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An assessment of the validity of the job analysis survey instrument used to define the content of tests used for a statewide teacher certification program.

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An Assessment of the Validity of the Job Analysis Survey Instrument Used to Define the Content of Tests Used for a Statewide Teacher Certification Program

A Dissertation Presented

By

Scott M. Elliot

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ABSTRACT

An Assessment of the Validity of the
Job Analysis Survey Instrument
Used to Define the Content of Tests
Used for a Statewide Teacher Certification Program

(February 1987)

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Increasingly, states are requiring that educators pass one or more tests in order to obtain a license to teach. Legal and professional standards require that these tests be shown to be job-related. Establishing the job-relatedness of the content of teacher certification tests is typically accomplished by conducting an empirical job analysis. In teacher certification, this typically involves surveying job incumbents (teachers) to obtain empirical data

on the importance and frequency of use of the test objectives to be measured. While considerable effort is devoted to the validation of the tests themselves, little has been done to establish the validity of the survey instruments used as a basis for conducting the job analysis.

This dissertation assessed the validity of the job analysis survey instrument used to define the content of tests used as part of a statewide teacher certification testing program. The construct validity of the instrument was assessed in three ways. First the extent to which the underlying dimensional structure of the instrument conforms to the expected structure was evaluated using factor analysis. Second, expected differences in objective ratings between known criterion groups was assessed using MANOVA. Third, the relationships between holistic ratings of each major content subarea identified on the instrument and the average ratings for the objectives in that subarea were examined. The results strongly support the validity of the job analysis survey instrument. The underlying dimensional structure, determined through factor analysis, closely matched the conceptual structure predicted based on the survey subareas. Six of the seven hypotheses examining differences in the job analysis survey results among the known criterion groups were confirmed. A strong relationship between the holistic subarea ratings

and individual objective ratings was found.

The implication of the results, limitations associated with the study, and future research are discussed. The results provide considerable evidence of the validity of the instrument and the research model offers a useful methodology for validating other measures. Limitations associated with the difficulty in proving validity, the design of the survey instrument, and dealing in an applied research context are discussed. Future research aimed at collecting additional validity evidence is recommended.

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CHAPTER I

INTRODUCTION

Overview.

Over the past two decades an increasing number of states have required educators to pass one or more tests in order to obtain a license or certificate to teach. Almost all 50 states have mandated some form of competency testing for teachers and the remaining states are moving in this direction.

Requiring teachers to meet an established set of criteria in order to teach is not a new phenomenon. In the early part of the nineteenth century, teachers were required to have basic proficiency in reading, writing and arithmetic (Rubinstein, McDonough and Allan, 1982; Jenzer, 1983). The advent of compulsory education later in the nineteenth century brought an extension of these criteria to include proficiency in pedagogy and other areas of professional technique as well as knowledge of the subject matter to be taught (Rubinstein, et al. 1982). While the emphasis, responsibilities, and methodologies for assessing prospective teachers has changed, these three elements of teacher assessment, basic skills, pedagogy and subject matter knowledge have prevailed as the central elements of teacher assessment.

Within the past decade, teacher credentialing has changed dramatically. With the increased demand for accountability in the educational system as a whole has come a growing concern over teacher competence. Hardly a day passes without an article in a major newspaper or periodical about teacher competence. The New York Times (Maeroff, 1983), and Harpers (Traub, 1983) are among the popular periodicals that have joined the list of publications that have raised concern over teacher competence. Perhaps the strongest voice on this issue came from the nationally publicized report issued by the National Commission on Excellence in Education (1983): A Nation At Risk: The Imperative for Educational Reform. The report criticizes current educators, raises concern about prospective educators graduating from teacher training institutions, and calls for several reforms in teacher education including stepped-up assessment of prospective teachers.

Teachers and professional teacher organizations have been, at best, skeptical of increased teacher assessment and testing of teachers citing problems elsewhere in the educational system (e.g., teacher salaries, school discipline). Even resistance among teacher groups is waning, however. In response to increased pressure for teacher accountability Albert Shanker (1985), head of the second largest teacher's union--American Federation of Teachers (AFT), has come out in support of a national teacher's test to be developed and controlled by the AFT.

This growing accountability movement has led to increased efforts to establish or redefine state-level programs responsible for licensing teachers. Whereas most of the burden for ensuring the competency of prospective teachers has traditionally fallen on the shoulders of teacher training institutions, increasingly state government has come to play a role in this process through licensure. Licensure is the "process by which an agency of the government grants permission to an individual to engage in a given occupation upon finding that the applicant has attained the minimal degree of competency required to ensure that the public health, safety and welfare will be reasonably well protected." (U.S. Department of Health, Education and Welfare, 1977, p.4). Although most states still require candidates for licensure to successfully complete an approved teacher education program, states are increasingly requiring some additional form of standardized assessment as part of the licensure process.

Tests may be administered at various points in the teacher certification process. Administration of standardized assessments typically occurs at one or more of the following decision points:

1. Admission into a teacher education program,

2. Upon completion of the teacher education program,

3. During the first year of teaching, and

4. During later years of teaching (renewal).

While tests have been used to make competency decisions at all four points, most teacher licensing programs have focussed on the first three points as part of the initial teacher certification process.

While testing for teacher certification may include any number of assessment methods ranging from the review of college coursework to in-class observation, most assessment programs include a paper and pencil test of knowledge of the content to be taught and/or, knowledge of pedagogy. The content to be included on the tests is typically defined through some form of job analysis, whereby the potential test content is verified by job incumbents as relevant, necessary or important to the teaching job.

This dissertation assesses the validity of the job analysis survey instrument used to define the content of a professional development (i.e. pedagogy) test for a state teacher certification testing program. This first chapter provides an overview of the testing program and discusses the nature of the problem for investigation along with the specific questions for investigation. The second chapter reviews the relevant literature in the area of job analysis. The third chapter describes the methods and procedures used to investigate the validity of the job analyses survey instrument. The fourth chapter presents the results of the validity study. A

discussion of the results and limitations of the research is provided in chapter five.

Nature of the problem.

Any instrument designed for certification or licensing, as is the case in teacher certification testing, must be shown to be job-related. It must fairly measure the content knowledge relevant to the job as performed by present job incumbents. Determining the job relatedness of content selected for inclusion in certification tests is endorsed by both the American Psychological Association (APA) (Standards For Educational and Psychological Tests 1985) and the Equal Employment Opportunity Commission (EEOC) (Uniform Guidelines on Employee Selection 1978). The guidelines require that the criteria used as a basis for certification must bear an empirical and logical relationship to successful job performance. For purposes of teacher certification, this suggests that test content should reflect the content knowledge or pedagogical skills required for teaching. While there are a number of ways in which this domain of knowledge can be identified, a systematic job analysis is typically used to establish an empirical and logical relationship between the test content and the teaching job.

Although determining the job-relatedness of the content proposed for testing is a critical step in the development of teacher licensing tests, there has been little attempt to validate the job analysis

survey instruments typically used for this purpose. The validity of the test rests not only on the validity of the test items, but the procedure used to define the job content upon which the items are based.

Before turning to the nature of the validity problem, it is helpful to describe the process used to develop the teacher certification tests that are the subject of this research and how the job analysis survey fits within this process.

Description of the teacher certification test development process.

The tests explored in this dissertation were feveloped in response to state legislation. In the early 1980s, the state legislature passed legislation relating to the certification of public school teachers and other educational personnel. One component of this legislation provided for the development and administration of examinations in areas in which certification is granted. The tests are required for all individuals seeking initial certification and those teachers seeking to add an endorsement in another certification area.

Individuals seeking certification are required to take a test in their area of content specialization (e.g. Mathematics) and a test covering knowledge of pedagogy. The steps taken in developing the tests are described below.

Select advisory committees. To help ensure that the tests accurately reflect the content for each certification area, an advisory committee of educators in each area in which tests were to be developed was formed to assist in the development process. The committees were composed of practicing educators representing both institutions of higher education and the public schools. The committees worked with the Department of Education and technical consultants contracted by the Department in carrying out all phases of the test development process.

Outline development. For each certification area, the state curriculum guidelines, public school texts and curriculum materials, and state teacher education program standards were reviewed. Based on these materials, a comprehensive content outline defining the major topics in the area was developed to define the domain of content to be included on the certification test. The outline was then reviewed and revised by the advisory committee to ensure that it accurately represented the area of specialization.

Objective development. After the domain of knowledge to be included on each certification exam was defined through a content outline, a set of test objectives further specifying the content to be reflected on the examination was developed. The purpose of this step was to provide a detailed set of objectives which reflect the knowledge required by practicing educators in the area. The objectives were reviewed by the advisory committee to ensure that they

accurately reflect the content of the specialization area.

Job analysis. Currently practicing public school educators in each field were asked to rate each objective in terms of its importance to the job and how frequently they made use of the content specified by the objectives in their job. This process was necessary to ensure that the objectives were job-related. The job analysis survey results were analyzed and presented to the advisory committee. The advisory committee reviewed the job analysis survey results and selected a sample of job-related objectives for which test items were to be written.

Item development. Following the job analysis, test items were written to measure each objective selected. The draft pool of test items were then reviewed and revised by the advisory committee.

Field testing. The items, as revised by the advisory committee were field tested to gather information about item performance under actual testing conditions. The test items for each area were administered to a sample of students who were currently enrolled in state teacher education programs. The field test results were analyzed and presented to the advisory committees. Revisions to test items were made by the advisory committees on the basis of the field test results.

Bias review. A separate panel of minority educators reviewed the

pool of test items for potential bias. Panel members were provided with statistical bias analyses to assist them in their task.

Content validation and standard setting. To verify the validity of the test items and to establish the standard (or pass-fail score) for the examination, a second committee of educators for each certification area was assembled. This committee reviewed each item in the item pool and, on the basis of their knowledge of the specialization area, judged whether or not the test item is a valid measure of the objective for which it is written. The second major task of the committee was to determine the pass/fail score for the examination using the procedures recommended by Angoff (1971).

Item selection and test construction. Based on the results of the field testing and the results of the content validation process, the items to be used in the final form of the test were selected and formatted into a final test form.

Job analysis described.

Job analysis is a process of systematically collecting information about the elements of a job. Job analysis has been routinely used in personnel-related areas such as defining job descriptions and the content of training programs for close to a century, and is increasingly being used as a basis to determine what should be measured on teacher certification tests.

A variety of approaches to assessing the elements of a given work situation are available (see Chapter 2); however, regardless of the selected method, most approaches include some determination of the critical and frequently performed elements of the job. Importance (criticality or essentiality) and frequency of performance (time spent or percentage of time consumed on the job) are the two key dimensions underlying most job analysis approaches (Levine, Ash, Hall and Sistrunk (1981)). Within the teacher certification arena, this would generally take the form of assessing the important and frequently applied teaching skills or content knowledge in the instructional setting.

Job analysis has been used to define the content of tests included in teacher certification programs in a number of states. Among the states that have conducted job analyses as part of their teacher certification test development efforts are Florida, Georgia, Alabama, Oklahoma, South Carolina, District of Columbia, Texas and West Virginia.

The current National Teacher Examination (NTE) developed by Educational Testing Service (ETS) was not initially developed based on an empirical job analysis. However, ETS has conducted a post hoc job analysis verifying the job-relatedness of the content assessed.

A complete review of the literature in the area of job analysis is provided in Chapter II.

Validity.

While the use of job analysis surveys has become an integral part of the development of teacher certification tests, there has been little attempt to collect validity evidence to support the use of these instruments for this purpose. Establishing the validity of assessment measures is an essential requirement for any measurement effort (APA Standards, 1985; Cronbach, 1971). Validity refers to the ability of a measuring instrument to do what it is intended to do (Nunnally, 1978), or, more specifically, the degree to which inferences from scores on an instrument are supported by evidence (APA Standards, 1985). Traditionally, and in licensing, three aspects of validity are discussed: criterion-related validity (predictive and concurrent), content validity, and construct validity (APA Standards, 1985). Criterion-related validity is of concern when one wishes to infer, from a given instrument, an individual's performance on some other variable referred to as the criterion (APA Standards, 1985; Nunnally, 1978). Content validity is of importance when one wishes to determine the extent to which the instrument measures the domain it is intended to measure (APA Standards, 1985). The third aspect of validity, construct validity, references the extent to which a measurement tool is related to the various elements or underlying traits associated with the construct it is purported to measure (Cronbach, 1971).

Validity is of particular concern in the development and use of

job analysis survey instruments where inferences made based on job analysis survey results will be used as a basis for determining what will be measured on the corresponding teacher certification test. It is imperative that the decisions regarding the content to be included on the teacher certification test reflect accurate information about the job content obtained from the job analysis survey instrument. The key concern within teacher licensing testing has been to ensure that the tests developed reflect the significant aspects of the teaching profession for which they are designed. At a minimum, the content of licensing instruments should be drawn from important elements of the teaching job.

Content validity. Content validation requires that a link between the content of the instrument and the domain of content it is purported to measure be established (APA Standards, 1985). The domain of interest in the case of teacher licensing is the knowledge and skills required by a teacher on the job. A logical and empirical link between the content of the instrument and the teaching job needs to be established.

Content validation studies in teacher licensing have focused primarily on the tests themselves. Content validity of the tests is often demonstrated by having panels of content experts rate the extent to which the test items match the test objectives identified through a job analysis. This may require a dichotomous decision (Rovinelli and Hambleton, 1977; Nassif, 1978) or multichotomous rating (Hambleton,

1980) on the part of content experts.

While individual test items and the overall test are typically subjected to rigorous validation procedures, less emphasis has been given to validating the job analysis survey instrument used as a basis for defining the test content. The validity of the teacher certification test rests not only on the validity of the test items, but upon the validity of the procedure used to determine the job content on which those items are based. To establish the content validity of the job analysis survey instrument, the link between the content of the instrument and actual teaching requirements may be demonstrated. This could be established by basing the survey content on other definitions of the job including job descriptions, state curriculum guidelines and definitions of the field offered by experts in the literature. This is essentially the approach that has been taken with most teacher certification testing programs developed to date.

While establishing the content validity of the job analysis survey instrument is clearly an important element in the development of teacher certification tests, a number of measurement specialists have emphasized that content validity is an insufficient criterion for establishing the validity of an instrument. Messick (1975) and, more recently, Hambleton (1980) note that content validity does not provide evidence regarding the uses of or inferences made from the instrument.

Criterion-related validity. Criterion-related validity "compares test scores or predictions made from them, with an external variable (criterion) considered to provide a direct measure of the characteristic or behavior in question" (Cronbach, 1971, p. 444). Criterion-related validity, as applied to teacher certification, examines the relationship between an instrument administered for certification purposes and actual teacher performance on the job.

Two forms of criterion-related validation are generally discussed: (1) concurrent validity, and (2) predictive validity (APA Standards, 1985). Statements of concurrent validity indicate the extent to which the test may be used to estimate an individual's present standing on the criterion, whereas predictive validity refers to the extent to which an individual's future level on a criterion can be predicted from a knowledge of prior test performance (APA Standards, 1985). Concurrent validation, as applied to teacher certification testing, examines the relationship between the test scores of practicing educators (job incumbents) and current performance. Establishing the predictive validity of a teacher certification measure involves the examination of the relationship between the test scores of prospective teachers (job applicants) and future performance. Both forms of criterion-related validity are concerned with the accuracy of the measures in predicting teacher competency.

While criterion-related validity has been held as an important

component of validating certification tests, a number of obstacles have prevented the execution of criterion-related validation studies for teacher certification measures. Hecht (1976), while supporting the importance of criterion-related validation for licensing and certification tests, notes that criterion-related validation studies are "difficult to develop, time-consuming, impractical for numerous reasons, and expensive" (p. 8). Nassif, Gorth, and Rubinstein (1977) provide a more in-depth treatment of these issues, as they relate specifically to teacher certification testing. Nassif et all (1977) suggest that in order to demonstrate the predictive validity of teacher certification tests, the following criteria are required:

(1) admission of all applicants for employment in the field;

(2) sufficient time lapse before observing the criterion variable;

(3) unexamined, unused results of the test, i.e., the predictor stored until correlated with the criterion (here, retention or dismissal of teacher due to subject-matter competence/ incompetence);

(4) the criterion must be measurable, i.e., a mechanism for accurately and reliably collecting the reasons for retention or dismissal of teachers (criterion) which clearly separates content knowledge as one of those reasons;

(5) sufficient sample size; and

(6) stability of the criterion.

However, most of these factors are usually not present in a certification program. In addition one would need to collect information across a minimum of a school year to get a complete picture of the complete curriculum taught. Moreover, this approach would be inappropriate for use in validating a job analysis survey instrument upon which the test is based where the intent is not to predict, but rather to define the job in question.

Construct validity. Construct validity is aimed at answering the question "Does the test measure the attribute it is said to measure" (Cronbach, 1971). Construct validation is a process (rather than a single study) of accumulating evidence relating scores on the instrument to the attributes of the construct the instrument is purported to measure. Cronbach (1971) notes that when statements are made that scores reflect levels of a certain skill or knowledge, one is "constructing" an interpretation of these scores, and construct validation is of necessity. While the constructs underlying job analysis survey measures are somewhat simpler than those encountered in more complex and abstract personality constructs such as "aggressiveness," there exists an underlying construct (e.g., "the job of a teacher" or "requisite content knowledge").

There has been little effort to establish the construct validity of job analysis survey measures. Potential approaches to, and problems inherent in, conducting a construct validation studies in this area are discussed below.

One of the primary methods for establishing the construct validity of a given measure is to establish a relationship between that measure and other measures of the same construct. For content knowledge tests used for teacher certification purposes, this would require a comparison of the tests with other assessments of applicants' content knowledge. Similarly, performance or pedagogical skill certification tests would be compared with alternative performance or pedagogical skill assessments. Attempts to construct validate job analysis measures using alternative measures of the construct suffer from many of the problems noted earlier in our discussion of criterion-related validity, notably the location of a suitable criterion measure and the stability of that criterion. A "well-matched" criterion measure adequately measuring the construct reflected in the instrument to be validated is often unavailable. Moreover, the use of instructor or supervisor assessments of a candidate's proficiency are unsuitable as criterion measures for construct validation because of the unreliability and questionable accuracy of such assessments.

While it is difficult to obtain alternative measures for use in construct validation. Other approaches to construct validation have

been suggested by Cronbach (1971) and Hambleton (1980). One alternative involves the use of factor analysis to verify the domain structure of the instrument, may prove fruitful. One would expect the empirically derived factor structure of an instrument to correspond to the specified domain structure of the instrument in some logical fashion. While the empirically derived factor structure may not be identical to the content structure imposed by content experts, it should be related to the underlying domain of the instrument in some meaningful way. Factor analysis of job analysis survey data has been used in the development of the teacher performance assessment instruments in Georgia and South Carolina.

Another alternative for establishing the construct validity of job analysis survey measures is based on a convergent/divergent validation approach (Campbell & Fiske, 1959). The survey results for known criterion groups (e.g., teachers in different settings) could be compared to determine if the two measures converge, i.e. the instrument produces expected differences or similarities between these known groups. To the extent that the measures converge to produce expected results for known criterion-groups, the instrument would be considered valid.

Specific problem for investigation.

While there is little question that teacher licensing tests should be based on an empirical job analysis, there is little evidence

to support the validity of the job analysis instruments used. This dissertation assesses the validity of the job analysis survey instrument used to define the content for a pedagogy test required of all applicants in a statewide teacher certification testing program. The specific questions for investigation are presented below.

Research questions/hypotheses.

This dissertation addressed several questions related to the construct validity of the job analysis survey instrument used to define the content of the teacher certification tests.

Q1) Does the empirically-derived dimensional structure of the instrument conform to the expected domain structure of the instrument as specified by content experts?

Rationale. Cronbach (1971) and Hambleton (1980) suggest that the empirically derived factor structure of a given instrument should be meaningfully related to the stated structure of the instrument. Therefore, the empirically derived factor structure of the job analysis survey instrument, as determined through factor analysis, should be logically related to the underlying structure of the survey instrument content.

Q2) Does the survey instrument converge with other measures related to the construct, i.e. produce expected differences/similarities in respondent ratings between known criterion groups?

Rationale. The job analysis survey results should converge with variables related to the job construct. That is, the job analysis survey instrument should produce expected differences/similarities between known groups of educators. One would expect that variables directly related to the job environment (i.e. job setting, grade levels taught) to produce differences in job analysis survey ratings. On the other hand, one would expect other variables less directly related to the job environment (i.e., years of experience, level of training) not to produce significant differences in job analysis survey ratings.

The first two hypotheses within Question 2 explore variables outside the job environment and as such predict no significant differences in job analysis survey ratings.

H2A - There will be no significant differences in a linear combination of the job analysis survey dimensions among teachers with different levels of teacher training.

H2B - There will be no significant differences in a linear combination of the job analysis survey dimensions among teachers with different levels of teaching experience.

While variables within the job environment should affect the amount of time spent on specific job responsibilities (as predicted in H2C and H2D) other variables outside the job environment should not contribute to differences in the amount of time spent on specific job responsibilities. Teachers with a higher level of teacher training (e.g. Master's or Doctoral degree) should not necessarily spend more or less time on required job responsibilities than those with a lower level of training (e.g. Bachelor's degree). Similarly, regardless of the years of teaching experience, job responsibilities for a classroom teacher should not differ.

The second two hypotheses within question 2 explore variables within the job environment, and as such predict significant differences in job analysis survey ratings.

H2C - There will be significant differences in a linear combination of the job analysis survey dimensions among teachers teaching at different grade levels.

H2D - There will be significant differences in a linear combination of the job analysis survey dimensions among teachers working in different teaching environments.

One would expect that teachers in differing teaching environments would spend differing amounts of time on the different job content areas. That is, administrators, teachers in self-contained classrooms, teachers in departmentalized settings, and teachers in multi-school settings are likely to differ in the job-relatedness ratings they assign to different job content areas as a function of the differences in job emphasis in these different environments.

Similar differences in job relatedness ratings would be expected for educators at different grade levels. For example, the job responsibilities for pre-school and elementary school teachers are likely to differ.

Q3) Is there a relationship between the holistic subarea importance ratings provided by respondents for each subarea and the average ratings assigned for the individual objectives in each subarea?

Rationale. One of the primary methods for establishing the construct validity of a given measure is to establish a relationship between that measure and other measures of the same construct. Therefore, one would expect a relationship between the average importance ratings assigned to

individual objectives in a major content subarea (micro level) and more global ratings of importance for the subarea(macro level).

These questions will be investigated through a secondary analysis of job analysis survey data collected as part of the development of a statewide teacher certification testing program. While this design offers the advantage of realism usually not possible in research in this area, this does impose limitations on the research. The data collection procedures, sampling procedures and instrumentation cannot be changed.

No single study can be said to establish the validity of a measurement instrument. However, by approaching validity from three different perspectives: a) examining the underlying dimensional structure, b) exploring the convergence/divergence of known criterion variables and c) comparing macro-level data with micro-level data for the same construct, significant evidence regarding the validity of the job analysis survey approach can be obtained.

The job analysis survey approach explored in this dissertation is the most commonly used job analysis technique in the development of teacher certification tests. Given the impact of the job analysis survey on the test development process and, ultimately, the impact of these tests on the prospective teacher population, this validity study is of considerable importance. The results of these questions will

provide substantial information to test developers and other educators involved in the teacher certification process.

C H A P T E R I I

REVIEW OF LITERATURE

This chapter reviews the literature in the area of job analysis. The legal and technical requirements for job analysis as well as the approaches and applications of job analysis methods used in determining the critical elements of the job to be assessed on teacher licensing tests are discussed.

Job analysis is a process of systematically collecting information about the elements of a job (Levine, Ash, Hall and Sistrunk, 1981). While job analysis has been routinely used in personnel-related areas for close to a century, it is only within the pass few decades that it has been employed in personnel testing. It is even more recently, since the mid-1970's, that it has been applied in teacher licensing testing.

