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Practice analysis of certified public accountants: technical report

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Practice Analysis of Certified Public Accountants

Technical Report

Submitted to:

Board of Examiners
American Institute of Certified Public Accountants

Harborside Financial Center
201 Plaza III
Jersey City, NJ 07311

Submitted by:

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January 2001

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Executive Summary

Overview

The Board of Examiners of the American Institute of Certified Public Accountants (AICPA) is responsible for preparing the Uniform CPA Examination, the licensing exam used by all 50 states, the District of Columbia, Puerto Rico, U.S. Virgin Islands, and Guam. This practice analysis provided a comprehensive understanding of the current requirements for public accounting and represents the first step in building a technically and legally sound licensure examination. The American Institutes for Research (AIR) conducted this practice analysis, along with staff from the AICPA Examinations Team and a task force of the Board of Examiners known as the Content Oversight Task Force (COTF).

Objectives and Procedures

The practice analysis had two primary objectives. First, it comprehensively described the tasks performed by entry-level CPAs, and the knowledge and skills needed to practice accounting successfully at entry-level. Second, it provided the data to help update content specifications for future versions of the Uniform CPA Examination.

Three phases of research activities were used to achieve these objectives. Throughout all the phases, particular attention was devoted to ensuring wide-scale participation of CPAs, adhering to professional standards for conducting practice analyses, and capturing recent and ongoing changes in accounting practice.

Phase 1—Planning primarily involved reviews of background materials and over 20 structured interviews with accounting professionals. These activities resulted in three major outcomes. First, they provided a comprehensive understanding of the accounting profession. Second, they helped generate important task, knowledge, and skill information—the requirements of accounting practice. Third, they provided information to develop sampling plans for focus groups and the practice analysis survey.

Phase 2—Analysis primarily involved conducting focus groups to specify further the requirements of accounting practice and administering a survey of these requirements to entry-level CPAs. Phase 2 activities began with five focus groups, each comprised of 8 to 12 CPAs, to identify and refine the tasks performed by entry-level CPAs, and the knowledge and skills needed for successful job performance. Participants were organized according to their primary practice area (e.g., accounting and auditing, taxation, or business and industry). During the 1 ½ to 2-day focus group sessions, participants reviewed and modified the lists of tasks, knowledge, and skills developed during Phase I.

The task, knowledge, and skill lists formed the basis for two versions of a practice analysis survey. One survey contained task information and one survey contained knowledge and skill information. Both surveys were designed to elicit various ratings such as importance and frequency. Surveys were administered to 5,000 entry-level CPAs (2,500 per version) that were randomly selected to be representative with respect to jurisdiction, gender, race/ethnicity, and firm size. Approximately 15 percent of the sample were comprised of CPAs in private industry.

Phase 3—Specifications provided a framework for using Phase 2 results. Specifically, we developed guidelines for using the survey results and a literature review of measurement methods (conducted as part of Phase 3) to construct a framework for developing the Uniform CPA Examination. These guidelines included recommendations for developing an initial framework for test development in terms of proportions of items needed to cover particular knowledge and skill domains. We also summarized a number of other issues to consider such as reliability of measurement, and practical features of the test administration and setting.

Major Findings

A total of 1,349 completed surveys were returned for an overall response rate of 27.5 percent.[1] The response rate for the task survey was 29.1 percent (714 out of 2,457). The response rate for the knowledge and skill survey was 25.9 percent (635 out of 2,453). Analyses to assess the quality of the data showed that the respondents did not make a lot of rating errors and were representative with respect to jurisdiction and other background variables (e.g., race/ethnicity, gender). Furthermore, the ratings were reliable, interpretable, and similar to ratings from a related practice analysis study.

A portion of each survey asked respondents about the percentage of time spent in various practice areas. Across all respondents, the most time spent in a given area was 29.9 percent for audit and 13.8 percent for both corporate income taxation and individual income taxation. The least reported time spent in a given practice area was 0.6 percent for both business valuation and profitability analysis, and 0.5 percent for both organization structuring and inventory management.

The task, knowledge, and skill ratings were the primary output from the survey. Most of the analyses of these ratings involved the computation of descriptive statistics, such as means and standard deviations. We then compared these results across practice groups defined as CPAs specializing in accounting and auditing, taxation, or business and industry.

The greatest level of similarity in ratings across practice groups was found among the skill requirements. For example, active listening, computational skills, reasoning skills, and interpersonal skills were highly important for CPAs in all practice groups. A moderate level of similarity occurred for the ratings of knowledge. For example, most practice groups regarded areas such as basic mathematics, writing mechanics, and standards for presentation and disclosure in financial statements as very important. However, each practice group also had its own specific areas of knowledge that were important for successful performance. The greatest differences between practice groups occurred in task ratings. Thus, even though the tasks performed by CPAs vary as a function of practice group, the knowledge requirements to a moderate extent and the skill requirements to an even greater extent overlap across practice groups.

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[1] This is based on the actual administration of 4,910 surveys; 90 surveys were undeliverable.

To evaluate further the task, knowledge, and skill ratings, we compared them for CPAs in public accounting and CPAs in private industry. Again, the same pattern emerged. These two groups of CPAs did not vary in their ratings of important skills, but did vary greatly in their importance ratings of tasks. In terms of knowledge requirements, there were moderate differences overall. The greatest differences in importance ratings occurred for taxation-related knowledge items. Conversely, CPAs in public practice did not differ from CPAs in private industry on their importance ratings for many of the knowledge items dealing with general business knowledge, law, and ethics.

Implications for the Uniform CPA Examination

The primary objective was to identify the tasks and activities performed by entry-level CPAs, and the knowledge and skills needed in order to perform them. This information, in turn, will be used in the development of content specifications for the Uniform CPA Examination. The content specifications represent a primary input into a testing plan for developing both paper-and-pencil and computer-based testing versions of the Uniform CPA Examination. In Section X of this report, we present some suggested guidelines for using the practice analysis results to develop such a testing plan.

Despite the wealth of information gathered during this project, it only presents a snapshot of the CPA profession. The practice analysis has comprehensively described the requirements of professional accounting as practiced today. Because ongoing changes in the profession were identified and accounted for, it is likely that the practice analysis will provide valuable information for several years to come. To ensure it does, we also developed an updating plan for keeping the practice analysis information up-to-date.

This final report provides complete documentation of the procedures and results of this practice analysis of CPAs. It is difficult to overstate the importance of comprehensive, up-to-date practice information. Such information forms the foundation for developing the Uniform CPA Examination and helps to ensure that this examination will effectively screen CPAs who possess the knowledge and skills needed to protect the public.

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Acknowledgments

A practice analysis for such a large, diverse, and technically demanding profession is a monumental undertaking. It requires the coordinated efforts of many people. I'd like to thank those who have worked so diligently on this project.

We have received tremendous support from the members of the AICPA Examinations Team. Ahava Goldman and Bruce Biskin have provided invaluable guidance in their roles as Staff Liaisons. I also thank Craig Mills, Jerry Melican, and the other members of the Examinations Team for their valuable insights and contributions.

I greatly appreciate the opportunity to work with the former and current Content Oversight Task Force—Richard Isserman, Sarah Blake, Barbara Bond, Lamar Harris, Louis Matusiak, Florine Nath, Gary O'Krent, Don Pallais, Harold Schultz, James Sprinkel, David Vaudt, and Jan Williams. Given their individual and collective knowledge and wisdom, it is quite easy to understand why they occupy such an important role in the AICPA and accounting profession.

The AIR project staff—Teresa Russell, Rob Calderon, Jay Goodwin, Kimberly Adams, Cassandra Jessee, and Celia Chandler—have done a exceptional job under a lot of pressure. Thanks for your hard work and willingness not to compromise on technical quality despite my ranting about due dates and timelines.

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Thanks to all the people at NASBA and the various State Boards' of Accountancy for providing time, direction, and information.

To all the CPAs who have given up hours and/or days to the practice analysis, thank you very much. Without your input the practice analysis could not occur. I have enjoyed learning from you and envy the manner in which you hold your profession with such high esteem. It is tough to ask busy professionals to look past their in-box. I have come to realize that there is something to the expression "for the good of the profession" when spoken by a CPA.

So many people have contributed to the practice analysis since it began and I apologize to anyone I have overlooked. To all, your contribution to this important project has been greatly appreciated.

Dwayne G. Norris, Ph.D. (Project Director, AIR)

I. Introduction

The Board of Examiners of the American Institute of Certified Public Accountants (AICPA) is responsible for preparing the Uniform CPA Examination, which is a licensing examination used by all 50 states, the District of Columbia, Puerto Rico, U.S. Virgin Islands, and Guam. Thus, the Board of Examiners must ensure that the Uniform CPA Examination measures the knowledge and skills needed by entry-level CPAs to protect the public. Furthermore, the examination must meet legal and professional standards for licensure examinations. An important part of ensuring that the Uniform CPA Examination measures important knowledge and skills, and adheres to legal and professional standards, is to conduct a practice analysis. A practice analysis provides a comprehensive understanding of the current requirements for public accounting and is the first step in building a technically and legally sound licensure examination.

The American Institutes for Research (AIR) conducted this practice analysis for the Board of Examiners. Staff from the AICPA Examinations Team and a task force of the Board of Examiners known as the Content Oversight Task Force (COTF) provided oversight to the project. This effort, which began in the spring of 1999, resulted in the infrastructure for developing content specifications that will serve as the blueprint for constructing future versions of the Uniform CPA Examination. This report provides complete documentation of the entire project.

Overview

Public accounting is one of America's most demanding professions. As with other well-respected professions such as medicine, law, and engineering, public accounting has several defining characteristics. These characteristics include (1) a responsibility to serve the public, (2) a complex body of knowledge, (3) high standards for admission to the profession, and (4) a need for public confidence (Whittington, Pany, Meigs, & Meigs, 1992). Ensuring that licensed Certified Public Accountants (CPAs) live up to the standards inherent in these defining characteristics of the profession is vital to maintaining the integral role of public accounting in the personal and business affairs of this country.

The American Institute of Certified Public Accountants (AICPA) is the national professional organization of CPAs. The AICPA has over 330,000 members serving the public, business and industry, government, and educational institutions. The Uniform CPA Examination is one of the AICPA's primary instruments for upholding professional standards. All 50 states, the District of Columbia, Puerto Rice, U.S. Virgin Islands, and Guam require successful completion of the Uniform CPA Examination in order to become a licensed CPA.

The commitment to maintaining the standards of public accounting, and the important role of the Uniform CPA Examination to that end, is evident in the AICPA Board of Examiner's decision to conduct this practice analysis of CPAs. The practice analysis had two primary objectives. First, it comprehensively described the tasks performed by CPAs, and the knowledge and skills needed to practice accounting successfully at entry levels of the profession. Second, it provided critical data needed to update content specifications

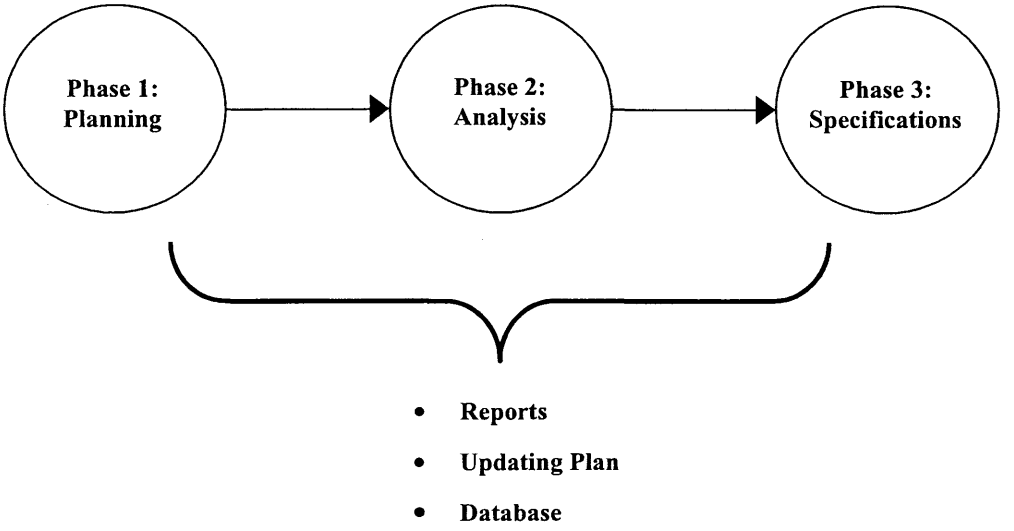
for future versions of the Uniform CPA Examination. Stated simply, this practice analysis provided the foundation needed to develop future Uniform CPA Examinations that are comprehensive, valid, and reflect the demands of current practice. Successful completion of a Uniform CPA Examination based on data from this practice analysis will signify mastery of the complex knowledge and skills needed by CPAs to serve the public faithfully.

Research Design

To develop the research design of this practice analysis, it was important to recognize that accounting is a diverse field that is undergoing major changes. Today's CPAs might find themselves functioning in many very different types of engagements ranging from providing traditional auditing services to offering management consulting and personal financial planning, services that increasingly are demanded. Like other professionals, CPAs must respond to the ongoing changes in the nature of their jobs and services brought about by such forces as technology and competition. This diversity and change require that both incumbent and aspiring CPAs master new knowledge and skills, as well as the capability to apply traditional knowledge and skills to very different working situations.

AIR designed an approach to conducting this practice analysis that (1) yielded comprehensive data about today's practice requirements, (2) was sensitive to changes in professional practice, and (3) was appropriate for the desired assessment media (paper-and-pencil or computer-based). As shown in Figure 1, the practice analysis was organized into three phases: planning, analysis, and specifications, as described below.

Figure 1. Research Design for Practice Analysis



Phase 1 began with a series of planning activities: attending a kick-off meeting with AICPA staff, interviewing a select sample of practitioners, academicians, and regulators, and reviewing the relevant AICPA literature and background materials. These activities resulted in three major outcomes. First, they illuminated recent and anticipated changes in public accounting that are likely to result from changes in technology, competition in the marketplace, and changing or emerging CPA engagements and services. Second, they provided information that we used to develop sampling plans for focus groups and a large-scale practice analysis survey. Third, they helped identify important task, knowledge, and skill information, and provided a comprehensive understanding of the accounting profession.

During Phase 2, a combination of task-based and critical incident job analysis methodologies (Flanagan, 1954; Gael, 1983; Harvey, 1991) were used to identify and refine the tasks performed by entry-level CPAs, and the knowledge and skills needed for successful job performance. These methodologies were applied primarily in the context of five focus groups of 8 to 12 CPAs each. We then constructed a comprehensive survey instrument based on the information about entry-level CPA tasks and worker requirements (e.g., skills), and administered it to 5,000 CPAs throughout all jurisdictions.

In Phase 3, we developed guidelines for using the practice analysis survey and literature review results to develop content specifications for the Uniform CPA Examination. These guidelines included specific recommendations for developing an initial framework for test development in terms of proportions of items needed to cover particular knowledge and skill domains. In this phase, we also considered a number of other issues such as reliability of measurement and practical features of the test administration and setting. For example, mastery of some knowledge and skills is better assessed through information about education and experience than by examination, and some will be better

suited to particular testing formats. These latter concerns were addressed in a literature review of measurement methods (Russell, Norris, & Goodwin, 2000).

Finally, we incorporated several specific features in our research design to assist the AICPA in building a state-of-the-art licensing examination. First, we *extended the specificity of information* collected during the 1991 practice analysis, where appropriate. Second, we *extended the type of information* collected in the 1991 practice analysis. Specifically, we collected critical incident information (Flanagan, 1954) that will be most useful in the development of complex item types (e.g., simulations). Finally, we stressed the *conceptual distinctions* among the various types of practice information that was collected. This required strict adherence to professional guidelines on collecting and describing task, knowledge, and skill requirements (e.g., Goldstein, Zedeck, & Schneider, 1993). This feature is particularly important for ensuring that particular item types on the Uniform CPA Examination are most appropriate for the knowledge and skills they measure.

Organization of Report

The remaining sections of this report address the technical aspects of the project. Some sections are more detailed than others. For example, those sections that deal with data analysis include statistical detail. Each section begins with a brief overview that describes its purpose and gives a general summary of the results.

In Section II, planning activities are discussed. The goals of the planning activities were to gather background information on accounting, to develop preliminary lists of tasks, knowledge, and skill requirements for the profession, and to solidify sampling plans for the focus groups and survey conducted during Phase II.

In Section III, we discuss the process used to finalize the task, knowledge, and skill information, the primary content of the survey. Included in this section is a description of the procedures and results from the focus groups, as well as the procedures for fine-tuning the preliminary lists of tasks, knowledge, and skills. This section also describes the quality control procedures used to review, edit, and organize practice information.

In Sections IV, V, VI, and VII, we describe the development and administration of the practice analysis survey. Section IV describes the practice analysis survey with emphasis on developing the rating scales and pilot testing the survey instrument. Section V describes the sampling plan used to identify CPAs to complete the survey. Section VI describes the survey administration and tracking procedures. Section VII presents the results of analyses conducted to assess the quality of the survey data.

In Section VIII, we discuss the survey results. Given the quantity of data collected, this section only presents some of the more salient findings. Extensive data tables are included in the appendices of the report for those readers who want more details.

Section IX describes the process of developing performance dimensions using the critical incidents collected during the focus groups. This section describes all activities from the collection of critical incidents to the validation of the performance dimensions.

Section X presents a framework for using the survey and performance dimension results to develop content specifications. Specifically, this section suggests a process for using the survey and literature review of measurement methods results (Russell, et al., 2000) to develop a testing plan for the Uniform CPA Examination.

Finally, Section XI includes some summary remarks on the practice analysis. Much of the documentation of the project activities is contained in the appendices. Although this material is essential for understanding the detailed procedures and results of the various research activities, it is not central to a solid overview of the practice analysis.

II. Planning

Overview

Aside from gathering background information about the field of public accounting, the primary objective of Phase 1—Planning was to develop concrete plans and supporting materials for Phase 2—Analysis. In particular, we reviewed a variety of relevant background materials and research products, and interviewed representatives of various entities having a stake in public accounting and the Uniform CPA Examination. During these activities, we concentrated on identifying the (1) tasks performed by CPAs, as well as the knowledge and skills needed to perform these tasks, and (2) important factors that must be taken into consideration when choosing CPAs to participate in the focus groups and complete the practice analysis survey. Phase I activities resulted in preliminary lists of tasks, knowledge, and skills, as well as sampling plans for focus groups and the survey.

Review of Background Materials

AIR project staff reviewed background materials that were relevant to various aspects of the accounting profession or the Uniform CPA Examination. The types of materials we reviewed included published research reports, web sites, published journal articles and columns, textbooks, course catalogs, working papers, and legal documents. Among these materials were the 1991 Practice Analysis Report (Professional Examination Service [PES], 1991), the 1997 status report on updating the Uniform CPA Examination content specifications (AICPA, 1997), the 1998 briefing report on converting the examination to a computer-based platform (AICPA & NASBA Computerization Implementation Committee [CIC], 1998), recent Journal of Accountancy articles, and the AICPA and other accounting related web sites. The background materials covered a range of topics including changes and emerging trends in the profession, accounting practice, content specification and test development, and prior or related practice analyses. The complete bibliography of background materials reviewed is presented in Appendix 1.

To begin the review of background materials, we attempted to locate as many sources of information as possible. At this stage, we generally regarded all materials as potentially valuable for the review, and consulted with the AICPA and other persons who were knowledgeable about particular resource materials to get a preliminary understanding of the scope and contents of the review materials. This step allowed us to categorize roughly the resources according to the type of information they contained and to assign materials to appropriate project staff members. For those materials regarded as essential, such as the 1991 Practice Analysis Report (PES, 1991), all project staff were required to review them before beginning other work on the project.

Planning Interviews

We began the planning interviews shortly after beginning the review of background materials. We interviewed 27 professionals representing various perspectives on the accounting profession. Appendix 2 contains a list of interviewees.

The objectives of these interviews were primarily to (1) gain a greater understanding of the accounting profession, particularly current trends and changes, and (2) to begin

identifying task, knowledge, and skill information. In addition, we used these interviews to gather information to devise our sampling plans for focus group and survey participants, and to identify additional background resource materials for review.

Interview Procedures

Figure 2 shows the overall plan for the interviews in terms of the type of interview, its purpose(s), and targeted sources of interviewees. As shown, the interviews were to provide four overlapping types of information. The first type of interview was to gain a basic understanding of the field of accounting. The second type of interview focused on current and future-oriented knowledge and skill requirements for practicing CPAs. The third type of interview was to gain a better understanding of the profession from the regulatory perspective. The fourth and final type of interview focused on ethics, peer review, and reasons for and types of ethical violations and substandard performance by CPAs and CPA firms.

Figure 2. Interview Plan

Type	Purpose of Interview	Source of Interviewees
Basics	To help project staff become familiar with the basics of accounting	CPAs in AIR's corporate business office
	To help project staff become familiar with the basics of auditing	A highly experienced auditor in the DC area
	To help project staff become familiar with the basics of taxation	A highly experienced CPA tax practitioner in the DC area
Current and Future-Oriented Knowledge and Skills	To obtain specific definitions of skill and knowledge requirements expected to be important in the future	Content Oversight Task Force members
	To obtain information on entry-level CPA skill and knowledge requirements from the AICPA upper management perspective	AICPA Upper Management
	To obtain input on skill and knowledge requirements from the educator perspective	American Accounting Association
Board of Accountancy Perspectives	To learn about the National Association of State Boards of Accounting (NASBA) and its perspective on future directions in the accounting profession	NASBA
	To learn about licensure requirements and future directions from the perspectives of selected jurisdictions	Boards of Accountancy in jurisdictions representing different geographic regions
Ethics and Competency	To learn about ethical principles and common ethics violations	AICPA Profession Ethics Team Personnel
	To learn about the mission and role of the Securities and Exchange Commission and perceived causes for audit failures	Securities and Exchange Commission
	To learn about the peer review process and common types of violations	Peer Review Board

Before conducting the interviews, we developed the interview plan and protocols. We then conducted two interview sessions with five CPAs currently employed by AIR. After

these sessions, slight modifications were made to the protocols. Appendix 3 contains the interview protocols for each of the four types of interviews.[2]

A team of two or more project staff conducted most interviews. At least one senior-level member of the project staff participated in each interview.

Summary of Interview Results

Appendix 4 provides detailed results of the background interviews. A brief summary of these results follows.

The basic interviews provided clarification of the areas of practice and types of responsibilities they involve (e.g., auditing versus accounting), basic definitions (e.g., engagement, independence), and the typical tasks performed in common engagements, as well as the knowledge and skills needed for successful practice in these engagements.

The current and future-oriented knowledge and skill interviews produced three major types of information. First, they provided background on marketplace and practice trends. For example, it was noted that in response to increased competition, CPA firms have had to broaden the types of services they provide. Second, these interviews provided an understanding of the general perceptions about what type of information should be targeted on future Uniform CPA Examinations. A common sentiment expressed by interviewees was that the exam should assess skills needed to protect the public trust. Most felt the exam also should assess basic knowledge in unregulated areas (e.g., corporate finance) and skills that will facilitate the development of advanced knowledge over time (e.g., analytical thinking). Finally, these interviews provided some guidance about what types of CPAs to use throughout the practice analysis. Most interviewees strongly suggested that CPAs in business and industry, in addition to CPAs in public practice, serve as subject matter experts (SMEs) in the focus groups.

The interviews with the National Association of State Boards of Accountancy (NASBA) and state board of accountancy (BOA) members provided a better understanding of the relationship between the AICPA and state-based agencies and illustrated some of the licensure requirements for specific states. These interviews also addressed changes that the field of accounting is undergoing. Again, participants reiterated the importance of basic skills such as communication, highlighted the importance of ethics in the field, and reaffirmed the impact that both technology and globalization is having on the practice of accounting.

