

N C A R B

NOVEMBER 2007



**2007  
PRACTICE ANALYSIS  
OF ARCHITECTURE**

### EXECUTIVE SUMMARY

The National Council of Architectural Registration Boards (NCARB) commissioned the 2007 Practice Analysis of Architecture conducted by their testing consultant, Prometric.

A practice analysis is designed to obtain descriptive information about the tasks performed in a job and the knowledge/skills needed to adequately perform those tasks. The purpose of the Practice Analysis was to provide NCARB with:

- ▶ a validated list of tasks and knowledge/skills related to work performed by recently licensed architects;
- ▶ an updated test specification for the Architect Registration Examination (ARE); recommendations for the development of an Intern Development Program (IDP) specification based on the Practice Analysis survey data, and;
- ▶ information about a number of issues related to the profession of architecture: architects' professional development needs; expected changes in the architect's job role; important changes in the profession of architecture; participation in the Intern Development Program (IDP); and architecture as a career.

### Conduct of the Practice Analysis

The study consisted of several activities: survey development; survey dissemination; and, compilation of survey results. The successful outcome of the practice analysis was dependent on the expert information provided by thousands of architects.

### Survey Development

Survey research is an efficient and effective way to identify the tasks and knowledge/skills that are important to the work performed by large numbers of architects. The task and knowledge/skills statements included on the survey covered the following domains:

1. Pre-Design: Project-related activities related to preliminary design
2. Design: Project-related activities covering schematic design through construction documents
3. Project Management: Project-related management activities and construction administration
4. Practice Management: Office-related management activities
5. General (Knowledge/Skills only)

The development of the survey was based on information from a number of sources:

- ▶ The 2001 Architecture Practice Analysis Study served as the primary resource for developing a listing of task and knowledge/skill statements.
- ▶ The Practice Analysis Task Force reviewed and refined the list of tasks and knowledge/skill statements validated in the 2001 Architecture Practice Analysis Study.
- ▶ Practicing architects reviewed a pilot version of the survey to ensure that it was clearly written and comprehensive in content.

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### Survey Content

The survey, disseminated in April 2007, consisted of five sections: Section 1, Background and General Information; Section 2, Tasks; Section 3, Knowledge/Skills; Section 4, Comments; and, Section 5, The IDP and Architecture as a Career.

### SURVEY RESULTS

#### Survey Response Rate

Prometric disseminated the online survey in April 2007 by e-mail based on a database of architects in the United States (including territories) and Canada provided by NCARB, the American Institute of Architects (AIA), and the Committee of Canadian Architectural Councils (CCAC).

Of the 49,624 architects to whom the survey was successfully delivered, a total of 9,835 (19.81%) submitted completed surveys that were included in the data analysis. To encourage participation, respondents were eligible to enter a drawing. Twenty respondents were randomly selected to win a \$100 Amazon.com gift certificate.

Based on the analysis of survey responses, a sufficient number of each representative group of architects completed the survey to meet the minimum requirements for statistical analysis of the results.

#### Profile of the Survey Respondents

The following provides highlights of respondent demographics based on most frequently occurring response percentages:

- ▶ Gender: Male (86.98%)
- ▶ Years Licensed: 7 to 9 years (29.67%)
- ▶ Employment Position: Principal (Equity Position) (40.92%)
- ▶ Employment Setting: Architecture firm (65.60%)
- ▶ Highest Educational Attainment: Bachelor of Architecture degree (52.95%)
- ▶ IDP Completed: 37.37%

#### Survey Ratings

Participants were asked to rate the tasks and knowledge/skills in terms of their importance for competent performance by a recently licensed architect practicing independently. Importance ratings were provided along a five-point continuum ranging from "of no importance" to "very important". Survey respondents gave most of the tasks (86 of 92, 93.48%) and knowledge/skills (99 of 100, 99.00%) high importance ratings.

In addition, respondents were asked to indicate when the knowledge/skill is acquired. Response options included: "not acquired"; "by completion of first professional architectural degree"; "during internship"; or, "after licensure". A majority of the knowledge/skills were rated

as acquired prior to licensure, either by completion of the first professional architectural degree or during internship. Seventeen knowledge/skills (mostly related to practice management) were rated by a majority of survey respondents as being acquired after licensure although these same knowledge/skills also were rated as important to the work of recently licensed architects practicing independently.

**Content Coverage**

Evidence was provided in this practice analysis on the comprehensiveness of the content coverage within the domains. If the tasks and knowledge/skills within a domain are adequately defined, then it should be judged as being well covered. Respondents indicated that the content was adequately covered, thus supporting the comprehensiveness of the defined domains.

**Write in Comments**

Survey respondents answered three open-ended questions. Prometric staff produced a preliminary summary of the results.

► *What additional professional development (including training and experience) could you use to improve your performance in the field of architecture?*

The most frequently mentioned topic was the business side of architecture/construction administration.

► *How do you expect your job in the field of architecture to change over the next few years? What tasks will be performed and what knowledge/skills will be needed to meet changing job demands?*

The most frequently mentioned topic was the design/environment (including sustainability).

► *If you could change the field of architecture, what is the most important change you would make?*

The most frequently mentioned topic, once again, was the business side of architecture/construction administration.

**The IDP and Architecture as a Career**

Approximately 40 percent of the respondents indicated that they have supervised or mentored an intern participating in the IDP in the last two years. A higher percentage of these supervisors/mentors rated the IDP as providing more adequate preparation for interns to become architects than they did architectural education (89.96 percent and 71.64 percent, respectively, for combined ratings of “adequate”, “well” or “very well”). A majority of survey respondents indicated that they are satisfied with their career in architecture.

**CONTENT COVERAGE**

1. Pre-Design
2. Design
3. Project Management
4. Practice Management
5. General: Knowledge/skills only

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### Updating the ARE Test Specification

At the ARE Test Specification meeting held in July 2007, recommendations were made regarding the tasks and knowledge/skills to be included in future versions of the ARE based on a careful review of the survey results.

### Developing an IDP Specification

The Practice Analysis provides an excellent opportunity for NCARB to ensure that the IDP structure is based on validated data. Information provided by thousands of survey participants ensures that both the ARE and IDP are based on a common set of validated tasks and knowledge/skills. Development of an IDP specification, based on survey data, is currently under consideration by NCARB.

### SUMMARY

This study took a multi-method approach to identifying the tasks and knowledge/skills that are important to the competent performance of recently licensed architects. The practice analysis process allowed for input from a representative group of thousands of architects and was conducted within the guidelines of professionally sound practice. The results of the 2007 Practice Analysis of Architecture provide a valid foundation of empirically derived data upon which to base the Architect Registration Examination and the Intern Development Program.