Any instrument designed for certification or licensing, as is the case in teacher certification testing, must be shown to be job related. It must fairly measure the content knowledge relevant to the job as performed by present job incumbents. Determining the job relatedness of content included on certification tests endorsed by both the APA (Standards for Educational and Psychological Testing 1985) and the Equal Employment Opportunity Commission (Uniform

Guidelines on employee selection procedures 1978). The guidelines suggest that the criteria used as a basis of certification must bear an empirical and logical relationship to successful job performance. For purposes of teacher licensing, this suggests that test content should reflect the content knowledge or pedagogical skills required for teaching.

A systematic job analysis is typically carried out to establish an empirical and logical relationship between the test domain and the teaching job. A discussion of the legal and technical requirements for job analysis is provided below.

Legal and technical requirements.

There are several recommendations provided in the APA Standards and the EEOC Guidelines.

APA Standards. The Standards for Educational and Psychological Testing (1985) are intended to provide a basis for evaluating the quality of testing practices as they affect the various parties involved (p. 1). The introduction to the Standards states that "the purpose of publishing the Standards is to provide criteria for the evaluation of tests, testing practices and the effects of test use. Although the evaluation of the appropriateness of a test or application should depend heavily on professional judgment, the standards can provide a frame of reference to assure that relevant

issues are addressed." (p.2).

> The introduction cautions "evaluating the acceptability of a test or test application does not rest on the literal satisfaction of every primary standard in this document and acceptability cannot be determined by using a check list. Specific circumstances affect the importance of individual standards. Individual standards should not be considered in isolation; therefore, evaluating acceptability involves the following: professional judgment that is based on a knowledge of behavioral science, psychometrics, and the professional field to which the tests apply; the degree to which the intent of this document has been satisfied by the test developer and user; the alternatives that are readily available; and research and experimental evidence regarding feasibility." (p. 2).

The Standards document identifies two levels of standards to be met by test developers and users: primary standards and secondary standards. "Primary standards are those that should be met by all tests before their operational use and that all test uses, unless a sound professional reason is available to show why it's not necessary, or technically feasible, to do so in a particular case." (p.2). "Secondary standards are desirable as goals, but are likely to be beyond reasonable expectation in many situations. Although careful consideration of these standards will often be helpful in evaluating tests and programs and in comparing the usefulness of competing instruments, limitations on resources may make adherence to them infeasible in many situations. Some secondary standards described procedures that are beneficial but not often used." (p.3). According to the Standards document, "ideally all relevant primary standards should be met at publication or first operational use of each test." (p.3).

The Standards for Educational and Psychological Testing (1985) are designed to be applicable to a wide variety of test uses and types of instrumentation. Test uses included under the rubric of the Standards are "standardized ability (aptitude and achievement) instruments, diagnostic and evaluative devices, interest inventories, personality inventories, and projected instruments." (p.3). The three broad categories of test instruments covered by the Standards include: "constructive performance tasks, questionnaires, and to a lesser extent, structured behavior samples." (p. 4).

While the Standards for Educational and Psychological Testing cover the gamut of test uses and types of instrumentation, two chapters are devoted to employment-related testing. Chapter 10 of the Standards, Employment Testing, is "more specific to the use of tests and inventories in employment selection, promotion and classification in civilian and military organizations. The major kinds of decisions to which tests might contribute in this setting are the following:

1) selecting individuals for an entry-level position.

2) making differential job assignments based on test data (classification)

3) selecting individuals for advanced or specialized divisions

4) promoting individuals from within an organization to higher

level positions (as when test information collected at an assessment center is used to make promotion decisions).

5) deciding who is eligible for training on the basis of a test prerequisite

6) using tests and inventories as diagnostic tools in aid in planning job and career development for individuals" (p.59).

Chapter 11 of the Standards, Professional and Occupational Licensing and Certification, is the chapter most directly applicable to this dissertation. As described in Chapter 11, "the primary purpose of licensure or certification is to protect the public". Licensing requirements are imposed to ensure that those licensed possess knowledge and skills in sufficient degree to perform important occupational activities safely and effectively. The purpose of certification is to provide the public (including employers and government agents) with a dependable mechanism for identifying practitioners who have met particular standards." (p.63).

While the introduction to Chapter 11 indicates that "issues of validity that are discussed in other sections of the Standard are also relevant to testing for licensure and certification (p.63), testing for licensure and certification does differ from other types of employment testing. The Standards indicate: "Although many of the issues of central importance in the present context are discussed in

the chapter on employment testing, some important distinctions must be made. For licensure or certification, the focus of test standards is on levels of knowledge and skills necessary to assure the public that a person is competent to practice, whereas an employer may use a test to maximize productivity." (p.63).

Both Chapter 10: Employment Testing and Chapter 11: Professional and Occupational Licensure and Certification identify the specific standards that must be met in the design and conduct of job analyses. The specific standards relevant to job analysis are listed and then described below:

Relevant APA Standards for job analysis.

Standard Number	Standard Text
10.4	Content Validation should be based on a thorough and explicit definition of the content domain of interest. The job selection, classification, and promotion, the characterization of the domain should be based on job analysis (conditional).
10.5	When the content-related validation

evidence is the standard support for the use of a test in selection or promotion, a close link between test content and job content should be demonstrated (primary).

10.6 When content-related evidence of validity is presented, the rationale for defining and describing a specific job content domain in a particular way (e.g., in terms of tasks to be performed in knowledge, skills, abilities or other personal characteristics should be stated clearly. The rationale should establish the knowledge, skills and abilities said to define the domain are the major determinents of proficiency in that domain (primary).

10.7 "If the validity of a test for selection into a particular job is based on content-related evidence, a similar inference should be made about the test in a new situation only if the critical job content

factors are substantially the same, (as is determined by a job analysis), the reading level of the test materials does not exceed that appropriate for the new applicant group and the new job, as there are no discernable features of the new situation that would substantially change the original meaning of the test materials. (conditional)

11.1 "The content domain to be covered by a licensure or certification test should be defined clearly and explained in terms of the importance of the content for competence, performance in an occupation. A rationale should be provided to support a claim that the knowledge or skills being assessed are required for competent performance in an occupation and are consistent with the purpose for which the licensing and certification program was instituted. (primary)"

The first standard cited (10.4) simply states that the definition of the domain of content to be measured should be based on a job analysis. Moreover the standard states that the content domain to be measured should be thoroughly and explicitly defined. The comment to standard 10.4 also states that "the job content domain should be described by characteristics that (a) can be represented in test content (b) will not change substantially over a specified period of time, and (c) the applicant should possess when being considered for employment.

Standard 10.5 states that there should be a close link between the content covered by the test and the actual content of the job. The standard comments that there must be additional evidence of the link between the content of the test and the content of the job if there is not a singular and direct relationship between the two domains. The rationale for the choice of job elements, e.g., tasks, knowledge, or skills, must be clearly stated under the requirement of 10.6. According to the Standards, this description should also include "the relative frequency or criticality of the elements" (p.61).

10.7 requires that if a test is to be used in a setting other than that for which it was originally developed, it must be determined that the "critical job content factors are substantially the same as is determined by a job analysis", the reading level of the test material does not exceed that appropriate for the new applicant group as a new job and there are no discernable features of the new

situation that would substantially change the original meaning of the test material." (p.61).

The domain of content covered by a test for licensing or certification must be clearly defined and justified in terms of the importance of the content for competent performance in the occupation according to standard 11.1. Moreover, a rationale to support a claim that the content measured is required for competent performance needs to be provided. Comments to the Standards indicate that "although the job analysis techniques are comparable, the emphasis for licensure and certification is limited appropriately to knowledge and skills necessary to protect the public." (p.64). Standard 11.1 also cautions that "skills that may be important to success but are not directly related to the purpose of licensure (i.e. protecting the public) should not be included in a licensing exam." (p. 64).

In short, the Standards for Educational and Psychological Testing require that a sound job analysis be conducted as a basis for defining the necessary job content to be measured on an employment-related test. Moreover, the standards call for the content domain to be thoroughly and explicitly defined and that a close link between the content of the test and the content of the job be established. A rationale for the choice of job elements used to describe the job content and a rationale in support of the claim that the knowledge or skills being assessed are required for competent performance must be provided.

EEOC uniform guidelines on employee selection procedures. The EEOC Guidelines (1978) are designed to provide employers, and others involved in the employee selection process, with specific guidelines in the development and use of employee selection devices. The Guidelines were designed to further explicate the requirements of title VII of the Civil Rights Act of 1964. The Guidelines indicate "one problem that confronted the congress which adopted the civil rights act of 1964 involved the effects of written pre-employement tests on equal employment opportunity. The use of these tests scores frequently denied employment to minorities in many cases without evidence that the tests were related to success on the job. Yet employers wished to continue to use such tests as practical tools to assist in the selection of the qualified employees. Congress thought to strike a balance which would proscribe discrimination, but otherwise permit the use of tests in the selection of employees". (Introduction). "The fundamental principle underlying the Guidelines is that employer polices or practices which have an adverse impact on employment opportunities of any race, sex, or ethnic group are illegal under Title VII and the Executive Order unless justified by business necessity." (Introduction). "The Guidelines adopt a "rule of thumb" as a practical means of determining adverse impact for use in enforcement proceedings. This rule is known as the "four-fifths" or "80%" rule. (Introduction). That is the pass rate for a group protected under Title VII must be at least four-fifths of the pass rate for the majority group for there to have been considered no adverse impact. If the pass rate for the protected group is less than

four-fifths the pass rate for the majority group, adverse impact is said to have resulted. If adverse impact results, the employer must justify the use of the procedure on grounds of "business necessity". This normally means that it must show a clear relation between performance on the selection procedure and performance on the job" (Introduction). In short, where there is adverse impact to a protected group because of the use of a particular test or assessment instrument, the employer must conduct a validation study in order to prove that there is a clear relationship between the job content and the content of the test instrument.

Section 2B of the guidelines are explicit in stating that the requirements presented apply to all types of employment decisions, including licensing and certification. Section 2B states:

> "Employment decisions. These guidelines apply to tests and other selection procedures which are used as a basis for any employment decision. Employment decisions include but are not limited to hiring, promotion, demotion, membership (for example, in a labor organization), referral, retention, and licensing and certification, to the extent that licensing and certification may be covered by Federal equal employment opportunity law. Other selection decisions, such as selection for training or transfer, may also be considered employment decisions if they lead to any of the decisions listed above."

The Guidelines describe various approaches to validation to establish a link between the test and the job. Among the approaches to establishing the link between the job and the selection device, the Guidelines allow for a content validation approach focusing on a sound job analysis.

The specific requirements that must be met under the EEOC Guidelines are described below.

Acceptable validity studies. According to the guidelines, validation is the demonstration of the job relatedness of a selection procedure. The guidelines provide specific standards for conducting validation studies. Criterion-related, construct and content validation approaches to validating employment tests are considered acceptable approaches. Section 5A states:

> "General Standards for Validity Studies-A. Acceptable types of validity studies. For the purposes of satisfying these guidelines, users may rely upon criterion-related validity studies, content validity studies or construct validity studies, in accordance with the standards set forth in the technical standards of these guidelines, section 14 below. New strategies for showing the validity of selection procedures will be evaluated as they become accepted by the psychological profession."

The Guidelines go on to state that no one validation approach is preferred. Appropriate methodology should be used for the situation at hand. The validation methodology should, according to the guidelines, conform to "generally accepted professional standards for evaluating standardized tests and other selection procedures" (section 5C). Section 5C later states that the standards applied should be those laid out in the American Psychological Association Standards for Educational and Psychological Testing.

The specific requirements for conducting a content validation study under EEOC Guidelines are listed in the table below.

EEOC guidelines content validity study requirements.

1) "Evidence of the validity of a test or other selection procedure by a content validity study should consist of data showing that the content of the selection procedure is representative of important aspects of performance on the job for which candidates are to be evaluated." (Section 5B)

2) The validation procedures used should be "consistent with generally accepted professional standards for evaluating standardized tests and other selection procedures, such as those described in the Standards for Educational and Psychological Tests I". (Section 5C)

3) "Validity studies should be carried out under conditions which assure insofar as possible the adequacy and accuracy of the research and report. Selection procedures should be administered and scored under standardized conditions." (Section 5E)

4) "In general, users should avoid making employment decisions on the basis of measures of knowledge, skills or abilities which are normally learned in a brief orientation period, and which have an adverse impact." (Section 5F)

5) Where job applicants are not expected to progress to a higher position automatically or within a reasonable amount of time, "it should be considered that applicants are being evaluated for a job at or near the entry-level." (Section 5I)

6) The validity study should be current. Currency should be considered in relation to "the validation strategy used, and changes in the relevant labor markets and job." (Section 5K)

In section 14 of the Guidelines more specific information about the requirements for validity studies is provided.

1) "Any validity study should be based upon a review of information about the job for which the selection procedure is to be used. The review should include a job analysis..." (Section 14A)

2) There should be a job analysis which includes an analysis of the important work behavior(s) required for successful performance and their relative importance and, if the behavior results in work products an analysis of the work product(s). Any job analysis should focus on the work behavior(s) and the tasks associated with them. If work behaviors are not observable, the job analysis should identify and analyze those aspects of the behavior(s) that can be observed and the observed work products. The work behavior(s) selected for measurement should be critical work behavior(s) and or important work behavior(s) constituting most of the job." (Section 14C 2)

3) "A selection procedure can be supported by a content validity strategy to the extent that it is a representative sample of the content of the job." (Section 14C 1)

4) A selection procedure designed to measure the work behavior may be developed specifically from the job and job analysis in question, or may have been previously developed by the user, or by the other users or by a test publisher." (Section 14C 3)

5) "To demonstrate the content validity of a selection procedure, a user should show that the behavior(s) demonstrated in the selection procedure are a representative sample of the behavior(s) of the job in question or that the selection procedure provides a representative sample of the work product of

the job. In the case of a selection procedure measuring a knowledge, skill or ability, the knowledge, skill or ability being measured should be operationally defined. In the case of a selection procedure measuring a knowledge, the knowledge being measured should be operationally defined or that body of learned information which is used in and is a necessary prerequisite for observable aspects of work behavior of the job. For any selection procedure measuring a knowledge, skill or ability, the user should show that (a) the selection procedure measures and is a representative sample of that knowledge, skill or ability; and (b) that knowledge, skill or ability is used in and is a necessary prerequisite to performance of critical or important work behavior(s)." (Section 14C 4)

Job analysis approaches.

A variety of approaches to assessing the elements of a given work situation are available; however, regardless of the selected method, most approaches include some determination of the critical and frequently performed elements of the job. Importance (criticality or essentiality) and frequency of performance (time spent or percentage of time consumed on job) are the two key dimensions underlying most job analysis approaches. Within the teacher licensing arena, this would generally take the form of assessing the important and frequently applied teaching skills or content knowledge in the instructional setting.

Job analysis approaches can be seen to vary along a number of dimensions. Levine, Ash, Hall, and Sistrunk (1981) have delineated three key dimensions along which job analyses vary:

- type of descriptor or element used to describe the job,
- the source of job information, and
- data collection methodology.

Among the descriptors used to describe a job are tasks, activities, skills, knowledge, and personal characteristics. A number of sources of job information are potentially available; these include job incumbents, supervisors, trained job analysts, and written documents. Data collection methods include questionnaires, interviews, observation, diaries, and actual job performance.

There are several approaches to conducting job analyses that differ with respect to the type of descriptor or element used to describe the job, the source of job information and data collection methodology used. The major job analysis approaches discussed in the literature are described below, followed by a discussion of the application of job analysis to teacher licensing test development.

Threshold traits analysis (TTA). TTA developed by Lopez divides all jobs into five major areas to represent all types of jobs comprehensively. These five areas are: physical, mental, learned, motivational, and social. There are 21 job functions (e.g., physical

exertion) and a corresponding set of 33 traits (e.g., strength, stamina) associated with each area. For example, the trait "Control-Integrity" is "willingness to adhere to recognized standards of moral and ethical behavior."

Job incumbents provide information about the tasks and demands (conditions under which tasks are performed) which are are categorized into the 21 job functions. The tasks and demands are rated on an eight point scale of importance to the job. Mean importance ratings are used to establish task and demand importance.

The 33 worker traits are rated by supervisors on whether they are relevant to the job, their level of difficulty or complexity required for acceptable performance on the job and the practicality of expecting applicants to have each trait based on the current labor market. The mean ratings of level of complexity are used to determine the extent of the trait's importance for overall job performance. Traits must achieve a pre-established level of agreement among raters and must have a mean rating higher than "0" to be considered relevant.

The TTA offers an easy to administer procedure that is purported to be applicable across all jobs. The procedure has the advantage of collecting information from both supervisors and incumbents.

The final product for the traits analysis is a computerized list of relevant traits that are practical to expect, their levels and the

weights they have in the overall job performance picture.

Ability requirement scales (ARS). Fleishman's (1975) Ability Requirement Scales (ARS) approach is used frequently in employment testing in business and industry. Fleishman identified 37 abilities grouped into four categories: (a) mental abilities, (e.g., verbal comprehension), (b) physical abilities, (e.g., stamina), (c) psychomotor abilities which require some action to be taken when specific sensory cues are present (e.g., choice reaction time), and (d) abilities having to do with the way incoming sensory material is perceived (e.g., spatial orientation). These abilities are seen to be applicable across all tasks and are claimed to be able to distinguish levels of competency among performers.

The Ability Requirements Scales are 5 or 7 point rating scales, anchored by task examples with scale values indicating relative amounts (high and low) of the ability needed to perform different tasks.

Individual tasks may be rated separately on each ability scale or an entire job may be rated on each ability. Individuals rate each task on the job on each ability scale, yielding a final product of a list of mean ability ratings for each of the 37 abilities. These results may be used to determine the relevance of each ability to the task (or job), and further applied in developing training materials or assessment instruments based on the results.

Position Analysis Questionnaire (PAQ). The PAQ is another commonly cited approach to job analysis. McCormick, Jeanneret, and Mecham's approach (1972) is used to describe a job in terms of 194 job elements or items. 187 items relate to job activities or the work situation, and another 7 deal with compensation.

The individual using the PAQ must determine, for each item, whether it applies to the job or not, and if so, the degree to which it applies is indicated using a rating scale. Each item is rated on one of six different rating scales:

(1) Extent of Use
(2) Amount of Time
(3) Importance to this Job
(4) Possibility of Occurrence
(5) Applicability
(6) Special Code

All but the applicability scale are rated on a 6 point scale (N = Does not apply; 1 = lowest degree; 6 = highest degree)

The Applicability scale is a dichotomous scale (Does Apply/Does Not Apply).

A list of scores for each major job dimension, composed of the job elements, is produced based on incumbent, supervisor or job

analyst ratings obtained.

Scores obtained are then interpreted to determine the specific requirements for the job for training and/or assessment.

Critical incident technique (CIT). The critical incident technique developed by Flanagan (1954) is one of the earliest systematic job analysis techniques that is still widely used. The procedure uses critical incidents as a basis for analyzing job requirements. An incident is considered critical if:

(a) the purpose or intent of the act is clear to the observer
(b) the consequences of the act are definite, and
(c) the act is crucial to either outstanding performance or markedly inferior performance

If a representative sample of critical incidents for a particular job is collected, the job may be defined in terms of the specific behaviors which are necessary for successful job performance.

Critical incidents may be collected by means of individual interviews, group interview, questionnaire methods, mailed questionnaires, and record forms or diary procedures. Flanagan indicates that at least 1,000 incidents must be collected for adequate analysis.

Supervisors and or incumbents provide the following information for each incident:

(a) what led up to the incident and the setting in which it occurred,

(b) exactly what the employee did that was so effective or ineffective,

(c) perceived consequences of the critical behavior, and

(d) whether such consequences were actually within the control of the employee.

The incidents collected are then abstracted and categorized to form a comprehensive picture of the job requirements. The categories, arrived at can then be used to develop checklists of critical task behaviors for either effective or ineffective performance.

While this is an effective procedure for making initial qualitative judgments of critical job behaviors, it offers no quantitative basis for determining levels of importance or ranks ordering the necessary job behaviors determined. This procedure can also be quite costly and time consuming. It does, however, offer a useful starting point for collecting quantitative job information.

Task inventory with the comprehensive occupational data analysis program (TI/CODAP). The TI/CODAP was developed by the Air Force as a method for analyzing the tasks underlying various military jobs. The

basis for the TI/CODAP is a task inventory listing all tasks performed by incumbents in an occupational group or job family being evaluated. Additional background information is collected as well (e.g. work experience, education, race).

Each task in the inventory is rated by job incumbents on a 7-, 9-, or 11-point "relative time spent" scale with end points of "very much below average" and "very much above average." The Air Force found the time spent scale to be the most reliable rating scale for tasks.

A task inventory is developed by trained analysts through a review of written documentation of the job and other available sources of information. This list is then reviewed by subject matter experts. The tasks included on the inventory are then rated on a relative time spent scale.

The ratings are analyzed and output containing the following information is produced: (1) percent of members performing each task, (2) percent of time spent per task by performing members, (3) average percent of time spent by all members in the group per task, and (4) cumulative percent of time together with a count of the numbers of tasks comprising the cumulative. Information may also be used to create unique job families and job hierarchies.

The TI/CODAP procedure is a frequently used procedure in the

military. It is a useful method for obtaining information on time spent on various tasks. However, the method is limited to relative time ratings and provides no information about the importance of tasks. Moreover, the procedure only describes what is done (tasks) and provides no information about knowledge, skill or ability required to perform the job.

Functional job analysis (FJA). Fine's (Fine and Wiley; 1971) FJA is a commonly used job analysis approach for use in training in business and industry. Trained analysts review background material, workers and supervisors are interviewed, the work is observed and task statements are completed. These statements are resubmitted to a group of content experts who indicate whether they perform each task. The objective is to provide at least 95% coverage of the work performed.

Tasks, describing what a worker does and what gets done, are identified according to the following definition of a task: "an action or action sequence grouped through time designed to contribute a specified end result to the accomplishment of an objective and for which functional levels and orientation can be reliably assigned." Task statements are written to include an explicit expression of a worker action and an immediate result expected of that action. The action verb is modified by the means (tools, method, equipment) used, by the immediate object of the action, and some indication of the prescription/discretion in the worker instruction.

Each task is rated on seven scales: Three Worker Function Scales of Data, People, and Things (DPT); the Worker Instruction Scale; and the three General Educational Development (GED) Scale of Reasoning, Mathematics, and Language. The Data Scale describes the way the worker relates to information, ideas, facts, and statistics. There are six levels of this ordinal scale (1=Comparing to 6=Synthesizing). The People Scale describes the manner in which the worker interacts and communicates with people. There are seven successive levels of this scale (1=Taking Instructions - Helping to 7=Mentoring). The Things Scale describes the way the worker physically interacts with tangibles, including machines, tools, equipment, and work aids. There are three successive levels (1=Handling to 3=Setting Up).

The final product of the procedure is a bank of task cards containing the information described above. Performance standards may also be set for each task identified.

The procedure developed by Fine is a sophisticated job analysis approach. The procedure provides job information on multiple dimensions. The major drawbacks of this procedure are time and complexity. The procedure takes about 8-12 days to develop the task bank alone, according to Fine. The level of understanding required to carry out the procedure is high, and a trained analyst is required to implement the procedure.

Job element method (JEM). Primoff's (1975) Job Element Method is

another alternative for obtaining information about aspects of the job that discriminate between superior and other performers. The first step in data collection for the JEM requires the identification of content experts to serve as panel members in the job analysis session. Typically, these are supervisors are experienced workers (usually incumbents) who understand the elements required on the job. The panel session has two parts: generating the job elements and rating the job elements. The job analyst provides instructions to the panel members and then asks them to generate tentative elements and subelements required for job performance. Then, panel participants are asked to rate each element on four scales.

