common for consultants to run factor analyses on data to determine if job dimensions and knowledges could be clustered in a meaningful way (Goodfellow, 1977; Rosenfeld & Thornton, 1976). These complex analyses were difficult to interpret and did not prove to be useful in uncovering core tasks, knowledges, and skills. For example, factors that emerged from the analyses

typically were not interpretable as important to the dimensions of the profession and dimensions that subject matter experts agreed were important did not emerge as factors (Cranny & Doherty, 1988). Today, these types of analyses are seldom performed. Data can be analyzed by examining the means and standard deviations of survey ratings. If unusual patterns are discerned in the data, additional analyses can be conducted to determine if any notable subgroup differences exist.

How can the cost-effectiveness of practice analyses studies be improved?

The primary factors that influence the cost of a practice analysis are the size of the sample and whether the practitioners involved in the process are paid or volunteer. Cost savings can be accomplished in several ways. Selection of the most parsimonious sample size will reduce survey administration and processing expenses (e.g., postage, printing, data entry). If the sample to be surveyed is very large, survey booklets that can be optically scanned may reduce data entry costs. Performing certain tasks “in-house” (e.g., data entry) also may reduce costs. The expenses of advisory committee members and other professionals involved in reviewing the draft survey may be reduced if they volunteer their time. Travel expenses also may be reduced if committee meetings can be held the day before or after professional conferences and conventions that the members would otherwise be attending. Finally, savings may be achieved if the board relies on the interest and professional responsibility of the survey sample to motivate their completion of the instrument, rather than providing payment for doing so.

How often should a licensing board conduct a practice analysis?

Experts in the field—practitioners—are the best judge of this and their decision is highly dependent on the nature of their profession. For example, the field of opticianry is not changing as rapidly as oncology nursing. If the research and knowledge base or technology of a profession is changing rapidly, or if new specialties are emerging in shorter periods of time, the time between practice analysis updates should reflect this momentum. Werner (1990) cautions that practice analyses can be very costly so their updates should not be planned just because a set period of time has elapsed. However, he suggests that the need for re-analysis be considered at least every 5 years.

When is a technical consultant needed and what should I look for in a consultant?

In most cases, licensing boards use technical resources provided by state licensing agency staff or if the state does not have staff resources, the board typically will hire a technical consultant to direct and facilitate the practice analysis process. Although members of the board may be involved in the technical process by gathering information, nominating content and practice experts, and reviewing documents, generally they do not feel that they have the expertise and/or the time to be actively involved in conducting technical studies. Board members also may utilize technical consultants to avoid any appearance of bias or conflict of interest (i.e., the appearance that the practice analysis is an intentional effort to exclude members of a profession or occupation from licensure, rather than an effort to define the profession).

Technical consultants, whether they be internal or external to the licensing agency or board, should be experts in educational and psychological measurement

or industrial/organizational psychology. However, it is important that this expertise also has been supplemented by professional experience in the development of certification and/or licensing programs. As noted previously, the types of job analysis techniques typically used in the development of selection and promotion procedures are not always appropriate to the development of licensure examinations. Moreover, licensure-related practice analysis must be conducted with an awareness of the intricacies of the legal and political climate in which a licensing board must operate. The checklist in Figure 3 can assist boards in evaluating previous or current work conducted for the board by technical consultants (Knapp, 1991).

Figure 3. Checklist for evaluating the practice analysis services of technical consultants.

YES	NO	
___	___	1. Are the goals/purposes of the practice analysis study clear and shared by key players or subgroups in your organization or profession?
___	___	2. Is the validation strategy consistent with the <i>Uniform Guidelines</i> and the <i>Standards for Educational and Psychological Testing</i> ?
___	___	3. Are the experts involved appropriate in background, number, and expertise? Can they provide the most accurate picture of the field?
___	___	4. Are the experts committed to the project and willing to dedicate the time necessary for the project?
___	___	5. Have all essential documents concerning responsibilities, skills, and knowledges necessary for practice been collected?
___	___	6. Is the survey instrument designed around the level of practice to be studied?
___	___	7. Are the responsibilities, skills, and knowledges in the instrument strongly linked to professional outcomes and everyday practice?
___	___	8. Are the responsibilities, skills, and knowledges within the profession's scope of practice?
___	___	9. Has the appropriate sample been selected?
___	___	10. Is there a strategy in place to achieve the best possible return rate?
___	___	11. Will the data lead to weighting responsibilities, skills, and knowledges according to their importance for practice?
___	___	12. Are the study methods and results communicated to the profession in an accurate and easily understood manner?

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