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### **INTRODUCTION**

The National Council of Architectural Registration Boards (NCARB) commissioned the 2007 Practice Analysis of Architecture that was conducted by their testing consultant, Prometric.

#### **About NCARB**

NCARB comprises the architectural registration boards of all 50 states as well as those of the District of Columbia, Puerto Rico, Guam, and the Virgin Islands. NCARB assists its member state registration boards in carrying out their duties and provides a certification program for individual architects.

The National Council of Architectural Registration Boards is committed to protecting the health, safety, and welfare of the public through effective regulation and exemplary service. In order to achieve these goals, the Council develops and recommends standards to be required of an applicant for architectural registration; develops and recommends standards regulating the practice of architecture; provides to Member Boards a process for certifying the qualifications of an architect for registration; and represents the interests of Member Boards before public and private agencies.

#### **About the Practice Analysis**

The major purpose of the Practice Analysis is to identify the tasks and knowledge/skills that are important for competent performance by recently licensed architects practicing independently, therefore ensuring a content-valid Architect Registration Examination (ARE) and Intern Development Program (IDP).

Another purpose of the Practice Analysis is to obtain information about a number of issues related to the profession of architecture: architects' professional development needs; expected changes in the architect's role; important changes in the profession of architecture; participation in the Intern Development Program (IDP); and architecture as a career.

#### **Practice Analysis and Adherence to Professional Standards**

Practice analysis refers to procedures designed to obtain descriptive information about the tasks performed on the job and/or the knowledge, skills, or abilities thought necessary to adequately perform those tasks. The specific type of job information collected for a practice analysis is determined by the purpose for which the information will be used.

For purposes of developing licensure and licensure examinations, a practice analysis should identify important job tasks and the knowledge/skills needed to perform them. Also, validated tasks and knowledge/skills are integral in the development of an internship program.

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The use of a practice analysis (also known as job analysis, role delineation, role and function study) to define the content domain is a critical component in establishing the content validity of licensure and licensure examinations. Content validity refers to the extent to which the content covered by an examination overlaps with the important components of a job (tasks, knowledge, skills, or abilities).

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A well-designed practice analysis should include the participation of a representative group of subject-matter experts who reflect the diversity within the profession. Diversity refers to regional or job context factors and to subject-matter expert factors such as experience, gender, and race/ethnicity. Demonstration of content validity is accomplished through the judgments of subject-matter experts. The process is enhanced by the inclusion of a large number of subject-matter experts who represent the diversity of the relevant areas of expertise.

*The Standards for Educational and Psychological Testing* (1999) (*The Standards*) is a comprehensive technical guide that provides criteria for the evaluation of tests, testing practices, and the effects of test use. It was developed jointly by the American Psychological Association (APA), the American Educational Research Association (AERA), and the National Council on Measurement in Education (NCME). The guidelines presented in *The Standards*, by professional consensus, have come to define the necessary components of quality testing. As a consequence, a testing program that adheres to *The Standards* is more likely to be judged to be valid and defensible than one that does not.

As stated in Standard 14.14,

"The content domain to be covered by a credentialing test should be defined clearly and justified in terms of the importance of the content for credential-worthy performance in an occupation or profession. A rationale should be provided to support a claim that the knowledge or skills being assessed are required for credential-worthy performance in an occupation and are consistent with the purpose for which the licensing or licensure program was instituted...Some form of job or practice analysis provides the primary basis for defining the content domain... (p.161)<sup>1</sup>

Therefore, knowledge/skills covered on a credentialing examination should be validated as relevant for performing important work tasks. The ARE is based on knowledge/skills identified through a practice analysis as important for the performance of tasks by recently licensed architects practicing independently. Further, the defensibility of a credentialing examination is enhanced by the linkage of validated knowledge/skills with important tasks. This is a key component in the structuring of the ARE. Linking provides two major benefits:

- 1) Linking establishes the relationship between the knowledge/skills covered on the ARE and the tasks to which the knowledge/skills are applied.

<sup>1</sup>American Educational Research Association, American Psychological Association, National Council on Measurement in Education. (1999). *The Standards for Educational and Psychological Testing*. Washington, DC: American Psychological Association.

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2) Linking provides guidance for item-writing activities. When item writers develop questions, they have a listing of tasks that relate to the knowledge/skills. This provides context for developing examination questions, and assists the item writers in question design.

The IDP complements the ARE through its focus on the performance of important tasks during the internship experience. Tasks validated through the practice analysis provide the content structure for the IDP. Knowledge/skills serve as the foundation of understandings necessary for task performance. The defensibility of the content of an internship program is enhanced by the linkage of validated tasks with knowledge/skills.

The 2007 Practice Analysis of Architecture was designed to follow the guidelines presented in *The Standards* and to adhere to accepted professional practices.

### **METHOD**

The Practice Analysis involved a multi-method approach that included meetings with subject-matter experts and a survey. This section of the report describes the activities conducted for the practice analysis.

First, subject-matter experts identified the tasks and knowledge/skills they believe are important to the work performed by licensed architects. Then a survey was developed and disseminated to licensed architects. The purpose of the survey was to obtain verification (or refutation) that the tasks and knowledge/skills identified by the subject-matter experts are important to the work of recently licensed architects practicing independently.

Survey research functions as a “check and balance” on the judgments of the subject-matter experts and reduces the likelihood that unimportant areas will be considered in the development of internship or examination programs. The use of a survey is also an efficient and cost-effective method of obtaining input from large numbers of subject-matter experts and makes it possible for ratings to be analyzed separately by appropriate respondent subgroups.

What matters most is that a licensure examination covers important knowledge/skills needed to perform job activities. A well-conducted practice analysis provides the foundation of information needed to achieve that goal, as well as establishes a strong framework for the content of an internship program.

The methodology used to conduct the Practice Analysis is described in detail below.

#### **1. Planning Meetings**

Project-planning meetings were held in December 2006 and January 2007 at the NCARB office in Washington, DC. Meeting participants included NCARB staff and the

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Board Liaison along with the Prometric staff responsible for conducting the Practice Analysis.

During the planning meetings, several issues were discussed including the composition of the Practice Analysis Task Force, the ARE® Test Specification Task Force, and the IDP Specification Task Force; meeting dates; development of the survey sampling plan; and survey dissemination issues.

### 2. Development of the Survey

#### Practice Analysis Task Force Meeting

NCARB convened a Task Force comprised of a representative group of architects. The Task Force meeting was conducted February 22-24, 2007, in San Francisco, CA. The purpose of the meeting was to develop the survey content. Prometric staff facilitated the meeting.