Elements are rated on the following 3-point scales: (a) Barely Acceptable -- what relative proportion of even barely acceptable workers are good in the element. Ratings range from all are good to almost none are good. (b) Superior -- how important is the element in selecting the superior worker. Ratings range from very important to does not differentiate. (c) Trouble Likely -- how much trouble is likely if the element is ignored when selecting applicants. Ratings range from much trouble to safe to ignore. (d) Practical -- is it practical to expect workers to possess the element. Ratings range from all openings can be filled to almost no openings if this element is demanded.

These scale ratings are used to compute the following values: (e) Total Value -- this value indicates whether an item is broad and

is an element or is narrow and thus a subelement. (f) Item Index -- this indicates the extent to which a tentative subelement is a useful factor within an element. (g) Training Value -- this value indicates which elements or subelements might be valuable subjects for training.

Those elements receiving the highest group Total Values are selected as elements and the remaining elements become subelements. Subelements are grouped under the critical elements according to similar subject matter. These can serve as the basis of test questions, etc..

The final product is a list of the elements, subelements and their respective values with columns for each of the values described above.

This procedure has the desirable characteristic of discriminating between superior and barely acceptable performers. However, the need for a trained analyst to implement the procedure and the large number of ratings required render this procedure less practical than other job analysis approaches. Moreover, the procedure does not really obtain information on importance of elements to the job.

Job analysis survey approach. This approach involves a large scale survey of the incumbent population, and is frequently employed in test development activities carried out by the Educational Testing

Service. In 1983, Rosenfeld, Shimberg and Thornton carried out a job analysis of licensed psychologists in the United States and Canada. While several methodologies were used in conducting the job analysis, the primary vehicle for obtaining job information was the survey approach. A sample of psychologists in the United States and Canada were asked to review a set of 59 responsibilities, 62 procedures, techniques and resources, and 49 important areas of knowledge covering the major aspects of the psychologists job. Job incumbents receiving the survey, were asked to rate these job elements on several dimensions. First, respondents were asked to rate the amount of time spent: "taking into account all the things you do in your professional role (as) in the course of a year, what is your best estimate of the amount of time you spend in carrying out this responsibility?" (p. II-XI). After rating time spent, respondents were asked to judge importance: "Regardless of the amount of time you spend, how important is this responsibility in meeting the overall goals of your current job (as) or practice (page II-XI). Respondents then judged the extent to which the job element was necessary at the time of licensure: "How essential is it that an individual in your professional role be competent at the time of initial licensure to carry out this responsibility?" (page II-XII). Finally, for those elements covering cognitive aspects of the job, respondents were asked to judge the level at which an individual needed to be able to apply the element: "Which statement best describes the level at which you use or apply this technique, procedure or resource?" (page II-XIII) For certain job elements the question was phrased slightly

differently, asking for the level of judgment required: "Which of the following statements best describes the level of judgment you must exercise when you use or apply information from this knowledge area?" (page II-XIV).

The results of the survey were analyzed to determine the job relatedness of each of the elements proposed for use in assessment for licensure. The ratings from the survey were factor analyzed in an effort to determine the major job dimensions underlying the psychologist's job in each specialty area. The mean ratings provided by respondents were also computed to determine the extent to which each element would be considered job related both across the psychologist's profession as a whole and for a sub-specialty within the profession. The mean ratings for each job element were compared to the overall subfactor scores for the job dimension as another indicator of how linked each of the elements was to an important dimension of the job. The factor analysis results, mean job element ratings, and correlations between the job elements and the job dimension factors were reviewed by committees of content experts, to determine the structure and content of the final psychologists licensure examination.

Job analysis applications in teacher certification.

The most frequently used approach to job analysis in the area of teacher licensing is the survey approach. In this approach, a list of

job elements such as the task performed on the job, the skills required by a job, or "knowledge" defined as cognitive objectives or competency statements is presented to job incumbents. Job incumbents receiving the survey are asked to judge each job element listed on one or more scales using either a dichotomous or multichotomous rating. Dimensions on which respondents are asked to judge the job elements typically include some measure of importance and frequency. Importance scales include direct measures of importance, judgments of essentiality (Nassif, 1977) and judgments of relevance to the job (Poggio, 1986). Measures of frequency include direct measures of the frequency with which an activity is performed and, judgments of time spent. Additional dimensions upon which job incumbents may be asked to rate the job elements include the extent to which an individual needs to know or be able to carry out at entry into the profession (Rosenfeld, Shimberg, and Thornton, 1983), the extent to which the performance of an activity is related to effectiveness on the job (Rosenfeld, Thornton and Skurnik, 1986), and the level at which an individual needs to be able to apply a task procedure or knowledge (Rosenfeld, Shimberg, and Thornton, 1983).

Survey methodology in teacher licensing. The survey approach has been applied in several teacher licensing test development efforts. Job analysis has been used in the development of teacher licensing tests in a number of states. Among the states that have conducted job analyses as part of their teacher certification test development efforts are Georgia, Alabama, South Carolina, and Oklahoma, West

Virginia, Texas and Connecticut. In all seven cases a survey approach was used. A sample of public school educators within the state were sent a survey instrument requesting them to rate on a Likert-type scale a series of content objectives, developed by panels of content experts, in terms of the amount of time spent teaching or using the objectives and the importance of the objectives to teaching. Based on the job analysis results, those objectives found to be most job related were included in the content of the examinations. In Georgia an interview procedure was used with a smaller sample of educators to supplement the quantitative ratings and gather further information about job content. For the Texas job analysis, a second survey was sent to teacher education program faculty to gather their perceptions of the importance of the objectives to the teaching job.

Similar procedures were used in the development of the Florida Teacher Certification Examination. Teacher competencies (objectives) were developed by a panel of teacher educators. The competencies were then sent to a sample of public school educators who rated the competencies in terms of their perceived "importance" to the field. No ratings of "frequency of use" or "time spent using" were collected.

Similar procedures have been used for more process-oriented assessment measures developed for use in teacher certification. The Basic Professional Studies Examination developed in Alabama to assess knowledge of pedagogical skills relied on job analysis for determining the content to appear on the test. A sample of educators across

teaching fields rated the frequency with which pedagogical skills were used and the importance of those skills. The content of the Performance tests developed in South Carolina and West Virginia were defined through a job analysis procedure. Again, using a survey approach, a sample of public school educators in the state rated the importance and frequency of use of a series of teaching skills and behaviors. In West Virginia a corresponding survey asking for rating of importance was sent to teacher education program faculty as well.

A job analysis, using the survey approach, was recently conducted for the National Teachers Examination (NTE) Core Battery by Rosenfeld, Thornton and Skurnik (1986). A review of literature, supplemented by interviews with teachers and administrators, was conducted to create an inventory of major job tasks and knowledge associated with the teaching job. The inventory was put into a job analysis survey and sent to 3500 teachers and 148 administrators for review.

Respondents rated each of the 83 tasks included in terms of the importance of each task to overall job performance, and the extent to which beginning teachers should be able to perform the task. The 39 knowledge areas were rated for importance, relationship to successful performance, and level of cognition at which the knowledge is typically used.

The results of the survey for the job tasks were factor analyzed to determine the underlying factors or job functions associated with

the teaching job. The mean importance ratings for the knowledge were also computed and linked to the 6 job functions determined through factor analyses. These results were reviewed by an advisory committee to determine recommended content for the NTE core battery.

Job analysis alternatives. While job analyses conducted for current teacher licensing tests have almost exclusively used the to survey other alternatives described earlier in this chapter may be suitable for use in teacher certification testing.

Whether the additional information gained from the use of these approaches warrants the large expenditure of resources remains to be seen. However, additional research in this area is necessary to determine the effectiveness of current job analysis approaches employed within the realm of teacher licensing, and to identify superior approaches to job analysis in this setting.

Job analysis approach used in this research.

The Job Analysis investigated for this dissertation reflects several of the traditions described in this chapter. The initial steps in the job analysis relied on a comprehensive review of both general and state-specific definitions of the job of the teacher. The review of state curriculum materials, teacher education program standards and literature in the area of teaching were used as a basis for defining the knowledge required in terms of a set of cognitive

objectives. This preliminary set of objectives was reviewed by a panel of job incumbents, school administrators and teacher educators to ensure a comprehensive definition of the knowledge required for the job. This final set of objectives was then sent out to a sample of practicing teachers in the state in the form of a survey. The specific survey methodology used is described in the next chapter.

CHAPTER III

METHODS AND PROCEDURES

This chapter describes the methodology employed to address the research questions posed in Chapter 1. The first section describes the source of the data including the nature of the sample, the instrumentation used to collect data, and the data collection procedures. The analysis procedures used to answer the first research question addressing the dimensional structure of the survey instrument are presented in the second section. The third section describes the methodology used to evaluate the second question which examines similarities/differences in survey results between known criterion groups. The methodology used to address research question 3, is described in the third section of this chapter.

Data source.

The construct validity of the job analysis survey instrument was assessed through a secondary analysis of job analysis survey data collected to define the content of a pedagogy test required of all applicants for certification in a statewide teacher certification testing program. This test is designed to measure a prospective teacher's knowledge in the areas of Instructional Planning and Curriculum Development, Assessment and Measurement, Instructional

Methodology and Classroom Management and Principles of Education. Separate pedagogy tests (with some overlap in content) and job analysis survey instruments were developed for elementary and secondary level teachers. All analyses were carried out separately for the elementary and secondary level surveys.

Sample. The sample for this study was composed of 297 public school educators teaching at the elementary level and 287 public school educators teaching at the secondary level. Educators were sampled from a complete listing of all educators in the state who held valid teaching certificates and were currently assigned to teach in classrooms in the state. Educators were randomly sampled to provide a representative sample of the state's teacher population.

Instrumentation. Two separate job analysis survey instruments were administered for this study: one for elementary educators, and one for secondary educators. The job analysis survey instrument administered to the sample of educators included a set of instructions for completing the instrument, a series of 8 background information (demographic) questions and the set of objectives proposed for measurement on the test that were developed by a panel of state educators to be rated by respondents (see Appendix A). The elementary level survey contained 50 objectives, and the secondary level survey contained 42 objectives. The set of objectives were developed to reflect the minimum pedagogical knowledge required by an entry-level educator in schools within the state.

Respondents were asked to rate each objective in 3 ways. First, respondents were asked to indicate whether or not they used the content of the objective in their teaching during this or the past school year; a dichotomous (yes or no) response was requested. Second, respondents were asked to judge the amount of time spent using the objective compared to other objectives on a 5-step, Likert-type scale ranging from "very little time" to "very much time." Third, respondents were asked to judge the importance of the objective to their job as a teacher; importance ratings were made on a 5-step, Likert-type scale ranging from "no importance" to "very great importance". Reliabilities for the time spent scales used as a basis for further analyses ranged from .75 to .92 (see Table 9).

As an additional step, respondents were asked to rate the overall importance of each of the four major subareas under which objectives were grouped (e.g., Instructional Planning and Curriculum Development). Respondents were asked to judge the importance of the content in each subarea to their job by assigning 100 points across the four subareas; more points were assigned to the subareas they considered to be more important, and fewer points to those considered to be less important.

Data collection. In the Spring of 1985, the job analysis survey instruments were distributed through state school district offices to the educators sampled. Respondents were asked to complete the survey and return it directly to the contractor responsible for analyzing the

data in the postage-paid envelope provided. Approximately three weeks after the initial survey mailing, a follow-up survey was conducted through the district offices. The final response rate was 66% for elementary teachers and 63% for secondary teachers.

Treatment of the data. The time spent ratings provided by respondents were used as a basis for all analyses carried out. Respondent time spent ratings were used as a basis for carrying out the factor analyses specified in research question 1, served as the dependent measure for the hypotheses posed in research question 2, and were compared to holistic subarea ratings for research question 3.

Respondents were first asked whether or not they taught or used the information contained in each objective, and were then asked to provide further time spent ratings only for those objectives they indicated that they did teach or use. For the purposes of this study, a "no" response to the first question (do you teach or use the objective?) was considered a "0" rating on the time spent scale (i.e. the respondent spent no time teaching or using the objective).

If a respondent failed to respond to either the first question (do you teach or use the objective) or the second question (how much time do you spend teaching or using the objective), the results for that objective were treated as missing data. For the factor analyses carried out for research question 1, the listwise deletion rule was used for any objective (the entire set of objective ratings was

deleted for that respondent). For the MANOVAs carried out for research question 2, the pairwise deletion rule was used for missing data (i.e., if data were missing for either the independent or dependent variable, the respondent was eliminated from the analysis).

Demographic questions.

As part of the job analysis survey, respondents were asked to complete a series of demographic questions. Responses to these demographic questions were used to 1) characterize the survey sample, 2) screen out inappropriate respondents and 3) create sample subgroups for later comparison as part of the investigation of Research Question 3. The survey questions addressed the following variables:

1. whether or not the respondent was teaching at the grade levels specified on the front cover of the survey,

2. whether or not the respondent held a current teaching certificate,

3. the level of teaching certificate held by the respondent,

4. the highest level of education attained by the respondent,

5. ethnic or racial background of the respondent,

6. years the respondent had been teaching,

7. grade levels the respondent was currently teaching,

8. environment in which the respondent was currently teaching.

The total number of respondents selecting each response option (frequency) and percent of respondents selecting each response option were computed. Cumulative frequencies and percents were calculated as well.

Research question one.

Research question 1 addressed the construct validity of the job analysis survey instrument, by exploring the dimensional structure of the survey instrument.

The dimensional structure of the survey instrument was explored using factor analysis. The underlying factor structure was compared to the expected dimensionality as specified by content experts (i.e. job analysis survey subareas) using procedures recommended by Cronbach (1971) and Hambleton (1980) to assist in determining the construct validity of the instrument.

Principal factors factor analysis was used to address research question 1. This procedure employs the squared multiple correlations

of each variable with all the other variables as prior communality estimates.

An eigenvalue of 1.0 was used as an initial cut-off criterion to determine the number of factors present and the eigenvalues were plotted using the scree procedure to determine the number of meaningful factors present. An eigenvalue of 1.0 was selected since factors with eigenvalue below 1 were not seen as contributing a meaningful amount of variance to the model.

After determining the number of meaningful factors present, a second factor analysis was carried out calling for the specific number of meaningful factors determined. To facilitate interpretation of the factors and to maximize the variance accounted for by the factors, this second factor analysis included a rotation of the factors using orthogonal (varimax) rotation. The variance accounted for by each factor was determined by dividing the associated eigenvalue by the number of variables in the model.

The individual factor loadings for each variable were examined to determine which variables contributed most highly to the definition of the factor and to determine the consistency of the observed factor structure with the a priori subarea structure. An item was required to have a primary loading of .40 or above on a factor and account for twice as much variance on that factor as any other factor to be considered validly loaded on that factor.

Separate factor analyses were carried out for the elementary level survey and the secondary level survey using the "time spent" scale.

Research question two.

Differences in a linear combination of the survey dimensions among known criterion groups were assessed using Multivariate Analysis of Variance (MANOVA). That is, the survey dimensions served as the dependent variable and each of the criterion groups for each survey demographic question served as independent variables. The multivariate F Ratio (Hotelling-Lawley F Ratio) was examined to determine the overall multivariate effect. Variance accounted for was assessed as $1-\Lambda$ (Wilks criterion).

For those tests where the overall multi-variate effect was significant, the univariate effects for each dependent variable were examined.

Individual between cell differences were assessed using Bonferoni confidence intervals. The .05 level of significance was used for all tests.

Separate MANOVAs were carried out for each of the hypothesized relationships proposed in research question 2.

Hypothesis 2a examined differences between teachers with the following different levels of training:

- Bachelor's Degree or below
- Master's Degree or above

Hypothesis 2b examined differences in the following levels of teaching experience:

- Level 1 - 1-3 years of experience
- Level 2 - 4-10 years of experience
- Level 3 - 11 or more years of experience

Hypothesis 2c examined differences between teachers at the following different grade levels:*

- Kindergarten
- Grades 1-6

*This analysis was only carried out for the elementary-level survey instrument.

Hypothesis 2d examined differences between teachers in the following teaching environments:

- Self-contained classroom

- o Departmentalized setting
- o Multi-setting/itinerant teachers

For each of the criterion groups defined in hypotheses 2a-d, separate MANOVAs were carried out for the elementary and secondary level surveys using the "time spent" ratings. The MANOVAS were carried out separately for the empirically derived factor-based scores and the a priori, conceptually-defined subarea scores. These analyses are illustrated in the table below.

MANOVAS COMPLETED

SCALE

LEVEL	empirical factor-based scores	conceptual subarea scores
elementary	elem/ empirical	elem/ conceptual
secondary	second/ empirical	second/ conceptual

Research question three.

This question addressed the correspondence between the holistic subarea ratings and the individual ratings for the objectives in the subarea. This analysis compared molar and molecular ratings provided

by respondents. While the more molar subarea ratings may not be completely consistent with the more molecular ratings of individual objectives within the subarea, a consistent pattern between the two sets of data was expected.

The average (mean) rating for the objectives in a subarea were compared to the overall mean subarea rating as illustrated below.

Subarea	Average Rating for Objectives in Subarea	Rank	Rank	Average Holistic Subarea Rating
I	X	Y	Y	X
II	X	Y	Y	X
III	X	Y	Y	X
IV	X	Y	Y	X

The degree of relationship between the two sets of data were plotted and both a Pearson r correlation and Spearman Rank Order Correlation were computed as indices of the degree of relationship between the two sets of ratings. While both sets of ratings were interval scales indicating that the Pearson r statistic may be appropriate, other assumptions of the parametric model may not have been met. Hence, the non-parametric Spearman rank order correlation was examined as well. Only overall means for the two sets of ratings

were compared since the structure of the data files did not permit matching of responses for individual survey respondents for statistical analysis. Separate comparisons were made at the elementary and secondary level.

C H A P T E R I V

RESULTS

This chapter presents the results of the analyses carried out to investigate the three research questions posed in Chapter 1. A demographic profile of the sample is followed by a presentation of the results for research questions one, two and three

Demographic Profile

As part of the job analysis survey, respondents were asked a series of demographic questions. The responses to these questions were used 1) to qualify individuals as legitimate respondents to the survey 2) to characterize the survey sample and 3) as independent predictor variables for use in evaluating research question two.

The first three survey questions asked were used as a basis for determining the legitimacy of the respondents for use in subsequent analysis. Question one asked the respondents whether they were teaching or had taught at the grade levels indicated on the front of the survey booklet (elementary or secondary) during this or the previous school year. The second question asked whether or not respondents currently held a teaching certificate in the state. In order to be considered eligible for further analysis, respondents were

required to answer "yes" to both questions (i.e. the respondent was required to be both currently teaching and hold current state teacher certification). As a further measure to qualify respondents, question 3 asked the level of teaching certificate they held (elementary, secondary, all-level, composite, other). To qualify as a legitimate respondent, the individual's response had to be consistent with the level of the job being evaluated by the survey (e.g., if the survey instrument was designed for the elementary level, the respondent had to hold an elementary level certificate). Therefore, respondents included in subsequent analyses were currently teaching, currently certified, and certified at the appropriate level.

Profile of the elementary level survey sample.

Two hundred and ninety seven respondents to the elementary pedagogy survey qualified as valid respondents for further analysis based on the first three questions.

Level of education. Respondents were asked the highest level of education they had attained. Twenty three of the 297 valid respondents did not answer this question. Over half (161/58.8%) of the remaining 274 respondents indicated that their highest degree was a Bachelor's degree. Another two-fifths (108/39.4%) of the respondents indicated that a Master's degree was their highest degree. The remaining five respondents (two per cent) indicated some other degree level.

Ethnic/racial background. Respondents were asked their racial or ethnic background. Twenty three of the 297 valid respondents did not answer this question. About two-thirds (188/68.6%) of the remaining 274 respondents indicated that they were white, non-hispanic. Almost a fifth (52/19%) classified themselves as hispanic, while another 10% (26/9.5%) said they were black, non-hispanic. The remaining eight respondents (2.9%) were either Asian American/Pacific Islander or classified themselves as "other".

Years of teaching experience. Question six asked individuals how many years of teaching experience they had. Twenty-four of the 297 valid respondents either did not answer this question or provided invalid responses to the question. About half (138/50.5%) of the remaining 273 valid respondents indicated that they had 11 or more years of teaching experience. Close to two-fifths (107/39.2%) had 4-10 years of teaching experience, and the remaining 10% (28/10.3%) had 1-3 years of experience teaching.

Grade levels. Respondents were asked what grade levels they were currently teaching. Fifty-one respondents either did not answer this question or provided invalid responses to the question. About four fifths (202/82.1%) of the remaining 246 respondents indicated they were teaching grades 1-6, while about a fifth (44/17.9%) of the respondents said they were teaching kindergarten.

Teaching environments. Respondents were asked about the type

of environment in which they taught. Fourty-one respondents either did not answer this question or provided invalid responses to the question. About three-fifths (156/60.9%) of the remaining 256 valid respondents were teaching in a self-contained classroom (teaching the same group of students more than one subject. Another third (81/31.6%) of the respondents indicated that they taught in a departmentalized setting (teaching the same subject to different groups of students), while the remaining 19 (7.4%) respondents said they were in a multi-setting/itinerant environment (teaching different groups of students at more than one school).

Profile of the secondary level survey sample.

Two hundred and eighty-seven respondents to the secondary pedagogy survey qualified as valid respondents for further analysis based on the first three questions.

Level of education. Seventeen of the 287 valid respondents did not answer this question. Just over half (151/55.9%) of the remaining 270 valid respondents indicated that they held a Bachelor's degree or lower. Another two-fifths (116/42.6%) of the respondents held a Master's degree or higher.

Ethnic or racial background. Fourteen of the 287 valid respondents did not answer this question. Four-fifths (221/81%) of the remaining 273 valid respondents classified themselves as white,

non-hispanic. Another 20 (7.3%) of the respondents classified themselves as black, non-hispanic, and another 20 (7.3%) indicated they were hispanic. The remaining 12 (4.4%) respondents classified themselves as American Indian, Asian American, or "other".

Years of teaching experience. Twenty-two of the 287 valid respondents either did not answer the question or provided invalid responses. About three-fifths (162/61.1%) of the remaining 265 valid respondents said they had 11 years or more of teaching experience. About a third (83/31.3%) of the respondents had 4-10 years of teaching experience, and the remaining 20 (7.5%) had 1-3 years of experience teaching.

Grade levels. Thirty of the 287 valid respondents either did not answer this question or provided invalid responses. Of the remaining 257 valid respondents, almost all (238/92.6%) said they were teaching grades 7-12. The remaining 19 (7.4%) of the respondents said they taught grades K-12.

Teaching environments. Twenty-three of the 287 valid respondents either did not answer this question or provided invalid responses. Of the remaining 264 valid respondents, almost all (239/90.5%) were in departmentalized settings (teaching the same subject to more than one group of students). Another 15 (5.7%) were in multi-setting/itinerant environments or administrative positions. The remaining 10 (3.8%) respondents were in self-contained classrooms

(teaching the same group of students more than one subject).

Research question one.

Research question one called for a comparison of the underlying empirical structure of the survey instrument with the survey subarea structure established conceptually by content experts. The underlying empirical structure of the instrument was evaluated using principal factors factor analysis. Separate factor analyses were carried out for the elementary and secondary level surveys.

Elementary level-factor analysis.

The first step in assessing the underlying empirical structure of the instrument was to determine the number of meaningful factors present. To facilitate this an initial factor analysis calling for the extraction of all factors with a minimum eigenvalue of one was undertaken. The initial factor analysis produced a solution with 11 factors meeting the minimum eigenvalue of one criterion. To assist in determining the number of meaningful factors present, the eigenvalues were plotted using the scree procedure. There was no clear break in the plot indicating the number of meaningful factors present. The eigenvalues for the first six factors are listed below. (See Table 10 for complete listing).

