NCARB

NCARB'S CONTRIBUTION TO THE NAAB 2013 ACCREDITATION REVIEW CONFERENCE

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INTRODUCTION

In preparation for the National Architectural Accrediting Board (NAAB) 2013 Accreditation Review Conference (ARC), the National Council of Architectural Registration Boards (NCARB) utilized data from the following sources:

- The *2012 NCARB Practice Analysis of Architecture*,
- Outcomes from focus groups with allied professionals and clients,
- Insight and guidance from the NCARB Education Committee and Board of Directors, and
- The NAAB *Study of Accredited Architectural Education.*

Several key insights emerged early in our effort:

- The significance of accredited architectural education,
- The benefit of greater collaboration in the educational environment,
- A need to improve the communication skills of our future practitioners,
- The major role that technology plays and will continue to play in the profession, and
- That increased knowledge and understanding of construction materials and how they are assembled, through hands-on experience, will greatly benefit future practitioners.

In its previous contributions to the ARC, NCARB focused on a few very specific, survey-driven expectations for improvement in architectural education and the accreditation process. This approach most recently resulted in successful changes to the Student Performance Criteria (SPC) supported by the NCARB *2007 Practice Analysis of Architecture*.

However, one of the most successful outcomes of the last ARC process was achieved through significant discussion and compromise at the conference itself. In 2007, NCARB's proposal that enrollment in the Intern Development Program (IDP) be a mandatory requirement for graduation was greatly debated. The compromise—that every NAAB-accredited program shall appoint and support a trained and funded IDP Educator Coordinator—has greatly enhanced the importance and understanding of the value of the IDP. This proves that working collaboratively with our collateral organizations brings positive change and that collective outcomes are far more powerful than individual objectives. Building on this success, NCARB and the American Institute of Architecture Students (AIAS) are in the process of piloting a new IDP Student Coordinator position. NCARB also looks forward to working with the American Institute of Architects (AIA) to strengthen and grow the Auxiliary Coordinator

component of the IDP Coordinator Program. We have seen additional progress over the past several years, as barriers between the traditional education, experience, and examination "silos" have been eliminated. Students can start receiving IDP credit earlier in their education (2010) and interns can start taking the Architect Registration Examination® (ARE®) after completion of their jurisdiction's education requirement (2007), thus blending education with internship and internship with examination. These positive changes have come about from effective communication and collaboration between NCARB and the Association of Collegiate Schools of Architecture (ACSA), AIA, AIAS, and the NAAB.

You will find the Council's approach in this paper to be more holistic and less specific than in the past. It is our hope that the NAAB will use the data from the collateral-supported *2012 NCARB Practice Analysis of Architecture* and their own *Study of Accredited Architectural Education* to influence and drive positive change in architectural education in the coming years.

According to the NAAB *Study of Accredited Architectural Education*, **41% of programs reported the IDP Educator Coordinator position improved their program, with 13% of programs reporting it improved their program dramatically**.

EXECUTIVE SUMMARY

When reviewing the data from the Practice Analysis and related reports, the NCARB Education Committee identified several themes early in the analysis, which are now formally presented in *NCARB's Contribution to the NAAB 2013 Accreditation Review Conference*. These four categories—common threads, recurring themes, proposed enhancements to the current Conditions for Accreditation, and blue-sky topics intended to generate future conversation—are thoroughly discussed and supported by data from the Practice Analysis.

"Common threads" are topics more general in nature, not necessarily specific to architecture, which could easily be interwoven throughout the curriculum. Survey respondents identified three topics—communication, collaboration, and leadership—as needing reinforcement in the overall curriculum.

- Data indicated that communication through graphic means is clearly covered in accredited education; however, students do not possess an equal command of basic written and oral presentation skills.
- Collaboration with others is essential to a successful practitioner. Exposure to team building strategies and completion of student projects that promote collaboration within the program and across the university—are critical.
- Many practitioners suggested that architects are losing their leadership role. A broad range of leadership skills should be developed early in education and refined through extracurricular activities.

Similarly, six "recurring themes" emerged that require a greater focus in education: professional conduct, practice management and project management, site design, constructability, sustainability, and technology.

- An overwhelming number of practitioners reported that professional conduct and compliance with regulations is critically important, is performed daily, and should be further incorporated in the foundations of an accredited program.
- According to survey respondents, knowledge and skills for many practice management and project management issues are acquired after licensure. The professional practice curriculum should be enhanced and further expanded to integrate important topics such as business development, office management, project management, and risk management.
- Site design knowledge and skills are clearly covered in education; however, practitioners reported the level of performance is below that indicated by educators and suggested that students should have a greater ability to perform these tasks prior to graduation.
- The integration and coordination of building systems, combined with the interpretation and application of building codes, are interdependent components of constructability. The Practice Analysis provides evidence that these important knowledge and skills are being acquired during internship; however, a majority of educators and practitioners indicated they should be acquired prior to completion of accredited education.

- As the emphasis on sustainability continues to increase, the knowledge of design strategies and energy codes as well as the ability to assess, develop, and implement sustainable criteria must also increase. Survey respondents indicated they believe that accredited education could better support students in developing this area of expertise.
- The profession's dependence on technology continues at a rapid pace. Accredited education must play a significant role in exposing students to a wide variety of graphic and project management applications and developing knowledge and skills to carry them through internship and practice.

The current *NAAB Conditions for Accreditation* were approved in 2009 and state the intention to *"define the minimum standards that professional degree programs in architecture are expected to meet in order to ensure that students are prepared to move to the next steps in their careers including internship and licensure."* NCARB believes that combining, expanding, extracting, and raising the performance level of various existing SPC will respond to the shortcomings identified above as common threads and recurring themes. NCARB also suggests that: Comprehensive Design should receive greater emphasis; revisiting the Education Core Requirement concept could better ensure that students acquire essential knowledge and skills; licensed practitioners and actively engaged IDP Educator Coordinators benefit every academic program and campus; and the studio instructional model should be reviewed to ensure relevance.

In closing, this paper posits several blue-sky topics that will encourage discussion and collaboration well beyond the close of the NAAB 2013 Accreditation Review Conference. These ideas to integrate the path to licensure range from new education models, to mandatory internships, to new expanded/integrated programs that allow licensure upon graduation. None of these concepts are new; however, we believe that there is a new opportunity to leverage a growing consensus. These ideas have surfaced in various discussions over time and will require significant exploration, development, and experimentation over the course of several years. One concept might simply enhance the existing process, while another may result in a prototype that sets the stage for a transformed path to licensure.

NCARB established a degree from a NAAB-accredited program as the requirement for NCARB certification in 1984.

Thirty-nine architectural registration boards require an accredited degree for initial licensure.

All architectural registration boards accept the accredited degree for reciprocal licensure.

NCARB has supported the efforts of the NAAB and accredited architectural education for many years. NCARB *Model Law* clearly identifies a professional degree in architecture from a NAAB-accredited program as a requirement for initial registration; the degree is also the primary means to satisfy the education requirement for NCARB Certification.

NCARB's Education Committee and Board of Directors maintain that accredited architectural education must remain focused on preparing future generations of architects for professional practice. To do otherwise would be a disservice to the profession and the public. It is with those intentions that this report is respectfully presented to the NAAB.

COMMON THREADS

COMMUNICATION

Effective communication with colleagues, consultants, and clients, as well as strong interpersonal skills, are critical to the success of the practitioner.

Practice Analysis data indicates educators, interns, and practitioners strongly agreed that tasks related to communicating design ideas graphically are covered in the curriculum and performed by students prior to completion of their architecture program.

TASK #	TASK STATEMENT	EDUCATORS		INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS / ARCHITECTS LICENSED IN THE PAST YEAR	ALL LICENSED ARCHITECTS
		TASK IS COVERED IN PROGRAM	TASK IS PERFORMED BY STUDENTS	TASK WAS PERFORMED BY COMPLETION OF DEGREE	IMPORTANCE RATING 0 1 2 3 4
22	Communicate design ideas to the client graphically through a variety of media	93.6%	98.8%	93.5%	3.25
23	Communicate design ideas to the client using hand drawings	93.6%	98.1%	88.6%	2.37
24	Communicate design ideas to client with 2D CAD software	95.3%	99.4%	90.6%	2.69
25	Communicate design ideas to client with 3D CAD software	95.9%	100%	85.4%	2.33
34	Prepare diagrams illustrating spatial relationships and functional adjacencies	95.3%	98.2%	94.5%	2.51

0 = Of little or no Importance 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Critically Important

While the ability to communicate graphically is clearly being acquired during education, basic communication skills—both written and oral—were identified in our focus groups and by respondents to the NAAB study as skills that need to be strengthened. **NCARB encourages the exploration of new and creative ways to effectively integrate these basics into the architecture curriculum,** which could be easily accomplished through activities like recording students' oral presentations and providing constructive feedback. Developing relationships with appropriate departments within the university, such as Communications or English, may also be a way to ensure these skills are acquired through co-curricular activities.

Students' basic **written and oral communications skills were identified as skills that need to be strengthened.**

COLLABORATION

The practice of architecture is a highly collaborative, team-driven effort. The ability to successfully interact with others is essential. The NAAB *Study of Accredited Architectural Education* reveals that nearly all participants (96%) believe that architects exist in a working environment that requires collaborative teamwork with other design, business, and construction professionals.

Over 80% of the architects completing the NCARB 2012 Practice Analysis survey rated "collaboration with stakeholders" as important, very important, or critically important. Data from the Practice Analysis further indicates that over half of the educators surveyed identified collaboration as included in their program and over 70% of those same respondents reported that students performed collaboratively (with guidance and feedback or independently) by completion of their program. Yet, when interns and architects licensed in the past year were asked the same question, only 31.5% indicated they had collaborated with stakeholders prior to completion of their program.

Over 80% of architects rated "collaboration with stakeholders" as important/critical, yet **only 31.5% of interns and recently licensed architects indicated they had performed collaboratively prior to completion of their education program.**

TASK #	TASK STATEMENT	EDUCATORS		INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS / ARCHITECTS LICENSED IN THE PAST YEAR	ALL LICENSED ARCHITECTS
		TASK IS COVERED IN PROGRAM	TASK IS PERFORMED BY STUDENTS	TASK WAS PERFORMED BY COMPLETION OF DEGREE	IMPORTANCE RATING 0 1 2 3 4
64	Collaborate with stakeholders during design process to maintain design intent and comply with Owner requirements.	55.6%	70.8%	31.5%	2.46
0 = Of little or no Importance 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Critically Important					

The gap in perception between educators and interns/architects clearly suggests that **additional emphasis should be placed on collaboration, teamwork, and team building skills during education. Exposure to team building strategies early in the curriculum is recommended.** One approach is to develop projects that engage students from other design-related disciplines such as landscape architecture and interior design. Although it may be more difficult to accomplish, expanding the team to involve engineering and construction science students would foster a greater appreciation of the necessary knowledge and skills other professionals contribute to the project. When possible, further expansion might even include those outside the design-related professions, such as students in real estate development courses, business management, and law programs. Another approach, faculty and students playing the role of "client," could also be used to further develop the collaborative skills necessary for success.

LEADERSHIP

Like collaboration, leadership is a skill essential to the success of the practitioner. Traditionally, the architect serves as the team leader, managing and coordinating all aspects of the project from start to finish. The leadership role becomes more critical as the size of the team and the complexity of the project increases. Serving as the team lead also positions the architect to more effectively serve the client. Based on data from the NAAB *Survey of Accredited Architectural Education*, 66% of respondents agreed that *"architects are losing their role in the design and construction of the built environment."* Therefore, **we believe it is important for architecture students to develop leadership skills and business acumen early in education**—recognizing that these skills include the ability to:

- discern when to take a subordinate role,
- ensure that the right disciplines are represented and engaged, and
- determine whether sufficient resources are present to ensure team and project success.

Many of these skills can be developed concurrently with studio projects designed to promote collaboration and teamwork.

Leadership skills may be embedded in the curriculum; however, students should not be limited by the constraints of studio projects. Joining the AIAS chapter and volunteering at the local community-based design center are excellent opportunities for students to exercise their leadership skills. We encourage faculty to promote active involvement with local AIA chapters and the National Associates Committee as opportunities for students and interns to further hone these important skills. **Promoting professional engagement and community service nurtures the future leaders of the profession**.

NCARB believes it is important for architecture students to develop leadership skills and business acumen early in their education.

RECURRING THEMES

PROFESSIONAL CONDUCT

Professional conduct and ethical behavior play an important part of every practitioner's work on a daily basis. According to the Practice Analysis findings, practitioners considered the task *"Adhere to ethical standards and codes of professional conduct"* very important and as the most frequently performed of the tasks surveyed. The same group considered the task *"Comply with laws and regulations governing the practice of architecture"* critically important and as the second most frequently performed task. These findings underscore their importance to the future practitioner. As such, **NCARB recommends that early in their architectural education, students should begin developing an understanding of the professional's responsibilities to clients, owners, building users, and society in general.**

TASK STATEMENT	ALL LICENSED ARCHITECTS		
	PERCENT PERFORMED	PERFORMED DAILY	IMPORTANCE RATING 0 1 2 3 4
Adhere to ethical standards and codes of professional conduct	95.3%	70.8%	3.46
Comply with laws and regulations governing the practice of architecture	94.6%	69.1%	3.50

0 = Of little or no Importance 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Critically Important

While data from the Practice Analysis suggests that these tasks are being covered, there is a slight difference in perception between educators vs. interns and recently licensed architects on the level to which it is being performed.

TASK #	TASK STATEMENT	TASK IS COVERED IN PROGRAM	TASK INTRODUCED BUT NOT PERFORMED		TASK PERFORMED WITH GUIDANCE AND FEEDBACK	
		EDUCATORS	EDUCATORS	INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS / ARCHITECTS LICENSED IN THE PAST YEAR	EDUCATORS	INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS / ARCHITECTS LICENSED IN THE PAST YEAR
102	Adhere to ethical standards and codes of professional conduct	85.4%	45.2%	35.7%	43.8%	33.1%
103	Comply with laws and regulations governing the practice of architecture	81.3%	56.8%	37.3%	38.8%	35.4%

A third comparison of statistics related to two similar knowledge/skill statements offers an interesting contrast between when professional conduct knowledge is reportedly acquired. Interns and architects licensed 10 years or less indicated that *"Knowledge of codes of professional conduct related to architecture practice"* and *"Knowledge of ethical standards relevant to architectural practice"* are typically first acquired during internship. However, educators and practitioners as a group overwhelmingly reported that these important knowledge and skills should first be acquired by completion of the accredited architecture degree program. When looking at the response rate across all licensed architects, even more suggested this important information should be acquired by completion of accredited education.