Prometric staff sent a pre-meeting mailing that included the meeting agenda, a list of tasks and knowledge/skills validated in the previous practice analysis published in 2001, and a list of current Task Force participants.

Activities conducted during the meeting included reviewing and, as needed, refining the major domains and tasks and knowledge/skills important to work performed by architects. Survey rating scales, background, and general information questions were presented and discussed.

#### Survey Construction

Following the Task Force Meeting, Prometric staff constructed the draft online survey. The following domains were covered on the survey:

1. Pre-Design: Project-related activities related to preliminary design
2. Design: Project-related activities covering schematic design through construction documents
3. Project Management: Project-related management activities and construction administration
4. Practice Management: Office-related management activities
5. General: Knowledge/skills only

#### Survey Review by Task Force

Each Task Force member received a copy of the draft survey. The purpose of the review was to provide the group an opportunity to view their work and recommend any revisions.

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Prometric compiled the comments and reviewed them by web conference with the Task Force members and NCARB staff. Recommended refinements were incorporated, as appropriate, into the survey in preparation for the conduct of a pilot test.

Prometric then conducted a survey pilot test. The purpose of the small-scale pilot test was to have architects who had no previous involvement in the development of the survey review it and offer suggestions for its improvement. A total of 22 architects were nominated by Task Force members and NCARB staff to participate in the survey pilot test. Pilot participants were asked to review the survey for clarity of wording, ease of use, and comprehensiveness of content coverage. Ten architects submitted comments that were compiled by Prometric and reviewed by web conference with the Task Force members and NCARB staff. The survey was revised and finalized based on a review of the pilot test comments.

### **Final Version of the Survey**

The final version of the survey consisted of five sections:

Section 1: Background and General Information;

Section 2: Tasks;

Section 3: Knowledge/Skills;

Section 4: Comments; and

Section 5: The IDP and Architecture as a Career.

### **Section 1: Background and General Information**

Survey participants were asked to provide general and background information about themselves and their professional activities.

### **Section 2: Tasks**

Survey participants were asked to rate the statements using the Importance rating scale shown below:

*How important is competent performance of the task for a recently licensed architect practicing independently?*

Response choices: 0 = Of no importance; 1 = Of little importance; 2 = Of moderate importance; 3 = Important; 4 = Very important.

### **Section 3: Knowledge/Skills**

Survey participants were asked to rate the statements using the Importance and Point of Acquisition rating scales shown below:

*How important is competent performance of the knowledge/skill for a recently licensed architect practicing independently?*

Response choices: 0 = Of no importance; 1 = Of little importance; 2 = Of moderate importance; 3 = Important; 4 = Very important.

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*At what point is the knowledge/skill acquired?*

Response choices: 0 = Not acquired; 1 = By completion of first professional architectural degree; 2 = During internship; 3 = After licensure.

Survey participants also were asked to indicate how well the statements covered the tasks and knowledge/skills within each domain. Respondents made their judgments using a five-point rating scale.

Response choices: 1 = Very Poorly; 2 = Poorly; 3 = Adequately; 4 = Well; 5=Very Well.

A write-in area was provided for respondents to note any areas that were not covered within a specific domain.

### Section 4: Comments

Survey participants were provided the opportunity to write in comments for the following three questions:

- ▶ *What additional professional development (including training and experience) could you use to improve your performance in the field of architecture?*
- ▶ *How do you expect your job in the field of architecture to change over the next few years? What tasks will be performed and what knowledge/skills will be needed to meet changing job demands?*
- ▶ *If you could change the field of architecture, what is the most important change you would make?*

### Section 5: The IDP and Architecture as a Career

Survey participants were asked to provide information on the following:

- ▶ *Have you been a supervisor or mentor to an intern participating in the IDP in the last two years?*

Response Choices: Yes; No

If the survey participant answered Yes, the following two questions were asked:

- ▶ *How well is architecture education preparing those interns to become architects?*  
Response Choices: Very Poorly; Poorly; Adequately; Well; Very Well.
- ▶ *How well is the IDP preparing those interns to become architects?*  
Response Choices: Very Poorly; Poorly; Adequately; Well; Very Well

All survey participants were advanced to a question about satisfaction with their career in architecture.

- ▶ *How satisfied are you generally with your career in architecture?*  
Response choices: Very Dissatisfied; Dissatisfied; Somewhat Dissatisfied; Somewhat Satisfied; Satisfied; Very Satisfied.

### 3. Dissemination of the Survey

NCARB contacted Member Board Executives at each Board of Architecture by e-mail shortly before the survey was disseminated to inform them about the upcoming survey of architects. Prometric disseminated a total of 55,398 online surveys in April 2007 by e-mail based on a database of architects provided by NCARB, the American Institute of Architects (AIA), and the Committee of Canadian Architectural Councils (CCAC). To encourage survey participation, respondents were entered into a drawing. Twenty respondents were randomly selected to win \$100 Amazon.com gift certificates. Follow-up reminder e-mails were sent to non-respondents, two weeks after the initial survey dissemination and one week prior to the survey closing.

### 4. Analysis of the Survey Data

As previously noted, the purpose of the survey was to validate the tasks and knowledge/skills that a relatively large number of architects judged to be relevant (verified as important) for competent performance by recently licensed architects practicing independently.

These objectives were accomplished through an analysis of the mean importance ratings for tasks and knowledge/skills. The derivation of the test specification from those statements verified as important by the surveyed professionals provides a substantial evidential basis for the content validity (content relevance) of credentialing examinations.

Based on information obtained from the survey, data analyses by respondent subgroups (e.g., years licensed as an architect; primary job responsibilities; employment setting; gender) are possible when sample size permits. A subgroup category is required to have at least 30 respondents to be included in the mean analyses. This is a necessary condition to ensure that the mean value based upon the sample of respondents is an accurate estimate of the corresponding population mean value.

The following quantitative data analyses were produced:

- ▶ Mean, standard deviation, and frequency (percentage) distribution for tasks and knowledge/skill importance ratings and content coverage ratings.
- ▶ Frequency (percentage) distribution for knowledge/skill point of acquisition ratings.

Write-in comments were summarized regarding task and knowledge/skill content coverage; architects' professional development needs; expected changes in the architect's job role over the next few years; and, important changes in the profession of architecture.

#### Criterion for Interpretation of Mean Importance Ratings

Since a major purpose of the survey is to ensure that only validated tasks and knowledge statements are included in the test specification, a criterion (cut point) for inclusion should be established.