Factor	Eigenvalue
Factor 1	15.30
Factor 2	4.01
Factor 3	2.56
Factor 4	2.45
Factor 5	2.18
Factor 6	1.79

To determine the most meaningful factor structure to fit the data, a second set of factor analyses calling for a specific number of factors was carried out. The initial solution was submitted to orthogonal (varimax) rotation to maximize variance accounted for by the factors. Since a four dimensional solution was anticipated based on the a priori subarea structure established by content experts, the four factor solution was examined first. The factor analysis calling for four factors with orthogonal rotation produced a solution accounting for 22.23% of the variance, with the following variances accounted for by each factor: Factor 1 = 7.74%; Factor 2 = 7.15%; Factor 3 = 3.73%; Factor 4 = 3.61%.

Thirty two (64%) of the 50 objectives met the criteria for acceptable loading on a factor. The first factor was composed of objectives related to Principles of Education and some objectives related to learning theory and certain areas of content area curriculum. The second factor reflected objectives related to classroom instruction and areas related to planning and content area

curriculum. The third factor contained objectives related to assessment and evaluation, and the fourth factor contained objectives related to planning for students needs. With 18 (36%) of the objectives failing to load statisfactorily and an additional 7 (14%) of the variables loading on an inappropriate factor (not consistent with the structure expected based on the survey organization), this solution was considered a poor representation of the data.

The three and five factor solutions were examined to determine if they more closely reflected the expected subarea structure. The factor analysis calling for three factors with orthogonal rotation produced a solution accounting for 20.34% of the variance, with the following variances accounted for by each factor: Factor 1: 7.50%; Factor 2: 7.18%; Factor 3: 5.67%. Only 18 (36%) of the objectives were satisfactorily loaded based on the established criteria, and many of the remaining objectives loaded on inappropriate factors. Based on these results, the three factor solution was considered a poor representation of the data.

The five factor solution accounted for 24% of the variance, with the following variances accounted for by each factor: Factor 1 = 6.63%; Factor 2 = 5.48%; Factor 3 = 5.34%; Factor 4 = 3.58%; Factor 5 = 2.97%. Thirty eight (76%) of the objectives were satisfactorily loaded based on the criteria established. The first factor was composed of objectives related to Principles of Education. The second factor contained objectives related to classroom

instruction and instructional planning. The objectives related to content area curriculum comprised the third factor. The fourth factor contained the assessment and evaluation objectives, while the fifth factor contained the objectives related to planning for student needs. The five factor solution reflected a close representation of the subarea structure determined by content experts. Four factors were clearly related to the four subareas identified in the survey instrument, and a fifth factor reflected content area curriculum -- a cluster of objectives from the first survey subarea.

As a further step to verify that the five factor solution was the best representation of the data, an additional factor analysis run, calling for six factors was examined. Examination of the factor loadings revealed that the addition of the sixth factor only served to tear apart the strong fifth factor and resulted in several objectives loading on inappropriate factors.

The five factor solution was selected as the best representation of the elementary-level data since it closely reflected the expected structure for the instrument and made the most conceptual sense. Each of the five factors contained objectives related to a single subarea on the survey instrument with two exceptions. First, Factor 2 contained the objectives related to classroom instruction (subarea 3) as well as 5 of the objectives from subarea 1 related to instructional planning. Second, a unique factor (factor 3) containing the cluster of objectives from subarea 1 related to content area

curriculum (e.g. Math, Science, Reading) emerged. These deviations make conceptual sense: It is logical for teachers to relate instructional planning with classroom instruction. Similarly, the content area curricula can be logically viewed as distinct from the planning process which was the location of this cluster in the survey instrument. Most importantly, while these two areas (instructional planning and the content curriculum) loaded differently than the established subarea structure, the variables they contained held together by cluster, the unit of organization within each subarea. That is, while two sets of objectives deviated from the subarea pattern, they did so in a logical fashion. The objective numbers associated with each of the five factors, along with their original subarea location are listed below.

Elementary Level Five Factor Solution

List of Objectives Associated with Each Factor

Factor 1: Principles of Education	Factor 2: Instruction	Factor 3: Content Area Curriculum	Factor 4: Assessment & Evaluation	Factor 5: Planning for Student Needs
41 (4)	11 (1)	16 (1)	23 (2)	1 (1)
42 (4)	12 (1)	17 (1)	24 (2)	2 (1)
43 (4)	13 (1)	18 (1)	25 (2)	3 (1)
44 (4)	14 (1)	19 (1)	26 (2)	4 (1)
45 (4)	15 (1)	20 (1)	27 (2)	7 (1)
46 (4)	30 (3)		28 (2)	8 (1)
47 (4)	31 (3)			9 (1)
48 (4)	34 (3)			
49 (4)	39 (3)			
50 (4)	40 (3)			

Secondary level factor analyses.

To assess the number of meaningful factors present, an initial factor analysis calling for the extraction of all factors with a minimum eigenvalue of 1 was undertaken. The initial factor analysis produced a solution with eight factors meeting the minimum eigenvalue of 1 criterion. To assist in determining the number of meaningful factors present, the eigenvalues were plotted using the scree procedure. There was no clear break in the plot indicating the number of factors present. The eigenvalue for the first six factors are listed below (see Table 14 for complete listing).

Factor	Eigenvalue
Factor 1	13.13
Factor 2	3.18
Factor 3	3.02
Factor 4	1.80
Factor 5	1.51
Factor 6	1.39

To determine the most meaningful factor structure to fit the data, a second set of factor analyses calling for a specific number of factors was carried out. The initial solution was submitted to orthogonal (varimax) rotation to maximize variance accounted for by the factors. Three, four and five factor solutions were examined.

Since a four dimensional solution was anticipated based on the survey subarea structure established by content experts, the four factor solution was examined first. The factor analysis calling for a four factor solution with orthogonal rotation produced a solution accounting for 19.13% of the variance, with the following variances accounted for by each factor: Factor 1 = 5.74%; Factor 2 = 5.04%; Factor 3 = 4.26%, and Factor 5 = 4.09%. Thirty three (79%) of the forty two objectives met the criteria for acceptable loading on a factor. The first factor contained objectives related to principles of education. The second factor primarily contained objectives related to classroom instruction as well as instructional planning. The third factor contained objectives relating to planning for student needs. Objectives related to assessment and evaluation comprised factor 4. With only four objectives loading on an unexpected factor and almost four-fifths of the objectives satisfactorily loaded, the four factor solution was considered a good representation of the data.

For purposes of comparison, the three and five factor solutions were examined as well. The factor analysis calling for three factors with orthogonal rotation produced a solution accounting for 17.7% of the variance, with the following variances accounted for by each factor: Factor 1 = 7.48%; Factor 2 = 5.91%; Factor 3 = 4.33%. While 37 (88%) of the variables were satisfactorily loaded according to the established criteria, the 3 factor solution resulted in many objectives loading inappropriately. For example, most of the objectives loading on the second and fourth factors in the four factor

solution collapsed into a single factor forcing assessment objectives with the instruction objectives and some planning objectives.

The five factor solution accounted for 20.26% of the variance with the following variances accounted for by each factor: Factor 1 = 5.6%; Factor 2 = 4.27%; Factor 3 = 4.01%; Factor 4 = 3.98%; Factor 5 = 2.38%. Thirty one (74%) of the objectives were satisfactorily loaded on a factor according to the established criteria. While the five factor solution was a possible alternative, more than a quarter of the variables overall failed to load satisfactorily and more than half of the classroom instruction variables failed to load satisfactorily.

The four factor solution was selected as the best representation of the secondary-level data, since it closely matched the established survey structure. While the three factor solution offered a possible alternative, it accounted for about 2% less variance and resulted in three major areas clustering together. This is inconsistent with the conceptualization of the job. Similarly, the five factor solution offered a possible alternative; however, most of the classroom instruction variables failed to load satisfactorily. Each of the four factors contained objectives related to a single subarea on the survey instrument with the exception of the second factor which contained both the classroom instruction objectives as well as several instructional planning objectives from subarea 1. The objective numbers associated with each of the four factors, along with their original subarea location are listed below.

Secondary Level Four Factor Solution

List of Objectives Associated with Each Factor

Factor 1: Principles of Education	Factor 2: Instruction	Factor 3: Planning for Student Needs	Factor 4: Assessment and Evaluation
33 (4)	12 (1)	1 (1)	15 (2)
34 (4)	13 (1)	2 (1)	16 (2)
35 (4)	14 (1)	3 (1)	17 (2)
36 (4)	20 (2)	4 (1)	18 (2)
37 (4)	21 (3)	5 (1)	19 (2)
38 (4)	22 (3)	6 (1)	
39 (4)	23 (3)	7 (1)	
40 (4)	24 (3)	8 (1)	
41 (4)	26 (3)	9 (1)	
42 (4)			

Research question two.

Research question two explored the extent to which the job analysis survey results converged with other variables related to the job, i.e., produced expected differences and similarities among known criterion groups. Differences in job analysis survey results among levels of several variables related to and unrelated to the job setting were explored using MANOVA. A series of MANOVAs were carried out for both the elementary-level and secondary-level job analysis

survey data. Two sets of analyses were carried out, one using the conceptually-defined subarea structure and the other using the factor analysis-based survey dimensions as dependent measures.

Elementary-level survey results.

Hypothesis 2a. Hypothesis 2a, predicting no significant differences in a linear combination of the job analysis survey subareas among levels of survey respondent's educational background was confirmed. The overall multivariate effect, assessed using the Hotelling-Lawley F-Ratio, was not significant for respondents with different educational backgrounds ($F = .27$; $df = 4,218$; $p < .89$)

Hypothesis 2a was also examined using the five factors identified in research question one as dependent variables. Hypothesis 2a was again confirmed; no significant differences in a linear combination of the five factors among levels of survey respondents' educational background was found. The overall multivariate effect was not significant for respondents with different educational backgrounds ($F = .51$; $df = 5,217$; $p < .77$).

Hypothesis 2b. Hypothesis 2b, predicting no significant differences in a linear combination of the job analysis survey subareas among levels of survey respondents teaching experience was confirmed. The overall multivariate effect, assessed using the Hotelling-Lawley F-Ratio produced no significant differences between

respondents with different levels of teaching experience ($F = 1.54$; $df = 8,434$; $p < .14$).

Hypothesis 2b was also examined using the five factors identified in research question one as dependent measures. Hypothesis 2b was again confirmed; no significant differences in a linear combination of the five factors among respondents with different levels of teaching experience were found. The overall multivariate effect was not significant for respondents with different levels of teaching experience ($F = 1.27$; $df = 10,436$; $p < .25$).

Hypothesis 2c. Hypothesis 2c, predicting significant differences in a linear combination of the job analysis survey subareas among respondents teaching at different grade levels, was confirmed. The overall multivariate effect, assessed using the Hotelling-Lawley F-Ratio, produced significant differences ($F = 6.54$; $df = 4/218$; $p < .01$). Grade level taught accounted for approximately 11% of the variance in the job analysis survey ratings ($1-\Lambda$). The first characteristic root reflected 100% of the model's effect.

To provide a further understanding of the differences observed, the univariate effects were examined. Significant differences between respondents at different grade levels were found only for subarea 1: Planning and Curriculum Development ($F = 11.64$; $df = 1, 221$; $p < .01$). Teachers at the kindergarten level ($\overline{X}=3.62$) rated planning and curriculum development higher than those in grades 1-6 ($\overline{X}=3.02$).

Hypothesis 2c was also examined using the five factors identified in research question one as dependent measures. Hypothesis 2c was again confirmed; significant differences in a linear combination of the five factors among respondents at different grade levels was found (Hotelling-Lawley $F = 5.37$; $df = 5,217$; $p < .01$). Grade level taught accounted for 11% of the variance in the five survey factors ($1-\Lambda$).

To provide a further understanding of the differences observed, the univariate effects were examined. Significant differences between respondents at different grade levels were found only for factor 5: Planning for student needs ($F = 18.50$; $df = 1/221$; $p < .01$). Teachers at the kindergarten level ($\overline{X}=3.22$) rated planning for student needs higher than those at grades 1-6 ($\overline{X}=2.48$).

Hypothesis 2d. Hypothesis 2d predicting significant differences in a linear combination of the job analysis survey subareas among respondents teaching in different environments was confirmed. The overall multivariate effect, assessed using the Hotelling Lawley F-Ratio, was significant ($F = 4.85$; $df = 8,434$; $p < .01$). Teaching environment accounted for approximately 15% of the variance in the job analysis survey ratings ($1-\Lambda$).

A series of contrasts were examined to assess differences between the three teaching environments. There were significant differences in the linear combination of four survey subareas between

those respondents in self-contained classrooms and those in departmentalized settings (Hotelling-Lawley F-Ratio = 8.60; df = 4,218; $p < .01$). The model accounted for approximately 14% of the variance ($1-\Lambda$). There were no significant differences between teachers in departmentalized settings and those in multi-school or administrative settings (Hotelling-Lawley F-Ratio = 1.0; df = 4,218; $p < .41$). There were no significant differences between teachers in self-contained classrooms and those in multi-school or administrative settings (Hotelling Lawley F-Ratio = 1.93; df = 4,218; $p < .11$).

To provide further understanding of the differences observed, the univariate effects were examined. There were significant differences in job analysis survey ratings among teachers in different teaching environments for subareas 1 and 3.

Significant differences in job analysis survey ratings among teachers in different teaching environments were observed for subarea 1: curriculum development and planning ($F = 9.12$; df = 2,21, $p < .01$). Bonferoni confidence intervals were examined to explore the differences between respondents in specific teaching environments. Teachers in self-contained classrooms ($\overline{X}=3.31$) differed from those in departmentalized settings ($\overline{X}=2.74$) (lower limit = .31; upper limit = 1.06; diff = .57). However, there were no significant differences between teachers in either of those environments and those in administrative or multi-school settings ($\overline{X}=2.57$).

Significant differences in job analysis survey ratings among teachers in different teaching environments were observed for subarea 3: Instruction ($F = 3.89$; $df = 2,221$; $p < .02$). Bonferoni confidence intervals examined to determine if the differences in respondent ratings for teachers in specific teaching environments did produce significant results. Teachers in self-contained classrooms ($\overline{X}=3.60$) did differ from those in departmentalized settings ($\overline{X}=3.22$) (lower limit = .01; upper limit = .61; diff = .31). However, there were no significant differences between teachers in either of these environments and those in administrative or multi-school settings ($\overline{X}=2.53$).

Hypothesis 2d was also examined with the five factors identified in research question one serving as dependent variables. Hypothesis 2d was confirmed; significant differences in a linear combination of the five survey factors among respondents in different teaching environments were found (Hotelling-Lawley F-Ratio = 11.15; df = 10,432; $p < .01$). Teaching environment accounted for approximately 34% of the variance in the job analysis survey ratings.

A series of contrasts were examined to assess the differences between the three teaching environments. There were significant differences in the linear combination of survey factors between those respondents in self-contained classrooms and those in departmentalized settings. The overall multivariate effect was significant (Hotelling-Lawley F Ratio = 19.60; df = 5/217; $p < .01$) accounting for

approximately 31% of the variance (1-Λ). There was no significant differences between teachers in departmentalized settings and those in multi-school settings. The overall multivariate effect was not significant (Hotelling-Lawley F-Ratio = .84; df = 5,217; $p < 52$). Significant differences were found between teachers in self-contained classrooms and those in multi-school settings (Hotelling-Lawley F-Ratio = 5.57; df - 5,217; $p < .01$).

To provide a further understanding of the differences observed, the univariate effects were examined. Significant differences in job analysis survey ratings among teachers in different teaching environments were observed for Factor 3: Content Area Curriculum (F = 46.40; df = 2,221; $p < .01$). Bonferoni confidence intervals were examined to explore the differences between respondents in specific teaching environments. For the content area curriculum factor, teachers in self-contained classrooms ($\overline{X}$=3.84) were significantly different from teachers in departmentalized settings ($\overline{X}$=2.13) (lower limit = 1.33; upper limit 2.21; diff = 1.77) and from teachers in multi-school settings ($\overline{X}$=1.78) (lower limit = .96; upper limit = 2.75; diff = 1.86). There were no differences in content area curriculum ratings between teachers in departmentalized settings and multi-school settings (lower limit = -.85; upper limit = 1.02; diff = .09).

Secondary level of survey results.

Hypothesis 2a. Hypothesis 2a, predicting no significant

differences in a linear combination of the job analysis survey subareas among levels of survey respondent's educational background, was confirmed. The overall multivariate effect, assessed using the Hotelling-Lawley F-Ratio, produced no significant differences between respondents with different educational backgrounds ($F = .60$; $df = 4,238$, $p < .66$).

Hypothesis 2A was also examined with the four factors identified in research question one serving as dependent variables. As hypothesized, there were no significant differences in a linear combination of survey factors among teachers with different educational backgrounds (Hotelling-Lawley F-Ratio = .56; df = 4,238, $p < .69$).

Hypothesis 2b. Hypothesis 2b predicting no significant difference in a linear combination of the job analysis survey subareas among levels of survey respondents teaching experience was confirmed. The overall multivariate effect, assessed using the Hotelling-Lawley F-Ratio, produced no significant differences between respondents with different levels of teaching experience ($F = 61$; $df - 8,474$; $p < .77$).

Hypothesis 2b was also examined with the four factors identified in research question one serving as the dependent variables. Hypothesis 2c was confirmed; no significant differences in a linear combination of the survey factors among teachers with different levels of teaching experience (Hotelling-Lawley F-Ratio =

.79; df = 8,478; p < .61).

Hypothesis 2c. Hypothesis 2c was not examined for secondary-level survey respondents, since all valid respondents fell in a single grade level range on the job analysis survey.

Hypothesis 2d. Hypothesis 2d predicting significant differences in a linear combination of job analysis survey subareas among teachers in different teaching environments was not confirmed. The overall multivariate effect, assessed using the Hotelling-Lawley F-Ratio, was not significant (F = .68; df = 8,474, p < .71).

Hypothesis 2d was also examined using the four factors identified in Research Question one as dependent variables. This hypothesis was not confirmed. Predicted differences between respondents in different teaching environments were not found (Hotelling-Lawley F-Ratio = 1.63; df = 8,474; p < .11).

Research question three.

Research question three addressed the correspondence between the holistic ratings for each subarea and the individual objective ratings for that subarea. That is, molar and molecular ratings of the job were compared to determine if a consistent pattern of results emerged.

Elementary Level Comparisons. The mean holistic ratings for each subarea were compared to the mean individual objective ratings for that subarea for the elementary-level respondents. A numerical comparison is provided below. A plot of the results, including the least squares regression line is provided in Table 32.

Elementary Level Comparison of Holistic Subarea Rating Means and Average Objective Rating Means

Subarea	Holistic Rating	Rank	Average Objective Rating	Rank
I	29.20	2	3.05	2
II	17.66	3	2.95	4
III	35.51	1	3.38	1
IV	17.08	4	3.03	3

As suggested by the above comparison and the plot of the data, there is a very close correspondence between the more global subarea ratings and the individual objective ratings for the subarea. To provide an indication of the degree of relationship between the holistic and individual ratings, both the Pearson r correlation coefficient and Spearman rank-order correlation coefficient were computed. The Pearson r correlation was .90, while the Spearman rank order correlation was .60. Caution should be used in interpreting this information. Although this provides some indication of relationship between the two sets of data, it is based on the overall

means and not on individual respondent ratings. This treatment of the data masks individual differences. Moreover, these correlations are based on only 4 sets of data points.

Secondary Level Comparison. The results for the secondary-level comparison of the mean holistic subarea ratings to the mean individual objective ratings for the subarea produced results similar to the elementary-level survey. The secondary- level comparison is described numerically below. A plot of the results, including the least squares regression line is provided in Table 33.

Secondary Level Comparison of Holistic Subarea Rating Means and Average Objective Rating Means

Subarea	Holistic Rating	Rank	Average Objective Rating	Rank
I	26.74	2	2.62	4
II	18.46	3	2.77	3
III	37.35	1	3.07	1
IV	17.57	4	2.79	2

As indicated in both the numerical table and plot of the data there is a moderate correspondence between the more global subarea ratings and the average individual objective ratings for the subarea.

To provide an indication of the degree of relationship between the holistic and individual ratings, both the Pearson r correlation

coefficient and Spearman rank order correlation coefficient were computed. The Pearson r correlation was .64, while the Spearman rank order correlation was .20.

As with the elementary-level data, caution should be used in interpreting this information. While this provides some indication of the relationship between the two ratings, it is based on the overall means and not individual respondent ratings. Since this treatment of the data masks individual differences, and the distributional assumptions of the Pearson r model may not be met, caution should be used in interpretation. Moreover, the correlation obtained is based on only 4 sets of data points.

The results for both the elementary and secondary level data suggest a good relationship between more global subarea-level ratings and the individual ratings provided for each objective in the subarea. While both sets of data showed a strong linear relationship, from the plots and estimated correlation, the elementary-level data showed a stronger relationship than the secondary level data.

CHAPTER V

DISCUSSION

This chapter summarizes the results of this study and discusses the implications of these results for the validity of the job analysis survey instrument investigated. The chapter concludes with a discussion of the limitations of the research and recommendations for future research in this area.

Summary of results.

Three research questions were posed as a basis for evaluating the validity of the job analysis survey instrument used to determine the content to be measured for a pedagogy test included in a statewide teacher certification testing program.

Research questions.

Q1: Does the empirically-derived dimensional structure of the survey instrument conform to the expected domain structure as specified by content experts?

Q2: Does the survey instrument converge with other measures related to the construct, i.e. produce expected

differences/similarities in respondent ratings between known criterion groups?

Q3: Is there a relationship between the holistic subarea importance ratings and the average ratings assigned for the individual objectives in each subarea?

The results of the analyses carried out to answer these questions are summarized below.

Research question one results.

The expected domain structure of the survey instrument was compared to the empirically-derived dimensional structure of the survey instrument through a series of factor analyses. Comparisons were made for both the elementary-level and secondary-level surveys.

For the elementary-level survey, three, four, and five factor solutions with orthogonal rotation were examined to determine the extent to which the empirical structure matched the conceptually-defined structure. The five factor solution was judged to be the best representation of the data. The five factor solution most closely reflected the conceptually-defined structure of the survey instrument, and had the greatest number of objectives satisfactorily loaded on the factors identified. Moreover, almost all the objectives were associated with a factor that would be expected based on the a priori

conceptualization. Four of the factors identified closely matched the four survey subareas, and the fifth factor, containing the objectives related to the content area curriculum, reflected the "content area curriculum" cluster from the first subarea on the survey.

For the secondary-level survey, three, four, and five factor solutions with orthogonal rotation were examined to determine the extent to which the empirical structure matched the conceptually-defined structure. The four factor solution was judged to be the best representation of the data. The four factor solution most closely reflected the conceptually-defined structure of the survey instrument, and had the greatest number of objectives associated with a factor that would be expected based on the a priori conceptualization. The four factors identified closely matched the four survey subareas; however, the cluster of objectives related to instructional planning was associated with the classroom instruction factor rather than the planning factor as predicted based on the a priori conceptualization.

Research question two results.

The extent to which the survey instrument converged with other measures related to the construct was examined in research question two. Predicted differences or similarities in respondent ratings among levels of several variables related to and unrelated to the job setting were investigated using Multivariate Analysis of Variance

(MANOVA). Differences in a linear combination of the survey subareas and a linear combination of the dimensions identified in research question one among individuals with different educational backgrounds, different levels of experience, different grade level assignments, and working in different environments were assessed. These relationships were assessed for both the elementary-level and secondary-level surveys. The analyses conducted are illustrated below.

	Dependent Variables			
	ELEMENTARY		SECONDARY	
Independent Variables	Subarea Scores	Factor-Based Scores	Subarea Scores	Factor-Based Scores
Educational Background	X	X	X	X
Years of Experience	X	X	X	X
Grade Levels Teaching	X	X		
Teaching Environment	X	X	X	X

For the elementary level survey, all four hypotheses posed were confirmed using both the conceptually-defined subarea scores as dependent measures and the empirically-derived, factor-based scores as dependent measures. As predicted, there were no differences in the amount of time spent on various job content areas between individuals

with different educational backgrounds or different levels of experience. There were, as predicted, differences in the amount of time spent on various job content areas between individuals teaching at different grade levels and for those teaching in different environments. With respect to time spent on different activities at different grade levels, teachers in grades 1-6 indicated that they spent less time on planning activities than teachers in Kindergarten classrooms. Teachers in different teaching environments spend different amounts of time on job activities, with teachers in self-contained classrooms indicating that they spent more time on planning activities and various classroom instruction activities than those in departmentalized settings.