Finally, the interviews that focused on ethics and competency provided insight into the role of the Securities and Exchange Commission (SEC), defined ethical concepts such as independence, and outlined the peer review process. In addition, these interviews detailed

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[2] If necessary, slight modifications were made to the protocols to ensure we covered all questions and relevant issues. Appendix 3 shows the original form of the protocols and does not reflect any modifications made for a particular interview.

common errors made by CPA firms that lead to audit failures or adverse/modified audit reports. These common errors dealt with insufficient risk assessment and professional skepticism, insufficient skill or staffing base, and inadequate documentation and reporting. Similarly, these interviews highlighted some of the deficiencies among entry-level CPAs that lead to audit failures or ethical violations. For example, a lack of understanding of the independence rules, failure to ask probing questions, and insufficient knowledge of business and economics were deficiencies noted among entry-level CPAs that are common causes of audit failures.

Taken together, the interviews provided a solid context for understanding the field of accounting, the various state and national organizations representing or regulating CPAs, and the tasks performed by CPAs in various engagements, as well as the knowledge and skill requirements for performing these tasks. We also received input to use when developing sampling plans for both the focus groups and the practice analysis survey.

Preparation of Preliminary Lists of Tasks, Knowledge, and Skills

As noted above, one of the intended results from reviewing background materials and conducting interviews was to develop a preliminary list of tasks, knowledge, and skills. The process of compiling information to form these lists is described below.

Procedures

The process of developing the preliminary lists of tasks, knowledge, and skills was straightforward. First, we reviewed and discussed the guidelines and mechanics for identifying, defining, and documenting task, knowledge, and skill information (e.g., Williams & Crafts, 1997; Goldstein, Zedeck, & Schneider, 1993; Gael, 1983). Second, we read the background materials (see Appendix 1) and written summaries of the planning interviews and wrote statements about the task, knowledge, and skill information reflected in those materials. Third, we recorded the task, knowledge, and skill statements in a single database.

When the background materials review and interviews were completed and all task, knowledge, and skill statements were entered into the database, a project staff member was assigned to review each type of practice information (i.e., task, knowledge, or skill). The objectives of this review were to:

1. ensure that the tasks, knowledge, and skills were written in accordance with technical standards;

2. delete tasks, knowledge, and skills that were clearly identical; and

3. ensure that all task, knowledge, and skill information extracted from background materials or interviews was reflected in the preliminary lists.

Additional Considerations

Several aspects of this process deserve emphasis. First, project staff were instructed to err in the direction of over-inclusiveness during this phase of the project. Consequently, they tended to be overly inclusive when developing task, knowledge, and skill statements.

Similarly, during review of the initial statements, reviewers tended to err on the side of inclusion when looking for redundant statements. Because of this emphasis on inclusiveness, project staff would not omit or delete statements before receiving comments from subject matter experts (SMEs) during the subsequent focus groups.

Second, the task, knowledge, and skill information from the 1991 practice analysis (PES, 1991) was included in the preliminary lists. This ensured that the current practice analysis built on the previous one.

Sampling Plan Considerations[3]

The review of background materials and planning interviews provided support for our initial plans for sampling focus group and survey participants. We always planned to hold focus groups with CPAs that specialized in accounting and auditing. The interview participants reaffirmed the decision to conduct focus groups with CPAs that practice in business and industry settings and CPAs that specialize in taxation. In addition, interview participants suggested that CPAs who have a background in information technology, personal financial planning, and management consulting also be considered for inclusion in the focus groups, although it was not suggested that focus groups be devoted exclusively to CPAs who specialize in these latter areas. Finally, most participants felt that practice in a government setting was sufficiently different to include CPAs from government environments in the focus groups.

Interviewees provided mixed feedback about whom we should sample. For example, some interviewees suggested we sample entry-level CPAs, while others suggested we sample both entry-level and experienced CPAs. Most interviewees agreed that the survey sample should be representative with respect to important demographic (e.g., gender, race/ethnicity) and background (e.g., type of practice) characteristics. Finally, we received confirmation that firm size was an important factor to consider in developing the sampling plan. The general sentiment was that requirements for practice in small firms might differ dramatically from the requirements for practice in large firms.

Although the information from the background materials did not directly address sampling issues, it did provide the level of understanding of the practice of accounting that we needed to evaluate the suggestions provided by the interviewees for sampling focus group and survey participants.

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[3] The actual sampling plan is described in Section V, "Survey Sampling Plan."

III. Final Lists of Tasks, Knowledge, and Skills

Overview

As noted above, Phase I activities resulted in preliminary lists of task, knowledge, and skill requirements for accounting. Although these lists were based in part on interviews with professionals in accounting, it was important to have additional accounting professionals directly review and revise the lists. This section describes the procedures and results of activities to finalize the lists of tasks, knowledge, and skills.

The process of creating a final list of tasks, knowledge, and skills involved three steps. First, we attempted to structure the task, knowledge, and skill information in a meaningful framework that would facilitate the refinement process. Second, we presented these lists to five focus groups. During these focus group sessions, SMEs reviewed, modified, and extended the lists of tasks, knowledge, and skills. SMEs also critiqued and modified the framework for presenting this information. Finally, AIR and AICPA staff, as well as the Practice Analysis Working Group—a working group consisting of a subset of the COTF—extensively reviewed the lists of practice information.

Framework

AIR project staff who conducted the review of background materials and the planning interviews created the preliminary lists of tasks, knowledge, and skills. To facilitate this process, various frameworks were adopted that helped organize the information in a meaningful fashion. During the focus groups, participants helped refine these frameworks. The final frameworks are shown in Figures 3, 4, and 5 for task, knowledge, and skill information, respectively.

As shown in Figure 3, we organized tasks into job areas, job dimensions, and job activities. At the highest level of this framework are *job areas* that represent broadly defined domains of professional practice (e.g., accounting and auditing). Falling under each job area are job dimensions. *Job dimensions* represent the groups of similar activities that occur within a given job area. For example, the job dimension, "evidence gathering," falls under the job area, "accounting and auditing." Finally, under each job dimension are *job activities*, the more specific descriptions of responsibilities falling under the associated dimension. Thus, "preparing work papers," represents a job activity related to the job dimension of "evidence gathering." Task statements were organized under the appropriate job activity.

Figure 3. Framework for Task Information

Job Areas, Job Dimensions, and Job Activities for Tasks

Common Tasks

Client Acceptance/Continuation
- General
- Risk
- Profitability
- Independence
- Review

Planning
- General
- Gather information about the client
- Assign/schedule staff

Practice Management
- General

Accounting and Auditing

Planning
- Gather information about the client
- Evaluate internal control
- Assess risk and materiality
- Preliminary plan for audit task
- Review

Evidence Gathering
- Substantive testing: General
- Substantive testing: Analytical procedures
- Preparing work papers
- Review

Reporting
- General
- Preparation
- Review
- Delivery

Compilation and Review
- General

Tax

Common Tasks
- General

Planning
- General
- Tax planning engagements
- Planning

Compliance
- Compliance planning
- Compliance preparation
- Compliance review

Representation
- General
- Notices
- Audit: General
- Appeals

Business and Industry

Common Tasks
- General

Financial Planning
- Budgeting
- Strategies/decision making
- Forecasting
- Business plans
- Capital expenditures
- Competitive benchmarking

General Accounting
- Transaction processing
- Account analysis and reconciliation
- General ledger and financial statements

Financial Reporting and Policy
- Internal management reporting
- External reporting
- Financial statement preparation
- Policy interpretation, selection, and compliance

Corporate Finance
- Cash management
- Capital structure
- Relations with investors and financial institutions

Financial Systems
- Analysis
- Design
- Development
- Testing
- Implementation
- Maintenance

As shown in Figure 4, we organized knowledge statements into knowledge content areas and knowledge categories. Knowledge content areas are the highest level of the framework and represent broadly defined areas of knowledge having a similar focus (e.g., general business knowledge). Under each content area are knowledge categories. Knowledge categories more specifically group the type of knowledge needed under each content area. For example, "economics" is a knowledge category under the "general business knowledge" content area. Knowledge statements fall under the appropriate knowledge category.

Figure 4. Framework for Knowledge Information

Knowledge Content Areas and Knowledge Categories

General Business Knowledge
- Business Structure
- Economics
- Government Regulation of Business
- Planning and Budgeting
- Corporate Financial Management
- Cost Measurement and Pricing
- Management
- Special Services
- Communication

Law and Professional Responsibilities
- Ethics and Licensing
- Business Law and Regulation

Information Identification, Control, and Analysis
- Research
- Data Analysis/Manipulation
- Information Technology

Auditing
- Planning and Field Work
- Reporting
- Standards and Guidance

Accounting, Presentation, and Disclosure
- Preparation, Use, & Analysis of Financial Statements
- Standards and Guidance

Government and Not-for-Profit
- Entity
- Accounting and Auditing

Federal Taxation
- General Concepts
- Individuals
- Corporations
- Partnerships and Limited Liability Companies
- Estates, Trusts, and Gift Tax
- Exempt Organizations
- Retirement and Benefit Plans
- Tax Advisory/Consulting Service
- Standards and Guidance

Figure 5 shows the framework for organizing skill information. A single level classification framework was used to organize skill information into skill categories. *Skill categories* represent homogeneous groupings of related skills (e.g., resource management).

Figure 5. Framework for Skill Information

Skill Categories	
Client Orientation	Technical Application
Contextual Comprehension	Complex Problem Solving
Communication and Documentation	Interpersonal Influence
Basic and Social Skills	Performance Management
Information Gathering and Utilization	Resource Management

Focus Groups

The objectives of the focus groups were to (1) review and modify the preliminary lists of tasks, knowledge, and skills, and (2) generate critical incidents.[4] Based on feedback from the interviews and discussions with the AICPA and the Practice Analysis Working Group, five focus groups of 8 to 12 CPAs each were convened. Four of the five focus groups were organized by area of specialization: two contained CPAs who specialized in accounting and auditing, one contained CPAs who specialized in taxation, and one contained CPAs working in business and industry (including government settings). The final focus group contained a cross-section of CPAs in terms of their areas of specialization and served as a review group.

Recruitment of SMEs

To recruit focus group participants, a short background information questionnaire was sent to the chairs of various AICPA committees. These committee chairs were given a description of the five focus groups and asked to distribute the questionnaire to potential participants. Appendix 5 shows the background information questionnaire.

A total of 65 CPAs returned their completed questionnaires directly to the AICPA. The responses to the questionnaire were then used to identify focus group participants. Because we had only 65 CPAs to choose from, participants in the first four focus groups were asked to nominate individuals they felt were appropriate to serve in the final focus group. We did not gather background information for most members of the fifth and final focus group.

In making focus group selections, an attempt was made to ensure that participants were representative with respect to region, gender, race, and office size. Most importantly, *all* focus groups participants were required to hold or to have recently held supervisory roles over entry-level CPAs. This latter criterion ensured that participants thoroughly

[4] Critical incidents were used to develop preliminary dimensions of professional practice. Therefore, the procedures for collecting and using critical incidents are discussed in Section IX, "Dimensions of Professional Practice."

understood the work of entry-level CPAs and were, therefore, an ideal group to delineate the practice requirements of entry-level CPAs. A total of 49 CPAs participated in the focus groups.

Tables 1 through 4 present the experience and demographic information for participants in each of the first four focus groups. As shown in these tables, the mix of focus group participants provided a good representation of CPAs with respect to state/region of practice, gender, years of practice, type of firm, office size, and current position. Below is a summary of the characteristics of the participants in the *first four* focus groups:

- Twenty-five men and 15 women participated.
- Most participants were white, with some minority participation. One participant was Spanish/Hispanic and two were African American.
- Participants represented jurisdictions from all U.S. census regions.
- For those in public practice, 16 participants worked in local firms, six worked in regional firms, and eight worked in national firms.
- For those in private industry, four work in the service industry, two in transportation, and one each in retail, oil and gas, communications, and health industries.
- Years of experience ranged from 4.5 to 29 years for those in public practice, and from 3 to 23 years for those in private industry.
- The business and industry focus group included one SME who specialized in information technology.

In the fifth (review) group, the participants represented nine different jurisdictions (DC, KS, NC, NV, PA, RI, TX, VA, and WA) and included six women and three men. One participant in this group had extensive experience in a government setting.

Appendix 6 shows the dates, locations, and participants of each focus group.

Table 1. Focus Group 1 – Accounting and Auditing

State	Gender	Race[a]	Years in Public Acct.	Years in Non-Public Acct.	Type of Firm	Size of Firm	Title	Number of Subordinates	Areas of Practice[b]
OK	M	W	14	0	Local	2-10	Partner	6-10	1,2,4,5,7
OK	M	W	22	0	National	11-100	Manager	>10	1
KY	M	W	9	1	Local	11-100	Manager	>10	1,2,3,5,7
NY	M	W	9	0	Regional	>100	Manager	>10	1,2,3
TX	M	S	12	0	Local	11-100	Partner	3-5	1,2,3,4,5
LA	M	W	10	0	Local	11-100	Manager	>10	1,2,3,5
AR	F	W	7	1	Local	2-10	Partner	3-5	1,2,3,5,6
VA	F	W	12	6	Local	11-100	Manager	>10	1,2,3,5,7

Note: Acct. = Accounting.
[a]Race/Ethnicity: W = White, A = African American, S = Spanish/Hispanic. [b]Area of practice: 1 = auditing and assurance; 2 = accounting; 3 = taxation; 4 = information technology; 5 = management consultant; 6 = personal financial planning; 7 = financial management/cost accounting

Table 2. Focus Group 2 – Accounting and Auditing

State	Gender	Race[a]	Years in Public Acct.	Years in Non-Public Acct.	Type of Firm	Size of Firm	Title	Number of Subordinates	Areas of Practice[b]
IL	M	W	5	2	National	>100	Manager	1-2	1,3,7
OK	M	W	20	1	Local	2-10	Partner	>10	1,3,5
MO	M	W	8	Not known	Regional	11-100	Manager	3-5	1,2,3,5,7
AR	M	W	22	10	Local	2-10	Partner	3-5	1,2,3,4,5,6
OK	F	W	15	0	National	11-100	Manager	>10	1,2
KS	M	W	9.5	0	Regional	11-100	Manager	6-10	1,2,3,4,5,7
TX	M	W	28	0	Local	11-100	Partner	>10	1,2,3,5
VA	M	W	23	3	Local	11-100	Partner	>10	1,2
AR	M	W	18	0	Regional	11-100	Partner	>10	1,2,3,5
AZ	F	W	4.5	0	Local	11-100	Senior	>10	1,2,3,5

Note: Acct. = Accounting.
[a]Race/Ethnicity: W = White, A = African American, S = Spanish/Hispanic. [b]Area of practice: 1 = auditing and assurance; 2 = accounting; 3 = taxation; 4 = information technology; 5 = management consultant; 6 = personal financial planning; 7 = financial management/cost accounting

Table 3. Focus Group 3 – Business and Industry

State	Gender	Race[a]	Years in Public Acct.	Years in Non-Public Acct.	Type of Firm	Size of Firm	Title	Number of Subordinates	Areas of Practice[b]
KY	F	W	4.5	3.5	Retail	>100	Manager	6-10	7
TX	M	A	2	17	Services	>100	President	6-10	1,2,4,5
ND	M	W	13	3	Services	11-100	Tax Specialist	1-2	3
MO	M	W	20	4	Health	11-100	CFO	6-10	2,3,5,6,7
WV	M	W	0	20	Oil & Gas	11-100	CFO	6-10	2
KY	M	W	6	5	Services	>100	Manager	6-10	2,4,7
AR	F	W	16	14	Services	11-100	President	3-5	2,3,5
VA	F	W	5	13	Transportation	>100	Manager	1-2	1,4,5,7
TX	F	A	0	23	Transportation	>100	Other	3-5	4
NJ	M	W	4	15	Communication	>100	Manager	>10	Not known

Note: Acct. = Accounting.
[a]Race/Ethnicity: W = White, A = African American, S = Spanish/Hispanic. [b]Area of practice: 1 = auditing and assurance; 2 = accounting; 3 = taxation; 4 = information technology; 5 = management consultant; 6 = personal financial planning; 7 = financial management/cost accounting

Table 4. Focus Group 4 – Taxation

State	Gender	Race[a]	Years in Public Acct.	Years in Non-Public Acct.	Type of Firm	Size of Firm	Title	Number of Subordinates	Areas of Practice[b]
CA	F	W	6	0	Local	2-10	Manager	6-10	3
CO	F	W	9.5	2	National	11-100	Manager	6-10	3
MN	M	W	4.5	0	Regional	>100	Tax Specialist	>10	1,2,3,5
VA	F	W	19	2	Local	2-10	Partner	6-10	2,3,6
KY	F	W	7	2	Regional	11-100	Manager	3-5	3
CA	F	W	5.5	0	National	11-100	Manager	1-2	3
TX	M	W	21	1	Regional	>100	Partner	>10	2,3,6
VA	M	W	29	0	Local	11-100	Manager	>10	1,3,5
NM	F	W	20	0	Local	11-100	Other	3-5	2,3,other
WI	M	W	24	2	Communication	11-100	Manager	>10	2,3
NV	F	W	25	0	Local	11-100	Partner	>10	1,2,3
CA	M	W	21	2	National	>100	Partner	>10	3

Note: Acct. = Accounting.

[a]Race/Ethnicity: W = White, A = African American, S = Spanish/Hispanic. [b]Area of practice: 1 = auditing and assurance; 2 = accounting; 3 = taxation; 4 = information technology; 5 = management consultant; 6 = personal financial planning; 7 = financial management/cost accounting

Focus Group Procedures

Each focus group convened for a 1½-day session. During a session, the participants first received an overview of the practice analysis and the role of the focus groups in developing the contents of the practice analysis survey. Participants then engaged in a series of structured exercises and open discussions. Appendix 7 contains a copy of the agenda used in all focus groups. Appendix 8 contains the protocols used for reviewing tasks, knowledge, and skills.[5]

The structured exercises to review the preliminary lists of tasks, knowledge, and skills were identical. For each focus group, the following activities occurred:

- an overview of the area being focused on (i.e., tasks, knowledge, or skills) was provided;
- participants briefly discussed the typical duties or dimensions of performance in their area(s) of specialty;
- participants individually reviewed the preliminary lists; and
- project staff addressed individual questions, as needed.

During the course of reviewing tasks, knowledge, and skills, participants were instructed to add statements they felt were missing, modify statements that were poorly worded, and indicate which statements they felt should be deleted. Following the individual reviews, the participants then engaged in a facilitated discussion about the critical issues identified during their review.

Given the length of the focus groups and the amount of material to be covered in them, it was necessary to modify the general procedures as outlined above from time to time. For example, in some focus groups we had participants work in pairs to review the lists; other times we divided the focus group participants into several groups for the purposes of discussion. We also had participants indicate how each task, knowledge, or skill fit in its respective framework. This process occurred whenever time permitted or when it was necessary for improving the quality of a particular list.

At the conclusion of each focus group, all information was collected and participants were thanked for their contributions.

Review and Approval

We instituted a series of iterative reviews to move from preliminary lists of tasks, knowledge, and skills to final lists. All reviews focused on the comprehensiveness and appropriateness of the task, knowledge, or skill statements. In addition, reviewers also provided feedback on the framework for structuring practice information.

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[5] To ensure that our focus group procedures and materials would be clear and understandable, we conducted an abbreviated pilot test of our materials with CPAs from AIR's corporate business office. They made suggestions that helped us structure the focus group activities.

The first set of reviews occurred as part of the focus groups. The initial focus group represented the first time in which the preliminary lists of tasks, knowledge, and skills had been reviewed by a large group of CPAs. We used the feedback from the initial accounting and auditing focus group to change the preliminary lists of tasks, knowledge, and skills prior to the start of subsequent focus groups. For example, after the completion of the first focus group but prior to the second, we substantially revised the frameworks used to organize task, knowledge, and skill information. We also made slight revisions to the tasks, knowledge, and skills, or the frameworks for this information, between each of the other focus groups.

The second review of the lists of task, knowledge, and skills occurred during the fifth and final focus group. As noted above, this cross-section of CPAs reviewed the lists of tasks, knowledge, and skills after feedback from the prior four focus groups had been incorporated.

The Practice Analysis Working Group conducted the final review of the lists of tasks, knowledge, and skills. This review occurred in conjunction with the review of the practice analysis survey. Each member of the Practice Analysis Working Group received the lists of tasks, knowledge, and skills to review and to suggest modifications and changes. This information was then used to finalize the lists of tasks, knowledge, and skills prior to incorporating them into the survey instrument.

During the course of conducting these three sets of reviews, SMEs individually reviewed specific aspects of the tasks, knowledge, or skills list. This occurred when we noted more substantive problems, the major reviews provided conflicting feedback, or we felt an additional review of the information would greatly improve its quality. For example, a senior-level CPA who specialized in taxation reviewed this component of the task list after the taxation focus group, but before the final review group. We also had one member of the Practice Analysis Working Group review the tasks and task framework between the fourth and fifth focus group.

Most changes to the lists involved (1) changing the wording of statements, (2) deleting or combining redundant or highly similar statements, and (3) adding less common, but highly relevant task, knowledge, or skill information. In terms of the framework for organizing information, most revisions occurred with the task framework. Although modified, the final knowledge and skill frameworks are very similar to their initial form.

IV. Practice Analysis Surveys

Overview

Given the large number of tasks, knowledge, and skills in the final lists of practice information, it was necessary to develop two versions of the practice analysis survey to reduce the time needed for respondents to complete all parts. Thus, one survey contained task information and one survey contained knowledge and skill information. By splitting the practice information in this manner, the task survey focused exclusively on the work requirements of CPAs, whereas the knowledge and skill survey focused exclusively on the worker characteristics needed for successful practice. Both versions of the survey contained sections asking for background information, time spent in various areas of professional practice, and respondent comments.

This section describes the practice analysis survey. In particular, it describes the rating scales for tasks, knowledge and skills, the format of the survey, and pilot testing and review of the survey instrument.

Task Ratings

Through discussions with AICPA staff, it was decided to rate tasks on their importance for successful job performance and the frequency with which they are performed. These are commonly used ratings for practice analysis studies (Harvey, 1991; Knapp & Knapp, 1995). To choose the particular form of the importance and frequency rating scales, we assembled a list of rating scales commonly used in similar studies and disseminated this list to project staff, AICPA staff, and the Practice Analysis Working Group for comment. Based on their feedback, we then revised and finalized the rating scales. Figure 6 shows the task importance and frequency rating scales.

Knowledge and Skill Ratings

To decide on the ratings for knowledge and skills, we adopted the same strategy used for tasks. That is, we assembled a list of commonly used rating scales for review and comment by project staff, AICPA staff, and the Practice Analysis Working Group. Using feedback from these reviews, we revised and finalized the rating scales for knowledge and skills. Knowledge ratings included importance, point of acquisition (requirement at entry to professional practice), and depth of knowledge required. Skill ratings included importance and point of acquisition (requirement at entry to professional practice). Figure 7 shows the knowledge rating scales and Figure 8 shows the skill rating scales.

Figure 6. Task Rating Scales

Not Relevant (NR)	Importance	Frequency
Is this task relevant to your current position? If not, shade in the NR circle and go to the next item. Do not provide the importance or frequency ratings for any statement you rate as NR.	How important is this task for effective performance in your current position? 1 = Not important 2 = Somewhat important 3 = Moderately Important 4 = Very Important 5 = Critical	How often do you perform this task in your current position? 1 = once a year or less 2 = more than once a year but not every month 3 = about once a month 4 = more than once a month but not every week 5 = about once a week 6 = more than once a week

Figure 7. Knowledge Rating Scales

Not Relevant (NR)	Importance	Depth of Knowledge	Point of Acquisition
Is this knowledge relevant to your current position? If not, shade in the NR circle and go to the next item. Do not provide the importance, depth of knowledge, or point of acquisition ratings for any statement you rate as NR.	How important is this knowledge for effective performance in your current position? 1 = Not important 2 = Somewhat important 3 = Moderately Important 4 = Very Important 5 = Critical	At what level do you have to understand this topic to perform effectively in your current position? 1 = Familiarity with basic concepts 2 = Solid working knowledge 3 = Thorough mastery	When did you acquire this level of understanding (i.e., the *depth of knowledge* needed to perform effectively in your current position)? 1 = Before passing examination 2 = Up to 3 years after passing examination 3 = Beyond 3 years after passing examination

Figure 8. Skill Rating Scales

Not Relevant (NR)	Importance	Point of Acquisition
Is this skill relevant to your current position? If not, shade in the NR circle and go to the next item. Do not provide the importance or point of acquisition ratings for any statement you rate as NR.	How important is this skill for effective performance in your current position? 1 = Not important 2 = Somewhat important 3 = Moderately Important 4 = Very Important 5 = Critical	When did you acquire or develop this skill? 1 = Before examination 2 = Up to 3 years after passing examination 3 = Beyond 3 years after passing examination

Other Survey Sections

In addition to a task or knowledge and skill section, each survey contained a section for background information, areas of professional practice, and comments. Each version of the survey was identical with respect to these additional sections.