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### Definition of Pass, Borderline, and Fail Categories for Task and Knowledge/Skill Means

	<u>Mean</u>
Pass:	At or above 2.50
Borderline:	2.40 to 2.49
Fail:	Less than 2.40

A criterion that has been used in similar studies is a mean importance rating that represents the midpoint between moderately important and important. For the importance rating scale used across many studies, the value of this criterion is 2.50.

It is believed that this criterion is consistent with the intent of content validity, which is to measure only important knowledge/skills in the credentialing examination. It is also considered appropriate for this criterion to be applied to the selection of tasks for the IDP specification. Therefore, for this practice analysis, Prometric recommended the value of this criterion should be set at 2.50.

The tasks and knowledge/skills were placed into one of three categories—Pass, Borderline, or Fail—based on their mean importance ratings:

- ▶ The Pass Category contains those statements whose means are at or above 2.50, and are considered eligible for inclusion in the ARE test specification and the IDP specification.
- ▶ The Borderline Category contains those statements whose means are between 2.40 and 2.49. The Borderline Category is included to provide a point of discussion to determine if the statement(s) warrant(s) inclusion in the ARE test specification and the IDP specification.
- ▶ The Fail Category contains those statements whose mean ratings are less than 2.40. It is recommended that statements in the Fail Category be excluded from consideration in the ARE test specification and the IDP specification.

If the ARE Test Specification Task Force and the IDP Specification Task Force believe that a statement rated below 2.50 should be included in the ARE Test Specification or IDP Specification and can provide compelling written rationales, those statements may be considered for inclusion. For example, although a task or knowledge/skill may have a mean of less than 2.50, more than 50.00% of the respondents may have rated the statement as important. In this instance, the ARE Test Specification Task Force or the IDP Specification Task Force might recommend the inclusion of the statement either in the ARE test specification or the IDP specification. The written rationale would note that a majority of the survey respondents rated the statement as important.

### 5. ARE Test Specification and IDP Specification

The ARE Test Specification and IDP Specification meetings were conducted concurrently on July 19-21, 2007 in Tucson, AZ. The two groups met jointly on the first day to discuss the Practice Analysis survey results. The ARE Test Specification Task Force and the IDP Specification Task Force met independently on the following two days.

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At the meeting of the ARE Test Specification Task Force, recommendations were made regarding the tasks and knowledge/skills to be included in the test specification based on a careful review of the survey results. At the meeting of the IDP Specification Task Force, members exchanged ideas for consideration of the development of an IDP Specification based on the survey data.

### SURVEY RESULTS

#### Survey Response Rate

Of the 55,398 surveys disseminated by e-mail to licensed architects, 49,624 surveys were delivered successfully. Forty-six individuals indicated that they are not licensed to practice architecture and were dismissed from participating in any part of the survey.

A total of 10,086 surveys were submitted among which 251 were mostly blank and therefore removed from the database. Thus, the calculation of the survey response rate of 19.82% is based on 9,835 respondents divided by 49,624 surveys delivered.

A representative group of architects completed the survey in sufficient numbers to satisfy the requirements for statistical analysis of the results.

TABLE 1. Survey Response Rates

NUMBER OF SURVEYS DISSEMINATED	NUMBER OF NON-DELIVERABLES	NUMBER OF SURVEYS DELIVERED	NUMBER OF SURVEYS SUBMITTED	NUMBER OF SURVEYS REMOVED FROM DATA BASE	NUMBER/ PERCENT OF SURVEYS INCLUDED IN DATA ANALYSIS
55,398	5,774	49,624	10,086	251	9,835/19.82%

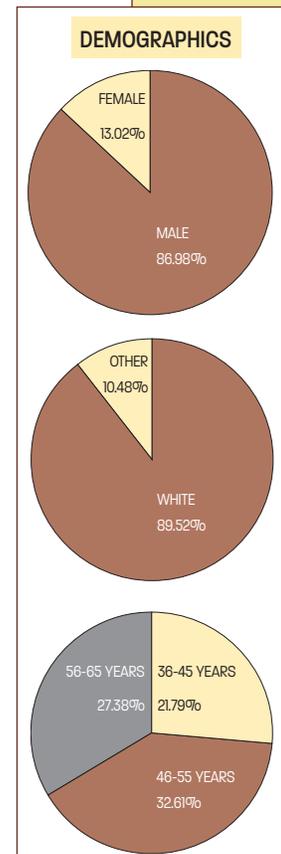
#### Background and General Information

The following is a summary of the background and general questions presented to survey participants.

Demographic Overview: Male (86.98%); Female (13.02%); White (89.52%, United States respondents); Other (10.48%, United States respondents); White/English or White/French (72.02%, Canadian respondents); Other (27.98%, Canadian respondents); Age (36 to 45 years, 21.79%; 46 to 55 years, 32.61%; 56 to 65, 27.38%).

Licensure: Virtually all respondents are active licensees. A few respondents (N=33) selected the inactive/emeritus response option. The database consists of representative groups of respondents who have been licensed across a range of years—from less than one year to more than 30 years.

... the survey response rate of 19.82% is based on 9,835 respondents divided by 49,624 surveys delivered.



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Current Employment: Most respondents (92.66%) reported that they work full time. By position, 40.92% of the respondents indicated that they are principals (equity position) and supervise employees (83.47%). By number of years in current position, the responses range from less than one year to more than 30 years. A majority of respondents (65.60%) reported that they work in an architecture firm. By size of firm/organization, responses ranged from “under five employees” (27.39%, the most frequently selected response) to “over 500 employees”.

Geographic Region: There was a representative group of respondents across the various NCARB regions. A total of 96.64% of the respondents indicated that they are located in the United States (95.74%) or United States territories (0.90%). Another 3.29% of the respondents are located internationally: Canada (1.99%) or other countries (1.30%).

Education and the IDP: Most respondents (81.20%) reported that their highest educational attainment is either a Bachelor of Architecture degree (52.95%) or a Master of Architecture degree (28.25%). A total of 37.37% of the respondents indicated that they completed NCARB’s IDP program (in Canada, IAP).

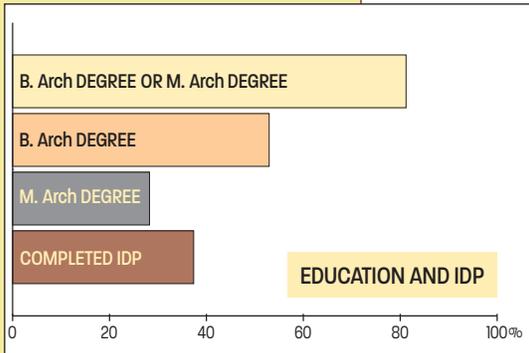
### **Task and Knowledge/Skill Ratings by Overall Group of Respondents**

The following provides a summary of survey respondents’ ratings of the tasks and knowledge/skills. Most of the 92 tasks and 100 knowledge/skills achieved high importance means. Also, a majority the knowledge/skills was identified as being acquired prior to licensure.