For the secondary-level survey, two of the three hypotheses proposed were confirmed. As predicted, there were no differences in the amount of time spent on various job content areas between individuals with different educational backgrounds or different levels of experience. While differences in time spent on various job activities among teachers in different teaching environments was predicted, the MANOVA failed to detect significant differences at the .05 level. However, it is difficult to draw conclusions based on these results with so few respondents in two of the cells (self-contained classrooms = 10; multi-school or administrative settings = 15.)

Research question three results.

The relationship between holistic subarea importance ratings and the individual importance ratings assigned to objectives in the subarea was assessed in question 3. To compare the two sets of ratings, the results were plotted and correlation coefficients were calculated for both the elementary and secondary-level data. Because individual respondent ratings could not be matched for the two measures, and only overall group means could be used, no formal significance testing was carried out. The review of the plot of the holistic subarea rating means and average individual objective rating means for each subarea for the elementary-level data showed a strong linear relationship. Both the Pearson r and Spearman rank order coefficients were quite high (Pearson r = .90; Spearman r = .60).

For the secondary-level data, the review of the plot showed a strong linear relationship between the two sets of ratings. While the Pearson r correlation was .64, the Spearman rank order correlation was .20.

Discussion of results.

Obtaining validity evidence to support the use of a given instrument is an important component of any measurement effort. Popham (1978) notes "Invalid tests yield evidence that will mislead. Clearly, therefore, attention to the validity question is critical"

(p. 34). There are many approaches to validation. Traditionally, validation approaches have been categorized in three ways: content validity, criterion-related validity and construct validity (Cronbach, 1971; Popham, 1978). Increasingly, however, two major categories are being identified: content validity and construct validity (Hambleton, 1980), with criterion-related validity included within the latter. In essence, this taxonomy separates validity into approaches relying on non-empirical methods and those that rely on empirical evidence. This dissertation investigated the validity of the job analysis survey instrument used to define teacher certification test content from a construct validity perspective. Validity was examined in three ways. First, the validity of the instrument was assessed by comparing the a priori, content-expert established subarea structure to the empirically derived dimensional structure of the instrument. Second, validity was examined with respect to the convergence/divergence of the survey results with other variables related to and unrelated to the job. Third, the consistency of results across methods of observation was examined by comparing the molecular-level average objective ratings with macro-level holistic ratings of survey subareas to determine the extent to which different measurement approaches produced similar results.

The results strongly support the validity of the instrument. First, the empirically-derived dimensional structure closely matched the conceptually-established survey subarea structure. Second, six of the seven hypotheses examining the convergence of the survey measure

with other measures related to the job were confirmed. Third, the relationship between the global subarea-level ratings and the individual objective-level ratings was a strong one.

Several researchers (c.f., Hambleton, 1980, Messick, 1975) have suggested that content validation is insufficient for establishing the validity of an instrument. This study went beyond content validation, to explore the construct validity of a commonly used job analysis survey instrument. Cronbach (1971) suggested several methods for establishing construct validity. These include:

1. Factor Analysis
2. Conference of Indicators
3. Consistency across methods of observation

These three approaches were used as a basis in this study for examining the construct validity of the job analysis survey instrument.

Research question one used factor analysis, as recommended by Cronbach (1971) and Hambleton (1980) as a basis for comparing the empirically-derived structure with the expected conceptual structure based on the survey subareas. Cronbach (1971) suggests that items that "by hypothesis are indicators of a certain construct are expected to show substantial loadings on the same factor" (p. 469). Moreover, items hypothesized as unrelated to a construct should not load on a factor associated with the construct. Based on this reasoning the job

analysis survey results were factor analyzed to determine the consistency of the results with the four sub-constructs within the instrument, the survey subareas. The results do support the validity of the instrument. For the elementary level factor analysis, 87% of the objectives that were satisfactorily loaded on a factor, were loaded on a factor expected based on the survey subarea and cluster structure. Similarly, the secondary-level solution had 88% of the satisfactorily loaded items loaded on an factor expected based on the survey subarea structure.

Although the objectives loaded on factors consistent with what would be expected on the basis of the survey subareas, the amount of variance accounted for by the model for both the elementary- and secondary-level surveys was somewhat lower than might be expected. The five factors identified for the elementary-level survey accounted for 24% of the variance, while the four factors identified for the secondary-level survey accounted for 19% of the variance. Given these findings, it may be worthwhile in the future to explore the underlying structure of the survey instruments using other cluster analysis approaches.

Research question two assessed the "convergence of indicators" as recommended by Cronbach (1971). As indicated by Cronbach (1971) "Persons who score high on the test ought to score high on other indicators of the same construct" (p. 466). Cronbach (1971) offers the example of a carpentry test where "one would expect experienced

carpenters to score higher on a test of carpentry knowledge than apprentices or handymen" (p. 466). Along these lines, research question two investigated the convergence of several indicators, based on the survey demographic questions, with the job analysis survey ratings. The results, strongly support the validity of the job analysis survey instrument. For the elementary level survey, as predicted, job analysis survey ratings were not significantly different for variables outside the job setting, specifically educational background and years of experience. Yet there were significant differences in job analysis survey ratings based on variables directly related to the job. Teachers at different grade levels and in different teaching environments were found to spend differing amounts of time on various job activities. Similar results were found at the secondary level, with no significant differences in survey ratings found among teachers, with different educational backgrounds and different levels of experience. Hypothesized differences in survey ratings among teachers in different teaching environments were not confirmed at the secondary level. However, it is difficult to draw a final conclusion here due to the small number of respondents in two of the three cells examined. Ninety percent of the teachers responding to the survey were in departmentalized settings. Fewer than fifteen respondents reported that they were in either of the other two environments explored.

These relationships observed in question two make sense; one would expect variables outside of the job <u>not</u> to produce differences

in ratings of the job, and those variables directly related to the job setting to produce differences in ratings of the job. The indicators did converge with the instrument as required to provide construct validity evidence as described by Cronbach (1971).

Research question three assessed the "consistency across methods of observation" as recommended by Cronbach (1971) and Campbell and Fiske (1959). Cronbach (1971) suggests that "measures of the same trait from dissimilar data ought to converge" (p. 468). That is to say two different measures of the same construct ought to produce similar results. To evaluate the consistency across methods of observation, job rating data obtained at two different levels using two different approaches was obtained. Respondents provided both holistic ratings for each subarea and provided individual objective ratings for the objectives in each subarea. The average objective-level rating for the objectives in each subarea was compared to the global subarea-level rating. The plots of the group means for the two types of ratings suggest a strong convergence of the two measures. The correlation between the two ratings at the elementary level were very strong. Both the parametric and non-parametric correlations were high (Pearson r = .90; Spearman r = .60). At the secondary level, the parametric Pearson-r correlation was fairly high (.64); however, the non-parametric Spearman rank order correlation was more moderate (.20). With only 4 sets of data points, the Spearman rank-order correlation is extremely sensitive to any difference in the order of the two sets of measures. Unfortunately, we cannot be

comfortable that the assumptions of the parametric model have been met using the group means, so no final conclusions regarding the relationship between these two measures based on the Pearson r correlation can be drawn. However, based on the linear trend evidenced by the plots of these two measures and corresponding least squares regression line at both levels, the strong results at the elementary level, and the moderate results at the secondary level, three appears to be consistency across these two measures of the teacher's job.

Overall, the results of this study support the validity of the job analysis survey measure. However, as Cronbach (1971) suggests: "Construct validation requires the integration of many studies. There is no such thing as a coefficient of construct validity nor does the series of studies permit a simple summary" (p. 464). Additional studies must be undertaken to provide more evidence of the validity of the job analysis survey instrument in question.

Future research.

There are several areas of validation research that could be explored to further establish the validity of the job analysis survey instrument.

Additional studies of convergence of indicators. This research examined the convergence of the survey measure with four indicators:

educational background, years of experience, grade levels taught and teaching environment. There are several additional variables that may be explored to examine the validity of the instrument. Perhaps most important of these is whether or not one is a teacher. Because of the applied nature of this research, the instrument was administered solely to teachers. In future research, the instrument could be administered to teachers and non-teachers. Since the content of the instrument focuses on activities of the teacher's job, the instrument should yield different results for the teacher and non-teacher groups. Other variables that would be useful in exploring the validity of the instrument are: type of school organization and educational philosophy. Teachers in different types of organizational structures and holding different perspectives on education would be likely to rate job activities differently.

Counter-hypotheses. Cronbach (1971) and Hambleton (1980) suggest that validation should involve the testing of counter-hypothesis to determine if there are factors other than the construct that may be contributing to the results. Within the realm of cognitive testing, Cronbach (1971) and Hambleton (1980) suggest several variables for counter-hypothesis testing including motivation, speededness, vocabulary, and test-taking strategy. Similar variables could be the source of counter-hypothesis testing for the job analysis survey instrument. This area of investigation would address the question "are there factors other than the job itself that are related to the job analysis survey instrument ratings?" Variables for

investigation within this realm might include: motivation, social desirability and fatigue.

Other job analysis approaches. In Chapter II several major job analysis approaches were discussed. As a further measure to establish the consistency of results across methods of observation as recommended by Cronbach (1971), the job analysis survey approach examined in this study could be compared to other job analysis approaches. Other approaches for comparison might include the Job Element Method, TI/CODAP, and Ability Requirements scales. The results obtained from these job analysis approaches could be compared to the results obtained using the job analysis survey instrument investigated in this study. One would expect similar results in evaluating the same job using different approaches (Cronbach, 1971; Campbell and Fiske, 1959).

Limitations.

While the results strongly support the validity of the job analysis survey instrument, there are several limitations to this research. The limitations of this research are discussed below.

Proving Validity. By examining the validity of the survey instrument from three different perspectives and for two different uses (2 test areas), substantial support for the validity of the instrument has been provided. While we can have a great deal of

confidence in the validity of the instrument, we cannot say validity has been proven. Cronbach (1971) emphasizes this point: "Validation of any instrument calls for an integration of many types of evidence. The varieties of investigation are not alternatives any one of which would be adequate. The investigations supplement one another" (p. 445).

This study uses several of the approaches for validation proposed by Cronbach (1971) and Hambleton (1980); however the accumulation of validity evidence needs to be an ongoing process.

Applied research. This research was conducted as part of an actual test development effort. While this offers the advantage of "realism", it presents several limitations.

First, the instrument was set up to meet the specific needs of the test development effort; had the instrument been designed solely for research purposes, several changes might have been included. Respondents were not permitted to rate the amount of time spent teaching or using an objective if they failed to give a positive response to the dichotomous (Yes/No) "do you teach or use this objective." To avoid the potential for substantial missing data in this research, respondents indicating that they did not teach or use the objective were assigned a rating of "0" on the time spent scale. This is an acceptable solution; but in a controlled research environment this could have been dealt with more effectively in the

design of the instrument. Moreover, had this been purely a research effort, the demographic questions included could have provided greater latitude for response than was necessary for test development purposes. For example, the question asking respondents what grade levels they taught only allowed for broad categories of grade levels necessary for qualifying the respondent as a valid one for the test area. A pure research approach would have permitted responses for individual grade levels (i.e., K, 1, 2, 3, etc.). In addition, other demographic questions, unrelated to the test development effort, could have been included to obtain further validity evidence using the approach employed in research question two.

Second, had this been a pure research effort there might have been greater control over the sampling for the study. While the goal in sampling for test development purposes was to obtain a random sample of the population, sampling for this purpose would have sought to maximize the numbers of respondents in each cell of the analyses carried out. This oversampling would have better met the research goals, but may have compromised the primary test development purpose.

Analysis of question three. The interpretation of the results obtained in answer to question three is limited. While the original design called for the matching of individual respondent holistic subarea rating responses with individual respondents objective ratings, this was not possible. The two sets of ratings were separated during the survey log-in process and lacked identifying

information to facilitate matching because of confidentiality concerns. While the results provide some indication of the relationship between the more global subarea ratings and the individual objective ratings, much information is lost in using only group means.

Conclusion

This research strongly supports the validity of the job analysis survey instrument examined. The analysis indicates that the empirically-derived dimensional structure is consistent with the expected survey subarea structure, that indicators expected to converge with the survey do in fact converge, and that there is a good degree of consistency across different methods of observation for the same construct. While there are several limitations related to the survey instrument, treatment of the data, use of applied data and the difficulty in proving validity, the evidence for the validity of the instrument examined is still substantial.

Future research efforts are recommended to investigate this survey instrument for different test fields and for other teacher certification programs. Moreover, additional indicators, and their relationship with the survey data should be investigated. As a further measure, research efforts should be directed at investigating other job analysis approaches in relation to the survey method investigated.

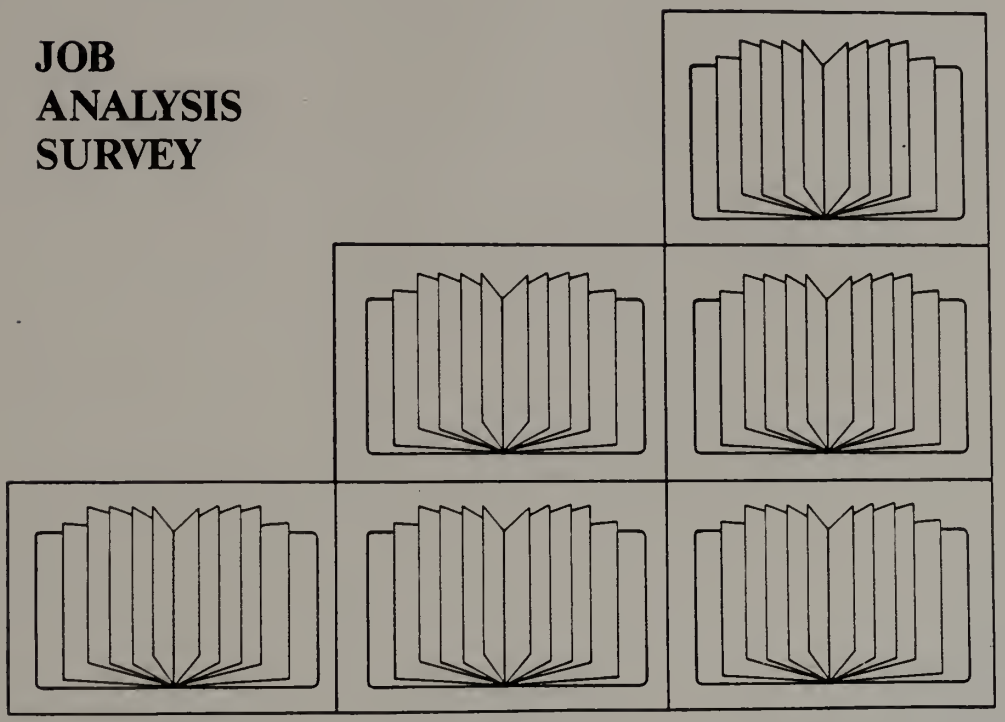
This research presents a significant contribution to both the validity literature and practical teacher licensing test development efforts. This dissertation offers a useful model for investigating the construct validity of measures. Most importantly, this dissertation supports the validity of the job analysis survey instrument used to define teacher licensing tests nationwide, and as such marks an important step toward ensuring that test instruments used as part of the employment process for one of the largest segments of our work force are valid ones.

APPENDIX A

Elementary Professional Development

Field 102

JOB ANALYSIS SURVEY



YOUR RESPONSE TO THIS SURVEY WILL BE STRICTLY CONFIDENTIAL. ALL INFORMATION IDENTIFYING INDIVIDUALS WILL BE ELIMINATED FROM THE DATA AFTER YOUR SURVEY BOOKLET AND RESPONSE FORM ARE RETURNED.

GENERAL INSTRUCTIONS

Completing the survey: Completing this survey should take approximately one-half hour. Record your responses on the JOB ANALYSIS RESPONSE FORM provided with this survey.

> USE ONLY A BLACK LEAD PENCIL to fill in your responses.

Comments: If you have any comments to offer about this survey, please note them on the Comments/Suggestions Page at the end of this survey booklet. Do not write comments on the Response Form.

Return Materials: When you have completed the survey, please return BOTH the Response Form and this booklet to:

National Evaluation Systems, Inc.
30 Gatehouse Road
P.O. Box 226
Amherst, Massachusetts 01004

ALL materials must be returned by April 5, 1985. A postage-paid envelope has been enclosed for your convenience. Please do not fold the Response Form.

IDENTIFICATION INFORMATION

In the box in the upper-left portion of the Job Analysis Response Form, enter the following information:

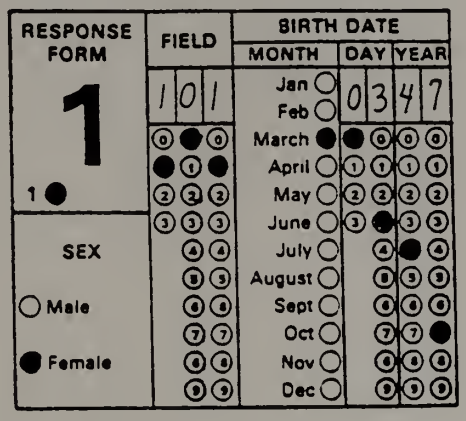
- SEX -- Fill in the appropriate circle for your sex.

- FIELD -- Enter the three-digit FIELD NUMBER noted on the cover of your survey booklet and fill in the corresponding circles.

- BIRTH DATE -- Fill in the appropriate circle for the month in which you were born. Enter the day of the month and the year of your birth in the boxes provided and fill in the appropriate response circles below each box. Please note that the day of the month in which you were born must be indicated as a two-digit number.

Example

Note the example below for how to complete this section of the Response Form.



SECTION I - BACKGROUND INFORMATION QUESTIONS

Directions: In the upper-right portion of the Job Analysis Response Form, complete the Background Information Questions. Fill in the circle corresponding to your response for each question below.

PLEASE SELECT ONLY ONE RESPONSE TO EACH QUESTION.

1. Please check the grade levels (All-Level, Secondary, Elementary) specified on the front of this booklet. Are you now teaching or have you taught at any one of these grade levels during this or the previous year?

   A. Yes B. No

2. Do you currently hold a [redacted] teaching certificate?

   A. Yes B. No

IF YOU HAVE ANSWERED "NO" TO EITHER QUESTION 1 OR 2, STOP HERE AND RETURN ALL MATERIALS TO NATIONAL EVALUATION SYSTEMS, INC., IN THE ENCLOSED POSTAGE-PAID ENVELOPE.

3. What level of [redacted] teaching certificate do you hold?

   A. Elementary
   B. Secondary
   C. All-Level
   D. Composite
   E. Other

4. What is the highest level of education you have attained?

   A. High school diploma or equivalent
   B. Some college but no degree
   C. Associate's degree
   D. Bachelor's degree
   E. Master's degree
   F. Doctoral degree
   G. Other

5. What is your ethnic or racial background?

A. American Indian/Alaskan Native
B. Asian-American/Pacific Islander
C. Black, non-Hispanic
D. Hispanic
E. White, non-Hispanic
F. Other

6. How many years of teaching experience do you have? (Count partial years as full years.)

A. 1-3 years
B. 4-10 years
C. 11 years or more

7. At what grade level(s) are you currently teaching?

A. Pre-Kindergarten
B. Kindergarten
C. Grades 1-6
D. Grades 7-12
E. Grades K-12

8. In which of the following environments do you primarily teach?

A. Self-contained classroom (teaching the same group of students more than one subject)
B. Departmentalized setting (teaching the same subject to different groups of students)
C. Multi-setting/itinerant (teaching different groups of students at more than one school)
D. Administrative (e.g., principals, instructional supervisors)
F. Other

SECTION II - JOB ANALYSIS

In the Job Analysis section of this survey, you will review broadly stated instructional objectives. The objectives define knowledge of teaching required by an entry-level teacher.

Directions: To complete this section of the survey, answer the following questions for each objective on the Objectives List:

- have you USED the content of the objective?
- how much TIME have you spent using the content of the objective?
- how IMPORTANT is the objective to your job as a teacher?

Follow the three steps below to complete this section of the survey:

STEP 1: Use. Indicate whether you have used the content of this objective in your work during this school year or the previous school year. Be sure to consider use of an objective as it relates to your job as a teacher.

Fill in the appropriate response in Column A of your Response Form.

Mark YES (Y) if you have used the content of the objective during this or the previous school year. Since each objective covers a broad range of content, you may not have used all of the content covered by each objective. You should mark YES (Y) if you have used all OR a portion of the content covered by the objective.

Mark NO (N) if you have not used the objective. If you mark NO (N) in Column A for an objective, proceed to the next objective in the survey.

STEP 2: Time spent. For each objective for which you have marked YES in Column A, indicate the amount of time you spent using the content of this objective during this school year or the previous school year in comparison with other objectives. Your rating for time spent should take into account the time you spend using the content of the objective throughout the school year. Fill in your response in Column B of your Response Form using the following scale:

1 = very little time
2 = little time
3 = moderate amount of time
4 = much time
5 = very much time

Fill in only one time spent rating on each objective. If you have any difficulty deciding between two different ratings for an objective, assign the higher rating to the objective.

STEP 3: Importance. For each objective for which you have marked YES in Column A, rate the extent to which the objective is important to your job as a teacher. Fill in your response in Column C of your Response Form using the following scale:

1 = no importance
2 = little importance
3 = moderate importance
4 = great importance
5 = very great importance

Fill in only one importance rating on each objective. If you have any difficulty deciding between two different ratings for an objective, assign the higher rating to the objective.

PLEASE NOTE: DO NOT MARK IN COLUMN D.

Examples

Example #1: In the example below, the person indicated that he or she had used Objective 1, spent "little time" using this objective in relation to time spent using other objectives, and felt that this objective was "of moderate importance" to his or her job as a teacher. Note that Column D is not used.

II. JOB ANALYSIS

	A	B	C	D
1	● N	1 ● 3 4 5	1 2 ● 4 5	1 2 3 4 5

Example #2: Objective 2 was not used during this year or the past school year by the reviewer, and therefore, he or she did not fill in Columns B, C, or D.

	A	B	C	D
2	Y ●	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

THE OBJECTIVES LIST BEGINS ON THE NEXT PAGE.

FOR EACH OBJECTIVE, ANSWER THE FOLLOWING:

A. **USE:** Have you used the content of this objective in your teaching during this or the past school year? Y = Yes N = No	B. **TIME SPENT:** For each objective used, how much time do you spend using the content of this objective in comparison with other objectives? 1 = very little time 2 = little time 3 = moderate amount of time 4 = much time 5 = very much time	C. **IMPORTANCE:** For each objective used, how important is this objective to your job as a teacher? The objective is of: 1 = no importance 2 = little importance 3 = moderate importance 4 = great importance 5 = very great importance

Objective No.	Objective	Objective No.
	INSTRUCTIONAL PLANNING AND CURRICULUM DEVELOPMENT	
	A. Child Development	
1.	Identify stages and characteristics of development of students (birth–age 22).	1.
2.	Apply knowledge of stages and characteristics of early childhood development from birth through kindergarten.	2.
3.	Apply knowledge of stages and characteristics of development at the elementary level.	3.
	B. Special Students	
4.	Recognize characteristics and needs of handicapped students.	4.
5.	Recognize the characteristics and needs of gifted and talented students.	5.
6.	Recognize characteristics and needs of students from special populations (e.g., limited English language proficiency, migrants).	6.
7.	Recognize characteristics and needs of educationally disadvantaged students.	7.
8.	Understand legal requirements relating to the education of special populations.	8.