To collect background information, we used a modified version of the background information form used to select focus group participants. This section asked for demographic information about respondents (e.g., gender) and standard information about a respondent's professional background (e.g., year licensed, size of office). We asked for background information necessary to verify the representativeness of the survey respondents and to analyze the survey data comprehensively.

The section on areas of professional practice asked respondents to indicate the percentage of time they spent in their current position on various types of engagements. There also was space for respondents to write in areas of practice in which they work that were not included in the list.

Finally, two pages were included at the end of the survey for respondents to provide any additional comments about the survey. For example, if the survey did not include tasks performed by a particular respondent, or omitted required knowledge and skills, the respondent could utilize this section of the survey to include this information.

Review and Approval

Members of the COTF reviewed the initial version of the survey. Specifically, pairs of reviewers reviewed various sections of both surveys. Each pair of reviewers compiled their final comments. The chair of the COTF, along with AICPA staff, looked at all comments on the survey and compiled them into a final set of recommended changes to the initial version of the survey.

In general, the type of changes made to the survey after the COTF review included the following:

1. deletions of redundant statements

2. word changes to better reflect terms commonly used by CPAs

3. reordering of statements to better reflect a process-orientation or common usage (e.g., knowledge statements related to the same area of practice, such as ethics, were grouped together).

After incorporating the feedback from the COTF, AIR project staff conducted a final review of the surveys. The focus of this final review was to eliminate any typographical and grammatical errors. After these reviews, the preliminary survey was finalized and assembled for pilot testing.

Pilot Test

The survey was pilot-tested with five CPAs prior to the actual administration.[6] Pilot-test participants were used to evaluate the task as well as the knowledge and skill version of the survey in a full-day workshop held at the AICPA facilities in Jersey City, NJ. The names and affiliations of pilot-test participants are shown in Appendix 9.

The objective of the pilot test was to get feedback on any aspect of the survey. Specific emphasis was placed on obtaining an accurate estimate of how long it took to complete both versions, clarifying any confusion about the survey instructions, and ensuring that respondents understood and could correctly make the survey ratings. Although feedback on the actual task, knowledge, and skill statements was solicited, this was not the primary focus of the pilot test.

Pilot-Test Procedures

For each version of the survey, the pilot test consisted of five successive activities. First, project staff provided a brief introduction to welcome participants, provided some background on the practice analysis study, explained the goals and procedures for the pilot study, and answered participant questions. Second, the participants completed the survey. We gave very little instruction on completing the survey to ensure that the pilot test mirrored what respondents would actually be required to do in the planned mail-out setting. Third, project staff recorded the time it took each participant to complete the survey. Fourth, AIR project staff reviewed the surveys to determine if they had been appropriately completed. In reviewing each survey, the project staff discussed any concerns the individual participants had and asked targeted questions about specific aspects of the survey such as the clarity of the instructions and rating scales. Finally, when all surveys were completed and reviewed, the project staff facilitated a group discussion about any problems or concerns with completing the survey.

Appendix 10 contains the protocol used for conducting the pilot test.

Pilot-Test Results

The pilot test did not reveal any major problems with either version of the survey. Appendix 11 presents a categorized list of the major issues and comments raised by pilot-test participants. Some findings from the pilot test were that:

1. It took respondents an average of 75 minutes to complete the knowledge and skill survey, and 50 minutes to complete the task survey.

2. Participants thought that the survey instructions were clear.

3. Participants understood the rating scales and had no problems making the ratings. Although some participants expressed problems making frequency ratings for tasks, subsequent inquiry into their specific ratings revealed that all participants had used this scale correctly.

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[6] Prior to the pilot test, we had three CPAs who currently work for AIR read the survey instructions, respond to several of the task, knowledge, and skill items, and provide feedback on the clarity of the instructions, rating scales, and other aspects of the surveys. Based on this "abbreviated" pilot test, we made minor revisions to the instructions of the surveys. No changes were made to the rating scales or survey items because of this abbreviated pilot test.

4. Participants felt that the tasks were easier to rate than the knowledge and skills.

Modifications

Only a few modifications were made to the preliminary surveys after the pilot test. Specifically, some of the background information items were reworded, the general instructions were modified to emphasize that all sections of the survey should be completed, and some redundant task statements were deleted.[7]

Final Survey

After making modifications to the survey, it was reviewed several more times. First, members of the project staff and AICPA reviewed the survey, followed by a second review from the COTF. After each review, only minor wording changes were made. Finally, a camera-ready copy of each survey was generated. Both AIR and AICPA staff then reviewed the camera-ready copy of the survey. Appendix 12 contains the final version of the task survey. Appendix 13 contains the final version of the knowledge and skill survey.

[7] All of the task statements that were deleted after the pilot test were from the job dimension labeled "financial systems." This redundancy had been noted during prior reviews; however, it was decided to leave these statements in the preliminary survey for the pilot test.

V. Survey Sampling Plan

Overview

The goal of the practice analysis survey was to obtain various ratings (e.g., importance) of tasks, knowledge, and skills from a representative sample of CPAs. To achieve this goal, we developed a sampling plan to ensure that those selected to complete the survey were representative of the population of interest—entry-level CPAs, defined as all practicing CPAs who have been licensed within the past five years (from August 1999).[8]

Our survey sample size was 5,000. The 5,000 CPAs were selected using a stratified random sampling design (Henry, 1990). This sampling strategy requires that the population of interest be described in terms of relevant strata (e.g., jurisdiction). Then within each stratum, a random sample of CPAs is selected. To use this sampling strategy, we (1) determined the population of entry-level CPAs (i.e., how many entry-level CPAs exist), (2) identified sampling strata, and (3) selected the sample. The sample was then checked against the sampling plan for accuracy. This section describes the key decisions and steps in developing the sampling plan.

Determining the Population of Entry-Level CPAs

There were two possible sources of information about the population of entry-level CPAs. The first source was the AICPA membership database. The second source was information provided by the jurisdictions and contained in the National Association of State Boards of Accountancy (NASBA) database.

Unfortunately, both sources of population information were inadequate in some respects, albeit for different reasons. The AICPA membership database did not include the total population of CPAs because not all licensed CPAs are members of the AICPA. In discussions with NASBA, we learned that many jurisdictions do not have an accurate count of the number of licensed CPAs, an inadequacy of the NASBA database. However, NASBA did provide estimates of the total number of licensees within each jurisdiction. It is important to note that the estimates of all licensees provided by NASBA include non-CPAs (e.g., licensed public accountants). After discussing the pros and cons of both sources of information with AICPA staff and the Practice Analysis Working Group, it was decided that the NASBA information better represented the population of CPAs,[9] and therefore, would serve as the basis for stratification by jurisdiction.

Several features of these databases warrant further discussion. First, despite differences in the exact count of licensed CPAs, both the AICPA database and the NASBA information on licensees were highly consistent in the rank ordering of the number of licensees by jurisdiction.

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[8] Because it is possible to be in the profession before receiving a license, we expected some respondents to have more than five years experience. The operational definition of "entry level" does not account for variability in actual practice experience possessed by many newly licensed CPAs. Indeed, most jurisdictions require a minimum number of years of experience in order to obtain a license.

[9] This was based on two arguments. First, few jurisdictions issue licenses to non-CPAs. Second, most accounting professionals who pass the Uniform CPA Examination and thus satisfy the major licensing requirement of all jurisdictions ultimately apply for and receive a CPA license given the benefits of the CPA designation.

For example, California and Texas are the two largest jurisdictions according to both sources. In fact, there were only a few jurisdictions where there were notable differences. Interestingly, these differences occurred primarily in jurisdictions where an individual first receives a certificate and then has the choice of obtaining a license. Overall, however, the rank ordering of licensees within most jurisdictions was nearly identical when comparing the AICPA membership and NASBA licensee information.

The second feature about these sources of population information was that neither had complete data about the year of licensure. This fact precluded an accurate estimate of the total number of entry-level CPAs as defined above. Accordingly, the use of a stratified sampling design was based on the following two assumptions:

1. The ratio of entry-level CPAs to the total number of CPAs is constant across all jurisdictions; and

2. The total number of entry-level CPAs in each jurisdiction is sufficiently large to obtain our target sample size of 5,000.

Stratification

Jurisdiction

It is important to have jurisdictional representation in the practice analysis sample because the Uniform CPA Examination is used by all jurisdictions. To determine the sample size for each jurisdiction, we first calculated the proportion of licensees within each jurisdiction relative to the total population of licensees. Upon examining these numbers, we determined that each jurisdiction would be minimally allocated one percent (n = 50) of the total sample size of 5,000.[10] This minimum threshold was chosen to ensure that completed surveys would be received from all jurisdictions; without the minimum threshold, many smaller jurisdictions would have far fewer than 50 CPAs allocated to the survey sample.

The one-percent minimum threshold accounted for 2,650 of 5,000 CPAs being sampled (i.e., 53 jurisdictions x 50 CPAs). The remaining 2,350 CPAs were allocated to those jurisdictions whose number of licensed CPAs was greater than one percent of the total population. For these jurisdictions, we used their proportion of licensees relative to the total number of licensees to allocate the remaining 2,350 CPAs in the sample. A common proportional allocation was given to those jurisdictions that were judged to be of similar size. For example, California and Texas were both given the same proportional allocation (i.e., 12.5 percent), followed by the group of Florida, New York and Ohio (i.e., 6.5 percent), and so forth.

Table 5 shows the sample size for each jurisdiction. As shown, the first two columns list the jurisdiction and associated census region, respectively. Column 3 shows the total number of licensees using estimates provided by NASBA. Column 4 shows the percentage of licensees versus the total number of licensees for each jurisdiction. Column 5 shows the common

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[10] Because of their low number of licensed CPAs, Guam and the Virgin Islands were combined. Therefore, the total number of jurisdictions is 53, with each having at least 50 CPAs allocated to the survey sample.

proportional allocation given to jurisdictions judged to be of similar size. Note that all jurisdictions with less than one percent of the total population of licensees (Column 4) were given a proportion allocation of zero percent (Column 5). Finally, the last column of Table 5 shows the sample size for each jurisdiction. To simplify the sampling plan, the estimates in the last column were slightly adjusted. For example, Texas's allocation of 350 surveys was calculated by taking 12.50 percent of 2,350; rounding the result of 293.75 to 300; and adding the 50 minimum per jurisdiction.

Area of Practice

The COTF had expressed a desire to examine similarities and differences in practice requirements of CPAs in public accounting versus private industry. In developing the sampling plan, we used a 90/10 percent split between CPAs in public accounting and private industry, respectively. This percentage breakdown was based on the notion that although it is important to compare practice in public accounting with practice in private industry, the Uniform CPA Examination (and thus this practice analysis) is aimed primarily at CPAs who go into public accounting.[11] Therefore, the bulk of our sampled CPAs were concentrated in public accounting.

Table 6 shows the results of the 90/10 percent split on CPAs in public and private industry. The first two columns of Table 6 are identical to the first 2 columns of Table 5 described above. Column 3 of Table 6 shows the sample size for each jurisdiction and is equivalent to the last column of Table 5. Column 4 of Table 6 depicts the sample sizes of CPAs in public practice for each jurisdiction. The values in this column represent 90 percent of the total sample size for a given jurisdiction (i.e., Column 3). Similarly, Column 5 of Table 6 depicts the sample size of CPAs in private industry and reflects 10 percent of the total sample size for each jurisdiction.

[11] Because the Uniform CPA Examination is a licensing examination, it is required by law to assess the knowledge and skills needed to protect the public. Most of the engagements that fit under the "protect the public" rubric fall in the public accounting domain.

Table 5. Sample Size by Jurisdiction

State	Region	Number of Licensed CPAs	% of Total Licensed CPAs	Adjusted % Used[a]	Sample Using NASBA Information[b]
Texas	South	74,610	12.71	12.50	350
California	West	64,798	11.04	12.50	350
Ohio	Midwest	38,640	6.58	6.50	205
New York	Northeast	34,697	5.91	6.50	205
Florida	South	32,500	5.54	6.50	205
New Jersey	Northeast	20,556	3.50	3.50	130
Pennsylvania	Northeast	20,500	3.49	3.50	130
Maryland	South	19,095	3.25	3.50	130
Washington	West	19,000	3.24	3.50	130
Michigan	Midwest	15,553	2.65	3.00	120
North Carolina	South	14,800	2.52	3.00	120
Georgia	South	13,697	2.33	3.00	120
Virginia	South	13,594	2.32	3.00	120
Minnesota	Midwest	12,674	2.16	2.50	110
Colorado	West	12,434	2.12	2.50	110
Massachusetts	Northeast	12,430	2.12	2.50	110
Oklahoma	South	12,277	2.09	2.50	110
Tennessee	South	11,732	2.00	2.50	110
Wisconsin	Midwest	10,791	1.84	1.80	100
Louisiana	South	10,400	1.77	1.80	100
Indiana	Midwest	9,300	1.58	2.00	95
Illinois	Midwest	8,831	1.50	2.00	95
Arizona	West	8,300	1.41	1.75	90
Missouri	Midwest	8,021	1.37	1.75	90
Oregon	West	8,000	1.36	1.75	90
Alabama	South	7,347	1.25	1.75	90
Kentucky	South	6,128	1.04	1.50	85
Arkansas	South	5,500	0.94	0.00	50
Nebraska	Midwest	5,031	0.86	0.00	50
Connecticut	Northeast	5,000	0.85	0.00	50
South Carolina	South	4,738	0.81	0.00	50
Mississippi	South	4,300	0.73	0.00	50
Iowa	Midwest	3,500	0.60	0.00	50
Puerto Rico	Territory	3,486	0.59	0.00	50
Montana	West	3,218	0.55	0.00	50
New Mexico	West	3,094	0.53	0.00	50
Utah	West	3,000	0.51	0.00	50
Kansas	Midwest	2,945	0.50	0.00	50
North Dakota	Midwest	2,542	0.43	0.00	50
Hawaii	West	2,316	0.39	0.00	50
Idaho	West	2,250	0.38	0.00	50
West Virginia	South	2,170	0.37	0.00	50
Nevada	West	2,051	0.35	0.00	50
New Hampshire	Northeast	1,900	0.32	0.00	50
Rhode Island	Northeast	1,800	0.31	0.00	50
Maine	Northeast	1,565	0.27	0.00	50
District of Columbia	South	1,300	0.22	0.00	50

State	Region	Number of Licensed CPAs	% of Total Licensed CPAs	Adjusted % Used[a]	Sample Using NASBA Information[b]
Wyoming	West	1,109	0.19	0.00	50
Alaska	West	914	0.16	0.00	50
Vermont	Northeast	886	0.15	0.00	50
Delaware	South	800	0.14	0.00	50
South Dakota	Midwest	728	0.12	0.00	50
Guam/Virgin Islands	Territory	137	0.03	0.00	50
TOTAL		586,985	100	100	5,000

[a]The adjusted % used reflects the proportional allocation of 2,350 of 5,000 sampled CPAs among jurisdictions comprised of greater than 1.00% of the total licensed CPA population.

[b]The approximate sample size is obtained by multiplying the adjusted % used times 2,350 and adding 50 (the minimum threshold sample size for all jurisdictions). The approximate sample size allocated to each state was adjusted slightly to reach the final sample size of 5,000 CPAs.

Table 6. Sample Size by Jurisdiction and Type of Practice

State	Region	Sample Using NASBA Information	Public – 90%	Private – 10%
Texas	South	350	315	35
California	West	350	315	35
Ohio	Midwest	205	185	20
New York	Northeast	205	185	20
Florida	South	205	185	20
New Jersey	Northeast	130	117	13
Pennsylvania	Northeast	130	117	13
Maryland	South	130	117	13
Washington	West	130	117	13
Michigan	Midwest	120	108	12
North Carolina	South	120	108	12
Georgia	South	120	108	12
Virginia	South	120	108	12
Minnesota	Midwest	110	99	11
Colorado	West	110	99	11
Massachusetts	Northeast	110	99	11
Oklahoma	South	110	99	11
Tennessee	South	110	99	11
Wisconsin	Midwest	100	90	10
Louisiana	South	100	90	10
Indiana	Midwest	95	85	10
Illinois	Midwest	95	85	10
Arizona	West	90	81	9
Missouri	Midwest	90	81	9
Oregon	West	90	81	9
Alabama	South	90	81	9
Kentucky	South	85	77	8
Arkansas	South	50	45	5
Nebraska	Midwest	50	45	5
Connecticut	Northeast	50	45	5
South Carolina	South	50	45	5
Mississippi	South	50	45	5
Iowa	Midwest	50	45	5
Puerto Rico	Territory	50	45	5
Montana	West	50	45	5
New Mexico	West	50	45	5
Utah	West	50	45	5
Kansas	Midwest	50	45	5
North Dakota	Midwest	50	45	5
Hawaii	West	50	45	5
Idaho	West	50	45	5
West Virginia	South	50	45	5
Nevada	West	50	45	5
New Hampshire	Northeast	50	45	5
Rhode Island	Northeast	50	45	5
Maine	Northeast	50	45	5
District of Columbia	South	50	45	5
Wyoming	West	50	45	5
Alaska	West	50	45	5
Vermont	Northeast	50	45	5

State	Region	Sample Using NASBA Information	Public – 90%	Private – 10%
Delaware	South	50	45	5
South Dakota	Midwest	50	45	5
Guam/Virgin Islands	Territory	50	45	5
TOTAL		5,000	4,501	499

Other Sampling Considerations

It is important that results of the practice analysis be maximally generalizable to the population of entry-level CPAs. Therefore, a CPA's areas of expertise, firm/office size, gender, and race/ethnicity were other important sampling strata to consider. By considering these variables in the sampling design, the survey results allowed us to investigate differences in practice requirements across the different levels of these variables.

Given the size of the sample (N = 5,000), it was reasonable to expect adequate coverage on the various levels of each of these variables. To ensure this outcome, we selected a sample of CPAs across all jurisdictions that approximated the composition of all entry-level CPAs on race/ethnicity, firm size, and gender. Thus, these latter variables also were strata in our sampling design. Because many jurisdictions comprised only one percent of the sample, we did not attempt to balance the composition of CPAs on these variables within jurisdiction or area of practice.

Finally, we did not stratify on area of expertise. This decision was based on the premise that the choice of strata, coupled with the overall large sample size, would produce adequate representation of CPAs on these variables.

Review and Approval

AICPA staff reviewed and commented on the sampling plan. After discussions, we made slight modifications; however, the basic plan as described above did not change.

Selection of Final Sample

Although we had planned to use a combination of state and AICPA database information to select our sample, we used only the AICPA membership database. The rationale not to pursue state-based data was threefold. First, the objective of the practice analysis is to provide a comprehensive description of the requirements of professional practice in accounting. There is no compelling argument to expect that CPAs who are members of the AICPA practice accounting differently than CPAs who are not members of the AICPA. Second, the AICPA membership is large and the membership database contained the critical information needed to execute the sampling plan.[12] Finally, a broadcast fax was sent out to each of the 54 boards of accountancy requesting information about all CPAs who had been licensed in their jurisdiction

[12] As noted above, the AICPA membership database did not include date of licensure information for a majority of AICPA members. Therefore, we used the date and jurisdiction of certification as a proxy for date and jurisdiction of licensure.

within the past five years. Only 17 jurisdictions provided this requested information, and not all of the responding jurisdictions provided complete data.

The process of physically selecting the sample from the database was done by the AICPA. In selecting the sample, the parameters established in the sampling plan were followed with one exception. In several jurisdictions, the number of CPAs to be sampled exceeded the actual number of CPAs who were members of the AICPA. This occurred in the District of Columbia, Wyoming, and Guam/U.S. Virgin Islands. For each of these jurisdictions, all CPAs who were members of the AICPA were selected in the survey sample. The difference between desired and available CPAs for the sample was then allocated to surrounding jurisdictions. For example, the desired sample size for the District of Columbia was 50 (see Table 5). However, the AICPA database contained only 41 entry-level CPAs who are licensed and practicing in DC. The extra nine CPAs targeted for the District of Columbia were assigned to the neighboring states of Maryland (5 slots) and Virginia (4 slots). Thus, the desired sample size for Maryland increased from 130 to 135, and for Virginia it increased from 120 to 124.

When the sample had been selected, we then conducted a series of quality checks to ensure the selected sample matched the parameters of the sampling plan. First, we verified that the overall and jurisdiction totals corresponded to those shown in Table 5. Second, we verified that the 90/10 percent split on CPAs in public practice versus private industry matched the projections shown in Table 6. Finally, we looked at various frequency distributions and cross-tabulations on age, gender, race/ethnicity, and firm size to ensure they matched our understanding of the actual distribution of entry-level CPAs on these variables.

Summary

We used a stratified sampling design to select a sample of 5,000 entry-level CPAs. Both jurisdiction and practice area served as primary strata. Across all 5,000 selected CPAs, race/ethnicity, firm size, and gender served as secondary strata.

The NASBA licensee information was used to determine the composition of our sample because this database provided the best available source of information about the population of licensed CPAs. The actual sample of 5,000 CPAs to receive the survey came from the AICPA database because it contained more of the individual information required for executing the sampling plan. Furthermore, all state-level jurisdictions are represented in the AICPA membership ranks.

One concern with using the AICPA membership database to select the survey sample was that it lacked comprehensive information about the date of licensure for many of its members. To deal with this fact, we used information about the date of certification as a proxy for date of licensure. Quality checks on the selected sample confirmed that the sample reflected the parameters of the sampling plan.

VI. Survey Administration

Overview

In this section, we describe the survey administration procedures. Using the sampling plan as a guide, we randomly assigned either a task or knowledge and skill version to each sampled CPA. We then assembled the survey packets according to survey assignment. The actual administration involved several mailings, including an advance and follow-up letters and two administrations of the survey packet. All completed surveys were logged in our tracking system upon receipt. From start to finish, survey administration occurred over approximately three months.

Survey Assignments

As noted above, we used a stratified random sampling design to select a sample of 5,000 CPAs. Each CPA received either a task version or a knowledge and skill version of the survey. We randomly assigned versions of the survey to ensure a roughly equal distribution of the survey on all demographic variables. This was accomplished through the following steps:

1. All selected CPAs were sorted using firm size and gender information. This sort was performed separately by jurisdiction and for CPAs in public practice or private industry.

2. Using this sorted list, a version of the survey was then assigned to each CPA in the sample in alternating fashion (i.e., the first CPA was assigned a task survey, the second CPA was assigned a knowledge and skill survey, etc.). An attempt was made to balance the allocation of surveys across the various classifications of race/ethnicity.

3. Descriptive statistics were calculated to verify that each version of the survey was evenly distributed.

4. Adjustments to the allocation of surveys were made as necessary.

Survey Packets

Each survey packet consisted of the following items:

1. The assigned version of the survey;

2. A copy of the advance letter from the AICPA President emphasizing the importance of the survey (see Appendix 14 for a copy of this letter);

3. A cover letter explaining the survey logistics (e.g., return procedures); and

4. A postage-paid return envelope for sending completed surveys directly to AIR.

The latter item was to encourage the return of the survey and to protect the confidentiality of the respondents and their survey responses. Survey packets were sent to all 5,000 participants via U.S. Postal Service.

Survey Tracking

Each survey was assigned a unique number for tracking survey respondents. We developed a database that contained demographic and address information, as well as survey response status (i.e., returned or not returned), to assist in the tracking of surveys. This database also allowed us to monitor the survey return rates.

Follow-up Procedures

Applying standard survey methodology (Dillman, 1978), the actual survey administration consisted of five distinct mailings. The first mailing contained a personalized advance letter from the President of the AICPA. This letter informed people they had been selected for the survey, explained its importance, and indicated the approximate time the surveys would be mailed. The second mailing consisted of the survey packets themselves. The third mailing contained a follow-up letter that reemphasized the importance of the practice analysis, thanked those who had already responded, and requested a response from those who had not. The fourth mailing contained a second follow-up letter. This letter was similar to the first follow-up letter; in addition, it extended the deadline for completing the surveys.[13] Finally, we distributed a new survey packet in the fifth mailing. This new packet was sent to everyone who had not returned a completed survey by one week prior to the extended deadline.