#### **Tasks**

Importance Ratings: Means, standard deviations, and percent frequency distributions for the tasks included on the survey were calculated based on the criterion for interpretation of mean importance ratings described previously in the Methods section of this document. As shown in Table 2, 86 (93.48%) of the tasks achieved importance means of at least 2.50.

Six tasks were placed in the Borderline or Fail Categories (means of less than 2.50). However, it should be noted that although the means for these six tasks are less than 2.50, a majority of respondents rated them as important (“moderately important”, “important”, or “very important”). However, between 11.85% and 23.05% of the respondents rated these tasks as not important (“of no importance” or “of little importance”).



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TABLE 2. Summary of Task Importance Means by Pass, Borderline, and Fail Categories

DOMAIN	NUMBER OF TASKS	NUMBER/PERCENTAGE		
		PASS (MEAN: $\geq 2.50$ )	BORDERLINE (MEAN: 2.40 TO 2.49)	FAIL (MEAN: $\leq 2.40$ )
1. PRE-DESIGN	22	21	0	1
2. DESIGN	22	18	1	3
3. PROJECT MANAGEMENT	25	24	1	0
4. PRACTICE MANAGEMENT	23	23	0	0
TOTAL NUMBER	92	86	2	4
PERCENT	--	93.48%	2.17%	4.35%

**Knowledge/Skills**

Importance Ratings: Means, standard deviations, and percent frequency distributions for the knowledge/ skills included on the survey were calculated based on the criterion for interpretation of mean importance ratings described previously in the Methods section of this document. As shown in Table 3, virtually all of knowledge/skills (99 out of 100, 99.00%) achieved importance means of at least 2.50.

TABLE 3. Summary of Knowledge/Skill Importance Means by Pass, Borderline, and Fail Categories

DOMAIN	NUMBER OF KNOWLEDGE/ SKILLS	NUMBER/PERCENTAGE		
		PASS (MEAN: $\geq 2.50$ )	BORDERLINE (MEAN: 2.40 TO 2.49)	FAIL (MEAN: $\leq 2.40$ )
1. PRE-DESIGN	10	10	0	0
2. DESIGN	29	29	0	0
3. PROJECT MANAGEMENT	15	15	0	0
4. PRACTICE MANAGEMENT	13	13	0	0
5. GENERAL KNOWLEDGE/SKILLS	33	32	1	0
TOTAL NUMBER	100	99	1	0
PERCENT	--	99.00%	1.00%	0.00%

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Point of Acquisition Ratings: Respondents were asked to identify when the knowledge/skill *is* acquired, not when the knowledge/skill *should* be acquired. Table 4 provides a summary of the point-of-acquisition ratings across the five knowledge/skill domains. For four of the domains (Pre-Design; Design; Project Management; and General Knowledge/Skills), the majority of knowledge/skills were rated as being acquired either “by completion of first professional architectural degree” or “during internship.” However, for the Practice Management domain, the majority of ratings (61.82%) were clustered in the “after licensure” response category.

**TABLE 4. Summary of Point of Acquisition Ratings**

DOMAIN	NUMBER OF KNOWLEDGE/SKILLS	PERCENTAGE			
		NOT REQUIRED	BY COMPLETION OF FIRST PROFESSIONAL ARCHITECTURAL DEGREE	DURING INTERNSHIP	AFTER LICENSURE
1. PRE-DESIGN	10	1.71%	20.81%	50.05%	27.42%
2. DESIGN	29	1.88%	30.22%	47.44%	20.45%
3. PROJECT MANAGEMENT	15	0.66%	4.86%	60.78%	33.43%
4. PRACTICE MANAGEMENT	13	2.31%	7.12%	28.75%	61.82%
5. GENERAL KNOWLEDGE/SKILLS	33	2.81%	45.62%	33.88%	17.68%
TOTAL NUMBER	100				

Following are 17 knowledge/skills for which a majority of respondents indicated that the point of acquisition is “after licensure.” It should be noted that the importance mean for each of these knowledge/skills is above 2.50, ranging from 2.87 to 3.41. (The percentage figure after each of the 17 knowledge/skills listed below represents the percentage of respondents who selected “after licensure” as the point of acquisition rating.)

### Domain 1: Pre-Design

- ▶ project financing and funding (63.67%)

### Domain 3: Project Management

- ▶ project budget management (51.20%)
- ▶ construction conflict resolution (55.74%)

**Domain 4: Practice Management**

- ▶ legal and ethical issues pertaining to contracts (51.59%)
- ▶ legal and ethical issues pertaining to practice (e.g., liens; taxation; licensure) (55.30%)
- ▶ business planning (70.73%)
- ▶ strategic planning (71.35%)
- ▶ financial management (69.10%)
- ▶ risk management (e.g., professional and general liability) (64.29%)
- ▶ marketing and communications (55.23%)
- ▶ human resources management (72.63%)
- ▶ IDP mentoring and supervising (69.44%)
- ▶ contract negotiation (e.g., fees; scope; schedules) (66.05%)
- ▶ invoicing for services (66.79%)

**Domain 5: General Knowledge/Skills**

- ▶ entrepreneurship (50.79%)
- ▶ mentoring—teaching others (62.05%)
- ▶ supervising (53.27%)

**Subgroup Analysis of Tasks and Knowledge/Skill Ratings: Index of Agreement**

The index of agreement is a measure of the extent to which subgroups of respondents agree on which tasks and knowledge/skills are important. In this study, indices of agreement were calculated for the following groups: years licensed as an architect; primary job responsibilities; supervisor/manager; employment setting; size of firm/organization; NCARB region (primary geographic location); gender; race/ethnicity; and age.

Using the mean importance ratings for task and knowledge/skill statements, indices of agreement were computed:

- ▶ If the subgroup means are above the critical importance value (mean ratings at or above 2.50), then they are in agreement that the content is important.
- ▶ If the subgroup means are below the critical importance value (mean ratings less than 2.50), then the subgroups are in agreement that the content is considered less important.
- ▶ By contrast, if one subgroup's (for example, female) mean ratings are above the critical importance value and another subgroup's (for example, male) means are below the critical importance value then the subgroups are in disagreement as to whether the content is important.

The index of agreement provides a method of computing the similarity in judgments between groups that is more tailored to the purpose of a practice analysis than the correlation coefficient. Although the correlation coefficient measures the tendency toward agreement along the full range of possible ratings, the agreement index focuses on whether two groups agree that the content should (or should not) be included in an examination.