Early in their architectural education, **NCARB recommends that students develop an understanding of the professional's responsibilities** to clients, owners, building users, and society in general.

KNOWLEDGE/ SKILL #	KNOWLEDGE OF	INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS: ARCHITECTS LICENSED 10 YEARS OR LESS		EDUCATORS: LICENSED ARCHITECTS	ALL LICENSED ARCHITECTS
		FIRST ACQUIRED BY COMPLETION OF DEGREE	FIRST ACQUIRED DURING INTERNSHIP	SHOULD FIRST BE ACQUIRED BY COMPLETION OF DEGREE	SHOULD BE ACQUIRED BY COMPLETION OF DEGREE
18	Codes of professional conduct as related to architectural practice	27.6%	62.0%	53.6%	56.7%
118	Ethical standards relevant to architectural practice	39.1%	51.1%	60.4%	67.3%

Professional conduct and ethical behavior are inextricably linked. Based on the responses to the Practice Analysis survey, NCARB recommends that these principles should be further incorporated in the foundations of accredited education. As a solution, we propose that NCARB's *Rules of Conduct* and the *AIA's Code of Ethics and Professional Conduct* be integrated into the curriculum through both hypothetical situations and real-world examples. Based on Practice Analysis results, we suggest that **emphasis should be placed on complying with various zoning ordinances, building codes, and professional regulations; as well as understanding the consequences of non-compliance**. Additionally, we believe **integrity, accountability, community service, and civic engagement should also be discussed as significant responsibilities of the architect** and their role in serving society.

NCARB recommends that **the principles of professional conduct and ethical behavior should be further incorporated** in the foundations of accredited education.

PRACTICE MANAGEMENT AND PROJECT MANAGEMENT

Issues such as business development, office management, risk management, and project management are extremely important to the livelihood of a successful practitioner. Over 60 tasks and a similar number of knowledge/skill statements related to practice management and project management were included in the Practice Analysis survey. Of the 15 knowledge/skills identified by more than 50% of all practitioners as being acquired post-licensure, 10 clearly fall into these two categories and were also rated as "important" or greater. Ideally, all knowledge and skills rated important should be acquired prior to licensure. While this is rarely the case, the data does indicate that more recently licensed architects feel they are acquiring these important knowledge/skills during internship. This trend is good news for internship and the profession.

Our survey indicates the belief that it is important for the academy to ensure that students are exposed to and understand basic practice management and project management knowledge and skills. **NCARB suggests that the professional practice course be enhanced and expanded** to expose students to best practices in business development, office management, and professional and project risk management. Furthermore, **we recommend that the professional practice curriculum be strengthened** to underscore the importance of project management aspects such as financial feasibility studies, project delivery methods, cost estimating, project budgets, construction schedules, conflict resolution, and post occupancy evaluation. **Engaging the practitioner in the classroom, and taking the classroom to the practitioner, is strongly encouraged to further expose students to these real-world practice management issues**. Additionally, students would also benefit from exposure to equity owners, occupants, clients, lenders, and insurers.

KNOWLEDGE/ SKILL #	KNOWLEDGE OF	INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS		ALL LICENSED ARCHITECTS	
		ARCHITECTS LICENSED 10 YEARS OR LESS			
		FIRST ACQUIRED DURING INTERNSHIP	FIRST ACQUIRED AFTER LICENSURE	ACQUIRED AFTER LICENSURE	IMPORTANCE RATING 0 1 2 3 4
71	Business development strategies	37.6%	31.3%	59.9%	2.47
73	Purposes and types of professional liability insurance related to architectural practice	40.0%	27.8%	58.0%	2.53
111	Methods to manage human resources	44.0%	20.4%	54.9%	1.95
6	Client and project characteristics that influence contract agreements	51.8%	34.2%	53.7%	2.96
86	Procedures for processing requests for additional services	66.9%	22.0%	53.7%	2.55
115	Purposes of and legal implications for different types of business entities	35.3%	25.3%	53.3%	1.96
122	Methods and procedures for risk management	43.1%	26.4%	53.3%	2.40
37	Strategies for anticipating, managing, and preventing disputes and conflicts	54.4%	23.6%	53.0%	2.56
67	Fee structures, their attributes and implications for schedule, scope, and profit	54.2%	27.6%	51.1%	2.68
85	Methods to identify scope changes that may require additional services	74.2%	20.2%	50.4%	2.77

0 = Of little or no importance 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Critically Important

SITE DESIGN

The results of the Practice Analysis suggest that the wide range of capabilities related to site design and master planning should be strengthened in the education curriculum. Approximately 17 knowledge and skill statements and 14 task statements are directly tied to site issues, zoning ordinances, environmental issues, utilities, transportation, infrastructure, civil engineering, and landscape architecture related tasks. These areas engage a broad range of underlying considerations such as sustainability, communication, collaboration with others, and application of technologies.

The following table compares the first point of acquisition of 10 of the major site design-related knowledge/skill statements. Interns and architects licensed 10 years or less were asked when they first acquired the knowledge/skill. When educators and licensed architects were collectively asked when they should first be acquired, the response increased. While these important knowledge/skills are covered in the education curriculum, the results indicate that they should be further emphasized.

KNOWLEDGE/ SKILL #	KNOWLEDGE OF	INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS	EDUCATORS
		ARCHITECTS LICENSED 10 YEARS OR LESS	LICENSED ARCHITECTS
		FIRST ACQUIRED BY COMPLETION OF DEGREE	SHOULD FIRST BE ACQUIRED BY COMPLETION OF DEGREE
53	Site design principles and practices	54.9%	86.6%
2	Master plans and their impact on building design	37.1%	65.2%
11	Effect of environmental factors on site development	45.1%	76.7%
15	Designing facility layout and site plan that meets site constraints	47.3%	74.7%
17	Elements and processes for conducting a site analysis	48.4%	71.1%
21	Land use codes and ordinances that govern land use decisions	12.9%	41.9%
32	Engineering properties of soils and their effect on building foundations and building design	21.1%	56.7%
52	Principles of landscape design and their influence on building design	46.4%	78.1%
80	Site analysis techniques to determine project parameters affecting design	41.3%	63.4%
16	Methods required to mitigate adverse site conditions	18.4%	39.1%

A similar conclusion can be made through a comparison of ten of the major site design-related tasks. Educators completing the survey indicated that students performed tasks *"with guidance and feedback"* or *"independently with minimal guidance"* at a higher rate than did interns and architects licensed in the past year.

Our data suggests that students should be more exposed and engaged in projects that directly relate to site development and site organization.

TASK #	TASK STATEMENT	EDUCATORS	INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS / ARCHITECTS LICENSED IN THE PAST YEAR
		TASK IS PERFORMED BY STUDENTS	TASK WAS PERFORMED BY COMPLETION OF DEGREE
4	Determine impact of applicable zoning and development ordinances to determine project constraints.	88.7%	52.6%
10	Determine impact of existing utilities infrastructure on site.	63.2%	35.7%
11	Determine impact of existing transportation infrastructure on site.	80.2%	52.6%
15	Analyze existing site conditions to determine impact on facility layout.	98.7%	86.0%
19	Consider results of environmental studies when developing site.	79.1%	47.7%
20	Develop mitigation options to address adverse site conditions.	67.5%	39.6%
29	Evaluate opportunities and constraints of alternative sites.	82.1%	47.4%
33	Prepare site analysis diagrams to document existing conditions, features, infrastructure, and regulatory requirements.	98.1%	81.5%
43	Design for civil components of site.	61.9%	42.5%
45	Design for landscape elements for site.	83.1%	72.4%

Practice Analysis survey participants indicated that graduates of accredited architecture programs should possess a greater knowledge/understanding and the ability to demonstrate the skills necessary to integrate the multiple issues and influences related to site design and master planning. The NCARB Education Committee suggests that **students should be more exposed and engaged in projects that directly relate to site development and site organization** such as solar orientation, utilities, transportation, and access. Further, the Committee recommends that **exposure to regulatory requirements and the ways development ordinances impact site feasibility studies and site design should be enhanced**. Many of these activities could be incorporated through assignments with students in the associated fields of landscape architecture, urban planning, environmental sciences, and civil engineering.

CONSTRUCTABILITY

Constructability is a key component leading to a successful project and "understanding constructability" was rated as the most important educational goal by respondents to the NAAB *Study of Accredited Architectural Education*. Assembling a set of construction drawings comprised of thoughtful details that can be built requires firsthand knowledge of materials, their properties, and unique characteristics. Mastery comes from years of experience, and competence is developed in a well-structured and supervised internship; however, the understanding of materials and the basic skills necessary to integrate them into a project should begin in the classroom. The NAAB study asserts that **architectural education must establish a solid framework for understanding how a building is put together with the assurance that the building complies with the codes, standards, and ordinances required to protect the public**. This combination will provide graduates with the confidence to successfully participate as productive team members and future project managers.

Building Systems and **Building Envelope** are extremely complex systems that rely on the integration and coordination of various materials and components across multiple disciplines. Based on the results of the Practice Analysis, the responses of educators and practitioners were closely split between "understand" and "apply" when asked to what extent the knowledge should first be acquired. However over 50% of this respondent group indicated that knowledge related to building systems and building envelope should first be acquired by completion of accredited education, underscoring the importance of establishing an early understanding of the construction sequence.

KNOWLEDGE/ SKILL #	KNOWLEDGE OF	EDUCATORS AND LICENSED ARCHITECTS			
		WHEN KNOWLEDGE SHOULD FIRST BE ACQUIRED	TO WHAT EXTENT KNOWLEDGE SHOULD FIRST BE ACQUIRED		
		BY COMPLETION OF EDUCATION	UNDERSTAND	APPLY	EVALUATE
43	Structural load and load conditions that affect building design	81.7%	46.3%	40.1%	13.6%
39	Structural properties of construction products, materials, and assemblies and the impact on building design and construction	78.0%	43.5%	40.6%	15.9%
38	Engineering design principles and their application to design and construction	75.9%	51.5%	35.8%	12.7%
35	Effect of thermal envelope in design of building systems	75.7%	41.6%	39.2%	19.2%
34	Building technologies that provide solutions for comfort, life safety, and energy efficiency	65.9%	44.5%	37.4%	18.1%
56	Relationship between constructability and aesthetics	65.0%	37.2%	35.9%	26.8%
40	Means and methods for building construction	64.6%	49.4%	33.4%	17.2%
10	Factors involved in selection of building systems and components	61.3%	34.3%	46.8%	18.9%
44	Energy codes that impact construction	56.4%	54.9%	33.9%	11.2%
107	Design decision and their impact on constructability	55.7%	43.6%	34.0%	22.4%

Building Codes are essential standards developed and enforced to ensure the safety of the public. The understanding and successful incorporation of building and zoning code requirements into a project are a primary responsibility of the architect in fulfilling the obligation to protect the public health, safety, and welfare. This body of knowledge was rated between very important and critically important, and is performed by a significant percentage of all practitioners. Architects and interns disagreed with educators regarding the role of education in acquiring this knowledge. Educators indicated the tasks are performed at a much higher rate by completion of an accredited degree than what was reported by interns and architects licensed in the past year.

Over 50% of educators and practitioners indicated that knowledge related to building systems, building envelope, and building codes should first be acquired by completion of accredited education.

TASK #	TASK STATEMENT	EDUCATORS	INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS	ALL LICENSED ARCHITECTS	
			ARCHITECTS LICENSED IN THE PAST YEAR		
		TASK IS PERFORMED BY STUDENTS	TASK IS PERFORMED BY COMPLETION OF DEGREE	TASK IS PERFORMED BY STUDENTS	IMPORTANCE RATING 0 1 2 3 4
4	Determine impact of applicable zoning and development ordinances to determine project constraints	88.7%	52.6%	87.3%	3.20
21	Perform building code analysis	84.1%	48.1%	91.8%	3.55
35	Prepare code analysis documentation	77.1%	39.6%	86.5%	3.05

0 = Of little or no Importance 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Critically Important

Almost 100% of practitioners rated the knowledge of *building codes and their impact on building design* between very important and critically important; however, interns and recently licensed architects reported that code-related knowledge and skills are acquired during internship. It is encouraging to note that more than 50% of educators and practitioners supported that these important knowledge and skills should first be acquired by completion of accredited education.

The current structure of the SPC does not clearly support the interpretation and application of building codes and zoning ordinances. The SPC covering Accessibility is also consistently identified by visiting teams as being "*not met*." **NCARB recommends that all code-related issues should be better identified and consolidated in order to more clearly require that students are able to interpret and apply various codes and ordinances and produce buildings that conform to building code requirements**. Evidence that student work meets code requirements is easily identifiable by visiting team members and deserves a higher priority in the overall accreditation process.

KNOWLEDGE/ SKILL #	KNOWLEDGE OF	INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS / ARCHITECTS LICENSED 10 YEARS OR LESS: FIRST ACQUIRED DURING INTERNSHIP	EDUCATORS / LICENSED ARCHITECTS: SHOULD FIRST BE ACQUIRED BY COMPLETION OF DEGREE	ALL LICENSED ARCHITECTS: PERCENT IMPORTANT	ALL LICENSED ARCHITECTS: IMPORTANCE RATING 0 1 2 3 4
20	Building codes and their impact on building design	82.0%	60.6%	99.3%	3.53
44	Energy codes that impact construction	68.7%	56.4%	91.1%	2.67

0 = Of little or no Importance 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Critically Important

SUSTAINABILITY

The emphasis on sustainability and its integration into design has increased dramatically over the last several years. While some consider the principles of sustainable design to be a specialization or an additional service, many clients, owners, and the public are expecting sustainability as a basic service and best practice. The results of the Practice Analysis clearly support that sustainable design issues are introduced in the curriculum; however, interns and architects licensed within the past year indicated that the tasks related to sustainable design are actually performed (either *with guidance and feedback* or *independently with minimal guidance*) to a much lesser extent than that indicated by educators.