FOR EACH OBJECTIVE, ANSWER THE FOLLOWING:

A. **USE:** Have you used the content of this objective in your teaching during this or the past school year? Y = Yes N = No	B. **TIME SPENT:** For each objective used, how much time do you spend using the content of this objective in comparison with other objectives? 1 = very little time 2 = little time 3 = moderate amount of time 4 = much time 5 = very much time	C. **IMPORTANCE:** For each objective used, how important is this objective to your job as a teacher? The objective is of: 1 = no importance 2 = little importance 3 = moderate importance 4 = great importance 5 = very great importance

Objective No.	Objective	Objective No.
9.	Adapt curriculum and instruction for teaching students from special populations.	9.
10.	Analyze the influence of cultural background on the instruction of students.	10.
	C. Curriculum Design	
11.	Apply educational goals and objectives to design curriculum.	11.
12.	Understand principles of curriculum organization.	12.
	D. Instructional Planning	
13.	Design instruction to enable elementary students to achieve educational goals and objectives.	13.
14.	Apply procedures for planning instructional lessons.	14.
15.	Derive goals and objectives appropriate to learner needs.	15.
	E. Content Area Curricula	
16.	Understand the reading curriculum.	16.
17.	Understand the English/language arts curriculum.	17.
18.	Understand the social studies curriculum.	18.

FOR EACH OBJECTIVE, ANSWER THE FOLLOWING:

A. **USE:** Have you used the content of this objective in your teaching during this or the past school year? Y = Yes N = No	B. **TIME SPENT:** For each objective used, how much time do you spend using the content of this objective in comparison with other objectives? 1 = very little time 2 = little time 3 = moderate amount of time 4 = much time 5 = very much time	C. **IMPORTANCE:** For each objective used, how important is this objective to your job as a teacher? The objective is of: 1 = no importance 2 = little importance 3 = moderate importance 4 = great importance 5 = very great importance

Objective No.	Objective	Objective No.
19.	Understand the natural sciences curriculum.	19.
20.	Understand the mathematics curriculum.	20.
21.	Understand the fine arts curriculum.	21.
22.	Understand the health and physical education curriculum.	22.
	ASSESSMENT AND EVALUATION	
23.	Understand principles of testing and measurement.	23.
24.	Understand methods and instruments for assessing elementary students in [redacted]	24.
25.	Apply principles for developing assessment instruments.	25.
26.	Apply procedures for scoring and interpreting assessment instruments.	26.
27.	Apply principles of evaluating an instructional program.	27.
28.	Apply principles of evaluation to monitor student progress and evaluate student achievement.	28.

FOR EACH OBJECTIVE, ANSWER THE FOLLOWING.

A. **USE:** Have you used the content of this objective in your teaching during this or the past school year? Y = Yes N = No	B. **TIME SPENT:** For each objective used, how much time do you spend using the content of this objective in comparison with other objectives? 1 = very little time 2 = little time 3 = moderate amount of time 4 = much time 5 = very much time	C. **IMPORTANCE:** For each objective used, how important is this objective to your job as a teacher? The objective is of: 1 = no importance 2 = little importance 3 = moderate importance 4 = great importance 5 = very great importance

Objective No.	Objective	Objective No.
	INSTRUCTIONAL METHODOLOGY AND CLASSROOM MANAGEMENT	
	A. Instructional Delivery	
29.	Apply knowledge of learning theory to instruction.	29.
30.	Apply knowledge of principles of instruction.	30.
31.	Analyze teaching strategies for delivering basic instruction.	31.
32.	Analyze teaching strategies for developing higher-level thinking skills.	32.
33.	Apply knowledge of reading skills to instruction in the content areas.	33.
34.	Identify principles and techniques of classroom organization.	34.
35.	Analyze uses of textbooks in instruction at the elementary level.	35.
36.	Analyze uses of supplementary materials in instruction at the elementary level.	36.
37.	Identify types and uses of audiovisual equipment.	37.
38.	Identify types of school and community resources used for instruction.	38.

FOR EACH OBJECTIVE, ANSWER THE FOLLOWING:

A. **USE:** Have you used the content of this objective in your teaching during this or the past school year? Y = Yes N = No	B. **TIME SPENT:** For each objective used, how much time do you spend using the content of this objective in comparison with other objectives? 1 = very little time 2 = little time 3 = moderate amount of time 4 = much time 5 = very much time	C. **IMPORTANCE:** For each objective used, how important is this objective to your job as a teacher? The objective is of: 1 = no importance 2 = little importance 3 = moderate importance 4 = great importance 5 = very great importance

Objective No.	Objective	Objective No.
	B. Classroom Management	
39.	Analyze principles of instructional management at the elementary level.	39.
40.	Apply principles of discipline management at the elementary level.	40.
	PRINCIPLES OF EDUCATION	
	A. Political and Ethical Aspects	
41.	Understand the purposes of education.	41.
42.	Understand the process of educational goal setting.	42.
43.	Identify state and federal laws related to the role of the classroom teacher.	43.
44.	Identify rights and responsibilities in education.	44.
45.	Apply principles of professional ethics in education.	45.
	B. Policy and Organization	
46.	Understand the structure and functions of the state school system.	46.
47.	Understand the local school system.	47.
48.	Understand the role of the federal government in education.	48.

FOR EACH OBJECTIVE, ANSWER THE FOLLOWING:

A. **USE:** Have you used the content of this objective in your teaching during this or the past school year? Y = Yes N = No	B. **TIME SPENT:** For each objective used, how much time do you spend using the content of this objective in comparison with other objectives? 1 = very little time 2 = little time 3 = moderate amount of time 4 = much time 5 = very much time	C. **IMPORTANCE:** For each objective used, how important is this objective to your job as a teacher? The objective is of: 1 = no importance 2 = little importance 3 = moderate importance 4 = great importance 5 = very great importance

Objective No.	Objective	Objective No.
49.	Understand procedures for hiring and evaluating personnel.	49.
50.	Identify ways of promoting and participating in professional development.	50.

SECTION III: SUBAREA ANALYSIS

The objectives in this survey are grouped into four subareas: I) Instructional Planning and Curriculum Development, II) Assessment and Evaluation, III) Instructional Methodology and Classroom Management, and IV) Principles of Education. Each subarea reflects a major group of content within the area of Professional Development.

Directions: To complete this section of the survey, you should answer the following question FOR EACH SUBAREA:

- how IMPORTANT is knowledge of the content in each subarea to your job?

Indicate below what you feel is the overall importance of each subarea by assigning a total of 100 points across the four subareas. You should assign more points to the subareas you consider to be more important, fewer points to subareas you consider to be less important. The number of points you assign must total 100.

In determining the number of points to assign to each subarea, you should consider, from your ratings in Section II of this survey, the "time spent" and "importance" of each of the objectives in each subarea. Please do NOT rerate any of the individual objectives in the previous section as you complete this section of the survey.

Example

In the example below, the person indicated that, overall, knowledge of the content in subarea III is most important to his/her job, knowledge of the content in subarea II is least important to his/her job, and knowledge of the content of subareas I and IV is of less importance than subarea III, but of equal importance to each other. Note that the total of the subarea ratings is 100.

SUBAREA	RATINGS
I	25
II	10
III	40
IV	25
TOTAL:	100

COMPLETE YOUR RATINGS OF THE IMPORTANCE OF EACH SUBAREA BELOW.

	SUBAREA	OBJECTIVE NUMBERS	RATINGS
I.	Instructional Planning and Curriculum Development	1 - 22	_____
II.	Assessment and Evaluation	23 - 28	_____
III.	Instructional Methodology and Classroom Management	29 - 40	_____
IV.	Principles of Education	41 - 50	_____
		TOTAL:	100 points

[redacted] Initial Teacher Certification Testing Program

JOB ANALYSIS SURVEY

COMMENTS/SUGGESTIONS PAGE

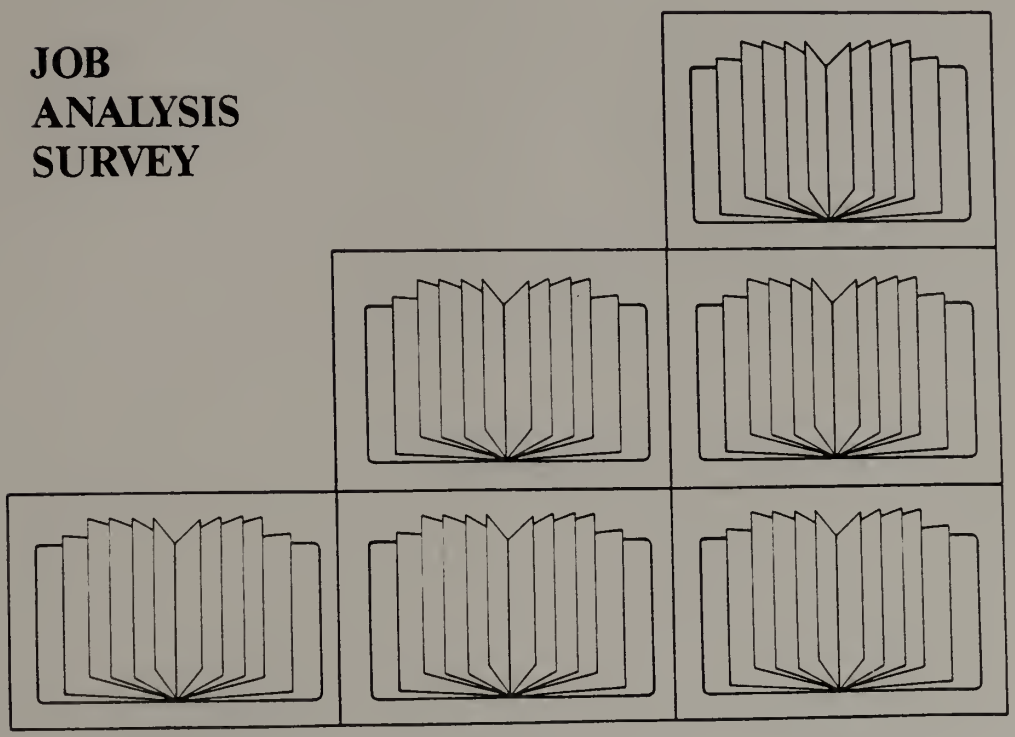
Please use this page for any comments or suggestions that you would like to make about the survey. If you have any comments about a specific section of the survey or a specific question/objective, it would be helpful to us if you refer to it by objective number and/or page.

Thank you for completing this survey. Please return BOTH this booklet and your RESPONSE FORM in the postage-paid envelope to National Evaluation Systems, Inc., 30 Gatehouse Road, P.O. Box 226, Amherst, Massachusetts 01004.

Secondary Professional Development

Field 103

JOB ANALYSIS SURVEY



YOUR RESPONSE TO THIS SURVEY WILL BE STRICTLY CONFIDENTIAL. ALL INFORMATION IDENTIFYING INDIVIDUALS WILL BE ELIMINATED FROM THE DATA AFTER YOUR SURVEY BOOKLET AND RESPONSE FORM ARE RETURNED.

GENERAL INSTRUCTIONS

Completing the survey: Completing this survey should take approximately one-half hour. Record your responses on the JOB ANALYSIS RESPONSE FORM provided with this survey.

> USE ONLY A BLACK LEAD PENCIL to fill in your responses.

Comments: If you have any comments to offer about this survey, please note them on the Comments/Suggestions Page at the end of this survey booklet. Do not write comments on the Response Form.

Return Materials: When you have completed the survey, please return BOTH the Response Form and this booklet to:

National Evaluation Systems, Inc.
30 Gatehouse Road
P.O. Box 226
Amherst, Massachusetts 01004

ALL materials must be returned by April 5, 1985. A postage-paid envelope has been enclosed for your convenience. Please do not fold the Response Form.

IDENTIFICATION INFORMATION

In the box in the upper-left portion of the Job Analysis Response Form, enter the following information:

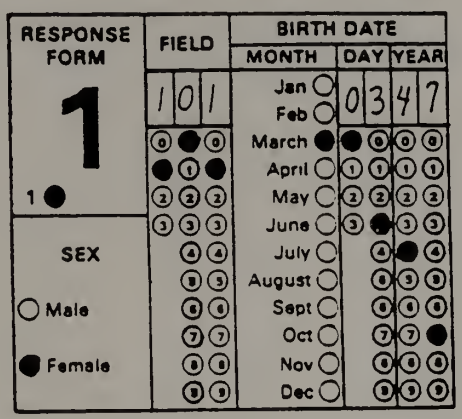
- SEX -- Fill in the appropriate circle for your sex.

- FIELD -- Enter the three-digit FIELD NUMBER noted on the cover of your survey booklet and fill in the corresponding circles.

- BIRTH DATE -- Fill in the appropriate circle for the month in which you were born. Enter the day of the month and the year of your birth in the boxes provided and fill in the appropriate response circles below each box. Please note that the day of the month in which you were born must be indicated as a two-digit number.

Example

Note the example below for how to complete this section of the Response Form.



SECTION I - BACKGROUND INFORMATION QUESTIONS

Directions: In the upper-right portion of the Job Analysis Response Form, complete the Background Information Questions. Fill in the circle corresponding to your response for each question below.

PLEASE SELECT ONLY ONE RESPONSE TO EACH QUESTION.

1. Please check the grade levels (All-Level, Secondary, Elementary) specified on the front of this booklet. Are you now teaching or have you taught at any one of these grade levels during this or the previous year?

   A. Yes B. No

2. Do you currently hold a [redacted] teaching certificate?

   A. Yes B. No

IF YOU HAVE ANSWERED "NO" TO EITHER QUESTION 1 OR 2, STOP HERE AND RETURN ALL MATERIALS TO NATIONAL EVALUATION SYSTEMS, INC., IN THE ENCLOSED POSTAGE-PAID ENVELOPE.

3. What level of [redacted] teaching certificate do you hold?

   A. Elementary
   B. Secondary
   C. All-Level
   D. Composite
   E. Other

4. What is the highest level of education you have attained?

   A. High school diploma or equivalent
   B. Some college but no degree
   C. Associate's degree
   D. Bachelor's degree
   E. Master's degree
   F. Doctoral degree
   G. Other

5. What is your ethnic or racial background?

A. American Indian/Alaskan Native
B. Asian-American/Pacific Islander
C. Black, non-Hispanic
D. Hispanic
E. White, non-Hispanic
F. Other

6. How many years of teaching experience do you have? (Count partial years as full years.)

A. 1-3 years
B. 4-10 years
C. 11 years or more

7. At what grade level(s) are you currently teaching?

A. Pre-Kindergarten
B. Kindergarten
C. Grades 1-6
D. Grades 7-12
E. Grades K-12

8. In which of the following environments do you primarily teach?

A. Self-contained classroom (teaching the same group of students more than one subject)
B. Departmentalized setting (teaching the same subject to different groups of students)
C. Multi-setting/itinerant (teaching different groups of students at more than one school)
D. Administrative (e.g., principals, instructional supervisors)
F. Other

SECTION II - JOB ANALYSIS

In the Job Analysis section of this survey, you will review broadly stated instructional objectives. The objectives define knowledge of teaching required by an entry-level teacher.

Directions: To complete this section of the survey, answer the following questions for each objective on the Objectives List:

- have you USED the content of the objective?
- how much TIME have you spent using the content of the objective?
- how IMPORTANT is the objective to your job as a teacher?

Follow the three steps below to complete this section of the survey:

STEP 1: Use. Indicate whether you have used the content of this objective in your work during this school year or the previous school year. Be sure to consider use of an objective as it relates to your job as a teacher.

Fill in the appropriate response in Column A of your Response Form.

Mark YES (Y) if you have used the content of the objective during this or the previous school year. Since each objective covers a broad range of content, you may not have used all of the content covered by each objective. You should mark YES (Y) if you have used all OR a portion of the content covered by the objective.

Mark NO (N) if you have not used the objective. If you mark NO (N) in Column A for an objective, proceed to the next objective in the survey.

STEP 2: Time spent. For each objective for which you have marked YES in Column A, indicate the amount of time you spent using the content of this objective during this school year or the previous school year in comparison with other objectives. Your rating for time spent should take into account the time you spend using the content of the objective throughout the school year. Fill in your response in Column B of your Response Form using the following scale:

1 = very little time
2 = little time
3 = moderate amount of time
4 = much time
5 = very much time

Fill in only one time spent rating on each objective. If you have any difficulty deciding between two different ratings for an objective, assign the higher rating to the objective.

STEP 3: Importance. For each objective for which you have marked YES in Column A, rate the extent to which the objective is important to your job as a teacher. Fill in your response in Column C of your Response Form using the following scale:

1 = no importance
2 = little importance
3 = moderate importance
4 = great importance
5 = very great importance

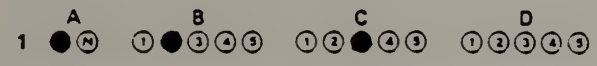
Fill in only one importance rating on each objective. If you have any difficulty deciding between two different ratings for an objective, assign the higher rating to the objective.

PLEASE NOTE: DO NOT MARK IN COLUMN D.

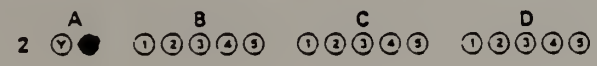
Examples

Example #1: In the example below, the person indicated that he or she had used Objective 1, spent "little time" using this objective in relation to time spent using other objectives, and felt that this objective was "of moderate importance" to his or her job as a teacher. Note that Column D is not used.

II. JOB ANALYSIS



Example #2: Objective 2 was not used during this year or the past school year by the reviewer, and therefore, he or she did not fill in Columns B, C, or D.



THE OBJECTIVES LIST BEGINS ON THE NEXT PAGE.

FOR EACH OBJECTIVE, ANSWER THE FOLLOWING.

A. **USE:** Have you used the content of this objective in your teaching during this or the past school year? Y = Yes N = No	B. **TIME SPENT:** For each objective used, how much time do you spend using the content of this objective in comparison with other objectives? 1 = very little time 2 = little time 3 = moderate amount of time 4 = much time 5 = very much time	C. **IMPORTANCE:** For each objective used, how important is this objective to your job as a teacher? The objective is of: 1 = no importance 2 = little importance 3 = moderate importance 4 = great importance 5 = very great importance

Objective No.	Objective	Objective No.
	INSTRUCTIONAL PLANNING AND CURRICULUM DEVELOPMENT	
	A. Child Development	
1.	Identify stages and characteristics of development of students (birth–age 22).	1.
2.	Apply knowledge of stages and characteristics of development at the secondary level.	2.
	B. Special Students	
3.	Recognize characteristics and needs of handicapped students.	3.
4.	Recognize the characteristics and needs of gifted and talented students.	4.
5.	Recognize characteristics and needs of students from special populations (e.g., limited English language proficiency, migrants).	5.
6.	Recognize characteristics and needs of educationally disadvantaged students.	6.
7.	Understand legal requirements relating to the education of special populations.	7.
8.	Adapt curriculum and instruction for teaching students from special populations.	8.
9.	Analyze the influence of cultural background on the instruction of students.	9.

FOR EACH OBJECTIVE, ANSWER THE FOLLOWING:

A. **USE:** Have you used the content of this objective in your teaching during this or the past school year? Y = Yes N = No	B. **TIME SPENT:** For each objective used, how much time do you spend using the content of this objective in comparison with other objectives? 1 = very little time 2 = little time 3 = moderate amount of time 4 = much time 5 = very much time	C. **IMPORTANCE:** For each objective used, how important is this objective to your job as a teacher? The objective is of: 1 = no importance 2 = little importance 3 = moderate importance 4 = great importance 5 = very great importance

Objective No.	Objective	Objective No.
	C. Curriculum Design	
10.	Apply educational goals and objectives to design curriculum.	10.
11.	Understand principles of curriculum organization.	11.
	D. Instructional Planning	
12.	Design instruction to enable secondary students to achieve educational goals and objectives.	12.
13.	Apply procedures for planning instructional lessons.	13.
14.	Derive goals and objectives appropriate to learner needs.	14.
	ASSESSMENT AND EVALUATION	
15.	Understand principles of testing and measurement.	15.
16.	Understand methods and instruments for assessing secondary students in [redacted] ✓	16.
17.	Apply principles for developing assessment instruments.	17.
18.	Apply procedures for scoring and interpreting assessment instruments.	18.
19.	Apply principles of evaluating an instructional program.	19.
20.	Apply principles of evaluation to monitor student progress and evaluate student achievement.	20.

FOR EACH OBJECTIVE, ANSWER THE FOLLOWING:

A. **USE:** Have you used the content of this objective in your teaching during this or the past school year? Y = Yes N = No	B. **TIME SPENT:** For each objective used, how much time do you spend using the content of this objective in comparison with other objectives? 1 = very little time 2 = little time 3 = moderate amount of time 4 = much time 5 = very much time	C. **IMPORTANCE:** For each objective used, how important is this objective to your job as a teacher? The objective is of: 1 = no importance 2 = little importance 3 = moderate importance 4 = great importance 5 = very great importance

Objective No.	Objective	Objective No.
	INSTRUCTIONAL METHODOLOGY AND CLASSROOM MANAGEMENT	
	A. Instructional Delivery	
21.	Apply knowledge of learning theory to instruction.	21.
22.	Apply knowledge of principles of instruction.	22.
23.	Analyze teaching strategies for delivering basic instruction.	23.
24.	Analyze teaching strategies for developing higher-level thinking skills.	24.
25.	Apply knowledge of reading skills to instruction in the content areas.	25.
26.	Identify principles and techniques of classroom organization.	26.
27.	Analyze uses of textbooks in instruction at the secondary level.	27.
28.	Analyze uses of supplementary materials in instruction at the secondary level.	28.
29.	Identify types and uses of audiovisual equipment.	29.
30.	Identify types of school and community resources used for instruction.	30.

FOR EACH OBJECTIVE, ANSWER THE FOLLOWING:

A. **USE:** Have you used the content of this objective in your teaching during this or the past school year? Y = Yes N = No	B. **TIME SPENT:** For each objective used, how much time do you spend using the content of this objective in comparison with other objectives? 1 = very little time 2 = little time 3 = moderate amount of time 4 = much time 5 = very much time	C. **IMPORTANCE:** For each objective used, how important is this objective to your job as a teacher? The objective is of: 1 = no importance 2 = little importance 3 = moderate importance 4 = great importance 5 = very great importance

Objective No.	Objective	Objective No.
	B. Classroom Management	
31.	Analyze principles of instructional management at the secondary level.	31.
32.	Apply principles of discipline management at the secondary level.	32.
	PRINCIPLES OF EDUCATION	
	A. Political and Ethical Aspects	
33.	Understand the purposes of education.	33.
34.	Understand the process of educational goal setting.	34.
35.	Identify state and federal laws related to the role of the classroom teacher.	35.
36.	Identify rights and responsibilities in education.	36.
37.	Apply principles of professional ethics in education.	37.
	B. Policy and Organization	
38.	Understand the structure and functions of the state school system.	38.
39.	Understand the local school system.	39.
40.	Understand the role of the federal government in education.	40.

FOR EACH OBJECTIVE, ANSWER THE FOLLOWING:

A. **USE:** Have you used the content of this objective in your teaching during this or the past school year? Y = Yes N = No	B. **TIME SPENT:** For each objective used, how much time do you spend using the content of this objective in comparison with other objectives? 1 = very little time 2 = little time 3 = moderate amount of time 4 = much time 5 = very much time	C. **IMPORTANCE:** For each objective used, how important is this objective to your job as a teacher? The objective is of: 1 = no importance 2 = little importance 3 = moderate importance 4 = great importance 5 = very great importance

Objective No.	Objective	Objective No.
41.	Understand procedures for hiring and evaluating personnel.	41.
42.	Identify ways of promoting and participating in professional development.	42.

SECTION III: SUBAREA ANALYSIS

The objectives in this survey are grouped into four subareas: I) Instructional Planning and Curriculum Development, II) Assessment and Evaluation, III) Instructional Methodology and Classroom Management, and IV) Principles of Education. Each subarea reflects a major group of content within the area of Professional Development.