## 2007 PRACTICE ANALYSIS OF ARCHITECTURE

One of the major purposes of this Practice Analysis is to verify appropriate test content. The agreement index provides a statistical method to address this question at the subgroup level. Furthermore, the agreement index requires only 30 respondents per subgroup for computation, whereas the correlation coefficient requires at least 100 respondents per subgroup to provide a reliable measure of agreement.

An illustrative example for two groups shows how the index is computed. If two groups passed the same 120 knowledge/skill areas and failed the same 2 knowledge/skill areas (out of the 124 total knowledge/skill areas in the survey), the consistency index would be computed as:  $\text{Agreement} = (120 + 2)/124 = 0.98$ .

There was a very high level of agreement among respondents regarding the importance of both tasks and knowledge/skills. Therefore, additional statistical subgroup comparisons were unnecessary.

### Content Coverage Ratings

The survey participants were asked to indicate how well the statements within each of the task and knowledge/skill domains covered important aspects of that domain. These responses provide an indication of the adequacy (comprehensiveness) of the survey content.

The five-point rating scale included: 1=Very Poorly; 2=Poorly; 3=Adequately; 4=Well; and 5=Very Well.

The means and standard deviations for the task and knowledge/skill ratings are provided in Tables 5 and 6. For the task domains, the means ranged from 3.87 to 3.96. The means across the knowledge/skill domains ranged from 3.75 to 3.86. The results provide supportive evidence that the tasks and knowledge/skills were comprehensive and adequately covered on the survey.

TABLE 5. Summary of Task Content Coverage Ratings

DOMAIN	MEAN	SD	FREQUENCY PERCENTAGE				
			VERY POORLY	POORLY	ADEQUATELY	WELL	VERY WELL
1. PRE-DESIGN	3.96	0.75	0.07%	0.94%	27.50%	46.24%	25.24%
2. DESIGN	3.87	0.74	0.07%	0.99%	31.26%	47.47%	20.21%
3. PROJECT MANAGEMENT	3.95	0.75	0.05%	0.73%	28.21%	46.46%	24.55%
4. PRACTICE MANAGEMENT	3.90	0.77	0.08%	1.34%	29.96%	45.26%	23.36%

## 2007 PRACTICE ANALYSIS OF ARCHITECTURE

**TABLE 6. Summary of Knowledge/Skill Content Coverage Ratings**

DOMAIN	MEAN	SD	VERY POORLY	POORLY	ADEQUATELY	WELL	VERY WELL
1. PRE-DESIGN	3.75	0.76	0.06%	1.86%	38.02%	42.79%	17.27%
2. DESIGN	3.79	0.76	0.11%	1.67%	36.02%	43.87%	18.33%
3. PROJECT MANAGEMENT	3.81	0.74	0.07%	0.93%	35.45%	45.17%	18.38%
4. PRACTICE MANAGEMENT	3.81	0.75	0.08%	1.16%	35.62%	43.99%	19.15%
5. GENERAL KNOWLEDGE/SKILLS	3.86	0.75	0.11%	0.87%	33.02%	45.36%	20.63%

### Write-In Comments

Many survey respondents provided responses to the following three open-ended questions:

1. *What additional professional development (including training and experience) could you use to improve your performance in the field of architecture?*

As shown in Table 7, the business side of architecture/construction administration, computer/technology and soft skills represent the topic areas most frequently mentioned.

**TABLE 7. Professional Development Needs**

TOPIC	ESTIMATED <sup>2</sup> PERCENTAGE OF COMMENTS
Business Side of Architecture/Construction Administration	29.69%
Computer/Technology (e.g., 3d Modeling; CADD; BIM)	18.99%
Soft Skills (e.g., mentorship)	18.07%
Materials and Products (including sustainability)	9.04%
Design (including environmental design)	5.58%
Standards/Code/Licensure	4.28%
Construction Experience	4.11%
Hand Drawing	3.84%
Seminars	2.13%
Project/Practice Management	2.02%
Engineering	Less than 1.00%
Exposure to "Best" in Architecture	Less than 1.00%
IDP/Academic Training	Less than 1.00%
Preservation and History	Less than 1.00%
No Change	Less than 1.00%

<sup>2</sup>The percentages presented in Tables 7 to 9 represent estimates. A combination of manual and computerized techniques was used by Prometric to summarize the thousands of write-in comments received for each question. Both techniques lack one hundred percent accuracy primarily due to words that contain similar word patterns (e.g., software; soft skills), multiple topics covered in one comment, and the clarity of the comments provided. The percentages, therefore, provide an estimate of the topic areas mentioned most frequently.

## 2007 PRACTICE ANALYSIS OF ARCHITECTURE

2. *How do you expect your job in the field of architecture to change over the next few years? What tasks will be performed and what knowledge/skills will be needed to meet changing job demands?*

As shown in Table 8, design/environment (including sustainability) and computer/technology represent the topic areas most frequently mentioned.

**TABLE 8. Expected Changes in One's Job in the Field of Architecture Over the Next Few Years**

TOPIC	ESTIMATED <sup>2</sup> PERCENTAGE OF COMMENTS
Design/Environment (including sustainability)	27.44%
Computer/Technology (e.g., 3d Modeling; CADD; BIM)	24.71%
Materials and Products (including sustainability)	13.97%
Business Side of Architecture/Construction Administration (finance, legal, marketing)	12.75%
Program/Practice Management	8.46%
Soft Skills (e.g., mentorship)	3.97%
Code/Standards/Licensure	2.75%
Education/Training	2.73%
Globalization	2.68%
No Change	Less than 1.00%

3. *If you could change the field of architecture, what is the most important change you would make?*

As shown in Table 9, the business side of architecture/construction administration and design represent the topic areas most frequently mentioned.

**TABLE 9. Most Important Change Wanted in the Field of Architecture**

TOPIC	ESTIMATED <sup>2</sup> PERCENTAGE OF COMMENTS
Business Side of Architecture/Construction Administration	15.47%
Design	14.15%
Appreciation of/for the Field (within the field/outside the field)	9.92%
Promotion of the Profession (including parity with other professions)	8.97%
Improved Practical Experiences in Educational Curriculum (e.g., intern; mentorship)	8.37%
Construction Experience	6.34%
Collaboration/Cooperation	4.97%
Project/Practice Management	4.83%
Value	4.56%
Increased Salary/Pay	4.48%
Educational Preparation	3.84%
Code/Standards/Licensure	3.78%
Fees and Reimbursement	3.13%
Computer/Technology (e.g., 3d Modeling; CADD; BIM)	2.59%
Materials and Products (including sustainability)	1.78%
General Comments	1.04%
Communication	Less than 1.00%
Diversity (in terms of minority representation)	Less than 1.00%
No Change	Less than 1.00%

<sup>2</sup>The percentages presented in Tables 7 to 9 represent estimates. A combination of manual and computerized techniques was used by Prometric to summarize the thousands of write-in comments received for each question. Both techniques lack one hundred percent accuracy primarily due to words that contain similar word patterns (e.g., software; soft skills), multiple topics covered in one comment, and the clarity of the comments provided. The percentages, therefore, provide an estimate of the topic areas mentioned most frequently.