TASK #	TASK STATEMENT	EDUCATORS		INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS ARCHITECTS LICENSED IN THE PAST YEAR	
		INTRODUCED, BUT NOT PERFORMED BY STUDENTS	TASK IS PERFORMED BY STUDENTS	INTRODUCED, BUT NOT PERFORMED BY COMPLETION OF DEGREE	TASK WAS PERFORMED BY COMPLETION OF DEGREE
12	Assess environmental impact of design decisions	17.5%	82.5%	26.0%	60.4%
17	Develop sustainability goals based on existing environmental conditions	11.7%	88.3%	23.7%	54.9%
18	Establish sustainability goals affecting building performance	13.9%	86.1%	26.3%	54.5%
76	Manage implementation of sustainability criteria	42.0%	58.0%	21.4%	24.4%
48	Select building performance modeling technologies to guide building design	28.4%	71.6%	24.7%	26.3%
98	Understand implications of evolving sustainable design strategies and technologies	28.7%	71.3%	26.9%	41.2%

KNOWLEDGE/ SKILL #	KNOWLEDGE OF	INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS ARCHITECTS LICENSED 10 YEARS OR LESS		EDUCATORS LICENSED ARCHITECTS	
		ACQUIRED BY COMPLETION OF DEGREE	ACQUIRED DURING INTERNSHIP	SHOULD FIRST BE ACQUIRED BY COMPLETION OF DEGREE	LEVEL OF KNOWLEDGE ACQUISITION: *UNDERSTANDING*
44	Energy codes that impact construction	6.4%	68.7%	56.4%	54.8%
82	Sustainability strategies and/or rating systems	22.9%	50.0%	62.5%	50.7%
83	Sustainability considerations related to building materials and construction processes	22.4%	52.7%	61.6%	55.3%
84	Techniques to integrate renewable energy systems into building design	25.1%	45.8%	63.4%	58.0%

Based on the data presented above, **it is desired that programs devote more time working with students to develop sustainability goals and strategies for their projects and provide students with a better understanding of emerging technologies related to sustainable design**. The data also indicates that both educators and practitioners expect students to gain a better understanding and command of energy codes and various rating systems that impact design and construction by completion of a NAAB-accredited program.

TECHNOLOGY

Technology permeates every facet of professional practice, and the profession's dependence on technology continues to grow. Whether it is a technology that assists in developing and communicating the design of a building or a tool that is used to successfully deliver or administer a project, **students are expected to understand the powerful role technology plays in both project management and practice management**. The data below indicates that faculty at NAAB-accredited programs are clearly covering both applications of technology in the classroom. However, similar to the findings presented earlier, in the discussion on sustainability, interns and architects licensed in the past year reported they are performing these tasks at a lower level of ability than indicated by educators.

> The changing nature of technology necessitates that multiple parties share responsibility for its introduction, competence, and mastery.

TASK #	TASK STATEMENT	EDUCATORS		INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS ARCHITECTS LICENSED IN THE PAST YEAR	
		INTRODUCED, BUT NOT PERFORMED BY STUDENTS	TASK IS PERFORMED BY STUDENTS	INTRODUCED, BUT NOT PERFORMED BY COMPLETION OF DEGREE	TASK WAS PERFORMED BY COMPLETION OF DEGREE
48	Select building performance modeling technologies to guide building design	28.4%	71.6%	24.7%	26.3%
98	Understand implications of evolving sustainable design strategies and technologies	28.7%	71.3%	26.9%	41.2%
36	Select technologies to develop and produce design and construction documentation	11.2%	88.8%	17.9%	57.1%
99	Understand implications of project delivery technologies	65.7%	34.3%	25.0%	28.9%

KNOWLEDGE/ SKILL #	KNOWLEDGE OF	INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS		EDUCATORS	
		ARCHITECTS LICENSED 10 YEARS OR LESS		LICENSED ARCHITECTS	
		ACQUIRED BY COMPLETION OF DEGREE	ACQUIRED DURING INTERNSHIP	SHOULD FIRST BE ACQUIRED BY COMPLETION OF DEGREE	SHOULD FIRST BE ACQUIRED DURING INTERNSHIP
34	Building technologies that provide solutions for comfort, life safety, and energy efficiency	27.6%	61.6%	65.9%	28.2%
116	Innovative and evolving technologies and their impact on architectural practice	25.1%	52.0%	40.3%	29.3%
31	Factors involved in selecting project appropriate computer based design technologies	22.0%	57.1%	36.2%	43.7%
89	Construction document technologies and their standards and applications	12.4%	80.2%	31.2%	57.7%
106	Project risks for new and innovative products, materials, methods, and technologies	9.6%	60.9%	23.2%	41.6%

As indicated above, interns and architects licensed less than 10 years overwhelmingly indicated they acquired technology-related knowledge during internship. When asked "When should the knowledge first be acquired?" educators and licensed architects collectively were split between education and internship. This is not surprising considering the fast pace at which technology emerges and changes. NCARB believes **the changing nature of technology requires that multiple parties share responsibility for its introduction, competence, and mastery**, recommending that:

- educators provide a sound introduction to a broader range of both project-specific and practice-specific technologies;
- students demonstrate an understanding of its benefits and application;
- interns develop a greater level of expertise and competence during a supervised internship; and
- licensed architects master the various technologies through continued use and advanced training provided by various software developers and vendors.

Technology will continue to play a significant role in the profession and spans all phases of an architect's career from accredited education, to internship, to licensure, and beyond.

CONDITIONS FOR ACCREDITATION

The threads and themes presented in this paper are intended to spur discussion in support of improving the effectiveness of architectural education. The following comments and recommendations are directed to specific portions of the current *Conditions for Accreditation*.

STUDENT PERFORMANCE CRITERIA

When licensed architects were asked, *"when should the knowledge/skill be acquired,"* the overwhelming response across all knowledge and skill statements was *"before completion of the accredited degree program."* While practitioners' expectations are not surprising, it fails to recognize the academy's struggle with an already crowded curriculum and stretched resources.

Based on the results of the Practice Analysis, only nine tasks were identified by more than 50 percent of educators as "not covered" in their program. Interns and architects responding to a similar question also stated that these nine tasks were "not introduced" during their education; however, they also identified approximately 35 additional tasks—those primarily dealing with practice/project management issues—they considered as "not introduced." After a thorough review of the tasks and knowledge/skill statements, the NCARB Education Committee believes that a great majority are covered or easily incorporated across a broad range of the Student Performance Criteria. This extensive coverage allows the faculty multiple opportunities to weave them throughout the curriculum.

TASK #	TASKS IDENTIFIED AS "NOT COVERED" OR "NOT INTRODUCED" IN EDUCATION BY EDUCATORS, INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS, AND ARCHITECTS LICENSED IN THE PAST YEAR (LISTED FROM HIGHEST TO LOWEST)
41	Update cost of work estimates
28	Prepare submittals for regulatory approval
73	Evaluate staffing plan to ensure compliance with established milestones
75	Assist client in selecting contractors
55	Review results from field reports, third party inspections, and other test results for conformance with contract documents
38	Manage project close-out procedures and documentation
39	Perform quality control reviews throughout the documentation process
70	Prepare staffing plan to meet project goals
40	Prepare cost of work estimates

Collaboration and leadership skills are intertwined with the expectation that the architect lead the collaborative effort required in today's complex projects.

TASK #	ADDITIONAL TASKS IDENTIFIED AS "NOT INTRODUCED" IN EDUCATION BY INTERNS WHO COMPLETED IDP WITHIN THE PAST 2 YEARS, AND ARCHITECTS LICENSED IN THE PAST YEAR (TOP 20 LISTED FROM HIGHEST TO LOWEST)
86	Establish procedures for building commissioning.
91	Determine billing rates.
54	Determine specific insurance requirements to meet contract or business needs.
80	Review Application and Certificate for Payment.
56	Manage modifications to the construction contract.
69	Negotiate terms and conditions of services outlined in Architect-Consultant Agreement.
68	Establish procedures for providing post-occupancy services.
90	Develop strategies to control risk and manage liability.
92	Develop business plan for firm.
79	Coordinate testing of building performance and materials.
53	Establish procedures to process documentation during contract administration.
62	Negotiate terms and conditions outlined in Owner-Architect Agreement.
85	Manage project-specific bidding process.
71	Establish procedures for documenting project decisions.
74	Manage client expectations to align with established milestones and final decision points.
87	Select design team consultants.
95	Develop procedures for responding to contractor requests (Requests for Information).
8	Evaluate results of feasibility studies to determine project's financial viability.
59	Prepare proposals for services in response to client requirements.
6	Determine design fees.

The Education Committee suggests the following modifications be considered during the review and update of the existing Student Performance Criteria:

- **Combine C1 – *Collaboration with C6 – Leadership.*** As discussed earlier in this paper, these two skills are intertwined with the expectation that the architect lead the collaborative effort required in today's complex projects. The level of performance for the combined SPC should be increased to *ability*.
- **Expand C4 – *Project Management.*** The existing descriptor is very limited and should be further expanded to introduce construction management knowledge and skills such as project delivery methods, phasing, scheduling and deadlines, testing processes, field reports, and project closeout and post-occupancy evaluation processes. The expected level of performance should remain at *understanding*.
- **Expand C5 – *Practice Management.*** The existing descriptor is somewhat limiting and should be further expanded to broaden a student's exposure to practice management knowledge and skills such as fee structures, project scope changes and additional services, consultant agreements, professional liability insurance, and a wide range of human resource management issues. The expected level of performance should remain at *understanding*.
- **Extract portions of C7 – *Legal Responsibilities* and relocate to B5 – *Life Safety*.** Practice related issues such as registration laws and professional service contracts are inappropriately combined with building code and other life safety concerns. C7 – *Legal Responsibilities* should focus on the understanding of public and client aspects of practice. The ability to successfully integrate building codes, zoning ordinances, accessibility requirements, and environmental regulations into student projects should be incorporated into B5 – *Life Safety*.
- **Raise A11 – *Applied Research* expected level of performance to *ability*.** Students are expected to be able to gather, assess, record, and evaluate information (A5 – *Investigative Skills*). Students should also be able to apply these findings to their work.

COMPREHENSIVE DESIGN

Comprehensive Design is a composite of 11 independent student performance criteria intended to assess a student's ability to produce a design project that successfully integrates all 11 SPC. Based on the annual NAAB accreditation decision reports, 32 of 103 programs reviewed in the past four years were identified as having *"not met"* Comprehensive Design. Those same reports indicated that two of the SPC—Technical Documentation and Accessibility—were *"not met"* on an individual basis. Failing to satisfy the Comprehensive Design SPC indicates that students lack the skills necessary to design a comprehensive project. As a result, we believe the academy's support of and the students' ability in comprehensive design must be increased to ensure that graduates are capable of demonstrating their competence to incorporate design, building codes, and building systems into an integrated whole.

NCARB believes the academy's support of and the students' ability in comprehensive design must be increased.

We recommend that faculty of accredited programs, with the support of ACSA, place greater emphasis on a student's thorough understanding and ability with the individual SPC. For example, integration of the multiple SPC could begin with smaller projects in early studio courses (Level III), building greater confidence with integration and coordination in intermediate studio work (Level IV), and culminating in the comprehensive design of more complex projects in advanced design courses (Level V) prior to graduation. Students' comprehensive design skills could also be enhanced through the progressive completion of a project that spans multiple semesters and/or courses.

CONDITIONS FOR ACCREDITATION	SCHOOL YEAR	CONTINUING ACCREDITATION		INITIAL ACCREDITATION	
		"NOT MET" COMPREHENSIVE DESIGN	TOTAL PROGRAMS REVIEWED	"NOT MET" COMPREHENSIVE DESIGN	TOTAL PROGRAMS REVIEWED
2004	2009	5	18		
	2010	8	32	1	3
2009	2011	6	24	1	2
	2012	13	29	0	3
TOTAL		32	103	2	8

EDUCATION CORE REQUIREMENT

Preparation for the future practice of architecture typically begins with enrollment in a NAAB-accredited program, with graduation dependent on the acquisition of knowledge and skills outlined in the Student Performance Criteria. Each program interprets and satisfies the SPC in its own way. Given the desire for a program to maintain its individual approach, the execution of the SPCs is often thought of as a default "core curriculum." In reviewing the Practice Analysis data and discussing perceived gaps between education and practice, NCARB offers that **the establishment of a more formalized core curriculum—a subset of a total degree program that is infrequently affected by trends or technology—may allow a more consistent approach to cover essential requirements that are fundamental to the successful practice of architecture**. These core elements could focus on and reinforce the aspects of architectural education that remain consistent across time and rarely change or fluctuate regardless of type of project, size of firm, or specialization of practice. The balance of the curriculum and the remaining SPCs could reflect the institution's focus or emphasis as well as provide students and faculty the flexibility to address emerging practice trends or develop practice specialization tracks.

Further, any core curriculum concept must be mindful of the individual strengths and emphasis of an institution, and avoid adding undue strain to budgets or limiting the creative approach to curricular innovation that is a hallmark of the architecture academy. **NCARB recommends that the opportunity to experiment with a core curriculum requirement be further explored** by the NAAB through cross-collateral collaboration, institutions, and other parties interested in developing a pilot program. This modified approach to augmenting the existing SPC may require other shifts in the existing accreditation requirements to lessen any perceived burden.

> Establishment of a more formalized core curriculum may allow a more consistent approach to cover requirements essential to the practice of architecture.

EDUCATION
HUMAN RESOURCES

NCARB has long supported the integration of practice in the academy. A successful program depends on more than financial resources; it requires appropriate human resources as well.