Directions: To complete this section of the survey, you should answer the following question FOR EACH SUBAREA:

- how IMPORTANT is knowledge of the content in each subarea to your job?

Indicate below what you feel is the overall importance of each subarea by assigning a total of 100 points across the four subareas. You should assign more points to the subareas you consider to be more important, fewer points to subareas you consider to be less important. The number of points you assign must total 100.

In determining the number of points to assign to each subarea, you should consider, from your ratings in Section II of this survey, the "time spent" and "importance" of each of the objectives in each subarea. Please do NOT rerate any of the individual objectives in the previous section as you complete this section of the survey.

Example

In the example below, the person indicated that, overall, knowledge of the content in subarea III is most important to his/her job, knowledge of the content in subarea II is least important to his/her job, and knowledge of the content of subareas I and IV is of less importance than subarea III, but of equal importance to each other. Note that the total of the subarea ratings is 100.

SUBAREA	RATINGS
I	25
II	10
III	40
IV	25
TOTAL:	100

COMPLETE YOUR RATINGS OF THE IMPORTANCE OF EACH SUBAREA BELOW.

	SUBAREA	OBJECTIVE NUMBERS	RATINGS
I.	Instructional Planning and Curriculum Development	1 - 14	_____
II.	Assessment and Evaluation	15 - 20	_____
III.	Instructional Methodology and Classroom Management	21 - 32	_____
IV.	Principles of Education	33 - 42	_____
		TOTAL:	100 points

[redacted] Initial Teacher Certification Testing Program

JOB ANALYSIS SURVEY

COMMENTS/SUGGESTIONS PAGE

Please use this page for any comments or suggestions that you would like to make about the survey. If you have any comments about a specific section of the survey or a specific question/objective, it would be helpful to us if you refer to it by objective number and/or page.

Thank you for completing this survey. Please return BOTH this booklet and your RESPONSE FORM in the postage-paid envelope to National Evaluation Systems, Inc., 30 Gatehouse Road, P.O. Box 226, Amherst, Massachusetts 01004.

APPENDIX B

Table 1

Elementary Level Demographic Summary

DEMOGRAPHIC QUESTION	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
Level of Education				
Missing Data	24	.	--	.
Bachelor's Degree or Lower	164	60.1	164	60.1
Master's Degree or Higher	109	39.9	273	100.0
Years of Experience				
Missing Data	24	.	--	.
One to Three Years	23	10.3	23	10.3
Four to Ten Years	107	39.2	135	49.5
Eleven or More Years	138	50.5	273	100.0
Grade Levels Taught				
Missing Data	51	.	--	.
Kindergarten	44	17.9	44	17.9
Grades One to Six	202	82.1	246	100.0
Teaching Environment				
Missing Data	41	.	--	.
Self-Contained Classroom	156	60.9	156	60.9
Departmentalized Setting	81	31.6	237	92.6
Multi-School/Administration	19	7.4	256	100.0

Table 2

Secondary Level Demographic Summary

DEMOGRAPHIC QUESTION	FREQUENCY	PERCENT	CUMULATIVE FREQUENCY	CUMULATIVE PERCENT
Level of Education				
Missing Data	17	.	--	.
Bachelor's Degree or Lower	151	55.9	151	55.9
Master's Degree or Higher	119	44.1	270	100.0
Years of Experience				
Missing Data	22	.	--	.
One to Three Years	20	7.5	20	7.5
Four to Ten Years	83	31.3	103	38.9
Eleven or More Years	162	61.1	265	100.0
Teaching Environment				
Missing Data	23	.	--	.
Self-Contained Classroom	10	3.8	10	3.8
Departmentalized Setting	239	90.5	249	94.3
Multi-School/Administration	15	5.7	264	100.0

Table 3

Elementary Level Average Objective Ratings by Subarea

SUBAREA	MEAN	STANDARD DEVIATION	STD ERROR OF MEAN	MINIMUM VALUE	MAXIMUM VALUE
Planning and Curriculum Devel.	3.05	0.84	0.05	0	5.00
Assessment and Evaluation	2.95	1.19	0.07	0	5.00
Instruction and Management	3.38	0.96	0.05	0	5.00
Principles of Education	3.03	1.06	0.06	0	5.00

Table 4

Elementary Level Average Objective Ratings by Factor

FACTOR	MEAN	STANDARD DEVIATION	STD ERROR OF MEAN	MINIMUM VALUE	MAXIMUM VALUE
Principles of Education	3.03	1.06	0.06	0	5.00
Instruction	3.85	0.82	0.05	0	5.00
Content Area Curriculum	3.13	1.53	0.09	0	5.00
Assessment and Evaluation	2.95	1.19	0.07	0	5.00
Planning for Student Needs	2.61	1.01	0.06	0	5.00

Table 5

Elementary Level Holistic Subarea Ratings Statistics

SUBAREA	N	MEAN	STANDARD DEVIATION	STD ERROR OF MEAN	MINIMUM VALUE	MAXIMUM VALUE
1	192	29.20	8.99	0.65	0.00	60.00
2	192	17.66	8.04	0.58	0.00	40.00
3	192	35.51	10.87	0.78	0.00	75.00
4	192	17.08	7.84	0.57	0.00	40.00

Table 6

Secondary Level Average Objective Ratings by Subarea

FACTOR	MEAN	STANDARD DEVIATION	STD ERROR OF MEAN	MINIMUM VALUE	MAXIMUM VALUE
Planning and Curriculum Devel.	2.62	0.86	0.05	0.29	5.00
Assessment and Evaluation	2.77	1.10	0.07	0	5.00
Instruction and Management	3.07	0.86	0.05	0	5.00
Principles of Education	2.79	1.05	0.06	0	5.00

Table 7

Secondary Level Average Objective Ratings by Factor

FACTOR	MEAN	STANDARD DEVIATION	STD ERROR OF MEAN	MINIMUM VALUE	MAXIMUM VALUE
Principles of Education	2.79	1.05	0.06	0	5.00
Instruction	3.44	0.88	0.05	0	5.00
Planning for Student Needs	2.67	1.05	0.06	0	5.00
Assessment and Evaluation	2.67	1.17	0.07	0	5.00

Table 8

Secondary Level Holistic Subarea Ratings Statistics

SUBAREA	N	MEAN	STANDARD DEVIATION	STD ERROR OF MEAN	MINIMUM VALUE	MAXIMUM VALUE
1	171	26.74	9.24	0.71	8.00	60.00
2	171	18.46	7.41	0.57	5.00	40.00
3	171	37.35	10.39	0.79	15.00	65.00
4	171	17.57	7.36	0.56	2.00	40.00

TABLE 9
Scale Reliabilities

Elementary Level

Scale	Cronbach's Alpha Reliability
Subarea 1: Instructional Planning and Curriculum Development	.89
Subarea 2: Assessment and Evaluation	.90
Subarea 3: Instructional Methodology and Classroom Management	.90
Subarea 4: Principles of Education	.92
Factor 1: Principles of Education	.92
Factor 2: Instruction	.90
Factor 3: Content Area Curriculum	.92
Factor 4: Assessment and Evaluation	.90
Factor 5: Planning for Student Needs	.75

Secondary-Level

Scale	Cronbach's Alpha Reliability
Subarea 1: Instructional Planning and Curriculum Development	.87
Subarea 2: Assessment and Evaluation	.88
Subarea 3: Instructional Methodology and Classroom Management	.87
Subarea 4: Principles of Evaluation	.91
Factor 1: Principles of Education	.91
Factor 2: Instruction	.90
Factor 3: Planning for Student Needs	.86
Factor 4: Assessment and Evaluation	.88

APENDIX C

Table 10

Elementary Level Initial Factor Analysis
(Mineigen = 1)

PRIOR COMMUNALITY ESTIMATES: ONE
PRELIMINARY EIGENVALUES: TOTAL = 50 AVERAGE = 1

	1	2	3	4	5	6	7	8	9
EV	15.295574	4.011026	2.563232	2.452441	2.178639	1.790781	1.441305	1.292436	1.270172
DIFF	11.284548	1.447794	0.110791	0.273802	0.387858	0.349476	0.148870	0.022264	0.126897
PROP	0.3059	0.0802	0.0513	0.0490	0.0436	0.0358	0.0288	0.0258	0.0254
CUM	0.3059	0.3861	0.4374	0.4864	0.5300	0.5658	0.5947	0.6205	0.6459
	10	11	12	13	14	15	16	17	18
EV	1.143274	1.004682	0.934988	0.932697	0.820882	0.797603	0.750227	0.697087	0.640915
DIFF	0.138592	0.069695	0.002291	0.111815	0.023279	0.047376	0.053139	0.056172	0.007010
PROP	0.0229	0.0201	0.0187	0.0187	0.0164	0.0160	0.0150	0.0139	0.0128
CUM	0.6688	0.6889	0.7076	0.7262	0.7426	0.7586	0.7736	0.7875	0.8004
	19	20	21	22	23	24	25	26	27
EV	0.633905	0.580128	0.576296	0.528397	0.498165	0.479725	0.463296	0.441406	0.412060
DIFF	0.053777	0.003833	0.047899	0.030231	0.018441	0.016429	0.021890	0.029345	0.018995
PROP	0.0127	0.0116	0.0115	0.0106	0.0100	0.0096	0.0093	0.0088	0.0082
CUM	0.8130	0.8246	0.8362	0.8467	0.8567	0.8663	0.8756	0.8844	0.8926
	28	29	30	31	32	33	34	35	36
EV	0.393066	0.372731	0.352949	0.346684	0.336913	0.313522	0.293987	0.272475	0.260285
DIFF	0.020334	0.019782	0.006266	0.009770	0.023391	0.019535	0.021512	0.012190	0.013368
PROP	0.0079	0.0075	0.0071	0.0069	0.0067	0.0063	0.0059	0.0054	0.0052
CUM	0.9005	0.9079	0.9150	0.9219	0.9287	0.9349	0.9408	0.9463	0.9515

Table 10
(continued)

Elementary Level Initial Factor Analysis
(Mineigen = 1)

PRIOR COMMUNALITY ESTIMATES: ONE
PRELIMINARY EIGENVALUES: TOTAL = 50 AVERAGE = 1

	37	38	39	40	41	42	43	44	45
EV	0.246916	0.245240	0.238615	0.214992	0.212245	0.185777	0.172481	0.166049	0.150338
DIFF	0.001676	0.006625	0.023623	0.002747	0.026468	0.013295	0.006433	0.015710	0.011050
PROP	0.0049	0.0049	0.0048	0.0043	0.0042	0.0037	0.0034	0.0033	0.0030
CUM	0.9564	0.9613	0.9661	0.9704	0.9746	0.9784	0.9818	0.9851	0.9881

	46	47	48	49	50
EV	0.139288	0.129300	0.114332	0.109353	0.101122
DIFF	0.009988	0.014968	0.004979	0.008231	
PROP	0.0028	0.0026	0.0023	0.0022	0.0020
CUM	0.9909	0.9935	0.9958	0.9980	1.0000

11 FACTORS WILL BE RETAINED BY THE MINEIGEN CRITERION

Table 11
Elementary Level Second Factor Analysis:
3 Factor Solution

ROTATED FACTOR PATTERN

	FACTOR 1	FACTOR 2	FACTOR 3
B1	0.41685	-0.00621	0.15580
B2	0.34957	0.03479	0.05558
B3	0.44524	0.05299	0.20695
B4	0.18632	0.07024	0.16908
B5	0.42199	0.16135	0.12407
B6	0.23423	0.21808	0.17967
B7	0.28214	0.28844	0.13967
B8	0.17414	0.19086	0.37444
B9	0.09941	0.32163	0.16929
B10	0.36346	0.30829	0.23200
B11	0.44959	0.15825	0.20915
B12	0.52263	0.21408	0.20775
B13	0.39158	0.20253	0.02312
B14	0.50641	0.31412	0.11588
B15	0.40328	0.25467	0.09058
B16	0.17559	0.80209	0.01863
B17	0.14199	0.80054	-0.03334
B18	0.31335	0.70860	0.00572
B19	0.33543	0.69005	-0.01654
B20	0.13905	0.77993	-0.06869
B21	0.55426	0.07711	0.11660
B22	0.25429	0.34159	0.20945
B23	0.01902	0.52602	0.47728
B24	0.03465	0.59086	0.50894
B25	-0.02634	0.56664	0.53354
B26	-0.12229	0.54973	0.62534
B27	0.16295	0.50200	0.48946
B28	0.10732	0.52168	0.28610
B29	0.51835	0.19693	0.32194
B30	0.51108	0.24303	0.31639
B31	0.56402	0.36836	0.19385
B32	0.49020	0.39475	0.15632
B33	0.34117	0.65884	0.07717
B34	0.54886	0.41597	0.13351
B35	0.35699	0.50481	0.15918
B36	0.46836	0.37941	0.20265
B37	0.50667	0.27260	0.22639
B38	0.57603	0.23453	0.24357
B39	0.56225	0.30672	0.23142
B40	0.43545	0.28563	0.15801

Table 11
(continued)
Elementary Level Second Factor Analysis:
3 Factor Solution

ROTATED FACTOR PATTERN

	FACTOR 1	FACTOR 2	FACTOR 3
B41	0.53240	0.02936	0.38298
B42	0.50768	0.05611	0.53885
B43	0.34606	0.03823	0.60295
B44	0.42688	0.07152	0.62969
B45	0.50446	0.06956	0.50517
B46	0.42201	0.03580	0.65331
B47	0.42991	0.01657	0.59703
B48	0.34033	0.10722	0.63529
B49	0.19417	0.05926	0.47914
B50	0.40612	0.07733	0.45622

Table 12
Elementary Level Second Factor Analysis:
4 Factor Solution

ROTATED FACTOR PATTERN

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
B1	0.26312	0.05941	-0.07663	0.47135
B2	0.11984	0.07324	-0.07673	0.50110
B3	0.30245	0.10286	-0.01985	0.49484
B4	0.04516	-0.05297	0.13473	0.56867
B5	0.28566	0.26756	-0.02810	0.26718
B6	0.12943	0.15492	0.16816	0.37546
B7	0.10109	0.23521	0.16304	0.43840
B8	0.18748	-0.00264	0.34676	0.49956
B9	-0.07304	0.11175	0.34182	0.55302
B10	0.20211	0.25295	0.20141	0.50732
B11	0.31635	0.21556	0.03529	0.40566
B12	0.38766	0.32526	0.01320	0.33554
B13	0.16521	0.29720	-0.04197	0.30871
B14	0.31985	0.44404	0.01072	0.25836
B15	0.20262	0.31908	0.02915	0.33877
B16	-0.03033	0.72236	0.37500	0.10548
B17	-0.10986	0.70198	0.36562	0.14960
B18	0.06455	0.71692	0.24279	0.15428
B19	0.06807	0.71990	0.20677	0.15609
B20	-0.10617	0.71509	0.32051	0.07749
B21	0.41323	0.29054	-0.15845	0.22419
B22	0.26788	0.35815	0.18754	0.05307
B23	0.19663	0.25845	0.61419	0.18544
B24	0.27276	0.35442	0.63813	0.04751
B25	0.24034	0.28764	0.67321	0.06755
B26	0.22924	0.18789	0.77798	0.08432
B27	0.33329	0.33081	0.52045	0.15214
B28	0.15399	0.37965	0.42697	0.11631
B29	0.51186	0.31117	0.06278	0.22403
B30	0.49219	0.34488	0.08922	0.22898
B31	0.43846	0.52448	0.04503	0.18838
B32	0.35706	0.51923	0.07075	0.17064
B33	0.16196	0.68696	0.24441	0.10772
B34	0.37194	0.56842	0.04290	0.19541
B35	0.30982	0.59246	0.18199	-0.02391
B36	0.40882	0.50724	0.09415	0.08531
B37	0.46804	0.43075	0.02788	0.10434
B38	0.50776	0.40883	-0.00633	0.18864
B39	0.49163	0.47652	0.02842	0.14622
B40	0.35533	0.41303	0.03641	0.11565

Table 12
(continued)
Elementary Level Second Factor Analysis:
4 Factor Solution

ROTATED FACTOR PATTERN

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
B41	0.61359	0.17873	-0.00268	0.17701
B42	0.68985	0.13440	0.13080	0.20893
B43	0.67926	0.05309	0.22874	0.04847
B44	0.69983	0.08092	0.24136	0.18453
B45	0.65204	0.14620	0.12143	0.23105
B46	0.74754	0.06272	0.22714	0.11644
B47	0.71933	0.06930	0.17433	0.10881
B48	0.64131	0.06709	0.30619	0.15763
B49	0.45851	0.01206	0.24343	0.06940
B50	0.54675	0.11479	0.14252	0.21364

Table 13
Elementary Level Second Factor Analysis:
5 Factor Solution

ROTATED FACTOR PATTERN

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
B1	0.26972	0.13285	0.07327	-0.14499	0.47771
B2	0.16934	0.01633	0.15823	-0.18712	0.55878
B3	0.25660	0.27212	0.03342	-0.03465	0.45353
B4	0.03590	0.11379	-0.06986	0.12464	0.55309
B5	0.29495	0.17133	0.27453	-0.09541	0.26162
B6	0.16893	0.06159	0.20191	0.10355	0.39389
B7	0.10711	0.16692	0.22829	0.12751	0.42584
B8	0.22894	0.04192	0.04221	0.29149	0.52161
B9	-0.07836	0.14205	0.08524	0.34623	0.53461
B10	0.14794	0.33475	0.15053	0.21617	0.44840
B11	0.17410	0.50809	-0.00911	0.11653	0.30024
B12	0.26828	0.49547	0.13330	0.06244	0.23688
B13	0.00054	0.53118	0.05030	0.06174	0.19036
B14	0.14520	0.63269	0.16915	0.11400	0.11663
B15	0.03614	0.55677	0.06423	0.13607	0.21920
B16	-0.02160	0.24636	0.69293	0.35237	0.08791
B17	-0.07452	0.17045	0.72217	0.31961	0.15357
B18	0.13850	0.10946	0.83964	0.11827	0.18716
B19	0.13417	0.12949	0.83045	0.08553	0.18215
B20	-0.07472	0.16959	0.73339	0.27594	0.07857
B21	0.44864	0.15383	0.33914	-0.28194	0.23097
B22	0.31759	0.07936	0.41659	0.10292	0.07413
B23	0.19291	0.17743	0.21653	0.61903	0.17589
B24	0.27366	0.19197	0.31229	0.63613	0.03795
B25	0.27231	0.10144	0.29474	0.64398	0.08350
B26	0.26169	0.07068	0.19251	0.76406	0.10394
B27	0.30196	0.27997	0.24615	0.53446	0.11739
B28	0.07362	0.35486	0.22990	0.50284	0.04702
B29	0.39147	0.50315	0.11009	0.11599	0.12024
B30	0.35371	0.55382	0.11387	0.16198	0.11078
B31	0.29090	0.61542	0.27788	0.12086	0.05447
B32	0.29045	0.41612	0.39396	0.07640	0.10015
B33	0.11418	0.39068	0.57480	0.25719	0.04569
B34	0.23805	0.58581	0.34376	0.10734	0.07165
B35	0.25836	0.36925	0.47959	0.19282	-0.08367
B36	0.32591	0.44239	0.35472	0.12016	0.00424
B37	0.42102	0.35246	0.33880	0.00991	0.05169
B38	0.46219	0.36339	0.32367	-0.03688	0.13642
B39	0.35173	0.58555	0.24147	0.09758	0.01780
B40	0.25897	0.43475	0.24962	0.07748	0.02500

Table 13
(continued)
Elementary Level Second Factor Analysis:
5 Factor Solution

ROTATED FACTOR PATTERN

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
B41	0.56180	0.31705	0.08892	-0.01928	0.12504
B42	0.63248	0.33700	0.03029	0.12325	0.15496
B43	0.69756	0.12555	0.05657	0.16884	0.05109
B44	0.71836	0.16408	0.08140	0.17426	0.18323
B45	0.59195	0.34187	0.04041	0.11641	0.17550
B46	0.76850	0.15055	0.06627	0.15652	0.11911
B47	0.71345	0.19596	0.04126	0.12478	0.09549
B48	0.68692	0.08817	0.10633	0.22275	0.17906
B49	0.49289	0.03583	0.04615	0.18514	0.09083
B50	0.52532	0.22584	0.06906	0.10935	0.19140

Table 14
Secondary Level Initial Factor Analysis
(Mineigen = 1)

PRIOR COMMUNALITY ESTIMATES: ONE
PRELIMINARY EIGENVALUES: TOTAL = 50 AVERAGE = 1

	1	2	3	4	5	6	7	8	9
EV	15.295574	4.011026	2.563232	2.452441	2.178639	1.790781	1.441305	1.292436	1.270172
DIFF	11.284548	1.447794	0.110791	0.273802	0.387858	0.349476	0.148870	0.022264	0.126897
PROP	0.3059	0.0802	0.0513	0.0490	0.0436	0.0358	0.0288	0.0258	0.0254
CUM	0.3059	0.3861	0.4374	0.4864	0.5300	0.5658	0.5947	0.6205	0.6459
	10	11	12	13	14	15	16	17	18
EV	1.143274	1.004682	0.934988	0.932697	0.820882	0.797603	0.750227	0.697087	0.640915
DIFF	0.138592	0.069695	0.002291	0.111815	0.023279	0.047376	0.053139	0.056172	0.007010
PROP	0.0229	0.0201	0.0187	0.0187	0.0164	0.0160	0.0150	0.0139	0.0128
CUM	0.6688	0.6889	0.7076	0.7262	0.7426	0.7586	0.7736	0.7875	0.8004
	19	20	21	22	23	24	25	26	27
EV	0.633905	0.580128	0.576296	0.528397	0.498165	0.479725	0.463296	0.441406	0.412060
DIFF	0.053777	0.003833	0.047899	0.030231	0.018441	0.016429	0.021890	0.029345	0.018995
PROP	0.0127	0.0116	0.0115	0.0106	0.0100	0.00.96	0.0093	0.0088	0.0082
CUM	0.8130	0.8246	0.8362	0.8467	0.8567	0.8663	0.8756	0.8844	0.8926
	28	29	30	31	32	33	34	35	36
EV	0.393066	0.372731	0.352949	0.346684	0.336913	0.313522	0.293987	0.272475	0.260285
DIFF	0.020334	0.019782	0.006266	0.009770	0.023391	0.019535	0.021512	0.012190	0.013368
PROP	0.0079	0.0075	0.0071	0.0069	0.0067	0.0063	0.0059	0.0054	0.0052
CUM	0.9005	0.9079	0.9150	0.9219	0.9287	0.9349	0.9408	0.9463	0.9515

Table 14
(continued)
Secondary Level Initial Factor Analysis
(Mineigen = 1)

PRIOR COMMUNALITY ESTIMATES: ONE
PRELIMINARY EIGENVALUES: TOTAL = 50 AVERAGE = 1

	37	38	39	40	41	42	43	44	45
EV	0.246916	0.245240	0.238615	0.214992	0.212245	0.185777	0.172481	0.166049	0.150338
DIFF	0.001676	0.006625	0.023623	0.002747	0.026468	0.013295	0.006433	0.015710	0.011050
PROP	0.0049	0.0049	0.0048	0.0043	0.0042	0.0037	0.0034	0.0033	0.0030
CUM	0.9564	0.9613	0.9661	0.9704	0.9746	0.9784	0.9818	0.9851	0.9881

	46	47	48	49	50
EV	0.139288	0.129300	0.114332	0.109353	0.101122
DIFF	0.009988	0.014968	0.004979	0.008231	
PROP	0.0028	0.0026	0.0023	0.0022	0.0020
CUM	0.9909	0.9935	0.9958	0.9980	1.0000