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**The IDP and Architecture as a Career**

Tables 10, 10a, and 10b present the results of three questions about the IDP. As shown in Table 10, 40.96% of the respondents reported that they had supervised or mentored IDP interns in the last two years. Tables 10a and 10b show the responses to two follow-up questions presented only to those supervisors/mentors. Although 71.64% of the respondents indicated that architecture education is “adequately” to “very well” preparing interns to become architects, 28.36% rated the educational preparation as “very poor” or “poor” (Table 10a). However, a different response pattern emerges for the question about how well the IDP is preparing interns to become architects. A total of 89.96% of the respondents indicated that the IDP is “adequately” to “very well” preparing interns to become architects, whereas only 10.05% rated IDP preparation as “very poor” or “poor” (Table 10b).

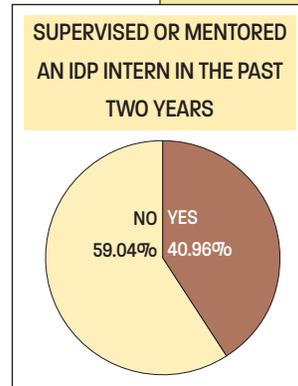


TABLE 10. Number/Percentage of Respondents Who Supervised or Mentored IDP Interns in the Last Two Years

RESPONSE	COUNT	PERCENT
Yes	4021	40.96%
No	5795	59.04%
Total	9816	100.00%
Missing	19	
Grand Total	9835	

Table 10a. How Well Architecture Education Is Preparing Those Interns to Become Architects

RESPONSE	COUNT	PERCENT
Very Poorly	136	3.39%
Poorly	1001	24.97%
Adequately	1939	48.37%
Well	829	20.68%
Very Well	104	2.59%
Total	4009	100%
Missing	11	
Grand Total	4021	

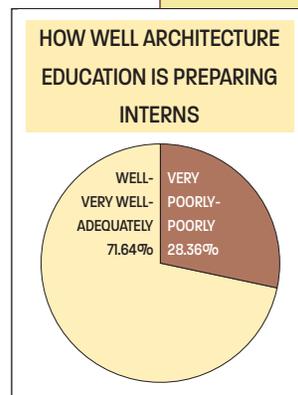
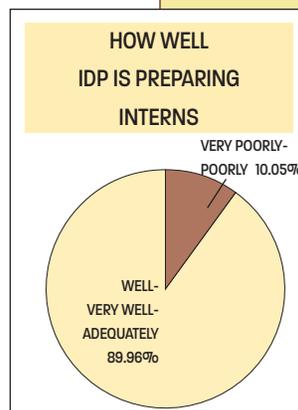


Table 10b. How Well the IDP Is Preparing Those Interns to Become Architects

RESPONSE	COUNT	PERCENT
Very Poorly	50	1.25%
Poorly	352	8.80%
Adequately	1789	44.73%
Well	1558	38.95%
Very Well	251	6.28%
Total	4000	100%
Missing	21	
Grand Total	4021	

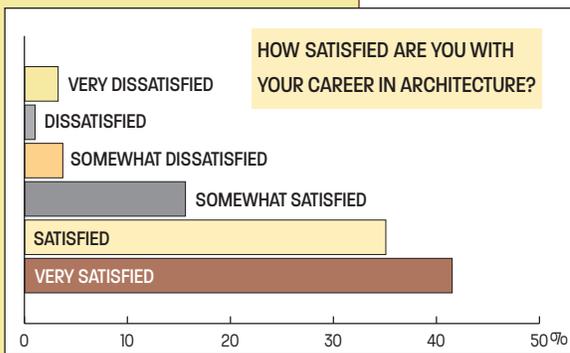


## 2007 PRACTICE ANALYSIS OF ARCHITECTURE

As shown in Table 11, a majority of survey respondents (92.11%) indicated that they are “somewhat satisfied” to “very satisfied” with their career in architecture. In contrast, only 7.90% of the respondents are “somewhat dissatisfied” to “very dissatisfied” with their career in architecture.

Table 11. Satisfaction with a Career in Architecture

RESPONSE	COUNT	PERCENT
Very Dissatisfied	317	3.23%
Dissatisfied	97	0.99%
Somewhat Dissatisfied	361	3.68%
Somewhat Satisfied	1529	15.59%
Satisfied	3437	35.04%
Very Satisfied	4069	41.48%
Total	9810	100.00%
Missing	25	
Grand Total	9835	



**SUMMARY, RECOMMENDATIONS, AND CONCLUSION**

The purpose of the Practice Analysis was to provide NCARB with:

- ▶ a validated list of tasks and knowledge/skills related to work performed by recently licensed architects;
- ▶ an updated test specification for the Architect Registration Examination (ARE); recommendations for the development of an IDP specification based on the practice analysis survey data; and
- ▶ information about a number of issues related to the profession of architecture: architects' professional development needs; expected changes in the architect's job role; important changes in the profession of architecture; participation in the Intern Development Program (IDP); and architecture as a career.

The tasks and knowledge/skills were developed through an iterative process involving the combined efforts of NCARB, subject-matter experts, and Prometric staff. The inventory was then put into survey format and subjected to verification/refutation through the dissemination of a survey to thousands of architects.

Survey participants were asked to rate 92 tasks and 100 knowledge/skills in relation to their importance for competent performance by a recently licensed architect practicing independently and the point of acquisition of the knowledge/skills. A large, representative sample of close to 10,000 architects participated in the Practice Analysis.

**Highlights of Survey Results**

- ▶ Over 90% of tasks and knowledge/skills were verified as important. Evidence was provided in this practice analysis that the comprehensiveness of the content within the task and knowledge/skill domains was adequately covered. Therefore, they should be used for preparation of the ARE and IDP specifications.
- ▶ A majority of the knowledge/skills were rated as being acquired prior to licensure, either by completion of the first professional architectural degree or during internship. However, 17 knowledge/skills (primarily related to practice management) were rated by a majority of survey respondents as being acquired after licensure. However, these same knowledge/skills were rated as important to recently licensed architects practicing independently.
- ▶ Areas for professional development were identified as well as expected changes in the respondents' job activities over the next few years and the changes most wanted in the profession of architecture. The business side of architecture/construction administration was the most frequently mentioned topic area for professional development and the change most desired in the profession of architecture. For expected changes in the respondents' job activities, design/environment (including sustainability) was the most frequently mentioned topic area.