Engaging Architects with knowledge of current and emerging practices in various capacities throughout an accredited program greatly enhances the student's educational experience. **Models that value and reward full-time faculty members who are licensed practitioners should be further developed**. For example, creation of a "Professor of Practice" position should be championed by the ACSA as well as other collaterals. Implementing such a position should be a goal for all accredited programs. **Other avenues to integrate practice through expanded adjunct positions, guest lecturers, and jury processes should also be explored**.

It has been suggested that because neither licensed architect status nor IDP Coordinator status are routinely recognized as assets in the pursuit of tenure, their value is greatly diminished within the academy. The Council encourages further discussion toward progress in this arena.

The engagement and support of the IDP Educator Coordinator as a student resource was a valuable addition to the 2009 Conditions for Accreditation. This single individual influences hundreds of students throughout their accredited education and may need additional assistance in larger programs. **NCARB recommends that a student-to-coordinator ratio be considered to further support students and recent graduates as they pursue licensure**.

Often overlooked resources are the students themselves. NCARB and the AIAS are currently working together to develop an IDP Student Coordinator position to supplement the IDP Educator Coordinator. In many instances, the new Student Coordinator working in tandem with the Educator Coordinator may more effectively reach peers early in their education to help understand and navigate the path to licensure.

The NCARB Prize and the NCARB Grant demonstrate the Council's commitment to integrating practice in the academy. NCARB has awarded over $800,000 to 53 different accredited programs over the past 12 years. And the NCARB Board of Directors has renewed its commitment through the recently restructured NCARB Award.

An active and engaged IDP Educator Coordinator provides students with a better understanding of requirements for licensure.

NCARB financially supports that effort through the annual IDP Coordinators Conference.

NCARB and AIAS have jointly developed and are pilot testing an IDP Student Coordinator position. At this point, 16 schools have volunteered to participate in the pilot.

STUDIO MODEL

With the exception of advances in emerging technologies, design education and the basic design teaching model have not significantly changed since the Beaux Arts period. The current method of one faculty member sitting "one on one" with a student while the other students wait for their critique is inefficient. This is particularly true for the early years of architectural education when students have not yet learned how to work effectively on their own. Could models be developed that would impact more students simultaneously, thus increasing learning and promoting efficiency collectively? Should student-to-teacher ratios be re-introduced in the Conditions for Accreditation? **NCARB encourages the ACSA and the AIAS to undertake a review to reinvent the instructional model while reinforcing the positive aspects of both the "present" and "remote" studio cultures**.

Could studio models be developed that would impact more students simultaneously, thus increasing learning and promoting efficiency collectively?

BLUE SKY

INTEGRATION OF THE PATH TO LICENSURE

A professional degree in architecture from a NAAB-accredited program provides a solid foundation for aspiring architects and allows students the freedom to learn and explore. The IDP has long been considered the second step on the path to licensure and provides interns the opportunity to apply the theories, knowledge, and skills acquired during education to real-world scenarios and actual projects. And finally, a standardized examination has required the demonstration of competent performance prior to licensure. These components have been combined in various forms to provide multiple pathways to licensure that have served the profession well for many years.

Over the years, the NAAB Conditions have been revised, the IDP has evolved, and the ARE has changed to respond to current issues and trends identified by the NCARB Practice Analysis and the profession. However, the length of time to licensure has increased since the introduction of the computer-based exam in 1997. Since then, NCARB and its Member Boards have responded with several major initiatives that decrease the time for those who seek licensure more quickly: concurrent testing during IDP (2007), earlier participation in the IDP (2010), and recognition of academic internships (2012).

The NAAB ARC regularly brings educators, students, interns, and practitioners together to strengthen and improve architectural education. As we look beyond this ARC, **NCARB stands ready to collaborate with ACSA, AIAS, AIA, and the NAAB to explore new models that might further blend the existing components of education, experience, and examination with regulation to more effectively prepare the future practitioner and better serve the profession**. For example, these new alternatives might emulate the medical or law model, may lead to a new degree nomenclature, might include a mandatory student internship in "teaching offices" or other structured work/study model, or might incorporate a new examination(s) administered as a requirement for graduation. Further exploration and experimentation may lead to a somewhat longer process that integrates education, internship, and examination in a manner that results in licensure upon graduation.

Education, experience, and examination all play an important role leading to licensure. When one component changes, others are impacted. NCARB is currently evaluating and exploring new opportunities for the Architect Registration Examination. Should a new model for the exam unfold, education and internship will have to assume additional responsibilities. Responding to these opportunities and challenges will require the engagement of the collaterals, the expertise of the academy, the acceptance of the architectural registration boards, and the support of the profession. Regardless of the outcome, the exploration will strengthen the path to licensure while ensuring the continued protection of the public.

APPENDIX: *2012 NCARB PRACTICE ANALYSIS OF ARCHITECTURE:* EDUCATION SURVEY RESULTS

BACKGROUND

In 2011, NCARB selected PSI Services, LLC to conduct a study of the practice of architecture ("practice analysis") in order to obtain information that will be used to drive the Architect Registration Examination®, inform the Intern Development Program, and guide NCARB's contribution to the National Architectural Accrediting Board (NAAB) 2013 Accreditation Review Conference. The results will also be used to inform NCARB's education programs and continuing education policies.

The *2012 NCARB Practice Analysis of Architecture* was designed under the guidance and review of a Practice Analysis Steering Committee (PASC), which was comprised of Member Board Members and additional architects representing the profession's collateral organizations: the American Institute of Architects (AIA), Association of Collegiate Schools of Architecture (ACSA), American Institute of Architecture Students (AIAS), and the NAAB. The Practice Analysis followed a rigorous approach that included the review of related source materials and multi-faceted methods of data collection. This approach included:

- A review of previous architecture practice analysis studies (NCARB, 2001 and 2007), the California Architects Board (CAB), and the practice analyses of several other professional licensing organizations;
- Focus group surveys and interviews with key client and other stakeholder groups;
- Meetings with panels of over 40 subject matter experts (SMEs) serving on the Practice Analysis Task Force (PATF) that was responsible for the generation and review of a list of professional tasks and knowledge/skills necessary to practice architecture; and,
- A national survey of licensed architects, interns, and educators who provided demographic information and then reviewed the lists of professional tasks, knowledge and skills, using formal rating scales to quantify their professional experience (e.g., importance of competent performance; frequency of performance/use; level of knowledge/skill required; when knowledge/skill should be acquired; and other rating scales).
- Different versions of the survey were developed for education, internship, examination, and continuing education.

PRACTICE ANALYSIS SURVEY

Prior to launching the main survey of architecture professionals, a pilot survey was launched to gather feedback regarding the comprehensive nature of the task and knowledge/skill statements as well as the functionality and design of the survey. A total of 1,338 e-mail invitations was sent and 218 individuals participated. Several refinements to the surveys were made on the basis of the pilot survey results.

Invitations for the main national survey of architecture professionals were sent via e-mail to 74,387 licensed architects, interns, and educators, drawing from databases provided by NCARB, AIA, ACSA and NCARB Member Boards. The e-mail campaign was carefully planned and several communications were issued to describe the practice analysis study and its importance to the profession. The survey invitation e-mail included complete instructions and background information regarding the purpose of the study. In addition to the e-mail invitations, the survey was also available through a public link located on the NCARB website to extend the Council's reach and increase the level of participation. Participants were routed to the appropriate version of the survey on the basis of their response to select background questions. The survey was accessible for 5 weeks, spanning the period of 2 April to 6 May, 2012.

Once the responses were received, a series of statistical analyses were conducted, and the characteristics of the survey sample were summarized. The sample represented all geographic regions in the United States, with a small percentage received from Canada). The survey respondents included practitioners from a wide range of professional settings, including:

- Architecture firms
- Architecture/engineering firms
- University/academic institutions
- Government/public sectors
- Design/build firms
- Specialty consulting firms

Organizational sizes ranged from sole practitioner to more than 100 employees. The respondents ranged in experience (two-thirds were licensed for more than 10 years while nearly 10% had been licensed for a year or less) and included a variety of job titles such as:

- Principal
- Project architect
- Project manager
- Facilities manager/owner's representative
- Educator
- Design architect
- Production architect, intern

A series of analyses of the survey ratings of professional tasks and knowledge/skills were conducted to identify important items with respect to education, internship, examination, and continuing education. Separate modules will be released containing the findings for each of these four areas, including how the data will inform programs like the IDP and the ARE.

EDUCATION SURVEY

The Education (EDU) practice analysis survey was divided into four parts with each part designed to elicit different information from a different group, as follows:

- Educators reviewed the tasks and indicated the extent to which students perform each task by completion of their architecture education;
- Interns and architects reviewed the tasks and indicated the extent to which they performed each task by completion of their architecture degree program;
- Educators and architects reviewed the knowledge/skill (K/S) statements and indicated which ones are best learned within the years of architecture education, and to what extent each K/S should be learned within the years of architecture education; and,
- Interns and architects reviewed the K/S statements and indicated when recently licensed architects first acquire the K/S and to what extent each K/S was acquired during accredited education.

Over 2,000 EDU surveys were completed. The results provide useful information to guide the development of NCARB policies and recommendations regarding the requirements of accredited architecture education.

In order to decrease the amount of time required to complete the survey and to help ensure that a sufficient number of responses would be obtained, the EDU survey was subdivided as follows:

SURVEY	SURVEY POPULATION
EDU A	Educators
EDU B	Interns who completed the IDP within the past 2 years but not the ARE Architects licensed in the past year and completed the IDP in the past 2 years
EDU C	Educators + Licensed architects
EDU D	Interns who completed the IDP within the past 2 years but not the ARE Architects licensed in the past year and completed the IDP in the past 2 years Architects licensed 2-10 years

SURVEY RESPONSE DATA PREPARATION AND QUALITY CONTROL

Data from the online survey software was exported into both an Excel and SPSS format for analysis. Participants who responded to at least 90% of the items in the survey were included in the final analysis. However, if a participant completed the same survey twice, their second response was not included in the analysis. Duplicate responses by the same participants were detected by a repeating ID number. Also, anomalies in a participant's response patterns were identified and their responses to the open-ended questions were examined. A small number of cases were excluded based on the response patterns and comments stating that they just selected any answer, or they did not belong to the particular survey population and had been mistakenly routed to the wrong survey.

OVERALL RESPONSE RATE

The final response rate across all Practice Analysis surveys was determined in several stages:

- Survey invitations delivered: Of the 82,985 survey invitations sent, 74,387 were successfully delivered.
- Surveys submitted: A total of 15,620 surveys were submitted via the open survey link (both partial and complete surveys).
- Surveys qualified (preliminary): A total of 2,543 respondents were disqualified from taking the survey. Individuals disqualified from taking the surveys were those who were not licensed and participated in the IDP more than 2 years ago. Therefore, there were 13,077 (17.58%) partial and complete surveys.
- Survey qualified (for analysis): Surveys were included the in the data analysis if respondents completed 90% or more of the survey. A total of 7,867 (10.58%) surveys met this criterion.

EDU SURVEY RESPONSE RATES

The number of acceptable responses for each EDU survey ranged from 52% to 80%, based on the 90% completion rule.

TOTAL RESPONSES RECEIVED FOR EDU SURVEYS

SURVEY TYPE	SURVEYS RECEIVED	NUMBER OF SURVEYS INCLUDED IN DATA ANALYSIS	PERCENTAGE OF SURVEYS INCLUDED IN DATA ANALYSIS
EDU A	238	171	72%
EDU B	384	308	80%
EDU C	1,444	1,086	75%
EDU D	869	450	52%

SUPPLEMENTAL STUDIES

In addition to the practice analysis survey, NCARB gathered data regarding the architecture profession in three supplemental studies. The first study, the Focus Group Report, involved conducting surveys and focus groups with individuals who regularly work with architects and identifying their perceptions regarding issues, challenges, and future directions (e.g., economic conditions, emerging technologies). The second study, the Crosswalk Study, compared the professional tasks and K/S identified in NCARB's *2007 Practice Analysis of Architecture* and the current practice analysis survey prior to its national administration. This study indicated the two were substantially aligned. The third study, the AIAS Survey, entailed administering a modified practice analysis survey to students who were registered to attend the AIAS Forum in December 2011. This survey included questions and rating scales designed to provide supplemental information in support of the EDU and IDP programs. The majority of tasks in the survey were reported as being covered in the student's architectural program.

CONCLUSION

The *2012 NCARB Practice Analysis of Architecture* provides a comprehensive and rich set of information from a broad and representative sample of architects, interns, and educators. The results of this study will provide the Council with the data needed to drive the ARE, inform the IDP, and guide NCARB's response to the NAAB 2013 Accreditation Review Conference. Additionally, the data will be used to inform the Council's future continuing education policies.

EDU SURVEY FINDINGS

EDU Task Ratings

Whether tasks were covered in architecture education

A total of 171 educators responded to the EDU survey and indicated whether each of the 104 task statements was covered in their respective programs. **Appendix Table B2** lists the percent of educators who rated each task as *Yes, No, or I Don't Know*, for whether the given task was covered. For instance, Table B2 shows that for EDU Task 1 ("*Gather information about client's vision, goals, budget, and schedule to validate project scope and program.*"), 71.3% indicated the task was covered by their program, 16.4% indicated it was not covered, and 12.3% indicated they didn't know whether the task was covered.

The percent of educators indicating their program covered each task ranged from 17.5% to 95.9%. Figure 2 displays the distribution across tasks for the percent of educators indicating each task is covered. In the figure, the percentages are reported in intervals of 10, where each interval includes the lower bound value and excludes the upper bound value (e.g., 80.0% - < 90.0% includes the values 80.0% to 89.9%). The only exception is with the interval 90.0% to 100.0%, which includes both 90.0% and 100.0% values. For example, the figure indicates 9 tasks were each rated by 90% or more of responding educators as being covered by their respective programs. Sixteen (16) tasks were each rated as being covered in 80% to 90% of the responding educators' programs. The data show a clustering pattern in which 31 tasks (29.8%) were rated as covered in 70.0% or more of responding educators' programs, and 57 tasks (54.8%) were rated as covered in 20.0% to 50.0% of the educators' programs.