[13] It was necessary to extend the initial deadline for completing the surveys due to unexpected delays in the second mailing.

VII. Data Quality

Overview

After administering the survey, the next step in the practice analysis was to analyze the survey data. The first type of analysis involved answering the question, "What is the overall quality of the survey data?" In this section, we present the results of analyses to answer this question.

This section begins by presenting the survey response rates. The overall response rate was lower than anticipated. However, as subsequent subsections show, the respondents made few rating errors and were representative with respect to sampling strata. Furthermore, the survey ratings were reliable and the results were similar to those obtained in other related studies. Taken as a whole, the section shows that despite the lower than anticipated response rate, the quality of the data was high.

Response Rate

A total of 5,000 surveys were initially administered. However, 90 surveys were undeliverable because of incorrect address information. This reduced the number of surveys actually administered to 4,910. Of these, 2,457 were task surveys and 2,453 were knowledge and skill surveys.

Of the 4,910 administered surveys, 1,349 completed surveys were returned for an overall response rate of 27.5 percent. The response rate for the task survey was 29.1 percent (714 out of 2,457). The response rate for the knowledge and skill survey was 25.9 percent (635 out of 2,453). The response rates observed for this practice analysis are below those obtained during the 1991 practice analysis. The return rates for each of the four versions of the survey in 1991 was approximately 40 percent (PES, 1991).

Data Preparation

Initially, the survey data were double-keyed to minimize potential data entry errors. That is, all survey responses were entered into an electronic database twice by separate data-entry staff. Whenever discrepancies occurred for a given item, the original data-entry person reconciled them. This process ensures that the data does not include errors associated with keypunching (i.e., transcription).

In most survey efforts, some respondents, for one reason or another, answer inconsistently, omit items or sections, and make other transcription errors. We began the analyses with a series of analyses to "clean up" the ratings data. The goal of this process was to remove respondents whose ratings exhibited anomalous patterns (e.g., excessive missing data) that suggested that they did not properly complete the survey or that they were not entry-level CPAs.

The data were assessed for two different types of errors: rating errors and excessive missing data. For purposes of data handling and analysis, separate samples were created for the knowledge and skill sections, respectively, of the knowledge and skill survey. One sample is composed of those individuals who passed all of the data cleaning screens for the knowledge section, while the other sample is composed of those individuals who passed all of the data cleaning screens for the skill section. Those who passed data cleaning screens for both knowledge and skill items, separately, are in both the knowledge and skill samples. Those individuals who passed the data cleaning

screens for only one of the two sections, either the knowledge or skill section, are present in only the sample for which they passed the screens. Because of this process, there are three samples corresponding to respondents who completed the task, knowledge, and skill ratings, respectively.

Rating Errors

Rating errors occur when the respondent does not use the rating scales consistently or as intended to respond to a particular item. For example, respondents could indicate that a task is not relevant to their current position, yet provide both frequency and importance ratings for that task.

Across the task, knowledge, and skill items, most respondents had no or few inconsistent responses. For the task survey, 11 out of 714 respondents gave inconsistent responses. Of these 11 respondents, seven had one inconsistent response, two had two inconsistent responses, and the remaining two respondents each gave three and four inconsistent responses, respectively. For the knowledge section of the knowledge and skill survey, one respondent gave more than three inconsistent responses, 344 respondents gave between one and three inconsistent responses to knowledge items, and 290 respondents gave no inconsistent responses. For the skill section of the knowledge and skill survey, two individuals each gave one inconsistent response; the remaining 633 respondents gave no inconsistent responses to skill items.

Incomplete responses occur when there are responses to one scale for a given item (e.g., frequency) but not the other rating scales for the same item (e.g., importance). This creates a situation where the information provided about a particular task, knowledge, or skill is incomplete for that respondent. Across both the task and the knowledge and skill survey, less than 5 percent of respondents gave more than five incomplete responses.

After reviewing the extent of rating errors present in the data, we reviewed the actual surveys containing these errors. Based on this review, it was decided to remove respondents who had erred in responding to more than 10 percent of the items in the task, knowledge, or skill sections of the survey. This resulted in removing three respondents from the task survey sample, and 13 respondents from the knowledge and skill survey samples.

Missing Data

Missing data occurs when a respondent fails to complete a survey item. The occurrence of missing data was far greater than the occurrence of rating errors. For the task survey and the knowledge and skill sections of the knowledge and skill survey, identification numbers were listed for all respondents with more than 10 percent of the items with missing data. Thus, identification numbers were listed for respondents with more than 23 items missing on the task survey, 25 items on the knowledge section of the knowledge and skill survey, and 6 items on the skill section of the knowledge and skill survey. For each of these respondents, the physical copy of their survey was obtained and the missing data were verified. There were 95 individuals flagged for large amounts of missing data. Of these, 43 were from the task survey sample, and 52 were from the knowledge and skill survey sample. Of the 52 individuals flagged for missing data in the knowledge and skill survey sample, 24 were flagged to be dropped from the knowledge sample but retained in the skill sample, 14 were flagged to be dropped from the skill sample but retained in the knowledge sample, and 14 were flagged to be dropped from both the knowledge and skill samples.

The remaining missing data were estimated using a modified mean substitution routine. That is, individuals with missing data points received the value of their practice group mean response for any item they did not complete. The practice group mean represents the best possible estimate of an individual's response to a particular item.

Non Entry-Level Respondents

The final stage of data cleaning involved screening out respondents who did not fall within the parameters specified for the sample. Specifically, the survey targeted entry-level CPAs, with entry-level defined as CPAs with up to five years of accounting experience since licensure. Therefore, individuals who reported taking the Uniform CPA Examination before 1994 and reported receiving their licenses before 1994 were removed. This screen removed 15 additional respondents from the sample: 10 from the task survey sample, and 5 from the knowledge and skill survey sample. These 15 individuals reported having taken the Uniform CPA Examination and obtaining their licenses between the years of 1975 and 1993. As shown in the row labeled "sample total" in Table 7, the final sample across both surveys contains 1,261 respondents. The final task sample contains 658 respondents. The final knowledge and skill sample contains 603 respondents. However, because we screened the knowledge and skill ratings separately, the 603 respondents in the knowledge and skill sample does not reflect respondents removed from either the knowledge or the skill samples. As shown in the row labeled "sub-sample total" in Table 7, the knowledge and skill sub-samples contained 579 and 589 respondents, respectively.

Table 7. Overall Response Rates and Data Loss Due to Cleaning.

	Task Survey Sample	Knowledge & Skill Survey Sample	Sample Total	*Knowledge Sub-Sample*	*Skill Sub-Sample*
Surveys sent	2,457	2,453	4,910	*2,453*	*2,453*
Total response	714	635	1,349	*635*	*635*
Lost due to rating errors	3	13	16	*13*	*13*
Lost due to missing data	43	14	57	*38*	*28*
Out of range experience	10	5	15	*5*	*5*
Sub-sample total				*579*	*589*
Sample total	658	603	1,261		

Data Quality

After data cleaning analyses, we then assessed the overall quality of the survey ratings. In doing so, we evaluated the data on five criteria: representativeness, reliability, validity, benchmark comparisons, and absolute sample size.

Representativeness

Representativeness refers to the extent that the survey respondents reflect the intended survey sample. As discussed in Section V, the key sampling strata included jurisdiction, area of practice,

gender, race/ethnicity, years of experience, and firm size. Therefore, we compared our respondents to the sample on these variables.[14]

Jurisdiction. Table 8 shows the results with respect to jurisdiction, where the 54 jurisdictions have been collapsed into the U.S. Census regions. This table shows the number of CPAs sampled and the number of returned surveys by region. The last two columns of Table 8 show the breakout of returns by version of the survey. As shown in Table 8, the percentage of CPAs that completed the survey is generally consistent with the percentage of CPAs that were sampled in each region. This pattern holds even when the jurisdictions are not collapsed into census regions as shown in Table 9. Thus, the CPAs who completed and returned surveys were generally representative of the CPAs who were sampled with respect to jurisdiction.

Table 8. Response Rates by Region.

	Sample Characteristics		All Respondents		Final Sample – Overall		Task Survey		Knowledge/Skill Survey	
Region	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Mid West	1,016	20.7	290	22.2	272	22.2	147	22.8	125	21.6
North East	812	16.5	219	16.7	206	16.8	115	17.8	91	15.7
South	1,837	37.4	478	36.5	452	37.0	223	34.6	229	39.6
West	1,148	23.4	301	23.0	274	22.4	152	23.6	122	21.1
Territory	97	2.0	21	1.6	19	1.6	8	1.2	11	1.9
Total	4,910	100.0	1309	100.0	1,223	100.0	645	100.0	578	100.0
Did Not Report*			40		38		13		25	

*Only individuals who self-reported their current state of residence are included as valid data in this table.

[14] Population estimates were not provided.

Table 9. Response Rates by Jurisdiction.

	Sample Characteristics		All Respondents		Final Sample – Overall		Task Survey		Knowledge/Skill Survey	
Jurisdiction	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Alabama	87	1.8	23	1.8	22	1.8	7	1.1	15	2.6
Alaska	49	1.0	13	1.0	13	1.1	7	1.1	6	1.0
Arizona	90	1.8	18	1.4	18	1.5	8	1.2	10	1.7
Arkansas	50	1.0	12	0.9	12	1.0	5	0.8	7	1.2
California	343	7.0	84	6.4	77	6.3	40	6.2	37	6.4
Colorado	106	2.2	31	2.4	27	2.2	14	2.2	13	2.2
Connecticut	48	1.0	13	1.0	12	1.0	7	1.1	5	0.9
Delaware	48	1.0	6	0.5	5	0.4	3	0.5	2	0.3
Florida	202	4.1	56	4.3	54	4.4	32	5.0	22	3.8
Georgia	116	2.4	28	2.1	27	2.2	16	2.5	11	1.9
Guam / U.S.V.I.	17	0.3	4	0.3	3	0.2	1	0.2	2	0.3
Hawaii	48	1.0	8	0.6	7	0.6	4	0.6	3	0.5
Idaho	53	1.1	13	1.0	12	1.0	7	1.1	5	0.9
Illinois	95	1.9	16	1.2	15	1.2	7	1.1	8	1.4
Indiana	95	1.9	22	1.7	20	1.6	11	1.7	9	1.6
Iowa	50	1.0	15	1.1	14	1.1	9	1.4	5	0.9
Kansas	48	1.0	9	0.7	9	0.7	5	0.8	4	0.7
Kentucky	85	1.7	35	2.7	33	2.7	12	1.9	21	3.6
Louisiana	99	2.0	23	1.8	23	1.9	12	1.9	11	1.9
Maine	49	1.0	9	0.7	8	0.7	6	0.9	2	0.3
Maryland	133	2.7	29	2.2	27	2.2	15	2.3	12	2.1
Massachusetts	108	2.2	17	1.3	17	1.4	11	1.7	6	1.0
Michigan	118	2.4	34	2.6	32	2.6	20	3.1	12	2.1
Minnesota	108	2.2	48	3.7	45	3.7	24	3.7	21	3.6
Mississippi	89	1.8	13	1.0	12	1.0	6	0.9	6	1.0
Missouri	50	1.0	23	1.8	21	1.7	11	1.7	10	1.7
Montana	55	1.1	18	1.4	15	1.2	9	1.4	6	1.0
Nebraska	50	1.0	16	1.2	14	1.1	7	1.1	7	1.2
Nevada	49	1.0	15	1.1	14	1.1	11	1.7	3	0.5
New Hampshire	49	1.0	15	1.1	15	1.2	10	1.6	5	0.9
New Jersey	128	2.6	40	3.1	38	3.1	18	2.8	20	3.5
New Mexico	49	1.0	12	0.9	9	0.7	6	0.9	3	0.5
New York	203	4.1	61	4.7	56	4.6	32	5.0	24	4.2
North Carolina	119	2.4	46	3.5	44	3.6	22	3.4	22	3.8
North Dakota	49	1.0	10	0.8	10	0.8	6	0.9	4	0.7
Ohio	204	4.2	57	4.4	53	4.3	31	4.8	22	3.8
Oklahoma	105	2.1	18	1.4	16	1.3	10	1.6	6	1.0
Oregon	89	1.8	22	1.7	20	1.6	12	1.9	8	1.4
Pennsylvania	128	2.6	48	3.7	46	3.8	22	3.4	24	4.2
Puerto Rico	80	1.6	17	1.3	16	1.3	7	1.1	9	1.6
Rhode Island	50	1.0	9	0.7	8	0.7	6	0.9	2	0.3

	Sample Characteristics		All Respondents		Final Sample – Overall		Task Survey		Knowledge/Skill Survey	
Jurisdiction	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
South Carolina	49	1.0	16	1.2	16	1.3	7	1.1	9	1.6
South Dakota	50	1.0	15	1.1	15	1.2	7	1.1	8	1.4
Tennessee	108	2.2	30	2.3	29	2.4	12	1.9	17	2.9
Texas	337	6.9	80	6.1	74	6.1	33	5.1	41	7.1
Utah	49	1.0	16	1.2	14	1.1	6	0.9	8	1.4
Vermont	49	1.0	7	0.5	6	0.5	3	0.5	3	0.5
Virginia	120	2.4	42	3.2	37	3.0	20	3.1	17	2.9
Washington	127	2.6	40	3.1	38	3.1	22	3.4	16	2.8
Washington Dc	40	0.8	9	0.7	9	0.7	6	0.9	3	0.5
West Virginia	50	1.0	12	0.9	12	1.0	5	0.8	7	1.2
Wisconsin	99	2.0	25	1.9	24	2.0	9	1.4	15	2.6
Wyoming	41	0.8	11	0.8	10	0.8	6	0.9	4	0.7
Total	4,910	100.0	1,309	100.0	1,223	100.0	645	100.0	578	100.0
Did Not Report			40		38		13		25	

Note. Guam and the U.S. Virgin Islands were combined due to the small sample sizes.

Area of Practice. Table 10 presents similar results for area of practice (i.e., public accounting versus non-public accounting). Recall that we intentionally constructed our sample to comprise approximately 90 percent of CPAs currently in public accounting and 10 percent not in public accounting. As Table 10 shows, the composition of CPAs that completed the survey was closer to 85 percent in public accounting and 15 percent in non-public accounting. Thus, the resultant distribution of CPAs for area of practice varied slightly from the intended distribution of 90/10 percent.

Table 10. Response Rates by Area of Practice.

	All Respondents		Final Sample – Overall		Task Survey		Knowledge/Skill Survey	
Practice	Freq	%	Freq	%	Freq	%	Freq	%
Private	193	14.6	180	14.5	88	13.5	92	15.7
Public	1,131	85.4	1,058	85.5	563	86.5	495	84.3
Total	1,324	100.0	1,238	100.0	651	100.0	587	100.0
Did Not Report	25		23		7		16	

Gender. Table 11 presents the response rates by gender. As shown, the CPAs we sampled consisted of approximately 49 percent females and 51 percent males. However, the composition of CPAs that completed surveys was approximately 56 percent females and 44 percent males. Thus, females responded at a higher rate than males and therefore comprised a slightly larger percentage of the final respondents than they did of the sampled respondents.

Table 11. Response Rates by Gender.

	Sample Characteristics		All Respondents		Final Sample – Overall		Task Survey		Knowledge/Skill Survey	
Gender	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Female	2,412	49.1	738	55.9	693	56.1	357	54.9	336	57.4
Male	2,497	50.9	582	44.1	542	43.9	293	45.1	249	42.6
Total	4,909	100.0	1,320	100.0	1,235	100.0	650	100.0	585	100.0
Did Not Report	1		29		26		8		18	

Race/Ethnicity. Table 12 shows the composition of respondents on race/ethnicity. As shown, the percentage of the various racial and ethnic subgroups remained consistent across the overall final sample, as well as the final sample for both versions of the survey. Approximately 88 percent of the respondents identified themselves as white.

Table 12. Response Rates by Race/Ethnicity.

	All Respondents		Final Sample – Overall		Task Survey		Knowledge/Skill Survey	
Race/Ethnicity	Freq	%	Freq	%	Freq	%	Freq	%
White	1165	88.3	1091	88.4	570	87.7	521	89.2
African American	21	1.6	20	1.6	10	1.5	10	1.7
Hispanic/Spanish	42	3.2	40	3.2	22	3.4	18	3.1
Asian/Pacific Islander	81	6.1	74	6.0	45	6.9	29	5.0
Native American/Alaskan	2	0.2	1	0.1	0	0.0	1	0.2
Other	8	0.6	8	0.6	3	0.5	5	0.9
Total	1,319	100.0	1,234	100.0	650	100.0	584	100.0
Did Not Report	30		27		8		19	

Years of Experience. Tables 13 and 14 show the distribution of respondents on years of experience in public practice and private industry, respectively. In both cases, the percentages of respondents indicating a given range of years of experience did not vary across versions of the survey. The results shown in Tables 13 and 14 confirm that our final sample was composed primarily of entry-level CPAs. However, we expected a small percentage of our respondents to have more than five years experience because many CPAs practice accounting before they obtain CPA licensure.

For public practice (see Table 13), approximately 22 percent of the final sample reported three years of experience, the modal response. Approximately 77 percent of the final sample reported five years or less experience in public practice. Conversely, approximately 23 percent of the final sample reported more than 5 years experience in public accounting.

For private industry (see Table 14), nearly 43 percent of the final sample reported no experience as expected given our concentration on CPAs in public accounting. Approximately 79 percent of the final sample reported five years or less experience in private industry. Conversely,

approximately 21 percent of the final sample had more than five years experience in private industry.

Table 13. Distribution of Respondents by Years of Experience in Public Accounting.

	All Respondents			Final Sample – Overall			Task Survey			Knowledge/Skill Survey		
Years	Freq	%	Cum %	Freq	%	Cum %	Freq	%	Cum %	Freq	%	Cum %
0	64	4.9	4.9	63	5.1	5.1	36	5.6	5.6	27	4.6	4.6
1	78	5.9	10.8	72	5.9	11.0	40	6.2	11.8	32	5.5	10.1
2	164	12.5	23.3	155	12.6	23.6	84	13.0	24.8	71	12.2	22.3
3	288	22.0	45.3	279	22.7	46.3	140	21.7	46.5	139	23.8	46.1
4	234	17.8	63.1	222	18.1	64.4	117	18.2	64.7	105	18.0	64.1
5	176	13.4	76.5	160	13.0	77.4	94	14.6	79.3	66	11.3	75.4
6	107	8.2	84.7	101	8.2	85.6	48	7.5	86.8	53	9.1	84.5
7	51	3.9	88.6	49	4.0	89.6	25	3.9	90.7	24	4.1	88.6
8	39	3.0	91.6	35	2.9	92.5	13	2.0	92.7	22	3.8	92.4
9	17	1.3	92.9	14	1.1	93.6	3	0.5	93.2	11	1.9	94.3
10	23	1.8	94.7	22	1.8	95.4	12	1.9	95.1	10	1.7	96.0
11	6	0.5	95.2	6	0.5	95.9	3	0.5	95.6	3	0.5	96.5
12	14	1.1	96.3	11	0.9	96.8	8	1.2	96.8	3	0.5	97.0
13	7	0.5	96.8	5	0.4	97.2	4	0.6	97.4	1	0.2	97.2
14	8	0.6	97.4	6	0.5	97.7	1	0.2	97.6	5	0.9	98.1
15	9	0.7	98.1	8	0.7	98.4	4	0.6	98.2	4	0.7	98.8
16	5	0.4	98.5	3	0.2	98.6	2	0.3	98.5	1	0.2	99.0
17	1	0.1	98.6	1	0.1	98.7	1	0.2	98.7	-	0.0	99.0
18	2	0.2	98.8	2	0.2	98.9	2	0.3	99.0	-	0.0	99.0
19	2	0.2	99.0	1	0.1	99.0	-	0.0	99.0	1	0.2	99.2
20	8	0.6	99.6	8	0.7	99.7	5	0.8	99.8	3	0.5	99.7
21	1	0.1	99.7	-	0.0	99.7	-	0.0	99.8	-	0.0	99.7
25	3	0.2	99.9	2	0.2	99.9	1	0.2	100.0	1	0.2	99.9
30	1	0.1	100.0	1	0.1	100.0	-	0.0	100.0	1	0.2	100.1
34	1	0.1	100.1	1	0.1	100.1	1	0.2	100.2	-	0.0	100.1
35	1	0.1	100.2	-	0.0	100.1	-	0.0	100.2	-	0.0	100.1
37	1	0.1	100.3	-	0.0	100.1	-	0.0	100.2	-	0.0	100.1
Total	1,311	100.0		1,227	100.0		644	100.0		583	100.0	
Did Not Report	38			34			14			20		

Table 14. Distribution of Respondents by Years of Experience in Private Industry

	All Respondents			Final Sample – Overall			Task Survey			Knowledge/Skill Survey		
Years	Freq	%	Cum %	Freq	%	Cum %	Freq	%	Cum %	Freq	%	Cum %
0	499	42.6	42.6	473	43.2	43.2	235	41.4	41.4	238	45.2	45.2
1	127	10.8	53.4	115	10.5	53.7	60	10.6	52.0	55	10.5	55.7
2	100	8.5	61.9	94	8.6	62.3	48	8.5	60.5	46	8.7	64.4
3	86	7.3	69.2	81	7.4	69.7	45	7.9	68.4	36	6.8	71.2
4	47	4.0	73.2	43	3.9	73.6	23	4.0	72.4	20	3.8	75.0
5	62	5.3	78.5	55	5.0	78.6	28	4.9	77.3	27	5.1	80.1
6	42	3.6	82.1	37	3.4	82.0	20	3.5	80.8	17	3.2	83.3
7	32	2.7	84.8	30	2.7	84.7	15	2.6	83.4	15	2.9	86.2
8	25	2.1	86.9	25	2.3	87.0	16	2.8	86.2	9	1.7	87.9
9	19	1.6	88.5	18	1.6	88.6	11	1.9	88.1	7	1.3	89.2
10	42	3.6	92.1	40	3.7	92.3	19	3.3	91.4	21	4.0	93.2
11	7	0.6	92.7	7	0.6	92.9	4	0.7	92.1	3	0.6	93.8
12	19	1.6	94.3	19	1.7	94.6	10	1.8	93.9	9	1.7	95.5
13	8	0.7	95.0	7	0.6	95.2	6	1.1	95.0	1	0.2	95.7
14	3	0.3	95.3	3	0.3	95.5	2	0.4	95.4	1	0.2	95.9
15	15	1.3	96.6	15	1.4	96.9	8	1.4	96.8	7	1.3	97.2
16	4	0.3	96.9	2	0.2	97.1	1	0.2	97.0	1	0.2	97.4
17	8	0.7	97.6	8	0.7	97.8	6	1.1	98.1	2	0.4	97.8
18	3	0.3	97.9	2	0.2	98.0	1	0.2	98.3	1	0.2	98.0
19	2	0.2	98.1	1	0.1	98.1	-	0.0	98.3	1	0.2	98.2
20	8	0.7	98.8	8	0.7	98.8	4	0.7	99.0	4	0.8	99.0
21	2	0.2	99.0	2	0.2	99.0	2	0.4	99.4	-	0.0	99.0
22	1	0.1	99.1	1	0.1	99.1	1	0.2	99.6	-	0.0	99.0
23	2	0.2	99.3	2	0.2	99.3	1	0.2	99.8	1	0.2	99.2
24	1	0.1	99.4	1	0.1	99.4	-	0.0	99.8	1	0.2	99.4
27	1	0.1	99.5	-	0.0	99.4	-	0.0	99.8	-	0.0	99.4
30	4	0.3	99.8	3	0.3	99.7	1	0.2	100.0	2	0.4	99.8
34	1	0.1	99.9	1	0.1	99.8	1	0.2	100.2	-	0.0	99.8
36	1	0.1	100.0	1	0.1	99.9	-	0.0	100.2	1	0.2	100.0
Total	1,171	100.0		1,094	99.9		568	100.2		526	100.0	
Did Not Report	178			167			90			77		

Note: Percentages may not sum to 100 due to rounding error.