Over 90% of tasks and knowledge/skills were verified as important. Evidence was provided in this practice analysis that the comprehensiveness of the content within the task and knowledge/skill domains was adequately covered. Therefore, they should be used for preparation of the ARE and IDP specifications.

## 2007 PRACTICE ANALYSIS OF ARCHITECTURE

- ▶ About 40% of the respondents indicated that they have supervised or mentored an intern participating in the IDP in the last two years. Among this group, there is a difference of opinion about how well architecture education is preparing interns to become architects. Although a majority of respondents (71.64%) indicated that architecture education is “adequately” to “very well” preparing interns to become architects, 28.36% rated the educational preparation as “poor” or “very poor”. In contrast, a total of 89.96% of the respondents indicated that the IDP is “adequately” to “very well” preparing interns to become architects, whereas only 10.04% rated IDP preparation as “poor” or “very poor”.
- ▶ For most survey respondents (92.11%), the profession of architecture is viewed as “somewhat satisfactory” to “very satisfactory”. Only 7.90% of the respondents are “somewhat dissatisfied” to “very dissatisfied” with their career in architecture.

### RECOMMENDATIONS

#### Updating the ARE Test Specification

At the ARE Test Specification meeting held in July 2007, decisions were made regarding the tasks and knowledge/skills to be included in or excluded from the test specification based on a careful review of the survey results. The group reviewed the tasks and knowledge/skills for each ARE division and recommended changes in accordance with the results of the Practice Analysis survey. These recommendations should be incorporated into the ARE in a timely fashion.

#### Developing an IDP Specification

The Practice Analysis provides an excellent opportunity for NCARB to ensure that the IDP structure is based on up-to-date empirically derived data. Information provided by thousands of survey participants ensures that both the ARE® and IDP are based on a common set of validated tasks and knowledge/skills. Development of an IDP Specification, based on survey data, is currently under consideration by NCARB. Recommendations developed by the IDP Specification Task Force should be acted upon in a timely fashion.

#### Point of Acquisition of Knowledge/Skills

The results of the Practice Analysis revealed a gap between 17 knowledge/skills validated as important for a recently licensed architect practicing independently and the point at which the knowledge/skill is acquired. A majority of respondents indicated that these knowledge/skills are acquired after licensure. It is advised that a task force be convened to review these knowledge/skills and develop recommendations, as appropriate, for enhancing the knowledge/skill acquisition opportunities in these areas prior to licensure (e.g., education; IDP).

**Satisfaction with Architecture Education**

Among respondents who indicated that they have supervised or mentored individuals participating in the IDP in the last two years, the results of the Practice Analysis revealed a difference in ratings regarding the adequacy of architecture education compared to the IDP in preparing individuals to become architects. As previously noted, 28.36% of the respondents rated educational preparation as poor in comparison to 10.05% of the respondents who rated the IDP as poor. The convening of a Task Force is advised to determine if: the education data are in alignment with other valid studies of the architecture profession; further research into the adequacy of educational preparation should be conducted as a benefit to the architecture profession; and any action items should be recommended based on the survey findings.

**Analysis of Write-In Comments (Professional Development Needs; Expected Changes in One's Job in the Field of Architecture Over the Next Few Years; Most Important Change Wanted in the Field of Architecture)**

The summarization of thousands of write-in comments was produced by Prometric staff without the participation and guidance of subject-matter experts. The convening of a Task Force would be beneficial to ensure that the write-in comments are categorized and tallied as accurately as possible and that action-item recommendations are developed by subject-matter experts.

**CONCLUSION**

The Practice Analysis took a multi-method approach to identify the tasks and knowledge/skills important to the work performed by recently licensed architects practicing independently. These findings provide the foundation of empirically derived data from which to inform and, as needed, refine the content of the ARE and the IDP. A plan should be developed to ensure that modifications are integrated into the ARE and IDP based upon the findings of the 2007 Practice Analysis of Architecture. Additionally, a plan should be developed to implement the other recommendations presented in this report.

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**PRACTICE ANALYSIS TASK FORCE**

- Andrew W. Prescott, AIA,  
Chair and Board Liaison
- Alan W. T. Baldwin, FAIA
- Stephen D. Dent, AIA, IES,  
New Mexico
- Blakely C. Dunn, AIA,  
Arkansas
- Sebastian M. Kaintoch, AIA
- William G. McMinn, FAIA
- John F. Miller, FAIA
- Melinda E. Pearson, AIA,  
Nebraska Member  
Board Executive
- Teri A. Petrzalek, AIA, Iowa
- William R. Ponko, AIA
- William E. Yoke Jr., AIA,  
West Virginia
- Stuart Howard, MAIBC,  
MRAIC, AIA,  
British Columbia
- James R. Cramer, The  
Greenway Group, Inc.
- Julia Leahy, Ph.D.,  
Prometric
- Linda Montgomery, Ph.D.,  
Prometric
- Kekku Lehtonen, AIA,  
Staff
- Harry M. Falconer Jr., AIA,  
Staff

## 2007 PRACTICE ANALYSIS OF ARCHITECTURE

### **ABOUT NCARB**

#### **Mission Statement**

The National Council of Architectural Registration Boards is committed to protecting the health, safety, and welfare of the public through effective regulation and exemplary service.

#### **Vision Statement**

As the facilitator for the protection of the health, safety, and welfare of the public, the National Council of Architectural Registration Boards:

- ▶ Requires a NAAB-accredited degree, successful completion of the Intern Development Program (IDP) and successful completion of the Architect Registration Examination® (ARE®).
- ▶ Protects and enhances the validity of the Intern Development Program (IDP) and the Architect Registration Examination (ARE).
- ▶ Encourages all architects to become Certificate holders.
- ▶ Advocates for the elimination of impediments to reciprocity.
- ▶ Serves as the trusted international center of registration data and regulatory information.
- ▶ Values diversity of opinion and representation.
- ▶ Promotes recognition of the architect as the primary building professional qualified to protect the health, safety, and welfare of the public, through the enhancement of the quality of the built environment and the richness of space and form.

#### **Core Values**

The National Council of Architectural Registration Boards believes in

- ▶ Integrity
- ▶ Service
- ▶ Accountability