Educators' ratings of the extent of task performance by students

When educators rated a given task as being covered by their respective programs, they were asked a follow-up question regarding the extent to which students in their program perform the task. **Appendix Table B3** lists the percent of educators who rated each task as *Introduced but not Performed, Performed With Guidance and Feedback*, or *Performed Independently With Minimal Guidance*.

For instance, with EDU Task 1 ("*Gather information about client's vision, goals, budget, and schedule to validate project scope and program.*"), 122 educators

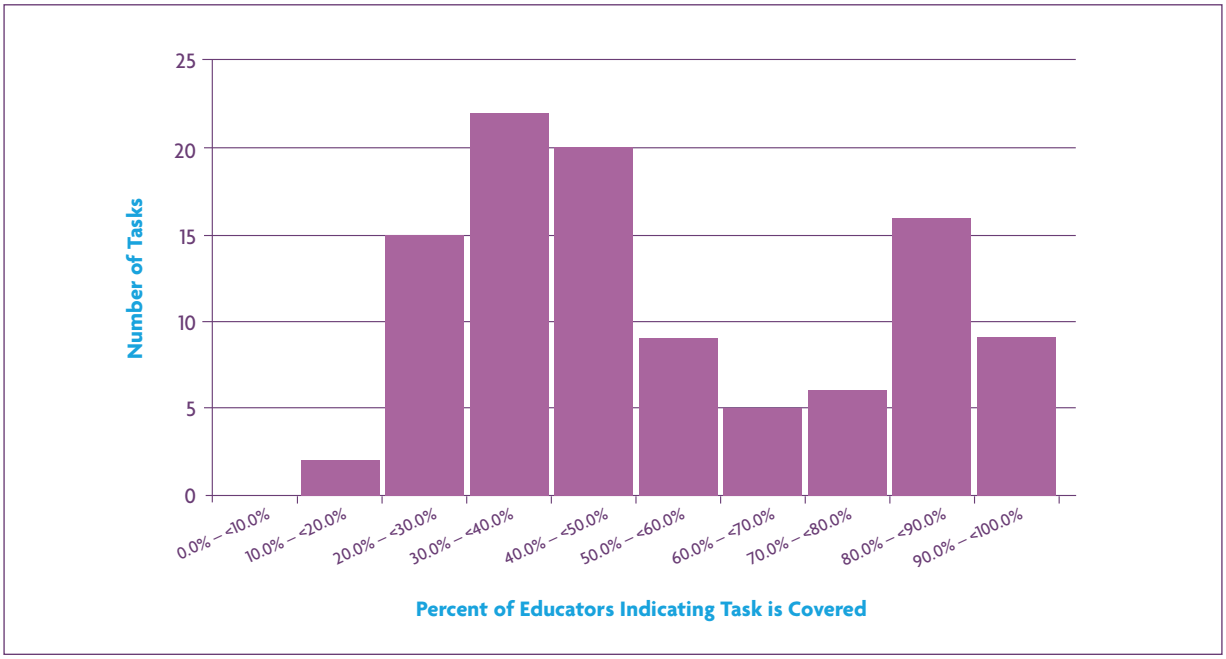

Figure 2. Distribution of EDU task ratings: Percent of educators indicating whether each task is covered

indicated their program covered EDU Task 1. Out of those 122 educators, 23.8% indicated students in their program were introduced to, but did not perform the task; 63.1% of educators indicated the task was performed by students with guidance and feedback; and 13.1% of educators indicated the task was performed independently by students with minimal guidance.

Reasons why tasks were not covered

Educators who rated a given task as not being covered by their programs were then asked to select one or more reasons why that task was not covered. **Appendix Table B4** lists the number of educators who selected each of the reasons offered for a task not being covered.

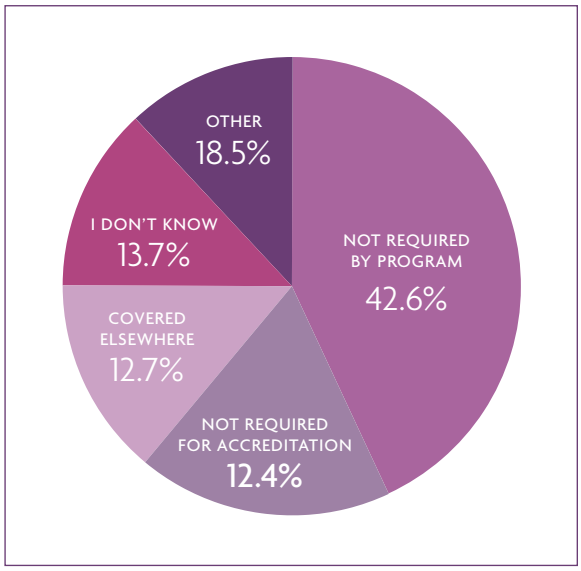

Figure 3. Reasons why tasks were not covered in architecture education program

Figure 3 displays the percent of ratings across all tasks for each of five reasons why tasks were not covered. Collectively, the most common reason given (42.6% of ratings) was because tasks were not required by their program. The reasons *Not Required for Accreditation, Covered Elsewhere*, and *I Don't Know* were selected at similar collective rates, 12.4%, 12.7%, and 13.7, respectively.

Extent of task performance by interns and recently licensed architects

A total of 308 interns (who completed IDP in the past 2 years but have not yet completed the ARE) and recently licensed architects (licensed in the past year and who completed IDP in the past 2 years), responded to the EDU survey and indicated the extent to which they performed each task by the time they completed their degree.

Appendix Table B5 lists the percent of the 308 interns and recently licensed architects who indicated for each task that they were: *Not Introduced; Introduced, but not Performed; Performed with Guidance and Feedback; Performed Independently with Minimal Guidance*; or *Don't Know/Don't Remember*. For instance, with EDU Task 1 ("*Gather information about client's vision, goals, budget, and schedule to validate project scope and program.*"), 26.0% indicated they were not introduced to EDU Task 1 by the completion of their degree, 29.5% indicated they were introduced to EDU Task 1 but did not perform the task, 30.5% indicated they performed the task with guidance and feedback, 12.0% indicated they *performed independently with minimal guidance*, and 1.9% indicated they *don't know/don't remember*.

Across the set of tasks contained in the EDU survey, the percent of interns and recently licensed architects who indicated they *Performed with Guidance and Feedback or Performed Independently With Minimal Guidance ranged from* 7.8% to 94.5%. The percent of interns and architects indicating a given task was Introduced, but not performed ranged from 2.6% to 38.3%.

Figure 4 summarizes the distribution of ratings across tasks with respect to the percent of interns and recently licensed architects who indicated they performed a given task (either with guidance or independently with minimal guidance). The figure also shows the distribution of task ratings for the percent of interns and architects who indicated they were introduced to, but did not perform each task.

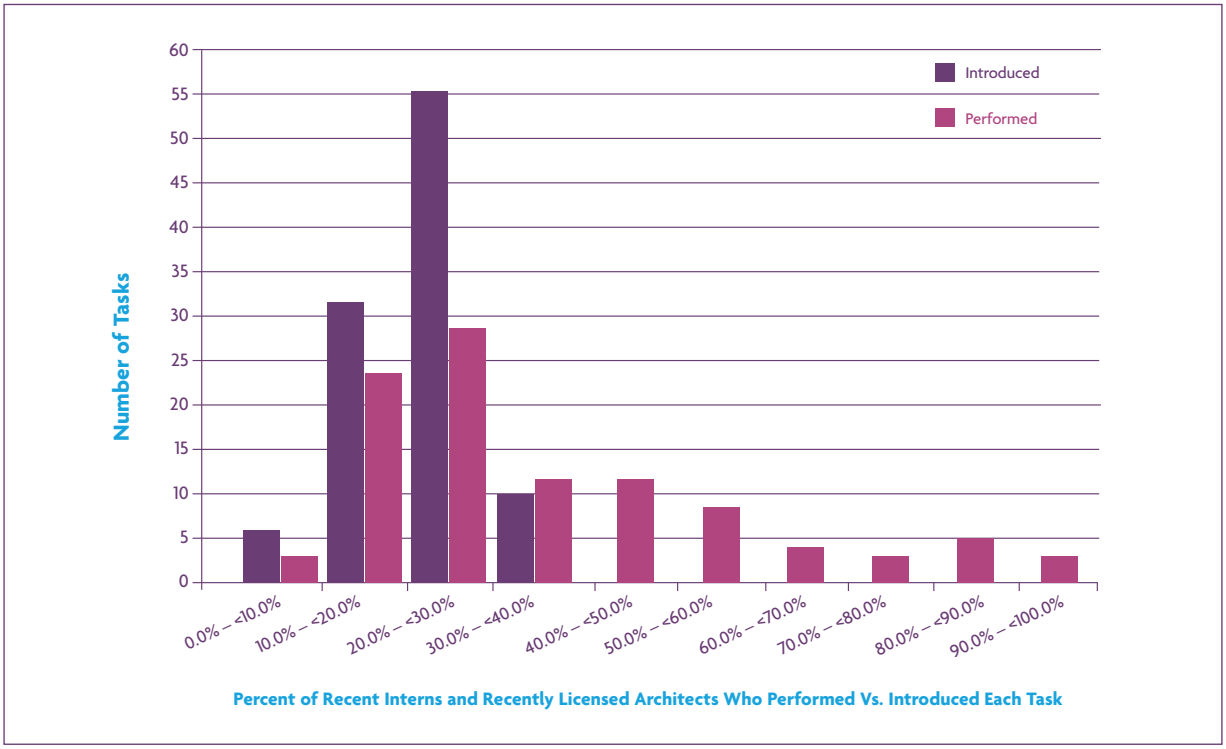

Figure 4. Distribution of EDU task ratings: Percent of interns and recently licensed architects indicating they performed or were introduced to each task by completion of their program

Overall, the results indicate that higher percentages of interns and architects performed the tasks by the time of program completion, as compared to the percentage who indicated that they were only introduced to the tasks without performing them. Approximately one-quarter (24) of the tasks were performed by a majority (50% or more) of interns and architects by the time of program completion.

For example, the figure indicates 3 tasks were rated by 90% or more of the interns and architects as being *performed* by the completion of their degree (with guidance and feedback or independently with minimal guidance); 5 tasks were rated by 80% to 90% of the respondents as being *performed*; 3 tasks were rated by 70% to 80% as *performed*; 4 tasks were rated by 60% to 70% as *performed*; and 9 tasks were rated by 50% to 60% as *performed*. All tasks were rated by fewer than 40% of respondents as being introduced but not performed.

EDU KNOWLEDGE/SKILLS

When interns and architects first acquired EDU knowledge/skills

A total of 450 interns and architects responded to the EDU survey and indicated when they first acquired each listed knowledge/skill. The interns completed IDP in the past 2 years, but not the ARE; the architects were either: (a) licensed within the past year and completed IDP in the past 2 years, or (b) licensed 2 to 10 years. **Appendix Table B7** lists the percent rating each knowledge/skill on first acquisition as *Not Acquired, By Completion of Accredited Architecture Degree Program, During Internship*, or *After Licensure*. For instance, with EDU Knowledge/Skill 1 ("*Knowledge of oral, written, and visual presentation techniques to communicate project information*."), 68.4% indicated they first acquired EDU Knowledge/Skill 1 *By Completion of Accredited Architecture Degree Program*, 28.4% indicated first acquisition *During Internship*, and 2.4% indicated *After Licensure*. Less than 1% indicated the knowledge/skill was *Not Acquired*.

Of the 122 EDU knowledge/skill statements listed in the survey, over two-thirds (85 out of 122 statements) were rated by a majority (50% or more) of the respondents as being first acquired *During Internship*. In contrast, only 12 knowledge/skills were rated by a majority as being first acquired *By Completion of Accredited Architecture Degree Program*, and only 2 statements were rated by a majority as *Not Acquired*. None of the 122 knowledge/skills were rated by a majority of interns and architects as being *First Acquired After Licensure*.

Cognitive levels of EDU knowledge/skills used by interns and architects

The same group of 450 interns and architects also rated each knowledge/skill in the EDU survey with respect to the cognitive level they typically use (*Understand, Apply,* and *Evaluate*). Respondents also had the option to indicate *Do Not Use Knowledge or Skill*. **Appendix Table B8** lists the percent of respondents rating each knowledge/skill at each cognitive level. For instance, with EDU Knowledge/Skill 1 ("*Knowledge of oral, written, and visual presentation techniques to communicate project information*."), 16.2% indicated that the level at which they used the knowledge/skill was *Understand*; 55.3% rated the knowledge/skill at the level of *Apply*; and 27.1% gave a rating of *Evaluate* for the knowledge/skill. A small percentage (1.3%) indicated they did not use the knowledge/skill.

Figure 5 displays the mean percent of respondents per knowledge/skill per cognitive level (when averaged across all EDU knowledge/skill statements). Across all 122 knowledge/skill statements, the mean percent for *Understand* was 25.1%, for *Apply* was 42.2%, and for *Evaluate* was 20.0%. The mean percent for *Do Not Use Knowledge or Skill* was 12.7%.

Reasons why EDU knowledge/skills were not used by interns and architects

The responding interns and architects who indicated they did not use a knowledge/skill were asked a follow-up question regarding the reason(s) why they did not use that knowledge/skill. **Appendix Table B9** tabulates the responses for six possible reasons. For instance, with EDU Knowledge/Skill 1 ("*Knowledge of oral, written, and visual presentation techniques to communicate project information*."), two respondents did not use the knowledge/skill in their practices, three cited *Lack of Experience* as their reason for not using the knowledge/skill, and three checked *Other* and were given the chance to type in a reason. No respondents indicated the reasons *Not Allowed by Jurisdiction, Not Recommended by Legal Counsel or Insurance Carrier*, or *Provided by Consultant(s)* for EDU Knowledge/Skill 1.