Office Size. Finally, Table 15 shows the composition of respondents by office size. Office size refers to the approximate number of accounting professionals in a CPA office or site. As shown in Table 15, the percentage of the final sample, as well as respondents to both versions of the survey, were roughly parallel with respect to office size. More respondents (approximately 43 percent) reported working in offices with 11 to 100 accounting professionals than in offices of other sizes. Approximately five percent of the final sample reported working in an office with one accounting professional.

Table 15. Response Rates by Office Size.

Number of Employees	All Respondents		Final Sample -- Overall		Task Survey		Knowledge/Skill Survey	
	Freq	%	Freq	%	Freq	%	Freq	%
1	66	5.0	59	4.8	30	4.6	29	4.9
2-10	366	27.7	336	27.2	157	24.2	179	30.4
11-100	565	42.7	533	43.1	277	42.7	256	43.5
> 100	325	24.6	309	25.0	185	28.5	124	21.1
Total	1,322	100.0	1,237	100.0	649	100.0	588	100.0
Did Not Report	27		24		9		15	

Other Comparisons. Appendix 15 includes the profile of respondents on other background items. Specifically, the results with respect to highest level of education, discipline of educational degree, type of public practice firm, current position in public practice, type of non-public firm, and current position in non-public practice are presented.

Summary. These results illustrate that the composition of the final sample, as well as the sample breakout for the task and the knowledge and skill versions of the survey were fairly consistent with the intended sample on jurisdiction, area of practice, and gender. In addition, the ratio of CPAs in public practice versus private industry was approximately 85 percent to 15 percent. This mix is only slightly different from the intended 90 percent to 10 percent composition. In terms of years of experience, most of the respondents had five or fewer years of accounting experience. Finally, the results for race/ethnicity and office size appeared to be reasonable based on the available information about the actual sample.

Reliability

Reliability refers to the extent a measurement procedure is free from random error. There are multiple ways to conceptualize and assess reliability. In this project, we were concerned with interrater reliability—the consistency with which different raters rated the survey items.

We assessed the reliability of the survey ratings using a generalizability theory approach (Shavelson & Webb, 1991). More specifically, the phi (ϕ) index was used to calculate interrater reliability (Shavelson & Webb, 1991; Brennan, 1983).

Reliability estimates range on a scale from 0.0 to 1.0, with perfect reliability (i.e., no random error) resulting in a reliability estimate of 1.0. Table 16 presents the reliability estimates for task, knowledge, and skill survey ratings. This table shows the reliability estimates for the actual number of raters in the row labeled "k raters." Also shown are the expected reliability estimates for 10, 50, and 100 raters. These latter estimates, which are based on statistical adjustments to the k-rater estimate, provide an indication of the expected reliability of the ratings when based on smaller subsets of the data.

As shown in Table 16, the reliability estimate for all raters was .99 for task importance and frequency ratings. For knowledge ratings, the reliability estimate was also .99 for importance

ratings, and .98 for depth of knowledge (DoK) and point of acquisition (PoA) ratings. Finally, for skill ratings, the reliability estimate was .99 for importance ratings and .98 for PoA ratings.

Table 16. Reliability Estimates for Task, Knowledge and Skill Ratings.

# of Raters	Task		Knowledge			Skill	
	Importance	Frequency	Importance	Depth of Knowledge	Point of Acquisition	Importance	Point of Acquisition
10	0.699	0.713	0.725	0.518	0.409	0.615	0.443
50	0.928	0.926	0.929	0.843	0.776	0.889	0.799
100	0.959	0.961	0.963	0.915	0.874	0.941	0.888
k raters	0.993	0.994	0.994	0.984	0.976	0.989	0.979
k =	658	658	579	579	579	589	589

Notes. In Generalizability terminology, this is an i x (r,p) design, where items, which is a fixed facet, are crossed with respondents who are nested within practice groups, both of which are random facets.

Validity

In addition to establishing reliability of the ratings, it is important to have information about the validity of the survey responses. *Validity*, in the context of the practice analysis, refers to the extent to which the ratings measure what they are intending to measure. There are several ways to assess validity. One way is to compare survey results to logical expectations given the nature of accounting practice.

To assess validity, we compared the mean importance ratings of a sample of tasks by practice groups. In selecting these tasks, we used the first task under each job dimension (see Figure 3); however, we did not use tasks from job areas or dimensions labeled "general" or "common." Table 17 shows the results of these comparisons for a subset of 11 tasks. The top third of the table contains tasks from the accounting and auditing task area. The middle third of the table contains tasks from the taxation task area. The bottom third of the table contains tasks from the business and industry task area. Across all tasks, the highest mean importance ratings occurred for the practice group that corresponded to the task area of a given task. For example, the first task in Table 17, "determine specific client industry audit requirements," is a task from the accounting and auditing task area. The mean importance ratings for this task were 3.13, 0.82, and 0.61 for the accounting and auditing, taxation, and business and industry practice groups, respectively.

Table 17. Task Importance Comparisons by Practice Group for Selected Task Items.

Task	A & A	Tax	B & I
Determine specific client industry audit requirements.	3.13	0.82	0.61
Prepare or review the client's trial balance.	3.57	2.16	1.27
Draft, or review client-prepared, financial statements and footnote disclosures for compliance with GAAP.	3.92	1.66	1.06
Conduct broad analytical review and inquiry to provide negative assurances.	2.52	1.43	0.53
Identify financial accounting issues related to areas of tax planning.	1.17	2.65	0.86
Review prior year return(s) for carry forward items, including NOLs and other credits.	1.86	4.05	0.97
Keep the client informed of, and document all, communications with tax authorities.	1.06	3.24	0.92
Formulate a budget to guide business decisions.	0.42	0.50	1.76
Prepare source documents by account classification.	0.95	1.21	1.71
Analyze the company's consolidated financial statements including account and trend analysis.	1.76	0.53	1.81
Establish a company-wide cash receipt policy.	0.10	0.08	0.64

Although not shown here, this pattern of ratings held up for most of the items (Section VIII explains practice group results further). This pattern of ratings is logically consistent with accounting practice and thus supports the meaningfulness and validity of the ratings gathered in this practice analysis.

Benchmark Comparisons

We also compared the ratings to ratings on the same or very similar items from another recent practice analysis project to evaluate further the validity of the survey results. This type of information provides a benchmarked comparison to judge the quality of the current survey results.

In this set of comparisons, ratings on items from a recent study on general business knowledge (GBK; Muenzen, Greenberg, and Sawtell, 2000) were compared to ratings on the same or very similar items from the current practice analysis. In all, comparisons were made on 26 items. The items from the general business knowledge survey were chosen to (1) closely correspond to items on the knowledge portion of our survey, and (2) expand the full range of topic areas (e.g., business, ethics, law).

Table 18 shows the results of these benchmark comparisons. In this table, the first column lists the knowledge areas taken from the practice analysis. The second column lists the corresponding knowledge area from the GBK survey. The last four columns of Table 18 show the mean and standard deviations of the ratings on these knowledge areas for the practice analysis (columns 3 and 4) and the GBK survey (columns 5 and 6). Because the ratings across these research projects occurred on two different importance scales, we did not perform a statistical comparison of the means. Instead, we calculated the correlation between the means ratings across all 26 knowledge items. The correlation between these two profiles of mean importance ratings was 0.71, indicating the relative ordering of these common knowledge areas in terms of importance ratings

was highly consistent across the two surveys. Furthermore, it is likely that had the samples been more congruent (e.g., the current effort used entry-level CPAs only), and had the scales been more comparable, the correlation likely would have been even higher.

Based on the comparisons of task importance ratings across practice groups and the benchmark comparisons of knowledge importance ratings, the survey results appear to be valid. There was no indication across the analyses that the survey ratings were anomalous.

Table 18. General Business Knowledge Benchmark Comparisons

		Importance			
		AIR-AICPA		GBK-PA	
AIR-AICPA	GBK-PA	Mean	SD	Mean	SD
2 The formation, capitalization, operation, profit allocation, and tax implications of business entities.	Formation, capitalization, operation, and tax implications of business entities, such as: corporations, partnerships, joint ventures, limited liability partnerships, limited liability corporations, and other unincorporated associations	3.28	1.42	2.90	0.40
66 Business ethics regarding privileged communications and confidentiality.	Business ethics	3.82	1.35	2.80	0.50
80 Law, regulations, codes, and standards pertaining to fraud detection and forensic accounting, including SAS#82, Consideration of Fraud in a Financial Statement Audit, and the Foreign Corrupt Practices Act.	Fraud	2.09	1.78	2.60	0.70
3 The rights, duties, liabilities, and authority of directors, officers, stockholders, partners, joint venturers, capitalists, and other owners.	Rights, duties, liabilities and authority of: stockholders, directors, officers, partners, joint ventures, members, and other owners	2.51	1.29	2.50	0.70
10 Business cycles and reasons for business fluctuations.	Business cycles; terminology used to explain business fluctuations; and reasons for fluctuations	2.14	1.57	2.40	0.70
33 Cash management including factors influencing the levels of cash, reasons for holding cash, synchronizing cash inflows and outflows, cash collection, compensating balances, and overdraft systems.	Cash management, such as: factors influencing the levels of cash; using the float; analysis and synchronization of cash inflows and outflows; methods to speed cash collections; overdraft systems; and compensating balances	2.08	1.66	2.40	0.70
36 Inventory management including factors influencing the level of inventory, costs of carrying inventory, and inventory management techniques.	Factors influencing the level of inventory	1.85	1.68	2.40	0.80

AIR-AICPA	GBK-PA	Importance			
		AIR-AICPA		GBK-PA	
		Mean	SD	Mean	SD
30 Long-term financing options including bonds, intermediate-term loans, term loans, lease financing, common stock, preferred stock, convertible securities, stock warrants and rights, stock options, employee stock ownership plans, and currency swaps.	Types and nature of long-term financing; bonds, intermediate-term loans; term loans; lease financing; common stock; preferred stock; convertible securities; stock warrants and rights; stock options; employee stock ownership plans; hedging instruments (swaps, options, futures)	1.82	1.63	2.40	0.70
35 Accounts receivable management including factors influencing the level of accounts receivable, reasons for carrying accounts receivable, variables and decisions regarding credit policy, credit instruments, and discounting techniques.	Factors influencing the level of accounts receivable, and variables and decisions regarding credit policy	2.06	1.71	2.30	0.70
21 Factors that affect business investment decisions such as economic value added, cash flow, net present value, discounted payback, and internal rate of return.	Analyses such as discounted cash flow, internal rates of return, payback, accounting rate of return, economic value analysis	2.08	1.53	2.20	0.80
27 The factors influencing optimum capital structure including risk, leverage, cost of capital, growth rate, profitability, asset structure, and the implications of loan covenants.	Factors influencing optimum capital structure such as risk, leverage, and cost of capital	1.66	1.59	2.20	0.80
86 The rights, duties, and liabilities of debtors, creditors, and guarantors.	Rights, duties, and liabilities of debtors, creditors, and guarantors	1.68	1.49	2.20	0.80
18 Forecasting/projection techniques including extrapolation, integrating industry projections, trend analysis, and other analytical techniques.	Forecasting/projection techniques	1.85	1.69	2.10	0.90
77 Law, regulations, codes, and standards for commercial transactions including the Uniform Commercial Code (negotiable instruments, letters of credit, sales, secured transactions, documents of title, and title transfer).	The Uniform Commercial Code regarding: negotiable instruments, including letters of credit; sales; secured transactions; documents of title; and title transfer	1.53	1.53	2.00	0.80
19 The budget process including purposes and methods of budgeting.	Annual profit plans and supporting budgets for sales, production, direct materials, direct labor, overhead, cost of goods sold, and selling and administrative expenses	2.04	1.67	1.90	0.90

AIR-AICPA	GBK-PA	Importance			
		AIR-AICPA		GBK-PA	
		Mean	SD	Mean	SD
71 Law, regulations, codes, and standards pertaining to securities.	Implications of Federal Securities Acts	1.33	1.49	1.90	0.90
8 Microeconomics including market structures and pricing, the consumption of goods, and theories of supply and demand.	Supply and demand	1.16	1.35	1.80	0.90
41 Factors affecting production costs.	Factors affecting production costs in the short run and the long run	0.98	1.46	1.80	0.80
51 Human resource management including recruitment, staffing, training and development, and performance evaluation.	Human resource management	1.50	1.68	1.80	0.90
85 Law, regulations, codes, and standards pertaining to bankruptcy and repossessions.	Bankruptcy acts	1.25	1.44	1.80	0.80
23 Business decision-making tools, including special analyses for decision-making and marginal analysis.	Analyses such as make vs. buy, add or drop a segment, sell or process further	1.34	1.53	1.70	0.90
72 Law, regulations, codes, and standards pertaining to employment and labor including OSHA, ADA, and unfair labor practices.	Implications of employment regulations, such as OSHA, ADA, and unfair labor practices	1.14	1.38	1.70	0.80
82 Law, regulations, codes, and standards pertaining to the formation and termination of agencies, the duties and authority of agents and principals and their obligations.	Formation and termination of agencies; duties of agents and principals; and liabilities and authority of agents and principals	0.93	1.30	1.70	0.80
76 Law, regulations, codes, and standards pertaining to intellectual property rights, including computer software.	Laws relating to computer technology rights	1.05	1.38	1.60	0.90
79 Law, regulations, codes, and standards pertaining to protection of the environment.	Implications of environmental regulations	0.77	1.22	1.50	0.80
75 Law, regulations, codes, and standards pertaining to personal property, real property, landlord and tenant relationships, and bailments.	Laws relating to bailments	1.42	1.46	1.00	0.80

Notes. The PES Importance Scale used anchors of 0 = 'Not Important,' 1 = 'Minimally Important,' 2 = 'Moderately Important,' and 3 = 'Very Important.'

Absolute Sample Size

A final concern about the survey data was the extent to which the mean ratings represent the best estimate of the "true" rating for a given item on a given scale. Not withstanding other psychometric and process issues (e.g., reliability, sample representativeness), the stability of a mean estimate improves as the sample size improves. Because the survey results (see below) were analyzed for all respondents and by practice group, it is important to assess the number of individuals a given mean rating is based on. Table 19 shows the absolute number of respondents broken out by practice group and version of the survey. As shown, the lowest value in Table 19 is 100 for the number of CPAs responding to the knowledge and skill survey that specialize in business and industry. Thus, at a minimum, the ratings of no fewer than 100 respondents contribute to the mean practice group ratings.

Table 19. Absolute number of respondents by Practice Group

	Accounting & Auditing	Tax	Business & Industry
Task Survey	324	217	108
KS Survey	272	191	100
Total	596	408	208

Note. Some respondents (N = 49) failed to respond to the 'Time Spent' questions that was used to make practice group classifications.

Summary

All of the analyses presented in this section support the overall quality of the survey data. Despite the lower than expected response rate, the 27.5 percent of entry-level CPAs who completed the survey represented the full sample on important background and demographic variables. The survey respondents also provided ratings that were reliable, logical, and similar to ratings obtained from other samples of CPAs on similar items. These findings bolster the confidence in the overall quality of the survey data results.

VIII. Survey Results

Overview

In the previous section of the report, we presented evidence that supports the overall quality of the survey data. In this section, we describe the survey results. Most of the analyses of the survey data involved the computation of descriptive statistics, such as means and standard deviations. Because of the volume of task, knowledge, and skill items and because these items were rated on multiple scales, it is impossible to present all the survey results in this section. Instead, we present the most salient results.

Specifically, this section presents three types of results. First, results with respect to ratings of time spent in various practice engagements are presented. Second, the salient results from the ratings of tasks, knowledge, and skills are discussed. Here, we only describe the top rated tasks, knowledge, and skills across practice groups. Finally, the results from comparisons of survey ratings between CPAs in public accounting and private industry are summarized. Appendix 16 presents complete ratings. Before presenting these results, however, we briefly discuss the use of the not relevant response ratings.

Not Relevant (NR) Responses

Survey respondents were required to first indicate whether they perform a given task in their current position or whether a given knowledge or skill was required for successful performance in their current position. If a survey respondent indicated a NR response for a task, knowledge, or skill item, they were instructed not to provide the other ratings. These instructions ensure that the importance, frequency, point of acquisition, or depth of knowledge ratings were only based on those respondents who perform a given task or require a given knowledge or skill for performance.

We recoded all NR responses to zero for task importance and frequency, knowledge importance, and skill importance. For example, if respondents indicated they did not perform a task, they then received a rating of 0 on the task importance and frequency rating scales. This procedure, in effect, equated a NR response to the absence of any importance and to no frequency of performance. If a respondent gave a NR response to a knowledge or skill item, the importance rating was recoded in this manner; however, NR responses were *not* recoded as 0 for knowledge point of acquisition or depth of knowledge ratings, or for skill point of acquisition ratings. It was determined that such recoding for these latter ratings was conceptually illogical.

Data Tables

Appendix 16 contains all the descriptive results of the survey ratings. They include:

- Task importance ratings for all respondents, by practice groups.
- Task frequency ratings for all respondents, by practice groups.
- Knowledge importance ratings for all respondents, by practice groups.
- Depth of knowledge ratings for all respondents, by practice groups.

- Knowledge point of acquisition ratings for all respondents, by practice groups.
- Skill importance ratings for all respondents, by practice groups.
- Skill point of acquisition for all respondents, by practice groups.

Below, we highlight some of the survey results.

Practice Groups

Section II of both versions of the survey asked respondents to indicate what percentage of time in their current position was spent in a given practice area (e.g., audits, budgeting, individual income taxation). In assessing these responses, it was first necessary to check their appropriateness. Therefore, we added the percentage ratings for each respondent and examined the total percentage of time allocated. Only three percent of all respondents estimated the total time to be greater than 100 percent, an indication that respondents correctly completed the time spent ratings.

Given the evidence that survey respondents correctly made the time spent ratings, we then examined the percentage of time estimates. With input from the AICPA, the practice areas were assigned to one of the three specialty areas—referred to as practice groups—focused on in this practice analysis: accounting and auditing, taxation, or business and industry. Table 20 shows the actual breakout of practice areas into practice groups. Then the percentage of time spent across all practice areas within a given practice group was calculated for each survey respondent. Based on these results, individual respondents were classified into the practice groups in which they spent the *majority of their working time*. Table 21 shows a comparison of practice groups between public practice and private industry. These results confirm that those spending most of their time on accounting and auditing and taxation related engagements are primarily concentrated in public practice. For example, approximately 89 percent of CPAs in public accounting spend their time in accounting and auditing and/or taxation compared to approximately 40 percent of CPAs in private industry.

Table 20. Practice Groups and Associated Practice Areas.

Accounting & Audit Group: Audits, Compilations, Reviews, Attestation & Other Assurance Services
Tax Group: Individual Income Tax, Corporate Income Tax, Other Income Tax, Non-Income Based Tax
Business & Industry Group: Bookkeeping, Advisory, Information Systems, Budgeting, Financing, Business Valuations, Projections/Forecasts, Cash Management, Inventory Management, Profitability Analysis, Organization Structuring, Litigation Support, Employee Benefit Plans

Table 21. Comparison of Practice Areas between Public Practice and Private Industry.

	Private		Public		Total	
	Freq	%	Freq	%	Freq	%
No Reported Time Spent	6	3.2	8	0.7	14	1.1
Accounting & Auditing	52	27.5	591	52.1	643	48.6
Taxation	24	12.7	418	36.8	442	33.4
Business & Industry	107	56.6	118	10.4	225	17.0
Total	189	100.0	1135	100.0	1324	100.1

Note. 25 Individuals did not report whether they are in public or private practice; percentages may not sum to 100 due to rounding error.

Next, we examined the percentage of time spent in each practice area. This occurred for all respondents, as well as by practice group. As shown in Table 22, across all survey respondents, the most time in a given practice area was 29.9 percent for audit, 13.8 percent for corporate income taxation, and 13.7 percent for individual income taxation. At the low end, the least time in a given practice area was 0.6 percent for business valuation and profitability analysis, and 0.5 percent for organization structuring and inventory management.

Table 22. Percentage of Time Spent in Practice Area.

		Practice Group			
Activity Category		Accounting & Auditing	Taxation	Business & Industry	All Groups
Audit	N	644	447	225	1,316
	Mean	56.34	4.63	4.51	29.91
	SD	31.71	7.99	9.55	34.62
Review	Mean	6.75	2.71	1.24	4.43
	SD	10.14	4.90	3.24	8.10
Compilations	Mean	8.80	6.68	3.48	7.17
	SD	14.31	8.45	7.83	11.77
Special Reports	Mean	2.79	0.43	2.83	1.99
	SD	10.76	1.54	7.41	8.25
Bookkeeping	Mean	2.21	4.75	16.95	5.59
	SD	5.73	7.35	23.77	12.59
Advisory	Mean	1.37	1.29	7.72	2.43
	SD	4.09	3.97	20.15	9.41
Attest & Other Assurance Services	Mean	1.51	0.11	0.37	0.84
	SD	5.73	0.87	2.88	4.26
Information Systems	Mean	0.67	1.00	11.32	2.61
	SD	3.15	4.08	23.45	10.95
Budgeting	Mean	0.20	0.26	5.13	1.07
	SD	1.13	1.21	10.16	4.70
Financing	Mean	0.09	0.17	4.56	0.88
	SD	0.72	1.53	14.15	6.16
Business Valuation	Mean	0.20	0.32	2.45	0.62
	SD	1.46	1.70	11.06	4.85
Projections & Forecasts	Mean	0.47	1.24	5.67	1.62
	SD	1.85	3.41	12.47	5.97
Cash Management	Mean	0.10	0.19	3.62	0.73
	SD	0.81	1.47	8.54	3.90

Inventory Management	Mean	0.11	0.07	2.21	0.46
	SD	0.93	0.72	11.47	4.86
Profitability Analysis	Mean	0.10	0.14	2.98	0.61
	SD	0.62	0.86	7.58	3.37
Organization Structuring	Mean	0.16	0.33	1.77	0.49
	SD	1.63	2.36	6.54	3.29
Litigation Support	Mean	0.15	0.20	4.80	0.96
	SD	1.18	1.15	16.90	7.27
Personal Financial Planning	Mean	0.53	2.53	0.45	1.20
	SD	4.25	9.90	2.12	6.61
Corporate Income Tax	Mean	5.92	30.27	3.35	13.75
	SD	7.85	24.18	5.83	19.38
Individual Income Tax	Mean	5.89	29.60	4.62	13.72
	SD	8.49	20.84	8.22	18.00
Other Income Tax	Mean	1.35	9.52	0.88	4.05
	SD	3.29	13.88	2.81	9.35
Non-Income Based Tax	Mean	0.43	2.26	0.32	1.03
	SD	2.23	7.24	2.21	4.67
Employee Benefit Plans	Mean	2.51	0.90	5.00	2.39
	SD	5.57	2.96	15.87	7.94

Note. Percentage of time spent estimates may not sum to 100 because some respondents reported time spent in areas other than those listed on the survey. There were many "other" areas but each had very low percent time estimates.

Examination of the percentage of time spent estimates by practice group provided confirmation for the creation of practice groups. For example, those classified as specializing in accounting and auditing reported spending an average of 56.3 percent of their time in audit, approximately 6 percent of their time in both corporate and individual income tax, and 2.5 percent of their time in employee benefit plans. Those respondents classified as specializing in accounting and auditing reported spending, on average, less than 2 percent of their time in all other non-accounting and auditing practice areas. Similarly, those respondents classified as specializing in taxation reported spending the greatest percentage of their time on taxation-related practice areas. Although this trend held up for those classified as practicing in business and industry, this class of CPAs reported a more equally distributed percentage of time spent across all practice areas. This reflects the greater diversity of practice areas engaged in by CPAs in business and industry.

Task Survey Results

As noted above, respondents rated tasks on importance and frequency. Besides examining the mean ratings on all tasks for each practice group (Appendix 16), we also examined the most important and most frequently performed tasks. These latter results follow.