Table 15
Secondary Level Second Factor Analysis:
3 Factor Solution

ROTATED FACTOR PATTERN

	FACTOR 1	FACTOR 2	FACTOR 3
B1	0.27823	0.03657	0.52921
B2	0.36371	0.03091	0.50710
B3	0.09125	0.18163	0.61996
B4	0.23819	0.23685	0.43561
B5	0.04219	0.01105	0.68824
B6	0.09820	0.16881	0.69283
B7	0.03332	0.19623	0.64700
B8	0.18430	0.06625	0.68042
B9	0.20184	0.12897	0.64190
B10	0.47278	0.19915	0.20402
B11	0.61047	0.21209	0.19584
B12	0.60369	0.08366	0.08751
B13	0.65313	0.12361	0.13080
B14	0.51021	0.12920	0.10436
B15	0.58042	0.27370	0.14163
B16	0.52478	0.29591	0.20612
B17	0.67444	0.07681	0.16572
B18	0.71126	0.03853	0.16208
B19	0.61579	0.19894	0.24537
B20	0.62970	0.19488	0.01798
B21	0.60069	0.19106	0.01651
B22	0.52911	0.26882	0.06711
B23	0.51706	0.26950	0.21242
B24	0.52500	0.28926	0.27850
B25	0.34321	0.22699	0.32331
B26	0.53612	0.31369	0.06712
B27	0.48099	0.18060	0.12735
B28	0.44596	0.18088	0.18344
B29	0.38335	0.26881	0.22382
B30	0.32665	0.33609	0.29273
B31	0.51077	0.39828	0.14662
B32	0.25190	0.38546	0.01879
B33	0.30126	0.54168	0.06860
B34	0.33171	0.60526	0.19150
B35	0.12890	0.65482	0.22694
B36	0.13405	0.73431	0.17449
B37	0.17026	0.61227	0.02014

Table 15
(continued)
Secondary Level Second Factor Analysis:
3 Factor Solution

ROTATED FACTOR PATTERN

	FACTOR 1	FACTOR 2	FACTOR 3
B38	0.20996	0.76575	0.16711
B39	0.15485	0.79676	0.10584
B40	0.14565	0.71703	0.23162
B41	0.21721	0.55061	0.09836
B42	0.35307	0.58786	0.09069

Table 16
Elementary Level Second Factor Analysis:
4 Factor Solution

ROTATED FACTOR PATTERN

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
B1	0.02520	0.31112	0.55397	0.06027
B2	0.01873	0.35691	0.52573	0.13914
B3	0.18459	0.05398	0.61601	0.08936
B4	0.23482	0.16823	0.43081	0.18142
B5	-0.00869	0.06676	0.70047	-0.01585
B6	0.17159	0.06786	0.69091	0.08318
B7	0.20601	-0.07332	0.63198	0.15340
B8	0.06683	0.13963	0.68152	0.12457
B9	0.13167	0.09415	0.63180	0.21150
B10	0.18935	0.35062	0.19981	0.32282
B11	0.20267	0.37884	0.17804	0.50834
B12	0.05524	0.65082	0.11385	0.16881
B13	0.10334	0.59630	0.14500	0.30218
B14	0.10840	0.54125	0.12636	0.14974
B15	0.26592	0.31483	0.11343	0.54960
B16	0.29668	0.15083	0.15714	0.68023
B17	0.05580	0.26009	0.11315	0.79978
B18	0.01973	0.36699	0.12669	0.70014
B19	0.19027	0.30045	0.21351	0.62536
B20	0.17257	0.58580	0.03012	0.28457
B21	0.16374	0.65111	0.03870	0.16925
B22	0.24705	0.57791	0.08787	0.14423
B23	0.25294	0.50606	0.22726	0.20700
B24	0.27752	0.42647	0.27921	0.31551
B25	0.22507	0.18498	0.30856	0.32524
B26	0.29582	0.51474	0.07917	0.22731
B27	0.17286	0.31435	0.11574	0.37939
B28	0.17143	0.35478	0.18390	0.27271
B29	0.26068	0.31025	0.22337	0.23420
B30	0.33332	0.19377	0.27923	0.29348
B31	0.38050	0.50236	0.15840	0.20940
B32	0.37384	0.30943	0.03132	0.03598
B33	0.53051	0.35409	0.08045	0.06499
B34	0.59488	0.32724	0.19571	0.14919
B35	0.64998	0.11520	0.22040	0.09625
B36	0.72742	0.13491	0.16875	0.08481
B37	0.60385	0.26756	-0.00828	-0.03190

Table 16
(continued)
Elementary Level Second Factor Analysis:
4 Factor Solution

ROTATED FACTOR PATTERN

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
B38	0.76699	0.10186	0.14562	0.24313
B39	0.78890	0.16538	0.10190	0.08135
B40	0.72480	0.02199	0.20751	0.23481
B41	0.55410	0.07564	0.07470	0.27510
B42	0.58062	0.25833	0.08055	0.26572

Table 17
Elementary Level Second Factor Analysis:
5 Factor Solution

ROTATED FACTOR PATTERN

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
B1	0.00892	0.56009	0.30523	0.08216	0.07402
B2	-0.00053	0.53513	0.35407	0.16938	0.07314
B3	0.19145	0.61323	0.01946	0.06863	0.09526
B4	0.24244	0.42743	0.09720	0.15030	0.19800
B5	-0.01035	0.70085	0.06333	-0.01499	0.02030
B6	0.17642	0.68855	0.04045	0.06613	0.08446
B7	0.21678	0.63045	-0.07824	0.13632	0.00969
B8	0.06485	0.68372	0.12583	0.12491	0.05986
B9	0.13745	0.63124	0.05904	0.19891	0.09535
B10	0.21980	0.18090	0.06849	0.21400	0.69857
B11	0.22278	0.16527	0.16462	0.44673	0.52560
B12	0.04647	0.10195	0.46405	0.10236	0.58463
B13	0.10372	0.13202	0.38787	0.23051	0.60752
B14	0.10249	0.11966	0.40173	0.10956	0.42839
B15	0.25570	0.12128	0.31628	0.58374	0.06437
B16	0.30604	0.16147	0.10694	0.67071	0.12831
B17	0.05592	0.12114	0.21155	0.82826	0.11984
B18	0.01580	0.13452	0.30473	0.71909	0.17882
B19	0.20481	0.21144	0.16831	0.58911	0.33079
B20	0.15411	0.03352	0.51841	0.29189	0.27124
B21	0.12534	0.04647	0.66178	0.21702	0.14038
B22	0.21898	0.09291	0.56114	0.16981	0.17967
B23	0.23404	0.23081	0.46934	0.21803	0.20133
B24	0.26793	0.28140	0.37335	0.31358	0.21653
B25	0.22758	0.30934	0.14478	0.31408	0.13343
B26	0.27757	0.08185	0.47193	0.23986	0.21240
B27	0.16229	0.12182	0.30131	0.39945	0.09591
B28	0.15415	0.19146	0.36108	0.30150	0.06991
B29	0.25109	0.22595	0.28861	0.23870	0.12897
B30	0.32765	0.28353	0.20001	0.30081	0.05162
B31	0.34749	0.16890	0.57135	0.26316	0.01127
B32	0.35360	0.03452	0.34065	0.05908	0.03672
B33	0.50657	0.08519	0.41054	0.09651	0.00921
B34	0.58468	0.19455	0.31004	0.13904	0.16005
B35	0.65508	0.21491	0.09274	0.06173	0.13450
B36	0.72474	0.16519	0.14339	0.06375	0.08428
B37	0.58143	-0.00555	0.33794	-0.00918	-0.02208

Table 17
(continued)
Elementary Level Second Factor Analysis:
5 Factor Solution

ROTATED FACTOR PATTERN

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
B38	0.76663	0.14409	0.11661	0.22373	0.06460
B39	0.77929	0.10085	0.20119	0.07447	0.03951
B40	0.72985	0.20524	0.03540	0.21001	0.04559
B41	0.57565	0.06518	-0.00246	0.22301	0.21855
B42	0.58404	0.07594	0.20297	0.23719	0.21495

APPENDIX D

Table 18

Elementary Level Mean Subarea Scores
Level of Education

VARIABLE	PLANNING & CURRICULUM DEVEL.		ASSESSMENT & EVALUATION		INSTRUCTION & MANAGEMENT		PRINCIPLES OF EDUC.	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
Level of Education								
Bachelor's Degree or Lower	3.05	.82	2.92	1.22	3.35	1.01	2.99	1.11
Master's Degree or Higher	3.09	.80	3.01	.16	3.43	.89	3.10	.99

*Means significantly different at the .05 level.

Table 19

Elementary Level Mean Subarea Scores
Years of Experience

VARIABLE	PLANNING & CURRICULUM DEVEL.		ASSESSMENT & EVALUATION		INSTRUCTION & MANAGEMENT		PRINCIPLES OF EDUC.	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
Years of Experience								
Less than One Year	2.98	.74	2.77	1.23	3.42	1.06	3.26	.98
One to Three Years	3.06	.80	2.94	1.24	3.41	1.00	2.96	1.12
Four or More Years	3.10	.85	3.01	1.16	3.37	.93	3.05	1.03

*Means significantly different at the .05 level.

Table 20

Elementary Level Mean Subarea Scores
Grade Levels Taught

VARIABLE	PLANNING & CURRICULUM DEVEL.		ASSESSMENT & EVALUATION		INSTRUCTION & MANAGEMENT		PRINCIPLES OF EDUC.	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
Grade Levels Taught								
Kindergarten	* 3.62	.79	2.92	1.26	3.71	.80	3.28	1.07
Grades One to Six	* 3.02	.77	3.01	1.18	3.44	.88	3.05	1.03

*Means significantly different at the .05 level.

Table 21

Elementary Level Mean Subarea Scores

Teaching Environment

VARIABLE	PLANNING & CURRICULUM DEVEL.		ASSESSMENT & EVALUATION		INSTRUCTION & MANAGEMENT		PRINCIPLES OF EDUC.	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
Teaching Environment								
Self-Contained Classroom	* 3.31	.72	3.10	1.09	* 3.60	.79	3.07	1.05
Departmentalized Setting	* 2.74	.85	2.81	1.36	* 3.22	1.09	3.15	1.11
Multi-School/Admin.	2.57	.69	2.41	1.12	2.53	1.04	2.51	1.01

*Means significantly different at the .05 level.

Table 22

Elementary Level Mean Factor-based Scores
Level of Education

VARIABLE	PRINCIPLES OF EDUCATION		INSTRUCTION		CONTENT AREA CURRICULUM		ASSESSMENT & EVALUATION		PLANNING FOR STUDENT NEEDS	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
Level of Education										
Bachelor's Degree or Lower	2.99	1.11	3.82	.86	3.17	1.56	2.92	1.22	2.55	1.01
Master's Degree or Higher	3.10	.99	3.91	.76	3.07	1.48	3.01	1.16	2.71	1.01

*Means significantly different at the .05 level.

Table 23

Elementary Level Mean Factor-based Scores
Years of Experience

VARIABLE	PRINCIPLES OF EDUCATION		INSTRUCTION		CONTENT AREA CURRICULUM		ASSESSMENT & EVALUATION		PLANNING FOR STUDENT NEEDS	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Years of Experience										
Less than One Year	3.26	.98	3.94	.75	3.00	1.53	2.77	1.23	2.66	1.10
One to Three Years	2.96	1.12	3.86	.84	3.26	1.55	2.94	1.24	2.56	1.04
Four or More Years	3.05	1.03	3.86	.81	3.07	1.53	3.01	1.16	2.65	.97

*Means significantly different at the .05 level.

Table 24

Elementary Level Mean Factor-based Scores
Grade Levels Taught

VARIABLE	PRINCIPLES OF EDUCATION		INSTRUCTION		CONTENT AREA CURRICULUM		ASSESSMENT & EVALUATION		PLANNING FOR STUDENT NEEDS	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Grade Levels Taught										
Kindergarten	3.28	1.07	4.12	.73	3.95	.99	2.92	1.26	*3.22	.93
Grades One to Six	3.05	1.03	3.90	.74	3.10	1.54	3.01	1.18	*2.48	.97

*Means significantly different at the .05 level.

Table 25

Elementary Level Mean Factor-based Scores
Teaching Environment

VARIABLE	PRINCIPLES OF EDUCATION		INSTRUCTION		CONTENT AREA CURRICULUM		ASSESSMENT & EVALUATION		PLANNING FOR STUDENT NEEDS	
Teaching Environment	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
Self-Contained Classroom	3.07	1.05	3.98	.69	*3.85	.96	3.10	1.09	2.69	.98
Departmentalized Setting	3.15	1.11	3.80	.94	*2.13	1.66	2.81	1.36	2.41	1.06
Multi-School/Admin.	2.51	1.01	3.28	.82	*1.78	1.52	2.41	1.12	2.77	.90

*Means significantly different at the .05 level

Table 26

Secondary Level Mean Subarea Scores
Level of Education

VARIABLE	PLANNING & CURRICULUM DEVEL.		ASSESSMENT & EVALUATION		INSTRUCTION & MANAGEMENT		PRINCIPLES OF EDUC.	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Level of Education								
Bachelor's Degree or Lower	2.57	.83	2.63	1.12	2.98	.87	2.77	1.06
Master's Degree or Higher	2.66	.89	2.92	1.07	3.17	.84	2.79	1.03

*Means significantly different at the .05 level.

Table 27

Secondary Level Mean Subarea Scores
Years of Experience

VARIABLE	PLANNING & CURRICULUM DEVEL.		ASSESSMENT & EVALUATION		INSTRUCTION & MANAGEMENT		PRINCIPLES OF EDUC.	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Years of Experience								
Less than One Year	2.38	.76	2.53	1.32	2.85	.77	2.84	1.02
One to Three Years	2.55	.83	2.65	1.08	3.00	.75	2.74	.95
Four or More Years	2.69	.86	2.87	1.07	3.13	.91	2.80	1.08

*Means significantly different at the .05 level.

Table 28

Secondary Level Mean Subarea Scores
Teaching Environment

VARIABLE	PLANNING & CURRICULUM DEVEL.		ASSESSMENT & EVALUATION		INSTRUCTION & MANAGEMENT		PRINCIPLES OF EDUC.	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Teaching Environment								
Self-Contained Classroom	2.54	1.04	2.47	1.10	2.81	.70	2.69	1.13
Departmentalized Setting	2.63	.03	2.81	1.08	3.11	.83	2.81	1.02
Multi-School/Admin.	2.41	1.12	2.41	1.43	2.94	1.12	2.85	1.44

*Means significantly different at the .05 level.

Table 29

Secondary Level Mean Factor-Based Scores
Level of Education

VARIABLE	PRINCIPLES OF EDUCATION		INSTRUCTION		PLANNING FOR STUDENT NEEDS		ASSESSMENT & EVALUATION	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
Level of Education								
Bachelor's Degree or Lower	2.77	1.06	3.33	.89	2.07	1.01	2.53	1.19
Master's Degree or Higher	2.79	1.03	3.55	.85	2.09	1.10	2.82	1.13

*Means significantly different at the .05 level.

Table 30

Secondary Level Mean Factor-Based Scores
Years of Experience

VARIABLE	PRINCIPLES OF EDUCATION		INSTRUCTION		PLANNING FOR STUDENT NEEDS		ASSESSMENT & EVALUATION	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
Years of Experience								
Less than One Year	2.84	1.02	3.18	.85	1.82	.88	2.43	1.43
One to Three Years	2.74	.94	3.39	.78	2.02	1.02	2.53	1.16
Four or More Years	2.80	1.08	3.52	.92	2.14	1.05	2.77	1.11

*Means significantly different at the .05 level.

Table 31

Secondary Level Mean Factor-Based Scores
Teaching Environment

VARIABLE	PRINCIPLES OF EDUCATION		INSTRUCTION		PLANNING FOR STUDENT NEEDS		ASSESSMENT & EVALUATION	
Teaching Environment	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
Self-Contained Classroom	2.69	1.13	2.88	.68	2.34	1.34	2.44	1.11
Departmentalized Setting	2.80	1.02	3.49	.85	2.06	1.02	2.70	1.15
Multi-School/Admin.	2.85	1.44	3.25	.90	2.01	1.37	2.35	1.49

*Means significantly different at the .05 level.

APPENDIX E

Table 32
Elementary Level Plot of Holistic Subarea
Rating Means and Average Objective Rating Means

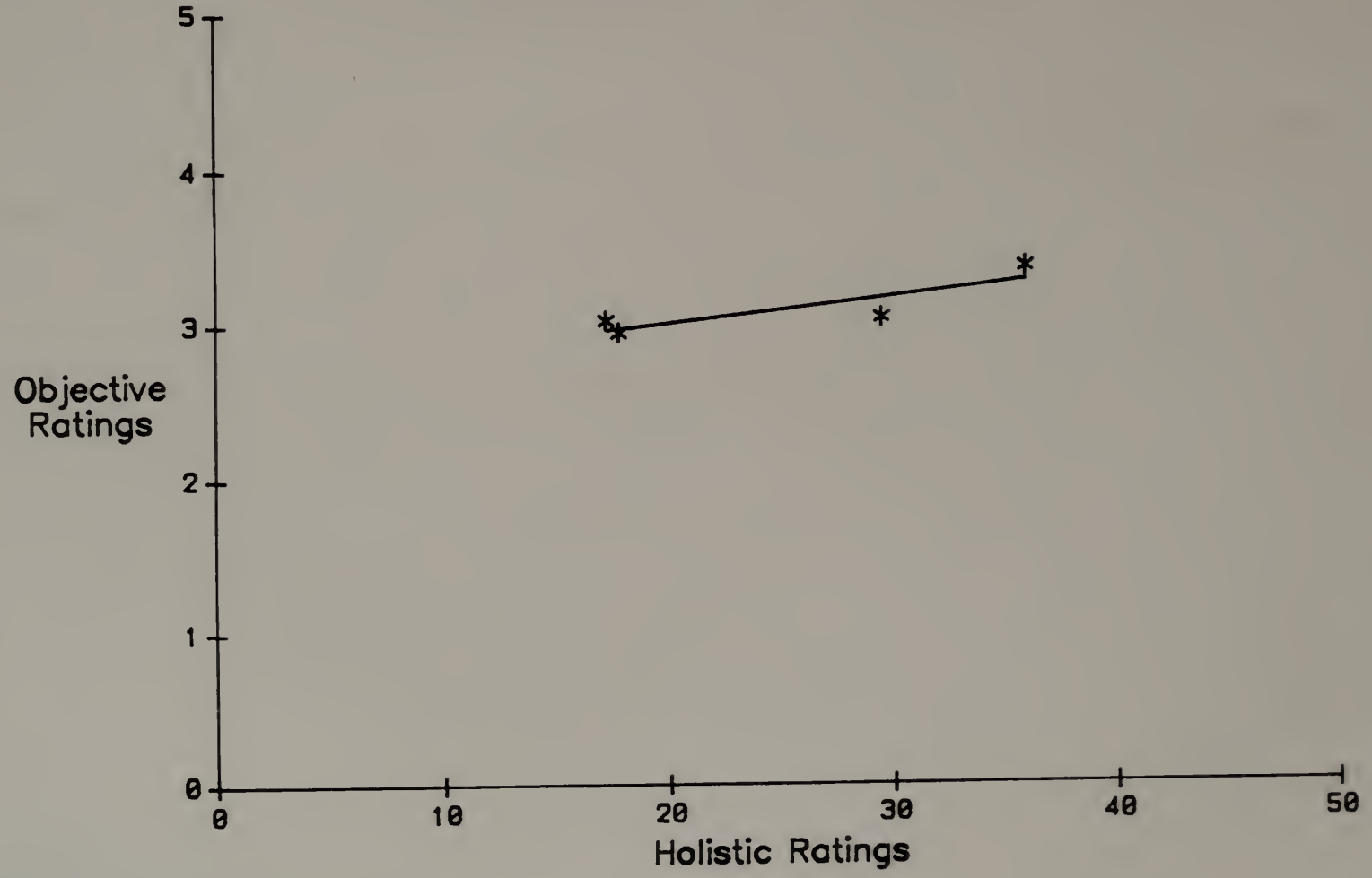
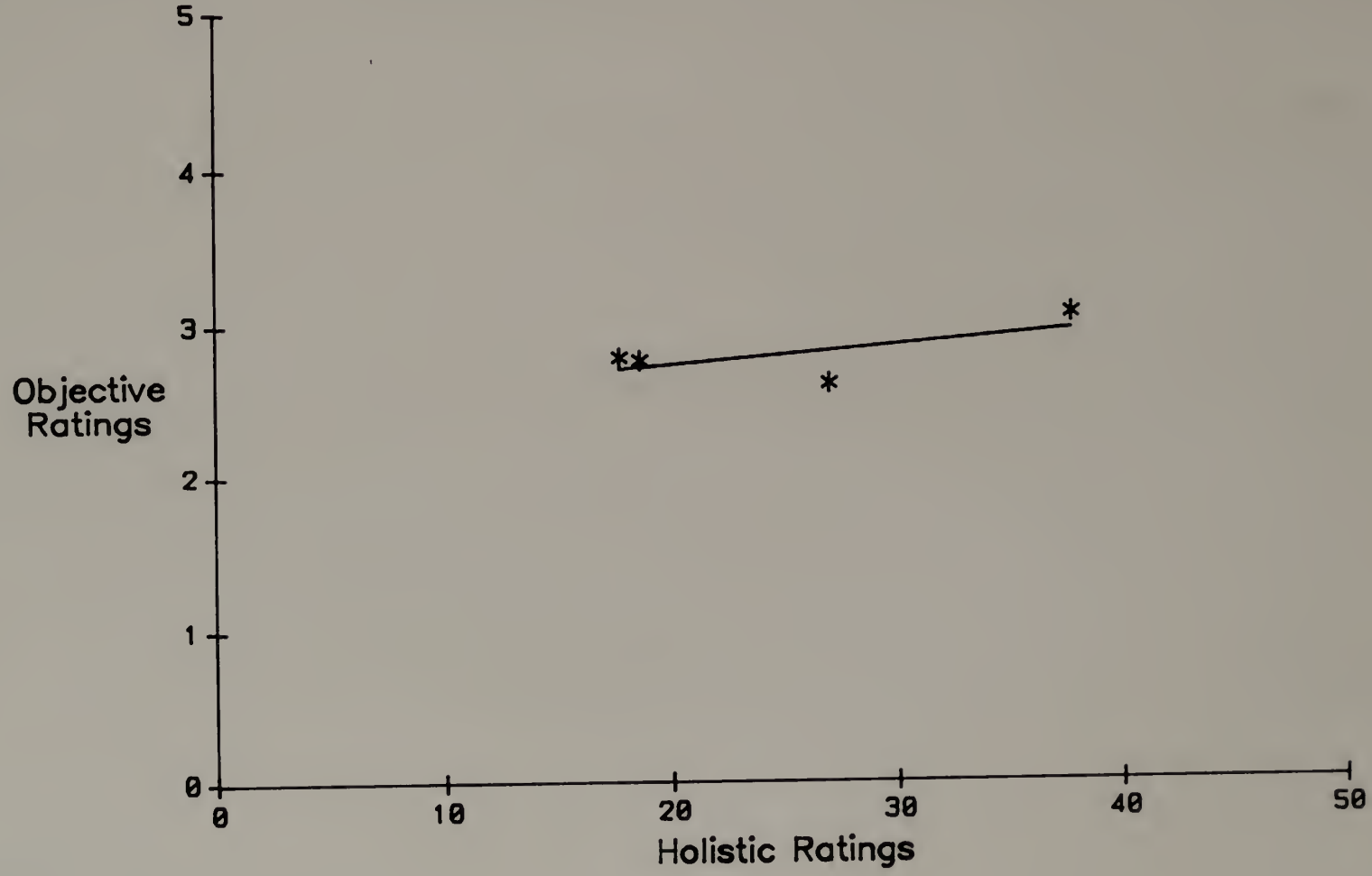


Table 33
Secondary Level Plot of Holistic Subarea
Rating Means and Average Objective Rating Means



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