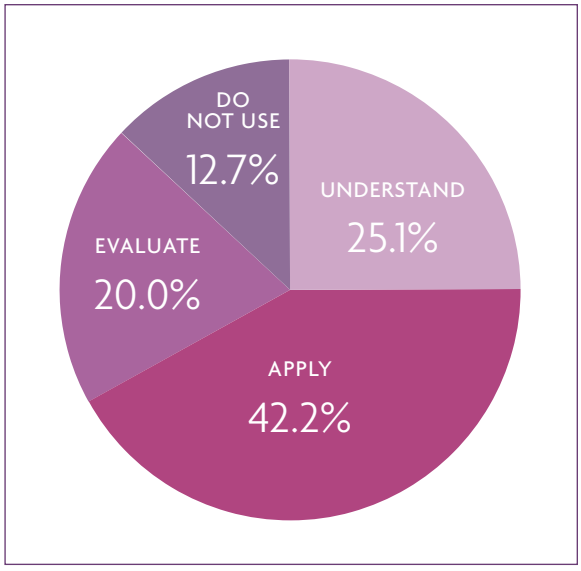

Figure 5. Mean percent of interns and architects rating each level at which they typically use knowledge/skills

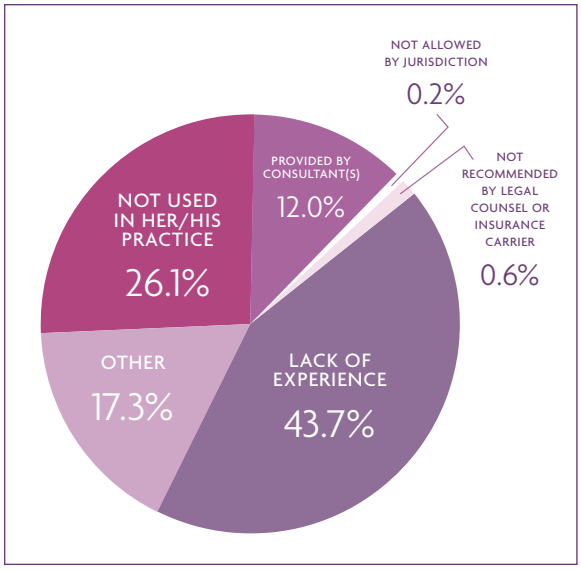

Figure 6. Mean percent of responses per reason why knowledge/skills were not used

Figure 6 displays the average percent of ratings across all knowledge/skill statements for each of six reasons why they were not used. Of the reasons cited, the most common was *Lack of Experience* (43.7% of ratings), followed by *Not Used in Her/His Practice* (26.1%), and *Provided by Consultant(s)* (12.0%). Of all reasons selected, *Not Allowed by Jurisdiction* and *Not Recommended by Legal Counsel or Insurance Carrier* were the least commonly observed (0.2% and 0.6%, respectively).

When knowledge/skills should first be acquired

A total of 1,086 educators and licensed architects responded to the EDU survey and indicated when they believed each knowledge/skill should first be acquired. **Appendix Table B10** lists the percent who rated each knowledge/skill as *By Completion of Accredited Architecture Education Program, During Internship, After Licensure, Acquisition Not Needed*, or *I Don't Know*. For instance, with EDU Knowledge/Skill 1 ("*Knowledge of oral, written, and visual presentation techniques to communicate project information*."), 80.2% of the 1,086 educators and licensed architects indicated that the knowledge/skill should first be acquired by the completion of an accredited architecture education program; 17.7% indicated first acquisition during internship, 1.1% indicated after licensure, 0.4% indicated acquisition not needed, and 0.6% indicated they did not know.

Of the 122 knowledge/skill statements, 19 were rated by 50.0% to 66.7% of the educators and licensed architects as knowledge/skills that should be acquired by the completion of a degree program. Another 24 of 122 knowledge/skill statements were rated by more than 66.7% of the educators and licensed architects as needing to be first acquired by the completion of a degree program. As such, 43 of 122 statements were rated by a majority of the educators and licensed architects as needing to be first acquired by the completion of a degree program. In comparison, 39 of the 122 knowledge/skills were rated by 50.0% or more of the respondents as needing to be first acquired during internship.

At what cognitive level should knowledge/skills be acquired

The educators and licensed architects who indicated a given knowledge/skill should be acquired were then asked to indicate the cognitive level at which the knowledge/skills should be acquired. **Appendix Table B11** lists the percent of respondents who indicated the cognitive level should be *Understand, Apply,* or *Evaluate*. For instance, with EDU Knowledge/Skill 1 ("*Knowledge of oral, written, and visual presentation techniques to communicate project information*."), 871 educators and licensed architects indicated that knowledge/skill should be acquired. Of those 871, 18.6% indicated *Understand* should be the level at which that knowledge/skill is acquired, 45.5% rated *Apply* as the appropriate level, and 35.9% indicated the level should be *Evaluate*.

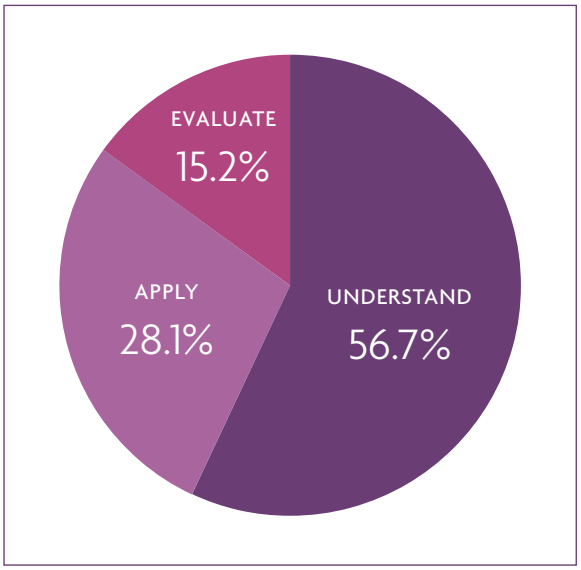

Figure 7. Mean percent of interns and architects rating each level at which knowledge/skills should be acquired

Figure 7 displays the mean percentage of respondents indicating each cognitive level that should be acquired across all of the knowledge/skills, as follows: 56.7% *Understand*, 28.1% *Apply*, and 15.2% *Evaluate*. It is interesting to compare these results to the earlier reported results in which interns and architects described the cognitive level of knowledge/skill that they use (25.1% *Understand*, 42.2% *Apply*, and 20.0% *Evaluate*).

These data suggest that educators and architects believe that a greater percentage of knowledge and skills should be acquired with a basic level of understanding by completion of a degree program, as compared to the actual experience reported by interns and newly licensed architects.

QUALITATIVE FINDINGS FROM OPEN-ENDED QUESTIONS

Changes over the next few years

A total of 1,485 EDU survey respondents (across the 4 EDU survey samples) replied to the questions "*How do you expect your job in the field of architecture to change over the next few years*?" and "*What tasks will be performed and what knowledge/skills will be needed to meet changing job demands*?"
EDU survey respondents expect that there will be an increased use of technology (BIM and 3D modeling) and practice tools, such as IPD. Furthermore, respondents see market demands for the knowledge of other programs such as project management software, social networking, and social media, research and internet skills.

In addition to increasing technological skills, EDU survey respondents mentioned the importance of business skills including, entrepreneurship, global practice strategies, client relations, general and strategic management, and negotiating. Respondents also indicated the need for international language skills. The need for better interdisciplinary collaboration with clients and contractors was also voiced.

Most important changes to make

There were 1,485 EDU respondents who responded to the question "*If you could change the field of architecture, what is the most important change you would make?*"

With respect to the changing role of the architect, some respondents felt that architecture education should emphasize the practice of architecture rather than narrowly focused specialties such as LEED or green technology. There is a need for well-rounded graduates who have a working knowledge of the basics and hands-on experience in the field rather than concentration on specialties. Other respondents suggested that architects should take a leadership role in the design and construction process in order to oversee the design process, control the quality of designs, and make decisive decisions regarding code standards. Some mentioned that a collaborative approach should be taken in project work, particularly in early stages of all processes.

As for adapting to changing demands, there were several opinions as to how the profession should adapt to changing demands of practice. There was an overwhelming majority of respondents who felt that the educational curriculum should include more hands-on experience in the field so that graduates can apply their knowledge to actual construction situations. There were respondents who suggested that graduates should have some familiarity with evidence-based design and post-occupancy evaluation as well as fundamentals of design, material selection, and building performance. Some respondents felt that architects should establish a collaborative relationship with other professionals early on in the design and construction phases.
A few respondents commented that the flexible work options should be available to accommodate work-life balance.

The majority of respondents commented that graduates' knowledge of fundamentals should be balanced with knowledge of technologies. The focus should remain on design fundamentals rather than the technologies themselves. By focusing on fundamentals and using technologies as tools, graduates will be able to truly visualize the finished design.

As far as knowledge/skills needed now and in the future, many respondents cited the need to establish clearly defined roles and responsibilities for members of a design and construction team. Defined roles and responsibilities would enable architects to control the outcomes of a project more effectively. Other respondents cited the need for integration of practical business management and hands-on field skills with the design fundamentals in order to be fully prepared to

handle the day-to-day activities and understand the risk exposures involved at a job site. Some indicated that a uniform architecture curriculum should be developed that focused on design fundamentals, construction, materials, construction methods, and construction documentation. Others suggested that architecture curricula could be integrated with engineering programs and related disciplines to expose students to diverse aspects of project work that occur in the field.

Professional practice and accreditation issues were noted:

- A uniform code should be created to simplify the design and construction process and documentation requirements;
- There should be a standardized degree program curriculum at a masters' level that would build upon the fundamentals learned in a bachelors' level program. The suggestion is that the bachelors' program would provide fundamentals and the masters' program would provide more specialized coursework and experiences; and

With respect to licensing:

- The licensing process should be streamlined, similar to the European system where examinations are taken upon graduation from a degree program;
- Some suggested creating separate licensing examinations for generalist and specialty tracks;
- Requirements for licensure should be broadened to allow anyone to take the examinations, even those without the IDP, as an alternate pathway to licensure.

With regard to NCARB, the majority of the comments addressed the IDP program:

- Some suggested extending the program to 5 years with mandated rotations in different subject matter areas; and
- Others suggested that the IDP could be integrated into the educational curriculum.

Additional comments

A total of 1,427 EDU survey respondents answered the question "*Are there any missing knowledge statements you would like to add or do you have any additional comments?*"

A majority of the respondents' comments stated the survey was comprehensive (528 respondents) or pertained to the field of architecture rather than the survey (613 respondents). A smaller number of respondents commented on the rating scales used, the particular task or knowledge/skill statements, or the survey itself (140 respondents). Others suggested additional topics, which in many cases were variations of existing content (173 respondents).

TABLE B1. LIST OF ALL EDU SURVEY TASK STATEMENTS

TASK #	TASK STATEMENT
1	Gather information about client's vision, goals, budget, and schedule to validate project scope and program.
2	Prepare design alternatives for client review.
3	Determine methods for Architect-Client communication based on project scope of work.
4	Determine impact of applicable zoning and development ordinances to determine project constraints.
5	Determine scope of services.
6	Determine design fees.
7	Determine project schedule.
8	Evaluate results of feasibility studies to determine project's financial viability.
9	Evaluate results of feasibility studies to determine project's technical viability.
10	Determine impact of existing utilities infrastructure on site.
11	Determine impact of existing transportation infrastructure on site.
12	Assess environmental impact of design decisions.
13	Define requirements for site survey based on established project scope.
14	Assess socio-cultural context of the proposed site.
15	Analyze existing site conditions to determine impact on facility layout.
16	Consider recommendations from geotechnical studies when establishing design parameters.
17	Develop sustainability goals based on existing environmental conditions.
18	Establish sustainability goals affecting building performance.
19	Consider results of environmental studies when developing site.
20	Develop mitigation options to address adverse site conditions.
21	Perform building code analysis.
22	Communicate design ideas to the client graphically through a variety of different media.
23	Communicate design ideas to the client using hand drawings.
24	Communicate design ideas to client with two-dimensional (2-D) computer aided design software.
25	Communicate design ideas to client with three-dimensional (3-D) computer aided design software.
26	Determine design parameters for building systems.
27	Develop conceptual project budget.
28	Prepare submittals for regulatory approval.
29	Evaluate opportunities and constraints of alternative sites.
30	Gather information about community concerns and issues that may impact proposed project.
31	Prepare building program.
32	Establish project design goals.
33	Prepare site analysis diagrams to document existing conditions, features, infrastructure, and regulatory requirements.
34	Prepare diagrams illustrating spatial relationships and functional adjacencies.
35	Prepare code analysis documentation.
36	Select technologies to develop and produce design and construction documentation.
37	Coordinate documentation of design team.
38	Manage project close-out procedures and documentation.
39	Perform quality control reviews throughout the documentation process.
40	Prepare Cost of Work estimates.
41	Update Cost of Work estimates.
42	Design for building structural system components.
43	Design for civil components of site.
44	Design for mechanical, electrical and plumbing system components.
45	Design for landscape elements for site.
46	Oversee design integration of building components and systems.
47	Select materials, finishes and systems based on technical properties and aesthetic requirements.
48	Select building performance modeling technologies to guide building design.
49	Prepare life cycle cost analysis.
50	Perform constructability review to determine ability to procure, sequence construction, and build proposed project.
51	Perform constructability reviews throughout the design process.
52	Prepare final procurement and contract documents.
53	Establish procedures to process documentation during contract administration.
54	Determine specific insurance requirements to meet contract or business needs.
55	Review results from field reports, third-party inspections and other test results for conformance with contract documents.

TABLE B1. LIST OF ALL EDU SURVEY TASK STATEMENTS (CONT.)