Table 23 shows the top ten most important tasks for each practice group. Examination of this table reveals that the top most important tasks varied considerably across practice groups. In fact, within the top ten most important tasks, only two tasks, "assess information about the client" and "organize personal work schedule to facilitate task completion and maximize use of time," are common for those specializing in accounting and auditing and those practicing in business and industry. Otherwise, the top ten most important tasks varied by practice group.

Table 23. Top 10 Most Important Tasks for Each Practice Group.

	Average Importance Rating
Accounting and Auditing Practice Group (n = 324)	
64 Prepare documentation to support and explain the findings of the audit (e.g., audit programs, analysis of account balances, results of confirmation procedures, and conclusions reached during the course of an audit).	3.93
72 Draft, or review client-prepared, financial statements and footnote disclosures for compliance with GAAP.	3.92
19 Organize personal work schedule to facilitate task completion and maximize use of time.	3.87
1 Assess information about the client.	3.81
63 Investigate variances in account balances that are inconsistent with anticipated results.	3.75
6 Evaluate the limitations of the internal control environment and internal control systems in a client organization.	3.75
57 Analyze accounts in order to reconcile account details to the general ledger balances.	3.75
34 Identify auditing/accounting issues pertaining to the engagement.	3.75
44 Assure compliance with auditing standards.	3.72
21 Identify relevant client financial information necessary to meet engagement objectives.	3.72
Taxation Practice Group (n = 217)	
87 Review tax law updates, professional journals, and IRS releases to keep current.	4.17
103 Identify accurate and relevant information and sources of information for the preparation of the tax return.	4.08
110 Review relevance, completeness, and accuracy of information obtained for preparation of a tax return.	4.07
100 Review prior year return(s) for carry forward items, including NOLs and other credits.	4.05
113 Identify forms, disclosures, and supporting schedules needed to generate a complete tax return.	4.05
101 Review filing deadlines for all tax returns and quarterly payments to ensure timely filing of tax returns and payments.	4.03
107 Analyze financial statements, workpapers, and client-prepared information used for tax return preparation.	4.01
129 Review client data from prior year to determine the completeness of current year tax return.	3.98
86 Assess whether adequate information has been provided by the client.	3.89
122 Prepare tax or information returns in compliance with filing requirements.	3.87
Business and Industry Practice Group (n = 108)	
19 Organize personal work schedule to facilitate task completion and maximize use of time.	2.78
156 Develop a network of contacts and relationships to use as sources of information, support, or business development.	2.71
193 Prepare income statements for period ended.	2.56
187 Analyze accounts for unusual fluctuations and make necessary adjustments.	2.55
186 Prepare account reconciliation and related schedules.	2.50
192 Prepare balance sheet as of a reporting date.	2.46
1 Assess information about the client.	2.34
22 Obtain an understanding of client's goals and objectives.	2.33
157 Make recommendations regarding business actions or alternatives.	2.27
158 Analyze implications of transactions from business standpoint.	2.25

Table 24 shows the top ten most frequently performed tasks by each practice group. As shown, three of the top ten most frequently performed tasks were common across all three practice groups. These tasks included "assess information about the client," "organize personal work

schedule to facilitate task completion and maximize use of time," and " communicate with staff and clients so that they know what they need to do in support of the engagement." Other commonalties in the top ten most frequently performed tasks occurred between CPAs specializing in accounting and auditing and those practicing in business and industry. These tasks included "identify relevant client financial information necessary to meet engagement objectives," "assign tasks to staff according to individual strengths and limitations, engagement requirements, and priorities," and "review audit work performed by staff to determine that the relevant audit objectives are met."

Table 24. Top 10 Most Frequently Performed Tasks for Each Practice Group.

	Average Frequency Rating
Accounting and Auditing Practice Group (n = 324)	
19 Organize personal work schedule to facilitate task completion and maximize use of time.	4.36
1 Assess information about the client.	3.67
25 Communicate with staff and clients so that they know what they need to do in support of the engagement.	3.57
64 Prepare documentation to support and explain the findings of the audit (e.g., audit programs, analysis of account balances, results of confirmation procedures, and conclusions reached during the course of an audit).	3.42
57 Analyze accounts in order to reconcile account details to the general ledger balances.	3.42
21 Identify relevant client financial information necessary to meet engagement objectives.	3.41
63 Investigate variances in account balances that are inconsistent with anticipated results.	3.25
69 Evaluate the accuracy, sufficiency, and competence of audit evidence.	3.14
65 Prepare schedule of account balances and transactions and examine underlying documentation.	3.13
61 Use checklists and other self-checking procedures to verify the reliability and accuracy of audit information and data.	2.98
Taxation Practice Group (n = 217)	
87 Review tax law updates, professional journals, and IRS releases to keep current.	4.30
19 Organize personal work schedule to facilitate task completion and maximize use of time.	4.28
129 Review client data from prior year to determine the completeness of current year tax return.	3.99
113 Identify forms, disclosures, and supporting schedules needed to generate a complete tax return.	3.99
107 Analyze financial statements, workpapers, and client-prepared information used for tax return preparation.	3.95
103 Identify accurate and relevant information and sources of information for the preparation of the tax return.	3.89
110 Review relevance, completeness, and accuracy of information obtained for preparation of a tax return.	3.85
86 Assess whether adequate information has been provided by the client.	3.78
123 Prepare appropriate documentation to support line item entries on tax returns.	3.70
100 Review prior year return(s) for carry forward items, including NOLs and other credits.	3.70
Business and Industry Practice Group (n = 108)	
19 Organize personal work schedule to facilitate task completion and maximize use of time.	3.47

156	Develop a network of contacts and relationships to use as sources of information, support, or business development.	2.50
185	Enter data into subsidiary and general ledgers.	2.50
187	Analyze accounts for unusual fluctuations and make necessary adjustments.	2.40
186	Prepare account reconciliation and related schedules.	2.33
1	Assess information about the client.	2.19
158	Analyze implications of transactions from business standpoint.	2.11
157	Make recommendations regarding business actions or alternatives.	2.09
193	Prepare income statements for period ended.	2.08
25	Communicate with staff and clients so that they know what they need to do in support of the engagement.	2.05

Knowledge Survey Results

Respondents rated knowledge items on importance, depth of knowledge, and point of acquisition. For knowledge importance ratings, there was more commonality among the top ten most important knowledge areas across practice groups than observed for task ratings. As shown in Table 25, all three practice groups regarded the "knowledge of basic mathematics including arithmetic and ratios" and "knowledge of standards for presentation and disclosure in financial statements including consolidated and combined financial statements, balance sheet, statements of income, comprehensive income, changes in equity accounts, and cash flows" as very important. The taxation specialty group had no other commonalties in the top ten most important knowledge statements. Conversely, CPAs specializing in accounting and auditing, and business and industry rated five other common knowledge areas among their 10 most important knowledge areas (e.g., basic writing mechanics, such as grammar, spelling, word usage, punctuation, and sentence structure).

Table 25. Top 10 Most Important Knowledge for Each Practice Group.

	Accounting and Auditing Practice Group (n = 272)	Average Importance Rating
97	Basic mathematics including arithmetic and ratios.	4.30
147	Standards for presentation and disclosure in financial statements including consolidated and combined financial statements, balance sheet, statements of income, comprehensive income, changes in equity accounts, and cash flows.	4.30
108	Spreadsheet software including the design and preparation of spreadsheets.	4.28
62	Key ethical concepts including independence, objectivity, integrity, and due care.	4.26
60	Basic writing mechanics, such as grammar, spelling, word usage, punctuation, and sentence structure.	4.23
149	Asset recognition, measurement, valuation, presentation, and disclosure for cash and cash equivalents, marketable securities, accounts receivable, inventories, investments, property, plant and equipment, leases and leasehold improvements, and intangible,	4.23
61	Effective business writing principles, such as organization, clarity and conciseness.	4.22
150	Liability recognition, measurement, valuation, presentation, and disclosure for current liabilities and accruals, contingent liabilities and commitments, deferred revenues, long-term liabilities, bonds payable, leases, pensions, and deferred income taxes.	4.21
127	Responsibilities and procedures associated with types of services including audit, attestation, review, and compilation.	4.21

154	Revenue and expense account recognition, measurement, valuation, presentation and disclosure.	4.20
Taxation Practice Group (n = 191)		
176	Income tax forms, instructions, due dates, and procedures for filing extensions.	4.59
109	Software for preparation of income tax returns.	4.43
177	Estimated tax payment requirements and underpayment penalties.	4.42
173	Accounting methods (e.g., accrual and cash) and the differences among them.	4.38
199	How to reconcile book income to taxable income.	4.32
180	Gross income inclusions, exclusions, and adjustments.	4.28
97	Basic mathematics including arithmetic and ratios.	4.24
147	Standards for presentation and disclosure in financial statements including consolidated and combined financial statements, balance sheet, statements of income, comprehensive income, changes in equity accounts, and cash flows.	4.24
193	Methods of claiming deductions (standard vs. itemized) and their consequences.	4.20
192	Adjustments to income.	4.17
191	Differences between earned income, self-employment income, investment income, and passive activity income and losses.	4.17
Business and Industry Practice Group (n = 100)		
108	Spreadsheet software including the design and preparation of spreadsheets.	4.50
97	Basic mathematics including arithmetic and ratios.	4.22
147	Standards for presentation and disclosure in financial statements including consolidated and combined financial statements, balance sheet, statements of income, comprehensive income, changes in equity accounts, and cash flows.	4.22
61	Effective business writing principles, such as organization, clarity and conciseness.	4.01
60	Basic writing mechanics, such as grammar, spelling, word usage, punctuation, and sentence structure.	3.98
111	General accounting software applications.	3.69
154	Revenue and expense account recognition, measurement, valuation, presentation and disclosure.	3.55
104	The role of information systems within business including reporting systems, transaction processing systems, document management systems, and management information systems.	3.53
106	Operating system software, software applications, and software security.	3.45
62	Key ethical concepts including independence, objectivity, integrity, and due care.	3.44

For the point of acquisition ratings, seven of the top ten knowledge areas were commonly regarded by all three practice groups as most likely required at some level[15] prior to taking the Uniform CPA Examination. Among these top required knowledge areas were "basic writing mechanics, such as grammar, spelling, work usage, punctuation, and sentence structure," "microeconomics including market structures and pricing, the consumption of goods, and theories of supply and demand," and "advanced mathematics including algebra." Table 26 shows the top 10 knowledge statements required prior to taking the Uniform CPA Examination for each practice group.

[15] It is necessary to examine the depth of knowledge rating for a given knowledge area to know at what level of understanding the knowledge area is required.

Table 26. Top 10 Knowledge Statements Required Prior to Taking the Uniform CPA Examination for Each Practice Group.

	Average POA Rating
Accounting and Auditing Practice Group (n range = 99 - 269)	
98 Advanced mathematics including algebra.	1.03
97 Basic mathematics including arithmetic and ratios.	1.04
99 Basic statistical concepts such as probability and measures of central tendency.	1.07
100 Advanced statistical methods such as regression, trend analysis, learning curve analysis, and exponential smoothing.	1.11
101 Measurement theory including reliability and validity.	1.12
8 Microeconomics including market structures and pricing, the consumption of goods, and theories of supply and demand.	1.16
60 Basic writing mechanics, such as grammar, spelling, word usage, punctuation, and sentence structure.	1.17
82 Law, regulations, codes, and standards pertaining to the formation and termination of agencies, the duties and authority of agents and principals and their obligations.	1.21
70 Law, regulations, codes, and standards pertaining to contracts including formation, performance, third-party assignments, discharge, breach, and remedies.	1.24
61 Effective business writing principles, such as organization, clarity and conciseness.	1.29
Taxation Practice Group (n range 53 - 188)	
98 Advanced mathematics including algebra.	1.02
97 Basic mathematics including arithmetic and ratios.	1.03
99 Basic statistical concepts such as probability and measures of central tendency.	1.06
100 Advanced statistical methods such as regression, trend analysis, learning curve analysis, and exponential smoothing.	1.09
60 Basic writing mechanics, such as grammar, spelling, word usage, punctuation, and sentence structure.	1.19
101 Measurement theory including reliability and validity.	1.19
102 Sensitivity analysis and its use in evaluating risk assessment alternatives.	1.19
103 Graphical representation techniques for accounting data flows.	1.22
8 Microeconomics including market structures and pricing, the consumption of goods, and theories of supply and demand.	1.22
9 Macroeconomics including federal fiscal policies, monetary policies and the role and impact of the Federal Reserve Board.	1.23
Business and Industry Practice Group (n range = 38 - 98)	
98 Advanced mathematics including algebra.	1.05
97 Basic mathematics including arithmetic and ratios.	1.07
99 Basic statistical concepts such as probability and measures of central tendency.	1.11
100 Advanced statistical methods such as regression, trend analysis, learning curve analysis, and exponential smoothing.	1.18
60 Basic writing mechanics, such as grammar, spelling, word usage, punctuation, and sentence structure.	1.19
8 Microeconomics including market structures and pricing, the consumption of goods, and theories of supply and demand.	1.22
101 Measurement theory including reliability and validity.	1.24
9 Macroeconomics including federal fiscal policies, monetary policies and the role and impact of the Federal Reserve Board.	1.26

173 Accounting methods (e.g., accrual and cash) and the differences among them.	1.27*
193 Methods of claiming deductions (standard vs. itemized) and their consequences.	1.27*
195 Filing status.	1.27*

* These items had the same mean rating and therefore were all included in the table.

Depth of knowledge ratings reflect how well a CPA needs to understand an area or body of knowledge. As shown in Table 27, there is significant commonality in the top ten depth of knowledge ratings between at least two out of the three practice groups. The only knowledge common across all three practice groups (and rated as requiring mastery by all three groups) was "basic mathematics including arithmetic and ratios." CPAs specializing in taxation and those specializing in business and industry both rated "methods of claiming deductions (standard vs. itemized) and their consequences" and "filing status" high for depth of knowledge. CPAs specializing in accounting and auditing, and business and industry rated four other common knowledge areas among their top ten: "basic writing mechanics, such as grammar, spelling, word usage, punctuation, and sentence structure," "effective business writing principles, such as organization, clarity and conciseness," "spreadsheet software including the design and preparation of spreadsheets," and "purposes and uses of principal financial statements and relationships among them."

Table 27. Top 10 Knowledge Statements with Greatest Depth of Knowledge Needed for Each Practice Group.

Accounting and Auditing Practice Group (n range = 253 - 269)	Average DOK Rating
97 Basic mathematics including arithmetic and ratios.	2.58
60 Basic writing mechanics, such as grammar, spelling, word usage, punctuation, and sentence structure.	2.38
129 Materiality concepts as they relate to audit planning, testing, and reporting.	2.37
135 Observation and verification procedures and techniques for tracing, vouching, and confirming transactions.	2.36
146 Purposes and uses of principal financial statements (e.g., balance sheet, statements of income, comprehensive income, changes in equity accounts, and cash flows) and relationships among them.	2.36
108 Spreadsheet software including the design and preparation of spreadsheets.	2.35
61 Effective business writing principles, such as organization, clarity and conciseness.	2.35
127 Responsibilities and procedures associated with types of services including audit, attestation, review, and compilation.	2.34
132 Analytical procedures and their use in the planning, testing, and review phases of an engagement.	2.33
134 Testing procedures and their application including compliance and substantive testing techniques, interim testing, tests of control, tests of detail, tests of attributes, and tests of nonroutine transactions.	2.30
Taxation Practice Group (n range = 179 - 189)	
97 Basic mathematics including arithmetic and ratios.	2.54
176 Income tax forms, instructions, due dates, and procedures for filing extensions.	2.46
193 Methods of claiming deductions (standard vs. itemized) and their consequences.	2.44
173 Accounting methods (e.g., accrual and cash) and the differences among them.	2.42

109	Software for preparation of income tax returns.	2.41
195	Filing status.	2.39
177	Estimated tax payment requirements and underpayment penalties.	2.38
191	Differences between earned income, self-employment income, investment income, and passive activity income and losses.	2.38
199	How to reconcile book income to taxable income.	2.36
196	Dependency rules and exemption rules for individual income taxes.	2.35

Business and Industry Practice Group (n range = 38 – 99)		
97	Basic mathematics including arithmetic and ratios.	2.54
108	Spreadsheet software including the design and preparation of spreadsheets.	2.41
193	Methods of claiming deductions (standard vs. itemized) and their consequences.	2.32
146	Purposes and uses of principal financial statements (e.g., balance sheet, statements of income, comprehensive income, changes in equity accounts, and cash flows) and relationships among them.	2.32
60	Basic writing mechanics, such as grammar, spelling, word usage, punctuation, and sentence structure.	2.31
61	Effective business writing principles, such as organization, clarity and conciseness.	2.24
195	Filing status.	2.22
98	Advanced mathematics including algebra.	2.20
66	Business ethics regarding privileged communications and confidentiality.	2.18
154	Revenue and expense account recognition, measurement, valuation, presentation and disclosure.	2.17

Skill Survey Results

Table 28 shows the top ten most important skills by practice group. As shown in this table, there was considerably more commonality across practice groups in the most important skills than observed for either tasks or knowledge areas. In fact, eight of the top ten most important skills were identical across practice groups. These included: interpersonal skills, active listening, reading comprehension, computational skills, reasoning skills, teamwork, self-monitoring, and time management. In addition, CPAs specializing in accounting and auditing and those specializing in taxation regarded the skill "work papers" as one of the top ten most important skills. Moreover, CPAs specializing in taxation and those practicing in business and industry regarded the skill "learning strategies" as one of the top ten most important skills.

Table 28. Top 10 Most Importance Skills for Each Practice Group.

Accounting and Auditing Practice Group (n = 272)		Average Importance Ratings
16 Work Papers	Documenting and cross-referencing work performed and conclusions reached in a thorough and accurate manner.	4.57
18 Active Listening	Attentively listening and asking questions for clarification to gain an understanding of the environment, situation, issues, and needs of personnel or clients.	4.49
19 Reading Comprehension	Reading, understanding, and retaining relevant written information.	4.49
51 Time Management	Planning, prioritizing, and monitoring one's own availability and resources.	4.48
17 Interpersonal Skills	Being aware of and adjusting to actions and expressions of other individuals.	4.37

46 Teamwork	Working with others to accomplish common goals and objectives.	4.37
28 Computational Skills	Performing appropriate calculations on financial and nonfinancial data.	4.29
30 Reasoning Skills	Developing sound, logical conclusions through the use of inductive and deductive reasoning.	4.26
48 Self Monitoring	Assessing one's own performance, capabilities, and limitations.	4.22
33 Professional Skepticism	Recognizing and responding to unusual patterns of information, data, and gaps in information flow.	4.20

Taxation Practice Group (n = 191)

51 Time Management	Planning, prioritizing, and monitoring one's own availability and resources.	4.43
19 Reading Comprehension	Reading, understanding, and retaining relevant written information.	4.41
18 Active Listening	Attentively listening and asking questions for clarification to gain an understanding of the environment, situation, issues, and needs of personnel or clients.	4.39
16 Work Papers	Documenting and cross-referencing work performed and conclusions reached in a thorough and accurate manner.	4.32
17 Interpersonal Skills	Being aware of and adjusting to actions and expressions of other individuals.	4.24
48 Self Monitoring	Assessing one's own performance, capabilities, and limitations.	4.11
30 Reasoning Skills	Developing sound, logical conclusions through the use of inductive and deductive reasoning.	4.09
50 Learning Strategies	Using appropriate resources to acquire and maintain up-to-date knowledge and skills.	4.06
28 Computational Skills	Performing appropriate calculations on financial and nonfinancial data.	4.05
46 Teamwork	Working with others to accomplish common goals and objectives.	4.02

Business and Industry Practice Group (n = 100)

18 Active Listening	Attentively listening and asking questions for clarification to gain an understanding of the environment, situation, issues, and needs of personnel or clients.	4.27
51 Time Management	Planning, prioritizing, and monitoring one's own availability and resources.	4.25
19 Reading Comprehension	Reading, understanding, and retaining relevant written information.	4.23
17 Interpersonal Skills	Being aware of and adjusting to actions and expressions of other individuals.	4.21
30 Reasoning Skills	Developing sound, logical conclusions through the use of inductive and deductive reasoning.	4.17
48 Self Monitoring	Assessing one's own performance, capabilities, and limitations.	4.16
12 Written Presentation	Conveying or promoting information, procedures, ideas, and results in writing at the level appropriate for a particular audience.	4.05
28 Computational Skills	Performing appropriate calculations on financial and nonfinancial data.	4.05
46 Teamwork	Working with others to accomplish common goals and objectives.	4.04
50 Learning Strategies	Using appropriate resources to acquire and maintain up-to-date knowledge and skills.	4.03

In terms of the point of acquisition ratings, seven of the top ten skills were regarded as most likely required before taking the Uniform CPA Examination by all practice groups. Among these top needed skills were "written presentations," " interpersonal skills," and "computational skills." Table 29 shows the top ten rated skills, by practice group, required before taking the Uniform CPA Examination.

Table 29. Top 10 Skills Required Before Taking the CPA Examination for Each Practice Group.

Accounting and Auditing Practice Group (n range = 261 - 274)		Average POA Rating
19 Reading Comprehension	Reading, understanding, and retaining relevant written information.	1.17
17 Interpersonal Skills	Being aware of and adjusting to actions and expressions of other individuals.	1.27
18 Active Listening	Attentively listening and asking questions for clarification to gain an understanding of the environment, situation, issues, and needs of personnel or clients.	1.28
46 Teamwork	Working with others to accomplish common goals and objectives.	1.32
28 Computational Skills	Performing appropriate calculations on financial and nonfinancial data.	1.34
30 Reasoning Skills	Developing sound, logical conclusions through the use of inductive and deductive reasoning.	1.37
48 Self Monitoring	Assessing one's own performance, capabilities, and limitations.	1.40
51 Time Management	Planning, prioritizing, and monitoring one's own availability and resources.	1.41
12 Written Presentation	Conveying or promoting information, procedures, ideas, and results in writing at the level appropriate for a particular audience.	1.44
47 Utilizing Feedback	Evaluating and using feedback from clients, coworkers, and supervisors.	1.47
Taxation Practice Group (n range = 184 - 193)		
19 Reading Comprehension	Reading, understanding, and retaining relevant written information.	1.18
17 Interpersonal Skills	Being aware of and adjusting to actions and expressions of other individuals.	1.26
46 Teamwork	Working with others to accomplish common goals and objectives.	1.30
18 Active Listening	Attentively listening and asking questions for clarification to gain an understanding of the environment, situation, issues, and needs of personnel or clients.	1.31
28 Computational Skills	Performing appropriate calculations on financial and nonfinancial data.	1.35
48 Self Monitoring	Assessing one's own performance, capabilities, and limitations.	1.36
51 Time Management	Planning, prioritizing, and monitoring one's own availability and resources.	1.38
24 Information Organization	Organizing information or data from multiple sources.	1.43
30 Reasoning Skills	Developing sound, logical conclusions through the use of inductive and deductive reasoning.	1.43
12 Written Presentation	Conveying or promoting information, procedures, ideas, and results in writing at the level appropriate for a particular audience.	1.45
Business and Industry Practice Group (n range = 94 - 104)		
19 Reading Comprehension	Reading, understanding, and retaining relevant written information.	1.35
28 Computational Skills	Performing appropriate calculations on financial and nonfinancial data.	1.38
46 Teamwork	Working with others to accomplish common goals and objectives.	1.42
18 Active Listening	Attentively listening and asking questions for clarification to gain an understanding of the environment, situation, issues, and needs of personnel or clients.	1.43
17 Interpersonal Skills	Being aware of and adjusting to actions and expressions of other individuals.	1.45
50 Learning Strategies	Using appropriate resources to acquire and maintain up-to-date knowledge and skills.	1.47

12 Written Presentation	Conveying or promoting information, procedures, ideas, and results in writing at the level appropriate for a particular audience.	1.48
48 Self Monitoring	Assessing one's own performance, capabilities, and limitations.	1.48
24 Information Organization	Organizing information or data from multiple sources.	1.49
47 Utilizing Feedback	Evaluating and using feedback from clients, coworkers, and supervisors.	1.50

Comparisons of Public Practice versus Private Industry

In the final set of analyses, we compared the survey results between CPAs in public practice and those in private industry. For these analyses, CPAs were split based on their responses to the background item concerning area of practice (item 12 in Section 1 of both versions of the survey). For the task survey results, 563 respondents were in public practice and 88 in private industry. For the knowledge and skill survey results, 496 respondents were in public practice and 93 in private industry.