TASK #	TASK STATEMENT
56	Manage modifications to the construction contract.
57	Prepare Owner-Contractor Agreement.
58	Respond to Contractor Requests for Information.
59	Prepare proposals for services in response to client requirements.
60	Prepare Owner-Architect Agreement.
61	Prepare Architect-Consultant Agreement.
62	Negotiate terms and conditions outlined in Owner-Architect Agreement.
63	Apply principles of historic preservation for projects involving building restoration or renovation.
64	Collaborate with stakeholders during design process to maintain design intent and comply with Owner requirements.
65	Present design concept to stakeholders.
66	Coordinate design work of consultants.
67	Select furniture, fixtures and equipment that meet client's design requirements and needs.
68	Establish procedures for providing post-occupancy services.
69	Negotiate terms and conditions of services outlined in Architect-Consultant Agreement.
70	Prepare staffing plan to meet project goals.
71	Establish procedures for documenting project decisions.
72	Monitor project schedule to maintain compliance with established milestones.
73	Evaluate staffing plan to ensure compliance with established milestones.
74	Manage client expectations to align with established milestones and final decision points.
75	Assist client in selecting contractors.
76	Manage implementation of sustainability criteria.
77	Identify changes in project scope that require additional services.
78	Assist Owner in obtaining necessary permits and approvals.
79	Coordinate testing of building performance and materials.
80	Review Application and Certificate for Payment.
81	Review shop drawings and submittals during construction for conformance with design intent.
82	Complete field reports to document field observations from site visit.
83	Manage information exchange during construction.
84	Resolve conflicts that may arise during design and construction process.
85	Manage project-specific bidding process.
86	Establish procedures for building commissioning.
87	Select design team consultants.
88	Conduct periodic progress meetings with design and project team.
89	Participate in pre-construction, pre-installation and regular progress meetings with design team.
90	Develop strategies to control risk and manage liability.
91	Determine billing rates.
92	Develop business plan for firm.
93	Develop and maintain effective and productive relationships with clients.
94	Develop procedures for responding to changes in project scope.
95	Develop procedures for responding to contractor requests (Requests for Information).
96	Develop strategies for responding to Owner requests (Requests for Proposal, Requests for Qualifications).
97	Understand firm's legal structure to comply with jurisdictional rules and regulations.
98	Understand implications of evolving sustainable design strategies and technologies.
99	Understand implications of project delivery technologies.
100	Understand implications of project delivery methods.
101	Prepare marketing documents that accurately communicate firm's experience and capabilities.
102	Adhere to ethical standards and codes of professional conduct.
103	Comply with laws and regulations governing the practice of architecture.
104	Understand implications of policies and procedures to ensure supervision of design work by architect in responsible charge/control.

TABLE B2. PERCENTAGE DISTRIBUTION OF WHETHER TASKS WERE COVERED IN THE EDUCATOR'S ARCHITECTURE PROGRAM

Survey: EDU A Survey Population: Educators

TASK STATEMENT	IS TASK COVERED			
	YES	NO	I DON'T KNOW	TOTAL N
1. Gather information about client's vision, goals, budget, and schedule to validate project scope and program.	71.3%	16.4%	12.3%	171
2. Prepare design alternatives for client review.	80.7%	14.6%	4.7%	171
3. Determine methods for Architect-Client communication based on project scope of work.	45.6%	33.9%	20.5%	171
4. Determine impact of applicable zoning and development ordinances to determine project constraints.	88.3%	7.0%	4.7%	171
5. Determine scope of services.	52.0%	31.0%	17.0%	171
6. Determine design fees.	40.9%	39.2%	19.9%	171
7. Determine project schedule.	57.3%	25.7%	17.0%	171
8. Evaluate results of feasibility studies to determine project's financial viability.	35.1%	42.7%	22.2%	171
9. Evaluate results of feasibility studies to determine project's technical viability.	38.6%	37.4%	24.0%	171
10. Determine impact of existing utilities infrastructure on site.	55.0%	26.9%	18.1%	171
11. Determine impact of existing transportation infrastructure on site.	76.0%	13.5%	10.5%	171
12. Assess environmental impact of design decisions.	83.6%	9.4%	7.0%	171
13. Define requirements for site survey based on established project scope.	49.1%	31.6%	19.3%	171
14. Assess socio-cultural context of the proposed site.	84.2%	9.4%	6.4%	171
15. Analyze existing site conditions to determine impact on facility layout.	91.8%	4.7%	3.5%	171
16. Consider recommendations from geotechnical studies when establishing design parameters.	40.4%	36.8%	22.8%	171
17. Develop sustainability goals based on existing environmental conditions.	84.8%	6.4%	8.8%	171
18. Establish sustainability goals affecting building performance.	84.2%	7.6%	8.2%	171
19. Consider results of environmental studies when developing site.	67.3%	18.1%	14.6%	171
20. Develop mitigation options to address adverse site conditions.	46.2%	32.2%	21.6%	171
21. Perform building code analysis.	84.8%	5.3%	9.9%	171
22. Communicate design ideas to the client graphically through a variety of different media.	93.6%	4.1%	2.3%	171
23. Communicate design ideas to the client using hand drawings.	93.6%	4.1%	2.3%	171
24. Communicate design ideas to client with two-dimensional (2-D) computer aided design software.	95.3%	2.9%	1.8%	171
25. Communicate design ideas to client with three-dimensional (3-D) computer aided design software.	95.9%	2.9%	1.2%	171
26. Determine design parameters for building systems.	88.9%	5.8%	5.3%	171
27. Develop conceptual project budget.	48.5%	31.6%	19.9%	171
28. Prepare submittals for regulatory approval.	23.4%	57.3%	19.3%	171
29. Evaluate opportunities and constraints of alternative sites.	71.9%	17.5%	10.5%	171
30. Gather information about community concerns and issues that may impact proposed project.	76.0%	15.2%	8.8%	171
31. Prepare building program.	88.9%	7.6%	3.5%	171
32. Establish project design goals.	90.1%	3.5%	6.4%	171

TABLE B2. PERCENTAGE DISTRIBUTION OF WHETHER TASKS WERE COVERED IN THE EDUCATOR'S ARCHITECTURE PROGRAM (CONT.)

Survey: EDU A Survey Population: Educators

TASK STATEMENT	IS TASK COVERED			
	YES	NO	I DON'T KNOW	TOTAL N
33. Prepare site analysis diagrams to document existing conditions, features, infrastructure, and regulatory requirements.	91.2%	5.8%	2.9%	171
34. Prepare diagrams illustrating spatial relationships and functional adjacencies.	95.3%	2.9%	1.8%	171
35. Prepare code analysis documentation.	69.0%	16.4%	14.6%	171
36. Select technologies to develop and produce design and construction documentation.	73.1%	13.5%	13.5%	171
37. Coordinate documentation of design team.	48.5%	33.3%	18.1%	171
38. Manage project close-out procedures and documentation.	20.5%	55.0%	24.6%	171
39. Perform quality control reviews throughout the documentation process.	22.8%	54.4%	22.8%	171
40. Prepare Cost of Work estimates.	30.4%	50.3%	19.3%	171
41. Update Cost of Work estimates.	18.7%	57.9%	23.4%	171
42. Design for building structural system components.	90.1%	4.1%	5.8%	171
43. Design for civil components of site.	56.1%	28.1%	15.8%	171
44. Design for mechanical, electrical and plumbing system components.	85.4%	8.2%	6.4%	171
45. Design for landscape elements for site.	83.0%	11.7%	5.3%	171
46. Oversee design integration of building components and systems.	78.9%	12.9%	8.2%	171
47. Select materials, finishes and systems based on technical properties and aesthetic requirements.	88.9%	5.8%	5.3%	171
48. Select building performance modeling technologies to guide building design.	59.1%	19.9%	21.1%	171
49. Prepare life cycle cost analysis.	44.4%	32.7%	22.8%	171
50. Perform constructability review to determine ability to procure, sequence construction, and build proposed project.	33.3%	45.6%	21.1%	171
51. Perform constructability reviews throughout the design process.	32.2%	47.4%	20.5%	171
52. Prepare final procurement and contract documents.	35.7%	47.4%	17.0%	171
53. Establish procedures to process documentation during contract administration.	28.1%	48.0%	24.0%	171
54. Determine specific insurance requirements to meet contract or business needs.	28.7%	48.5%	22.8%	171
55. Review results from field reports, third-party inspections and other test results for conformance with contract documents.	20.5%	55.6%	24.0%	171
56. Manage modifications to the construction contract.	28.7%	49.1%	22.2%	171
57. Prepare Owner-Contractor Agreement.	50.3%	24.6%	25.1%	171
58. Respond to Contractor Requests for Information.	34.5%	46.2%	19.3%	171
59. Prepare proposals for services in response to client requirements.	37.4%	36.8%	25.7%	171
60. Prepare Owner-Architect Agreement.	52.0%	25.7%	22.2%	171
61. Prepare Architect-Consultant Agreement.	47.4%	28.7%	24.0%	171
62. Negotiate terms and conditions outlined in Owner-Architect Agreement.	33.9%	40.9%	25.1%	171
63. Apply principles of historic preservation for projects involving building restoration or renovation.	67.3%	21.6%	11.1%	171
64. Collaborate with stakeholders during design process to maintain design intent and comply with Owner requirements.	55.6%	26.9%	17.5%	171

TABLE B2. PERCENTAGE DISTRIBUTION OF WHETHER TASKS WERE COVERED IN THE EDUCATOR'S ARCHITECTURE PROGRAM (CONT.)

Survey: EDU A Survey Population: Educators

TASK STATEMENT	IS TASK COVERED			
	YES	NO	I DON'T KNOW	TOTAL N
65. Present design concept to stakeholders.	81.9%	10.5%	7.6%	171
66. Coordinate design work of consultants.	45.6%	39.2%	15.2%	171
67. Select furniture, fixtures and equipment that meet client's design requirements and needs.	43.3%	41.5%	15.2%	171
68. Establish procedures for providing post-occupancy services.	31.0%	47.4%	21.6%	171
69. Negotiate terms and conditions of services outlined in Architect-Consultant Agreement.	26.3%	48.0%	25.7%	171
70. Prepare staffing plan to meet project goals.	24.0%	53.2%	22.8%	171
71. Establish procedures for documenting project decisions.	30.4%	44.4%	25.1%	171
72. Monitor project schedule to maintain compliance with established milestones.	38.0%	38.0%	24.0%	171
73. Evaluate staffing plan to ensure compliance with established milestones.	17.5%	56.1%	26.3%	171
74. Manage client expectations to align with established milestones and final decision points.	24.0%	47.4%	28.7%	171
75. Assist client in selecting contractors.	22.2%	56.1%	21.6%	171
76. Manage implementation of sustainability criteria.	58.5%	24.6%	17.0%	171
77. Identify changes in project scope that require additional services.	35.7%	41.5%	22.8%	171
78. Assist Owner in obtaining necessary permits and approvals.	35.7%	43.3%	21.1%	171
79. Coordinate testing of building performance and materials.	32.7%	43.3%	24.0%	171
80. Review Application and Certificate for Payment.	33.9%	41.5%	24.6%	171
81. Review shop drawings and submittals during construction for conformance with design intent.	48.5%	32.2%	19.3%	171
82. Complete field reports to document field observations from site visit.	42.7%	33.9%	23.4%	171
83. Manage information exchange during construction.	24.0%	48.5%	27.5%	171
84. Resolve conflicts that may arise during design and construction process.	42.7%	34.5%	22.8%	171
85. Manage project-specific bidding process.	32.2%	45.6%	22.2%	171
86. Establish procedures for building commissioning.	25.1%	46.8%	28.1%	171
87. Select design team consultants.	39.2%	38.6%	22.2%	171
88. Conduct periodic progress meetings with design and project team.	40.4%	35.7%	24.0%	171
89. Participate in pre-construction, pre-installation and regular progress meetings with design team.	29.2%	43.9%	26.9%	171
90. Develop strategies to control risk and manage liability.	37.4%	38.0%	24.6%	171
91. Determine billing rates.	32.7%	42.7%	24.6%	171
92. Develop business plan for firm.	48.5%	29.8%	21.6%	171
93. Develop and maintain effective and productive relationships with clients.	49.7%	25.1%	25.1%	171
94. Develop procedures for responding to changes in project scope.	32.7%	38.0%	29.2%	171
95. Develop procedures for responding to contractor requests (Requests for Information).	28.7%	43.3%	28.1%	171
96. Develop strategies for responding to Owner requests (Requests for Proposal, Requests for Qualifications).	33.9%	36.3%	29.8%	171
97. Understand firm's legal structure to comply with jurisdictional rules and regulations.	49.7%	25.7%	24.6%	171
98. Understand implications of evolving sustainable design strategies and technologies.	83.6%	6.4%	9.9%	171

TABLE B2. PERCENTAGE DISTRIBUTION OF WHETHER TASKS WERE COVERED IN THE EDUCATOR'S ARCHITECTURE PROGRAM (CONT.)