Analyses

Two types of analyses occurred using only the importance ratings for tasks, knowledge, and skills: mean rating comparisons using effect size estimates and profile correlations. In the first type of analysis, we calculated effect size estimates to evaluate subgroup (i.e., public practice versus private industry) ratings on each survey item. An effect size provides an indication of just *how* different subgroup ratings are. We used the *d*-statistic as the effect size measure (Cohen, 1988). The *d*-statistic estimates effect size in standard deviation units.[16]

Our second type of analysis looked at the relative ordering of task, knowledge, and skill importance ratings according to their mean subgroup ratings. Specifically, we correlated the subgroup profiles, where profile refers to the mean ratings across all tasks, knowledge, or skills for a particular subgroup. The Pearson correlation coefficient, *r*, provides an index of the consistency between two sets of ratings. When correlation is perfect, then the rank ordering of one set of ratings is exactly identical ($r = 1.00$) or exactly opposite ($r = -1.00$) to the rank ordering of the corresponding set of ratings. For example, suppose there is a correlation of 1.00 between task importance ratings for CPAs in public and private industry. If we were to sort the task ratings in descending order based on the mean ratings within practice area subgroups, they would be ordered the same whether we looked at CPAs in public practice or CPAs in private industry. While the effect size estimates allow us to assess the absolute magnitude of any subgroup differences, profile correlations tell us the extent to which different subgroups rated tasks, knowledge, and skill importance relatively the same way.

[16] In interpreting the effect size results, we relied on Cohen's (1988) operational definitions of small (.20), medium (.50), and large (.80) effect size thresholds. These guidelines are based on the extent to which the two score distributions overlap—i.e., an effect size of zero (0) indicates no differences between subgroup ratings. However, these guidelines must be carefully regarded without a specific context on which to draw.

Mean Comparisons

Appendix 17 presents the mean comparisons for public accounting and private industry for task, knowledge, and skill importance ratings across all survey items. These comparisons are ordered by the absolute value of the d-statistic. Thus, items with larger mean differences occur first. In reviewing these findings, it is instructive to consider the survey items in which the greatest and least amount of differences occurred in the mean ratings. These "extreme" differences capture where CPAs in public practice and CPAs in private industry were most similar and dissimilar.

Table 30 shows the comparisons on an illustrative subset of tasks. Specifically, this tables lists the five tasks in which CPAs in public practice and CPAs in private industry show the greatest and least difference in importance ratings. Each statement also lists the task category and task area under which it was organized. For example, the task "prepare periodic management reports" was rated as somewhat important by CPAs in private industry (mean = 1.77) and rated as not important by CPAs in public practice (mean = 0.13). The comparison of mean importance ratings on this task resulted in a d-value of –1.69. Conversely, there was no practical difference in the importance ratings for the task "provide advisory services to attorneys and their clients relating to financial aspects of controversies or transactions." Both subgroups gave this task a mean rating of less than one. Inspection of Table 30 and Appendix 17 reveal that the pattern of similarities and differences in task importance ratings between CPAs in public practice and private industry conform to expectations based on the areas that these two groups of CPAs generally practice.

Table 30. Mean Difference Comparison between Public and Private Practice for a Subset of Tasks

ID	Task	Public Mean	Public SD	Private Mean	Private SD	d
216	Business & Industry: Corporate Finance: Prepare periodic management reports.	0.13	0.66	1.77	2.06	-1.69
21	Common: Planning: Identify relevant client financial information necessary to meet engagement objectives.	3.54	1.55	1.28	1.80	1.42
172	Business & Industry: Financial Planning: Communicate a financial summary or variance report to the appropriate decision-makers.	0.43	1.14	2.27	2.12	-1.41
1	Common: General: Assess information about the client.	3.74	1.42	1.64	2.04	1.38
13	Common: General: Prepare engagement letter to client and assure a common understanding of engagement objectives with client.	3.18	1.87	0.77	1.68	1.31
227	Business & Industry: Financial Systems: Evaluate computer software for clients to select the best package based on their requirements and specifications.	0.61	1.29	0.67	1.51	-0.05
225	Business & Industry: Financial Systems: Evaluate client's financial system needs and the how best to address those needs.	0.81	1.47	0.87	1.72	-0.04
192	Business & Industry: General Accounting: Prepare balance sheet as of a reporting date.	2.30	2.04	2.38	2.23	-0.04
204	Business & Industry: Financial Reporting & Policy: Develop training as necessary to communicate new and existing accounting policies and procedures to relevant parties.	0.79	1.51	0.84	1.55	-0.03
161	Business & Industry: Common: Provide advisory services to attorneys and their clients relating to financial aspects of controversies or transactions.	0.54	1.26	0.50	1.29	0.03

Table 31 shows similar comparisons on an illustrative subset of knowledge items. The practice area subgroups differed the most in their importance ratings on "knowledge of reconciling differences between book income and taxable income", which is a taxation related knowledge item. In fact, there were two salient trends in the comparisons on knowledge ratings. First, the greatest differences occurred on taxation related knowledge items overall (see Appendix 17). Second, for large effects (i.e., d-statistic > .80), all the differences occurred because CPAs in public practice gave higher mean knowledge importance ratings. Among the knowledge areas where CPAs in public practice and CPAs in private industry were consistent in their ratings, most items pertained to the areas of general business knowledge, law and professional responsibilities, and technology.

Table 31. Mean Difference Comparison between Public and Private Practice for a Subset of Knowledge Statements.

ID	Knowledge	Public Mean	Public SD	Private Mean	Private SD	d
212	Federal Taxation: Partnerships & Limited Liability Companies: Reconciling differences between book income and taxable income.	3.06	1.88	0.68	1.38	1.32
109	Information Identification, Control & Analysis: Information Technology: Software for preparation of income tax returns.	3.53	1.90	1.09	1.77	1.30
199	Federal Taxation: Corporations: How to reconcile book income to taxable income.	3.66	1.61	1.56	1.89	1.26
193	Federal Taxation: Individuals: Methods of claiming deductions (standard vs. itemized) and their consequences.	3.21	1.99	0.83	1.63	1.22
67	Law & Professional Responsibilities: Ethics & Licensing: CPAs' legal responsibilities and potential liabilities.	3.89	1.13	2.32	1.96	1.22
161	Accounting, Presentation & Disclosure: Standards & Guidance: The Securities and Exchange Commission (SEC) and its reporting requirements including Acts establishing SEC and its powers, SEC accounting standards and policies, and reporting and disclosure requirements.	1.43	1.69	1.46	1.78	-0.02
27	General Business Knowledge: Corporate Financial Management: The factors influencing optimum capital structure including risk, leverage, cost of capital, growth rate, profitability, asset structure, and the implications of loan covenants.	1.64	1.55	1.67	1.72	-0.02
100	Information Identification, Control & Analysis: Data Analysis: Advanced statistical methods such as regression, trend analysis, learning curve analysis, and exponential smoothing.	1.09	1.39	1.06	1.49	0.02
31	General Business Knowledge: Corporate Financial Management: Control positions of owners and management, investor relations, and responsibilities to capital holders.	1.43	1.50	1.45	1.54	-0.01
81	Law & Professional Responsibilities: Business Law & Regulation: Law, regulations, codes and standards pertaining to the accessibility of information including the Freedom of Information Act and Privacy Acts.	0.92	1.32	0.91	1.56	0.00

Finally, the comparisons of skill importance ratings showed that few large effects occurred between CPAs in public practice and CPAs in private industry (see Table 32). In fact, large effects occurred for only six skills: business relationship, agreement documentation, work papers, client responsiveness, business development, and taxation assessment. On each of these six skills, CPAs in public practice provided the higher mean importance ratings.

Table 32. Mean Difference Comparison between Public and Private Practice for a Subset of Skills.

		Public		Private		
ID	Skill Name	Mean	SD	Mean	SD	d
3	Business Relationship	4.01	1.29	2.21	2.12	1.24
13	Agreement Documentation	3.30	1.68	1.24	1.92	1.20
16	Work Papers	4.45	0.81	3.29	1.84	1.11
2	Client Responsiveness	3.87	1.38	2.28	2.01	1.07
4	Business Development	3.01	1.82	1.15	1.75	1.03
12	Written Presentation	3.98	1.29	3.98	1.10	0.00
49	Performance Monitoring	3.53	1.46	3.54	1.35	0.00
44	Conflict Resolution	3.19	1.63	3.19	1.57	0.00
28	Computational Skills	4.16	0.95	4.16	0.94	0.00
31	Strategic Thinking	3.69	1.20	3.69	1.19	0.00

Profile Correlations

The results with respect to the correlation between the profile of task, knowledge, and skill importance ratings for CPAs in public practice versus private industry are consistent with the above noted differences in task, knowledge, and skill ratings. Across all tasks, the correlation between ratings from different practice areas was .14. For knowledge ratings, the correlation across all areas was .57, and for skill ratings, the correlation was .75. Thus, CPAs in public practice and private industry have a highly similar profile of skill requirements and moderately similar profile of knowledge requirements. Despite these similarities in worker characteristics, however, CPAs in public practice and CPAs in private industry do not have similar profiles in the task requirements of accounting practice.

IX. Dimensions of Professional Practice

Overview

As noted in Section I, part of each focus group session was devoted to the collection of critical incidents. This information was used to develop behaviorally based performance dimensions of professional practice. These dimensions reflected the full performance domain for professional accounting practice. Along with task information, they provide a means of fully depicting the work requirements for CPAs. The primary reason for collecting this type of information was to generate and organize behavioral examples of practice that would be useful in future examination preparation activities (e.g., developing simulations).

The procedures to collect and process the critical incidents as part of developing the dimensions of professional practice are described below. Also described are the major steps used to gather validity evidence for the dimensions of professional practice.

Collection of Critical Incidents

During the focus groups, we used a structured exercise to generate critical incidents (Anderson & Wilson, 1997; Flanagan, 1954). Participants first received an overview of what critical incidents are and how to write them. Then, we instructed the participants in writing critical incidents on critical incident forms (see Appendix 18). After all participants had an opportunity to write several critical incidents, they read selected critical incidents to the group. After a brief discussion of the critical incidents, participants then continued to write critical incidents for the remainder of the time allotted for this exercise. This process resulted in 400 critical incidents. Throughout the exercise, project staff read all critical incidents and provided feedback to individuals as needed. Appendix 19 contains the protocol used in conducting the critical incident portion of the focus groups.

Preliminary Dimensions of Professional Practice

Preliminary dimensions of professional practice were developed based on the critical incidents. We began this process by first editing the critical incidents. We then held a brief training session to orient project staff to the process of developing dimensions of professional practice. After training, the two staff members[17] independently sorted incidents into an unspecified number of categories depicting similar types of behaviors. The two project staff then met to discuss and decide upon a common set of categories. The critical incidents were then re-sorted into these categories. This final sort provided the basis for defining preliminary dimensions of professional practice.

Editing

Before the development process, all critical incidents were typed, entered into a database, and edited. The editing process ensured that the critical incidents conformed to the appropriate format (see Appendix 18). The critical incidents also were edited for typographical and

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[17] Both persons who developed dimensions of professional practice were Ph.D. level staff who had been working on the project and therefore were familiar with the content domain.

grammatical errors. Given the extensive review and feedback procedures during the generation of critical incidents, they required very little editing at this stage.

Training

Critical incident training was based on previous research and experiences gained through other related projects. During the training, project staff reviewed research and previous AIR work with critical incident sorting. After this review, a senior member of the project team described the critical incident sorting process in detail. Finally, project staff reviewed several critical incidents and attempted to extract the primary behaviors represented in them. The group then discussed the behaviors extracted for each critical incident, as well as the process of using this behavioral information to develop dimensions of professional practice.

Initial Sorting Exercise

The purpose of the initial sorting of the critical incidents was to generate a set of homogeneous categories with respect to the behavioral descriptions contained in the set of critical incidents. The approach taken to generating these performance dimensions was very similar to a card-sorting methodology (Chi, Glaser, & Rees, 1982). Each member was given the complete set of edited critical incidents generated during the focus groups. They then independently read each critical incident and noted the primary behaviors represented by the critical incident. After reading each critical incident, they sorted it into categories based on the behaviors the incident described. There was no pre-specified number of categories into which to sort the critical incidents at this stage.

After independently sorting the entire set of critical incidents, the project staff discussed the resultant categories. The two project staff members doing this exercise developed 11 and 12 performance categories, respectively, at this stage of the process. The discussion of their results focused on the reasoning behind the performance categories and their general definitions. For example, discussion was required to clarify the difference between "Communication" and "Client Relations" (i.e., client relations is not always communication, but it is always activity oriented toward gaining or retaining a client). Through this discussion, 13 categories were created to comprehensively cover the range of performance described in the critical incidents. Further discussion clarified the intended meaning of each of these categories and the phrasing of the category labels.

Performance Dimension Re-Sort

Having agreed upon 13 categories, the same two project staff members again independently sorted the entire set of critical incidents into them. Each member kept notes of which critical incidents were relevant to more than one performance category and the reasoning behind the choice of the category they ultimately selected for these particular critical incidents.

At the conclusion of the re-sort, the two project staff members again met to discuss and reconcile any discrepancies. Where classification discrepancies occurred, they discussed the behaviors represented in the critical incidents and reached a consensus on how the critical incident should be classified. This process resulted in agreement on how each of the critical incidents should be classified and how the performance dimension represented by each of the categories was generated.

Preliminary Performance Dimensions
At the conclusion of the re-sort of critical incidents, the two staff members wrote performance dimension definitions. The definition of each performance dimension was generated from the behavioral information contained in the critical incidents representing that dimension.

During the process of generating the critical incidents, the focus group participants indicated the level of performance depicted using a 1 (ineffective) to 7 (effective) Likert-type rating scale. The two project staff members developing the definitions used this rating information to group the critical incidents within a given performance dimension by their rated level of performance. Two lists of behaviors were identified for each performance dimension, one representing a high level of performance for that dimension, the other representing a low level of performance. These groups of behaviors were then used to develop behaviorally based definitions of each dimension of professional practice. The preliminary performance dimensions included:

1. Professional Skepticism
2. Determining Materiality
3. Management & Supervision
4. Communication
5. Research
6. Client Relations
7. Ethics
8. Taking Responsibility & Professionalism
9. Taking Initiative
10. Problem Resolution
11. Client Systems, Business, & Context Understanding
12. Technical Core Proficiency
13. Planning, Preparing, & Organizing Work

Re-Translation of Critical Incidents

Following the development of the performance dimension definitions, two additional members of the project staff re-sorted a subset of the critical incidents into the performance dimensions. Half of the critical incidents were re-sorted. The two project members then read each of the randomly selected critical incidents and classified them into one of the 13 performance dimensions. Although they were specifically instructed to create new performance dimensions if they felt it was warranted, they did not create any new dimensions and all of the subset of critical incidents were sorted into one of the 13 performance dimensions. Following the initial sort, the two project staff members met to discuss and resolve their differences. They had an initial agreement rate of 65 percent and were able to reach consensus in all cases of initial disagreement.

After the completion of the re-sort, the sorting decisions for all four staff members completing this exercise (the two original members as well as the two additional members) were compared to assess the extent to which there was overall agreement. This set of analyses could only be done on the subset of critical incidents that the new sorters assessed. There was an agreement rate of 65 percent using the criteria of full agreement among the four sorters (i.e., all four sorters made the same classification decision). A second set of criteria for agreement was defined by meeting one of three conditions: 1) all four sorters made the same classification decision, 2) three

of the four sorters made the same classification decision, or 3) the two sets of sorters reached the same classification decision after discussion. Using this second criterion for agreement, there was an agreement rate of 83 percent. For the remaining 17 percent of the critical incidents staff members involved in this process met to discuss areas of disagreement and reach consensus on classifying these critical incidents into a performance dimension.

To understand further the performance dimensions, the final classification decisions for this subset of critical incidents were mapped against the four original decisions (i.e., decisions made independently by the four project staff prior to any discussion). This mapping is represented in Table 33 below. The diagonal of this matrix represents the proportion of accurate original classification decisions relative to the total number of classification decisions for a given dimension. The off-diagonal cells within a particular column represent the proportion of inaccurate original classification decisions relative to the total number of decisions for a given dimension. The off-diagonal cells as a whole give an indication of the inter-relatedness of the performance dimensions. To the extent that two performance dimensions have an inherent relationship, the number of cross-classifications should be higher. For example, the determining materiality dimension appears to be relatively robust and does not carry a strong relationship to the other performance dimensions. Conversely, the problem resolution dimension appears to have multiple strong relationships, as demonstrated by the relatively high number of cross-classifications represented in the off-diagonal cells.

Table 33. Performance Dimension Reclassification Decision Mapping.

** 1 - 2%	Professional Skepticism	Determining Materiality	Management & Supervision	Research	Communication	Client Relations	Ethics	Taking Responsibility...	Taking Initiative	Problem Resolution	Client Systems...	Technical Proficiency	Planning, Preparing, ...
Professional Skepticism	66%				**	**		3%	**	16%		**	3%
Determining Materiality	**	88%							**			**	
Management & Supervision	**		67%	**	**	**							
Research	**		4%	63%		**	5%		8%	5%	4%		11%
Communication	3%		8%	8%	54%	8%	**	20%	**	7%		**	
Client Relations	5%	4%		**	6%	68%	**	10%	4%	**	4%	5%	8%
Ethics				4%			82%			**		**	
Taking Responsibility...	**				8%	8%	5%	45%				**	6%
Taking Initiative	3%		4%	8%	6%	4%	**	13%	55%	5%	7%	6%	
Problem Resolution	10%			4%	6%	**	**		6%	52%	18%	9%	6%
Client Systems...	**	4%		**		**			**		61%	4%	
Technical Proficiency	5%	4%	8%	6%	10%	5%		5%	15%	9%	7%	65%	6%
Planning, Preparing, ...			8%	**	4%	3%		5%	6%	**		4%	61%

Note. The columns represent the first sort; the rows represent the second sort.

Expert Review

The next major step of developing the performance dimensions involved having content experts review the performance dimension definitions. Fifteen content experts were recruited from AICPA committee chairs to participate in this exercise. These individuals included five professors of accounting, eight individuals in public practice, and two individuals in private practice. On average, these 15 experts had 26.9 years of cumulative experience in accounting, ranging from 7 to 39 years of total experience. Further, they had an average of 21.9 years of experience in public accounting practice, with a range of no public accounting experience to 39 years of experience.

These content experts completed a written exercise in which they read a list of exemplar behaviors for each of the 13 performance dimensions. For each behavior they were asked to determine if that behavior was representative of that particular dimension or, if not, to indicate in which dimension it belonged. There were 169 behaviors listed across all dimensions, with between six and 21 positive and negative behaviors listed for each dimension. For 88 of the 169

behaviors, at least 90 percent of the experts agreed that it belonged in the intended dimension. For 145 of the 169 behaviors, at least 60 percent of the experts agreed that it belonged in the intended dimension. Of the remaining 24 behaviors, 17 were from the communication, problem resolution, and taking initiative dimensions. Ten of the behaviors were edited to reflect more clearly the intended dimension, four behaviors were moved to a different dimension, and two behaviors were removed from the list altogether. The remaining behaviors were reviewed and retained. The lack of agreement regarding these latter behaviors was determined to reflect the multidimensionality of performance in complex jobs, such as those in accounting. Appendix 20 contains the final set of performance dimensions with their definitions.

Performance Dimension Comparison

The final body of evidence gathered in support of the performance dimensions involved a comparison of this set of performance dimensions to another established model of job performance. The comparison model of job performance was developed by Campbell, Oppler, McCloy, and Sager (1993) and contains eight dimensions of job performance: job-specific task proficiency, non-job-specific task proficiency, written and oral communication task proficiency, demonstrating effort, maintaining personal discipline, facilitating team and peer performance, supervision and leadership, and management and administration. This model of job performance is widely accepted as applicable across a wide variety of jobs, and is one of the more widely accepted general models of job performance.

For this exercise, eight Ph.D. level staff with backgrounds in industrial/organizational psychology compared the accounting-based performance dimensions to the Campbell et al. (1993) model of job performance.[18] Specifically, the respondents were asked to make paired-comparisons between the dimensions of two models using a 0 (not related) to 3 (related to a great extent) rating scale. Interrater reliability estimates were obtained using a generalizability theory approach and calculating the phi coefficient. The phi coefficient across all eight raters was .83, supporting the conclusion that the ratings were reliable.

In comparing the two models of job performance, an average rating of 1.50 or greater represents a relationship between performance dimensions (see Table 34). The Campbell dimension of job-specific task proficiency was most strongly related to the accounting dimensions of technical proficiency (3.00), determining materiality (3.00), professional skepticism (2.86), and research (2.71). Non-job-specific task proficiency did not exhibit a strong relationship with any of the dimensions, but did exhibit a weak to moderate relationship with several of the dimensions. Written and oral communication task proficiency was rated as being strongly related to the communication (3.00) and client relations (2.71) dimensions. Demonstrating effort was rated as being most strongly related to the taking initiative dimension (3.00), and weakly to moderately related to several other dimensions. The maintaining personal discipline dimension had a moderate to strong relationship to the ethics (2.57) and taking responsibility and professionalism (2.00) dimensions. The facilitating peer and team performance dimension had a weak to moderate relationship to management and supervision (1.71), and to planning, preparing, and organizing work (1.57) dimensions. The supervision and leadership dimension was strongly

[18] None of these eight participants were members of the project team.

related to management and supervision (3.00). The management and administration dimension was strongly related to management and supervision (2.57), with a weak to moderate relationship with planning, preparing, and organizing work (1.57).

Table 34. Mean Ratings and Standard Deviations for the Comparison of Two Models of Job Performance.

0 = Not related 1 = To a small extent 2 = To a moderate extent 3 = To a great extent	Campbell et al. (1993) Performance Dimensions							
Dimensions of Professional Practice	1. Job-specific task proficiency	2. Non-job-specific task proficiency	3. Written and oral communication task proficiency	4. Demonstrating effort	5. Maintaining personal discipline	6. Facilitating peer and team performance	7. Supervision & Leadership	8. Management & Administration
1. Professional skepticism	2.86 (0.38)	1.43 (0.98)	0.00 (0.00)	1.86 (0.69)	0.14 (0.38)	0.00 (0.00)	0.00 (0.00)	0.29 (0.49)
2. Determining materiality	3.00 (0.00)	1.71 (0.95)	0.00 (0.00)	0.86 (0.69)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.57 (0.53)
3. Management & supervision	1.00 (1.00)	1.00 (1.00)	1.71 (0.49)	0.86 (0.69)	0.29 (0.49)	1.71 (1.11)	3.00 (0.00)	2.57 (0.53)
4. Research	2.71 (0.49)	1.71 (0.76)	0.43 (0.79)	1.43 (0.98)	0.14 (0.38)	0.00 (0.00)	0.00 (0.00)	0.29 (0.49)
5. Communication	0.57 (0.79)	1.71 (0.76)	3.00 (0.00)	0.43 (0.53)	0.00 (0.00)	0.86 (1.21)	1.00 (1.29)	0.86 (1.21)
6. Client relations	1.43 (1.13)	1.71 (0.76)	2.71 (0.49)	0.71 (0.76)	0.14 (0.38)	0.14 (0.38)	0.14 (0.38)	0.57 (1.13)
7. Ethics	0.71 (1.11)	1.00 (1.15)	0.00 (0.00)	0.29 (0.49)	2.57 (0.79)	0.71 (0.76)	1.00 (1.15)	0.29 (0.76)
8. Taking responsibility & professionalism	1.00 (1.15)	1.29 (1.11)	0.14 (0.38)	1.29 (0.76)	2.00 (1.41)	1.14 (0.90)	0.86 (1.07)	0.29 (0.49)
9. Taking initiative	0.29 (0.76)	1.57 (1.13)	0.00 (0.00)	3.00 (0.00)	0.14 (0.38)	0.57 (0.98)	0.57 (1.13)	0.57 (0.98)
10. Problem resolution	1.71 (0.95)	1.57 (1.13)	0.29 (0.49)	1.71 (0.76)	0.29 (0.49)	0.71 (1.25)	0.86 (1.46)	1.00 (1.41)
11. Understanding client systems, business, & context	2.14 (1.07)	1.71 (0.95)	0.14 (0.38)	1.86 (0.69)	0.00 (0.00)	0.00 (0.00)	0.14 (0.38)	1.14 (1.35)
12. Technical proficiency	3.00 (0.00)	0.71 (1.11)	0.43 (0.79)	0.71 (0.76)	0.14 (0.38)	0.00 (0.00)	0.29 (0.76)	0.14 (0.38)
13. Planning, preparing, & organizing work	1.43 (1.40)	1.43 (0.98)	0.43 (0.79)	1.43 (0.79)	0.14 (0.38)	1.57 (1.51)	0.00 (0.00)	1.57 (1.27)

Overall, the accounting-based performance dimensions mapped onto the Campbell et al. (1993) dimensions of job performance quite well. All 13 of the accounting performance dimensions

related to one or more of the Campbell dimensions. These results provide benchmarked support for the set of accounting-based performance dimensions as being both reasonable and comprehensive.

Summary

From the 400 critical incidents generated during the focus groups, 13 performance dimensions were developed. Various types of validity evidence were gathered throughout the process of developing these dimensions. Evidence of the reproducibility of the dimensions came through the process of sorting the critical incidents into the performance dimensions. Evidence of the accuracy of the performance dimension definitions resulted from the review of the dimensions and their associated behaviors. Finally, validity evidence was gathered through the mapping of the performance dimensions onto a known model of job performance.

X. Content Specifications

Overview

Developing content specifications, whether for a paper-and-pencil or computer-based test (CBT), requires several goals to be balanced:

1. Maximizing content validity
2. Meeting professional psychometric standards for tests
3. Minimizing undesirable outcomes
4. Enhancing the credibility and acceptability of the exam
5. Constraining developmental and operational costs

These goals are rarely in alignment (Peterson & Bownas, 1982; Russell & Peterson, 1997). For example, maximizing credibility may mean increasing the authenticity of the exam. However, authentic measures require more testing time and typically require human scoring of responses, which is costly, thereby making it more difficult to ensure adequate content coverage, meet psychometric standards of reliability, and constrain the cost of testing (Hardy, 1995). As this example illustrates, test development inevitably involves balancing goals and making some difficult decisions.

The test plan is the document wherein all of the research from a practice analysis and literature review comes together. It specifies the content of the examination and the methods to be used to measure various knowledge and skill. It is a tool for informing and documenting testing decisions. It is a blueprint documenting the allocation of test content (e.g., knowledge and skills to be measured) to measurement methods. As such, the test plan contains the data needed to support and defend the content representativeness of the examination and decisions made about the measurement methods used.

In this section, we describe potential test planning efforts for the CBT version of the Uniform CPA Examination.[19] Figure 9 illustrates the general framework of a test plan. The rows at the top of the test plan specify content to be measured (i.e., the content specifications). This content resulted from the practice analysis; we have listed a few illustrative knowledge and skill statements. The columns of the matrix list measurement methods that are likely to be useful and appropriate in measuring the identified knowledge and skills. The rows at the bottom of the spreadsheet summarize the measurement method's standing on the criteria of concern. These measurement methods and their evaluation are the products of literature reviews and expert judgment. The last step is to select the measurement methods that may be used to cover specific

[19] Many of the issues described in this section also are applicable to test planning efforts for paper-and-pencil versions of the Uniform CPA Examination. We focus on the future CBT version to help facilitate the transition from paper-and-pencil to computer.

content. We have placed X's in this figure, but numeric estimates of proportions or numbers of items could be used as well.

The Rows of the Test Plan: Content Specifications

As mentioned, the rows of the test plan are derived from information gathered during the practice analysis. Previous sections of this report have described the CPA practice analysis. Over the course of these sections, we have referred to different types of descriptors. *People characteristics* are statements about the knowledge and skills that CPAs need to practice accounting effectively. *Practice descriptors*—tasks and performance dimensions—describe the work done in the practice of accounting. CPA performance is a function of people applying their knowledge and skill to specific tasks and areas of performance.

People Characteristics

The first step in completing the rows of the test plan, or the content specifications, is to make preliminary cuts on knowledge and skills based on the practice analysis data. The knowledge and skill statements provide a guide as to what the exam should be measuring. Particularly, knowledge and skill statements rated as being important for effective performance and as being needed early in one's career as a CPA are the best candidates for inclusion on the exam.

In finalizing the content specifications, several factors must be considered in addition to knowledge and skill importance and point of acquisition data from the practitioner survey. For example, some knowledge and skills are difficult to measure reliably or within a reasonable time on an exam. Others might be important for one's performance as a CPA but not necessary for protecting the public from incompetent practice. Finally, if the profession is changing rapidly, some important knowledge and skills might be emerging, but not yet be incorporated into the practice of many professionals.

In sum, it is necessary to supplement the practice analysis survey data with expert judgment. Toward that end, the COTF is reviewing the data presented in Appendix 16, taking into account additional concepts (e.g., the need to protect the public, changes in public accounting) and will make recommendations about the use of knowledge and skills in content specifications for the CBT. Other committees and representatives are also being asked to comment. The result of these reviews will be the content specifications for the examination.[20]

[20] It is important to note that test specifications are always evolving and will continue to evolve as AICPA obtains more input on them.

Figure 9. Sample Test Plan Framework

Knowledge or Skill	Measurement Method								Education	Experience
	Situational Judgment Test	Work Sample Tests					Essay Test	Multiple Choice and Other Objective Tests		
		1	2	3	4	5 6				
General Business Knowledge: Business Structure (3%)										
Legal structures for business entities (1%)								X	X	
Formation, capitalization, operation, profit allocation, and tax implications of business entities (1%)								X		
The rights, duties, liabilities, and authority of directors, officers, stockholders, partners, joint ventures, capitalists, and other owners (1%)								X		
General Business Knowledge: Economics (1%)										
Business cycles and reasons for fluctuations (.5%)		X								X
Competitive factors in the marketplace (.5%)		X								X
Criteria										
Instrument and Scoring System Development	Mod-High			High			Mod-High	Low		
Authenticity	Mod-High			High			Mod-High	Low		
Reliability	Mod			Low-Mod			Low-Mod	High		
Validity	Mod			Mod-High			Unknown	High		
Subgroup Differences	Mod			Mod			Unknown	High		
Applicant Acceptance	Mod-High			High			Mod-High	Low		
Unintended Consequences	None			None			Possibly	None		
Training Implications	Low			High			High	Low		
Resistance to Compromise	High			Low			Low	High		
Consistency/Robustness of Administration and Scoring	High			Low-Mod			Low-Mod	High		
Cost	Mod			High			Mod-High	Low		

Practice Descriptors

Practice descriptors—task statements and performance dimensions—do *not* appear in the rows of our test plan. However, they do serve three important roles. First, practice descriptors provide the context for measuring knowledge and skills. Therefore, they provide useful contextual information for item writers. Second, showing a linkage between knowledge and skills and the actual work performed ensures that knowledge and skills were not selected arbitrarily for measurement. Third, task statements can be used to design work samples and simulation tests. For example, tasks that are typically performed together can be identified and used to define a simulation. Linkages between the task cluster and the knowledge and skills delineate the constructs to measure in the simulation.

This third notion—using task statements to guide the development of simulations—is very important regarding the use of complex simulations as a component of licensure testing. Demonstrating the content representativeness of an examination becomes more intricate as different measurement methods are used. One way to do it is to sample tasks to use in developing work samples or simulations. Then, indicate which knowledge and skills the tasks are expected to elicit, and then track the knowledge and skills measured by the entire examination across measurement methods. Figure 9 illustrates this concept. The six work sample tests listed at the top of the page might be defined by sampling tasks, but we are tracking their contribution to test content in terms of the knowledge and skills they are intended to measure. Knowledge and skill statements appear in the rows of the test plan.

The Columns of the Test Plan: Measurement Methods

The columns of the test plan matrix—measurement methods—were derived from a literature review of measurement methods likely to be useful for the examination (Russell, Norris, & Goodwin, 2000). We prepared a preliminary list of measurement methods for review and met with AICPA psychometric staff to reach consensus on the final list. It included eleven methods. Six were measures of procedural knowledge and skill: 1) situational judgment tests, 2) work sample tests, 3) essay tests, 4) interviews, 5) assessment centers, and 6) ethical dilemma tests. Two were measures of declarative knowledge: 7) multiple choice and 8) other objective format. Three were measures of the quality of education and experience: 9) biographical data (grade point average), 10) accomplishment records, and 11) portfolios.

Education and Experience

The last two columns of Figure 9, Education and Experience, represent knowledge and skills thought to be typically taught in most baccalaureate degree programs or obtained through the experience requirements imposed by most states. Education and experience represent measurement options for licensure that must be considered in developing the CPA Examination. The education and experience columns provide information that the AICPA can use as it makes decisions about how different knowledge and skills should be measured.

The Lower Portion of the Matrix: Evaluation of Measurement Methods

Review Criteria

Prior to the literature review, we developed a list of criteria for measurement methods based on our previous experience with literature reviews, professional guidelines (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999; Society for Industrial and Organizational Psychology Inc., 1987), and input from the AICPA. There are three primary types of criteria listed in Figure 10—descriptive, psychometric, and operational. *Descriptive criteria* refer to the format and scoring of the measurement method. *Psychometric criteria* include reliability, validity, and fairness. *Operational criteria* include all of the other variables that influence the measure's acceptability to examinees and its usefulness for fulfilling the purpose of the exam (e.g., cost).

Figure 10. Criteria for Describing and Comparing Instruments

Criterion	Definition
Descriptive	
Instrument and scoring system development	The difficulty and complexity of procedures for developing the instrument and how it will be scored.
Authenticity	The degree to which the test realistically represents accounting tasks.
Psychometric	
Reliability	Degree to which the method tends to yield consistent scores as measured by traditional psychometric methods such as test-retest, internal consistency, or parallel forms reliability.
Validity	Degree of evidence supporting inferences drawn from test scores. While licensure examinations typically rely on content validation—a mapping of the work of the profession against the exam content, correlations between test scores and other variables of interest are also a source of validation evidence.
Subgroup Differences	Extent to which differences between racial and gender subgroup mean scores are typically observed for the instrument.
Operational	
Applicant Acceptance	Extent to which the appearance and administration methods of the examination enhance or detract from its plausibility or acceptability to the profession.
Consequential Validity	Extent to which use of the assessment does not have unintended negative results.
Training Implications	The extent to which applicants, assessors, and examination developers would need to be trained for the assessment to be reliable and valid.
Resistance to Compromise	Extent to which test questions can be easily leaked or test responses can be coached, guessed, remembered, or faked by examinees.
Consistency/ Robustness of Administration and Scoring	Extent to which administration and scoring is standardized across administrators and locations; ease of administration, and scoring.
Cost	Developmental and operational costs: costs associated with instrument and scoring system development, administration, and scoring, and frequency and difficulty of developing alternate forms.

Review Methods

With input from the AICPA psychometric staff, we also agreed upon an appropriate level of review for each measurement method before conducting the literature review. For measures needing low-level reviews, our goal was to describe the measurement method clearly enough to allow the AICPA to determine whether it might wish to use it in the future. Here, we referenced only a few publications that serve as primary sources for each measurement method. For a measurement method receiving a high level of review our primary goal was to identify the major issues relevant to the method, its qualities, and new or inventive ideas relevant to the method. In doing so, we conducted the following activities:

- Identified key words for each measurement method,
- Searched the American Psychological Association's PsycINFO® On-line database containing abstracts from 1,479 journals from 1990 to the present,
- Reviewed abstracts and selected relevant journal articles, and
- Reviewed conference programs for the 1998, 1999, and 2000 American Educational Research Association, the National Council on Measurement in Education, and Society for Industrial and Organizational Psychology conferences.

We also reviewed books and papers that we knew were of interest, including their citation lists to ensure we had covered major themes for each topic. For example, the AICPA had provided papers from a conference sponsored by the Educational Testing Service. Those papers led us to additional references to review.

Review Results

The complete results of the literature review appear in a separate document (Russell, et al, 2000). The primary conclusions we drew are:

- *Authenticity and instrument/scoring system development.* Development of items and scoring systems is typically more laborious and difficult for the highly authentic tests, such as work samples (Felker & Rose, 1997). Computer scoring of complex responses is an area of vigorous research and many advances have been made in recent years, particularly in applications to professional licensure examinations (Bejar, 1991; Bennett, 1999; Bennett, Steffen, Singley, Morley, & Jacquemin, 1997; Braun, Bennett, Frye, & Soloway, 1990; Chung & O'Neil, 1997; Clauser, Clyman, & Swanson, 1999; Clauser, Margolis, Clyman, & Ross, 1997). However, some of these scoring methods are context dependent because of the nature of the work in the profession for which they were developed and how generalizable they are to other professional examinations remains a question.

  An aspect of work sample (authentic task) development that is often overlooked has to do with sampling tasks for measurement. Recent research suggests that task variability, confounded with the occasion of testing, is the major source of

measurement error in performance tests scores (Shavelson, Ruiz-Primo, & Wiley, 1999). This argues for sampling tasks within domains and for increasing the number of tasks tested to address the instability in performance across tasks and testing occasions. However, this would greatly increase the time required for testing and the cost of developing and administering the examination.

- *Validity.* Validity refers to the degree of evidence supporting inferences drawn from test scores. While licensure tests typically rely on content validity evidence, studies in the employment setting demonstrating that measurement methods yield scores that are correlated with measures of job performance also provide useful evidence (Mehrens, 1997; Sireci & Preston, 2000; Smith & Hambleton, 1990). Multiple choice objective tests of ability and knowledge have the most extensive research history, with studies dating back nearly 100 years. These studies suggest that, regardless of job or occupation, scores on ability and knowledge measures are among the strongest predictors of how well people will perform their jobs (Schmidt & Hunter, 1998). Work sample and situational judgment test scores are also strong predictors of work performance across occupations (McDaniel, Finnegan, Morgeson, Campion, & Braverman, 1997; Schmidt & Hunter, 1998). Scores from structured interviews, assessment centers, and accomplishment records tend to yield smaller, but useful validity coefficients, although the accomplishment record has been less extensively studied than the other two methods (Hough, 1984; Hough, Keyes, & Dunnette, 1983; Schmidt & Hunter, 1998). Even grade point average (GPA) has some relationship to job performance, with correlations between them approaching .20 (Roth, BeVier, Switzer, & Schippmann, 1996; Roth & Clarke, 1998). Too few studies were available from which to draw conclusions about the validity of essay test scores.

- *Reliability/Subgroup Differences.* Reliability refers to the degree to which the method tends to yield consistent scores as measured by traditional psychometric techniques such as test-retest, internal consistency, or parallel forms reliability. Less reliable assessments yield lower subgroup differences than ones that are more reliable, due to measurement error in scores. Often the choice is between more reliable measures and less reliable ones that yield smaller score disparities.

- *Candidate Acceptance.* Measures that resemble job content are more likely to be perceived as fair by applicants, favoring the use of more authentic measures (Arvey & Sacket, 1993; Rynes, 1993).

- *Unintended negative consequences.* Overall, we found very few unintended negative consequences associated with any of the measures. A potential problem could arise for essays if candidates were allowed to choose between writing and typing their essays, since the quality of handwriting may affect scoring (Chase, 1990; Powers, Fowles, Farnum, & Paul, 1994). In addition, for methods that require significant self-direction from the applicant, such as portfolios and accomplishment records, it is very important to ensure that applicants receive adequate instruction in preparing their materials.

- *Consistency of administration and scoring/training implications.* One of the most salient concerns about all methods of measurement that involve human judgment is ensuring that assessors, scorers, or graders are well trained. The quality of scoring rubrics, the clarity of training materials, and the overall quality of training is very important to ensuring consistency.

- *Resistance to compromise.* One concern is the ease with which examinees can remember the essential aspects of specific test questions. A test that presents a few extensive exercises is thought to be more memorable, and therefore less secure, than one with many items. This is potentially a concern for work samples, essay items, and moral/ethical dilemma tests, depending on the number of items and their complexity. Another important concern has to do with methods of measurement that rely on the integrity or memory of the candidate. The accuracy of self-reported GPA, accomplishments, or portfolios could be a source of concern because candidates may not describe their own performances accurately.

- *Cost.* Developmental costs are ones incurred in the initial development and pilot testing of the assessment and its scoring system. Operational costs refer to those required to maintain the assessment (e.g., construction of equivalent forms) and score it. Clearly, the most expensive methods are work samples because their development is difficult and their scoring is labor intensive if done by human scorers, which is typically the case. Development of computer scored work samples is a distinct possibility given current research in this area; however, we suspect that development of computer-scoring algorithms that the AICPA would be comfortable defending will involve an extensive program of research. Even if a computer based scoring algorithm is identified that is psychometrically acceptable, the cost of educating the various stakeholders would need to be factored into the decision to use it.

Completing the Test Plan

With a plethora of measurement strategies available, the essential question is how to combine these strategies into a test plan that will help the AICPA achieve its goals for the examination. As mentioned before, one important goal for any licensure examination is to maximize the representation of important content in the examination. Tracking the content and its distribution in the examination becomes more difficult as the number and type of measurement methods in use grows. For example, tracking five knowledge areas assessed by a single measurement method is simpler than tracking the same five knowledge areas when they are assessed by three different measurement methods each.

Including work samples or simulations makes it more difficult to track the distribution of test content and adds complexity to the development process. Work samples and simulations typically are designed around tasks or clusters of tasks, *not* knowledge and skill statements. To develop work samples and simulations, tasks should be sampled from domains and examined carefully to determine whether they can feasibly be tested. Task selection and feasibility assessment will depend on the time and resources available for testing. For this reason, the development of the test plan becomes an iterative process. One or more tentative exam structures need to be scoped out. As more information is

gathered regarding the merits and deficiencies of the alternatives, they can be refined, dropped or replaced. With respect to the Uniform CPA Examination, this process can be captured in the following six steps.

1. *Select measurement methods for the examination.* Selection of measurement methods for inclusion on the exam ultimately will be a policy decision. The available resources for testing, perspectives of constituencies, and research findings will all have to be considered; many of these variables are summarized in the literature review (Russell et al., 2000).

2. *Define work sample tests and the knowledge and skills they address.* If the AICPA chooses to include work samples in the exam, the next and perhaps most challenging step in completing the test plan is to define the substance of the work sample tests. The task data from the practice analysis will provide a starting point to define the work samples (Felker & Rose, 1997). Tasks should be sampled within the broader task domains to ensure adequate representation of the range of content. Within domains, important and frequently performed tasks are good candidates for item development. In some cases, an individual task might be sufficient for the development of a work sample; other work samples might be based on a small group of tasks that are typically performed together. Additionally, tasks that have measurable processes and products are the best candidates for work samples (Felker & Rose, 1997). After critical tasks within domains have been identified, experts (e.g., CPAs and measurement specialists) must determine whether the task has measurement potential and define the set of work samples to be developed.

   After work samples are defined, the columns under "Work Sample Tests" in the test plan can be completed. An "X" would indicate that a particular knowledge or skill should be measured in the work sample. The "X" might later be replaced by a number indicating the magnitude with which the work sample measures the knowledge and skill (e.g., number of measurement points or items for each knowledge and skill).

3. *Assign knowledge and skills to remaining measurement methods.* At this point, the test plan will have Xs under the columns for work sample tests to indicate which knowledge and skills are to be measured in this way. The next step is to review the list of knowledge and skill statements and determine which measurement methods (including experience and education) could reasonably be used, and which single method is likely to be best for measuring each knowledge or skill. The number of items to be allocated to the knowledge or skill in the measure then needs to be determined. These decisions should be made by the appropriate experts.

4. *Estimate reliability.* One important goal for any licensure examination is to maximize reliability. The reliability of the score(s) used to make pass-fail decisions about CPA candidates is crucial to ensuring the testing process is both fair to candidates and accurate enough to make pass-fail decisions at acceptable level of error. This score is usually a composite score from several subscores, and the reliability of the composite score is a function of the reliabilities and variances of the subscores (Nunnally, 1967). Eventually, it will be useful to estimate the composite score reliability associated with

alternative structures of the exam. For example, a database could be developed making assumptions about the reliability of different subtests and the magnitude of the correlation between them. Important parameters could be included in the database, such as anticipated subgroup differences, test length, or scoring costs. Analyses could be conducted to estimate the reliability and subgroup differences associated with different combinations of tests. As an example, similar work was done to aid the military services in deciding on new tests to add to the Armed Services Vocational Aptitude Battery (Sager, Peterson, Oppler, Rosse, & Walker, 1997).

5. *Evaluate costs and feasibility.* The cost and feasibility associated with a particular test plan will depend largely on whether the plan contains memorable, complex, computer-administered work samples and assessments. These types of questions require greater development cost than multiple choice format tests do, and grading them is much more complicated. Cost and feasibility assessment, along with reliability estimation, will help inform the process of developing content specifications.

XI. Conclusion

This final report provides documentation of the procedures and results of the practice analysis of CPAs. There were multiple objectives to this practice analysis as described in the RFP issued for it. The primary objective was to identify the tasks and activities performed by CPAs, and the knowledge and skills needed in order to perform them. This information, in turn, will be used in the development of content specifications for the Uniform CPA Examination. Furthermore, the content specifications will serve in developing both paper-and-pencil and computer-based testing versions of the Uniform CPA Examination.

The RFP specifically called for practice analysis information that was *very detailed and that allowed for* the following:

- Identification of the requirements of entry-level CPAs;
- Identification of similarities and differences in the requirements of CPAs practicing in public accounting versus private industry;
- Identification of the licensure requirements (education, experience, and examination) that are most indicative of mastery of entry-level accounting competencies;
- Development of content specifications for the Uniform CPA Examination;
- Direct, unambiguous mapping of content domains to different question formats as most appropriate (e.g., multiple-choice, simulations, accounting problems); and
- Development of a plan to keep the content specifications current.

The results outlined in Sections I through X above, have presented the procedures and results of the effort to satisfy these objectives. This documentation therefore constitutes an important component of the CPA licensure program. That is, it provides up-to-date information about the requirements of professional accounting practice. These requirements are described in detail, and include the delineation of the tasks performed, as well as the delineation of the knowledge and skills needed to perform them. There is also detailed information about the performance dimensions of professional accounting. These performance dimensions are defined in terms of the behaviors represented in 400 critical incidents.

Aside from the delineation of practice requirements, this practice analysis also has provided detailed information to help evaluate various measurement methods available for use in future examinations, information to aid in developing test items, and guidance on how to proceed with the next phase of test development—developing the test plan.

Yet, despite the wealth of information gathered during this project, it only presents a snapshot of the CPA profession. The practice analysis has comprehensively described the requirements of professional accounting as practiced today by entry-level CPAs. There is

some concern regarding just how long this information will remain valuable given the rapid changes the profession is undergoing. Because we captured ongoing changes in the profession, it is likely that the practice analysis will provide valuable information for several years to come. Moreover, to ensure it does, we developed an updating plan for keeping the practice analysis information up-to-date.

Our intent in developing the plan for keeping the practice analysis up-to-date was to ensure that the procedures used were efficient, not overly burdensome, and resulted in data that align with the data collected during this original practice analysis. Future efforts to update the practice information should begin by reviewing this report, particularly the updating plan, before beginning. More specifically, to update the practice analysis, the following general steps might occur:

- Identify changes in the practices. Small-scale surveys, phone interviews, focus groups, or committee discussion (e.g., during professional conferences) should be initiated to identify the changes in the practice since the prior practice analysis study. These activities should identify changes in terms of the specific engagements affected, as well as the associated tasks, knowledge, and skills that are affected.

- Determine the extent to which changes in the profession affect current survey ratings. Affected engagements, tasks, knowledge, and skills should be rated in targeted surveys.

- Determine the extent to which changes in the practice affect the links between tasks, and knowledge and skills. This phase of the updating plan provides the data needed to make adjustments to the content specifications.

- Adjust (if necessary) content specifications. The information collected by the targeted survey is used to adjust the weighting of existing knowledge and skills or to add new critical knowledge and skills to the content specifications.

Each of these updating activities will involve a markedly reduced level of effort. Appendix 21 describes the updating plan in detail.

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