Survey: EDU A Survey Population: Educators

TASK STATEMENT	IS TASK COVERED			
	YES	NO	I DON'T KNOW	TOTAL N
99. Understand implications of project delivery technologies.	62.6%	18.1%	19.3%	171
100. Understand implications of project delivery methods.	62.0%	14.6%	23.4%	171
101. Prepare marketing documents that accurately communicate firm's experience and capabilities.	49.1%	29.8%	21.1%	171
102. Adhere to ethical standards and codes of professional conduct.	85.4%	3.5%	11.1%	171
103. Comply with laws and regulations governing the practice of architecture.	81.3%	7.0%	11.7%	171
104. Understand implications of policies and procedures to ensure supervision of design work by architect in responsible charge/control.	48.0%	22.2%	29.8%	171
MEAN	53.4%	29.1%	17.5%	171.0
MIN	17.5%	2.9%	1.2%	171
MAX	95.9%	57.9%	29.8%	171

TABLE B3. PERCENTAGE DISTRIBUTION OF EXTENT TO WHICH STUDENTS PERFORMED TASKS, IF COVERED

Survey: EDU A Survey Population: Educators

TASK STATEMENT	IF COVERED, TO WHAT EXTENT			
	INTRODUCED BUT NOT PERFORMED	PERFORMED WITH GUIDANCE & FEEDBACK	PERFORMED IND. WITH MINIMAL GUIDANCE	TOTAL N
1. Gather information about client's vision, goals, budget, and schedule to validate project scope and program.	23.8%	63.1%	13.1%	122
2. Prepare design alternatives for client review.	6.5%	84.1%	9.4%	138
3. Determine methods for Architect-Client communication based on project scope of work.	41.0%	55.1%	3.8%	78
4. Determine impact of applicable zoning and development ordinances to determine project constraints.	11.3%	80.1%	8.6%	151
5. Determine scope of services.	51.7%	44.9%	3.4%	89
6. Determine design fees.	70.0%	27.1%	2.9%	70
7. Determine project schedule.	36.7%	56.1%	7.1%	98
8. Evaluate results of feasibility studies to determine project's financial viability.	60.0%	35.0%	5.0%	60
9. Evaluate results of feasibility studies to determine project's technical viability.	39.4%	48.5%	12.1%	66
10. Determine impact of existing utilities infrastructure on site.	36.8%	51.6%	11.6%	95
11. Determine impact of existing transportation infrastructure on site.	19.8%	71.0%	9.2%	131
12. Assess environmental impact of design decisions.	17.5%	77.6%	4.9%	143
13. Define requirements for site survey based on established project scope.	21.4%	70.2%	8.3%	84
14. Assess socio-cultural context of the proposed site.	7.6%	83.3%	9.0%	144
15. Analyze existing site conditions to determine impact on facility layout.	1.3%	86.6%	12.1%	157
16. Consider recommendations from geotechnical studies when establishing design parameters.	56.5%	36.2%	7.2%	69
17. Develop sustainability goals based on existing environmental conditions.	11.7%	81.4%	6.9%	145
18. Establish sustainability goals affecting building performance.	13.9%	75.7%	10.4%	144
19. Consider results of environmental studies when developing site.	20.9%	66.1%	13.0%	115
20. Develop mitigation options to address adverse site conditions.	32.5%	51.3%	16.3%	80
21. Perform building code analysis.	15.9%	71.7%	12.4%	145
22. Communicate design ideas to the client graphically through a variety of different media.	1.3%	82.5%	16.3%	160
23. Communicate design ideas to the client using hand drawings.	1.9%	75.6%	22.5%	160
24. Communicate design ideas to client with two-dimensional (2-D) computer aided design software.	0.6%	73.0%	26.4%	163
25. Communicate design ideas to client with three-dimensional (3-D) computer aided design software.	0.0%	76.2%	23.8%	164
26. Determine design parameters for building systems.	10.5%	82.9%	6.6%	152
27. Develop conceptual project budget.	40.5%	50.0%	9.5%	84
28. Prepare submittals for regulatory approval.	62.5%	27.5%	10.0%	40
29. Evaluate opportunities and constraints of alternative sites.	17.9%	69.1%	13.0%	123
30. Gather information about community concerns and issues that may impact proposed project.	12.3%	73.1%	14.6%	130
31. Prepare building program.	4.6%	85.5%	9.9%	152

TABLE B3. PERCENTAGE DISTRIBUTION OF EXTENT TO WHICH STUDENTS PERFORMED TASKS, IF COVERED (CONT.)

Survey: EDU A Survey Population: Educators

TASK STATEMENT	IF COVERED, TO WHAT EXTENT			
	INTRODUCED BUT NOT PERFORMED	PERFORMED WITH GUIDANCE & FEEDBACK	PERFORMED IND. WITH MINIMAL GUIDANCE	TOTAL N
32. Establish project design goals.	3.9%	87.0%	9.1%	154
33. Prepare site analysis diagrams to document existing conditions, features, infrastructure, and regulatory requirements.	1.9%	83.3%	14.7%	156
34. Prepare diagrams illustrating spatial relationships and functional adjacencies.	1.8%	86.0%	12.2%	164
35. Prepare code analysis documentation.	22.9%	61.9%	15.3%	118
36. Select technologies to develop and produce design and construction documentation.	11.2%	74.4%	14.4%	125
37. Coordinate documentation of design team.	30.1%	51.8%	18.1%	83
38. Manage project close-out procedures and documentation.	72.2%	22.2%	5.6%	36
39. Perform quality control reviews throughout the documentation process.	50.0%	45.0%	5.0%	40
40. Prepare Cost of Work estimates.	44.2%	50.0%	5.8%	52
41. Update Cost of Work estimates.	59.4%	37.5%	3.1%	32
42. Design for building structural system components.	11.7%	82.5%	5.8%	154
43. Design for civil components of site.	38.1%	50.5%	11.3%	97
44. Design for mechanical, electrical and plumbing system components.	17.8%	74.7%	7.5%	146
45. Design for landscape elements for site.	16.9%	71.1%	12.0%	142
46. Oversee design integration of building components and systems.	14.8%	77.8%	7.4%	135
47. Select materials, finishes and systems based on technical properties and aesthetic requirements.	7.9%	80.9%	11.2%	152
48. Select building performance modeling technologies to guide building design.	28.4%	59.8%	11.8%	102
49. Prepare life cycle cost analysis.	74.0%	22.1%	3.9%	77
50. Perform constructability review to determine ability to procure, sequence construction, and build proposed project.	56.1%	36.8%	7.0%	57
51. Perform constructability reviews throughout the design process.	45.5%	49.1%	5.5%	55
52. Prepare final procurement and contract documents.	55.7%	41.0%	3.3%	61
53. Establish procedures to process documentation during contract administration.	87.5%	10.4%	2.1%	48
54. Determine specific insurance requirements to meet contract or business needs.	93.9%	6.1%	0.0%	49
55. Review results from field reports, third-party inspections and other test results for conformance with contract documents.	91.4%	5.7%	2.9%	35
56. Manage modifications to the construction contract.	87.8%	8.2%	4.1%	49
57. Prepare Owner-Contractor Agreement.	69.8%	25.6%	4.7%	86
58. Respond to Contractor Requests for Information.	86.4%	6.8%	6.8%	59
59. Prepare proposals for services in response to client requirements.	67.2%	23.4%	9.4%	64
60. Prepare Owner-Architect Agreement.	71.9%	24.7%	3.4%	89
61. Prepare Architect-Consultant Agreement.	86.4%	11.1%	2.5%	81
62. Negotiate terms and conditions outlined in Owner-Architect Agreement.	91.4%	6.9%	1.7%	58

TABLE B3. PERCENTAGE DISTRIBUTION OF EXTENT TO WHICH STUDENTS PERFORMED TASKS, IF COVERED (CONT.)

Survey: EDU A Survey Population: Educators

TASK STATEMENT	IF COVERED, TO WHAT EXTENT			
	INTRODUCED BUT NOT PERFORMED	PERFORMED WITH GUIDANCE & FEEDBACK	PERFORMED IND. WITH MINIMAL GUIDANCE	TOTAL N
63. Apply principles of historic preservation for projects involving building restoration or renovation.	35.7%	51.3%	13.0%	115
64. Collaborate with stakeholders during design process to maintain design intent and comply with Owner requirements.	29.2%	62.5%	8.3%	96
65. Present design concept to stakeholders.	11.4%	78.6%	10.0%	140
66. Coordinate design work of consultants.	61.5%	20.5%	17.9%	78
67. Select furniture, fixtures and equipment that meet client's design requirements and needs.	39.2%	45.9%	14.9%	74
68. Establish procedures for providing post-occupancy services.	85.2%	11.1%	3.7%	54
69. Negotiate terms and conditions of services outlined in Architect-Consultant Agreement.	95.7%	2.2%	2.2%	46
70. Prepare staffing plan to meet project goals.	69.0%	21.4%	9.5%	42
71. Establish procedures for documenting project decisions.	71.2%	21.2%	7.7%	52
72. Monitor project schedule to maintain compliance with established milestones.	60.0%	32.3%	7.7%	65
73. Evaluate staffing plan to ensure compliance with established milestones.	76.7%	13.3%	10.0%	30
74. Manage client expectations to align with established milestones and final decision points.	80.5%	12.2%	7.3%	41
75. Assist client in selecting contractors.	87.2%	2.6%	10.3%	39
76. Manage implementation of sustainability criteria.	42.0%	47.0%	11.0%	100
77. Identify changes in project scope that require additional services.	80.6%	9.7%	9.7%	62
78. Assist Owner in obtaining necessary permits and approvals.	85.5%	9.7%	4.8%	62
79. Coordinate testing of building performance and materials.	69.6%	23.2%	7.1%	56
80. Review Application and Certificate for Payment.	91.4%	5.2%	3.4%	58
81. Review shop drawings and submittals during construction for conformance with design intent.	73.5%	22.9%	3.6%	83
82. Complete field reports to document field observations from site visit.	61.6%	31.5%	6.8%	73
83. Manage information exchange during construction.	85.7%	14.3%	0.0%	42
84. Resolve conflicts that may arise during design and construction process.	75.3%	17.8%	6.8%	73
85. Manage project-specific bidding process.	96.4%	3.6%	0.0%	55
86. Establish procedures for building commissioning.	93.2%	6.8%	0.0%	44
87. Select design team consultants.	79.1%	13.4%	7.5%	67
88. Conduct periodic progress meetings with design and project team.	62.3%	34.8%	2.9%	69
89. Participate in pre-construction, pre-installation and regular progress meetings with design team.	68.0%	26.0%	6.0%	50
90. Develop strategies to control risk and manage liability.	90.6%	6.3%	3.1%	64
91. Determine billing rates.	82.1%	12.5%	5.4%	56
92. Develop business plan for firm.	44.6%	48.2%	7.2%	83
93. Develop and maintain effective and productive relationships with clients.	64.7%	28.2%	7.1%	85
94. Develop procedures for responding to changes in project scope.	69.6%	21.4%	8.9%	56

TABLE B3. PERCENTAGE DISTRIBUTION OF EXTENT TO WHICH STUDENTS PERFORMED TASKS, IF COVERED (CONT.)

Survey: EDU A Survey Population: Educators

TASK STATEMENT	IF COVERED, TO WHAT EXTENT			
	INTRODUCED BUT NOT PERFORMED	PERFORMED WITH GUIDANCE & FEEDBACK	PERFORMED IND. WITH MINIMAL GUIDANCE	TOTAL N
95. Develop procedures for responding to contractor requests (Requests for Information).	83.7%	8.2%	8.2%	49
96. Develop strategies for responding to Owner requests (Requests for Proposal, Requests for Qualifications).	79.3%	15.5%	5.2%	58
97. Understand firm's legal structure to comply with jurisdictional rules and regulations.	77.6%	16.5%	5.9%	85
98. Understand implications of evolving sustainable design strategies and technologies.	28.7%	67.1%	4.2%	143
99. Understand implications of project delivery technologies.	65.7%	28.7%	5.6%	108
100. Understand implications of project delivery methods.	68.2%	24.3%	7.5%	107
101. Prepare marketing documents that accurately communicate firm's experience and capabilities.	42.9%	48.8%	8.3%	84
102. Adhere to ethical standards and codes of professional conduct.	45.2%	43.8%	11.0%	146
103. Comply with laws and regulations governing the practice of architecture.	56.8%	38.8%	4.3%	139
104. Understand implications of policies and procedures to ensure supervision of design work by architect in responsible charge/control.	77.1%	18.1%	4.8%	83
MEAN	48.9%	42.8%	8.2%	91.5
MIN	0.0%	2.2%	0.0%	30
MAX	96.4%	87.0%	26.4%	164

TABLE B4. PERCENTAGE DISTRIBUTION OF REASON(S) WHY TASKS WERE NOT COVERED

Survey: EDU A Survey Population: Educators

TASK STATEMENT	REASON(S) NOT COVERED						
	NOT REQUIRED BY PROGRAM	NOT REQUIRED FOR ACCRED.	COVERED ELSEWHERE	I DON'T KNOW	OTHER	N – TOTAL REASONS NOT COVERED[1]	N – INDIVIDUALS TASK NOT COVERED[2]
1. Gather information about client's vision, goals, budget, and schedule to validate project scope and program.	11	6	2	7	5	31	21
2. Prepare design alternatives for client review.	13	3	2	3	7	28	8
3. Determine methods for Architect-Client communication based on project scope of work.	17	7	5	17	18	64	35
4. Determine impact of applicable zoning and development ordinances to determine project constraints.	4	0	1	3	4	12	8
5. Determine scope of services.	26	9	7	8	12	62	29
6. Determine design fees.	27	12	12	11	15	77	34
7. Determine project schedule.	18	6	9	7	10	50	29
8. Evaluate results of feasibility studies to determine project's financial viability.	40	12	9	13	12	86	38
9. Evaluate results of feasibility studies to determine project's technical viability.	30	11	8	10	16	75	41
10. Determine impact of existing utilities infrastructure on site.	23	9	7	6	10	55	31
11. Determine impact of existing transportation infrastructure on site.	12	3	3	6	3	27	18
12. Assess environmental impact of design decisions.	5	2	2	6	3	18	12
13. Define requirements for site survey based on established project scope.	27	8	5	13	9	62	33
14. Assess socio-cultural context of the proposed site.	8	3	4	0	3	18	11
15. Analyze existing site conditions to determine impact on facility layout.	3	1	0	3	2	9	6
16. Consider recommendations from geotechnical studies when establishing design parameters.	32	13	8	11	8	72	39
17. Develop sustainability goals based on existing environmental conditions.	4	2	1	3	5	15	15
18. Establish sustainability goals affecting building performance.	6	3	1	3	5	18	14
19. Consider results of environmental studies when developing site.	13	5	2	8	9	37	25
20. Develop mitigation options to address adverse site conditions.	27	11	4	11	10	63	37
21. Perform building code analysis.	4	1	2	2	1	10	17
22. Communicate design ideas to the client graphically through a variety of different media.	1	0	1	1	4	7	4
23. Communicate design ideas to the client using hand drawings.	4	2	0	0	3	9	4
24. Communicate design ideas to client with two-dimensional (2-D) computer aided design software.	1	0	1	0	3	5	3

TABLE B4. PERCENTAGE DISTRIBUTION OF REASON(S) WHY TASKS WERE NOT COVERED (CONT.)

Survey: EDU A Survey Population: Educators

TASK STATEMENT	REASON(S) NOT COVERED						
	NOT REQUIRED BY PROGRAM	NOT REQUIRED FOR ACCRED.	COVERED ELSEWHERE	I DON'T KNOW	OTHER	N – TOTAL REASONS NOT COVERED[1]	N – INDIVIDUALS TASK NOT COVERED[2]
25. Communicate design ideas to client with three-dimensional (3-D) computer aided design software.	2	0	1	0	2	5	2
26. Determine design parameters for building systems.	8	2	1	1	1	13	9
27. Develop conceptual project budget.	24	5	6	13	16	64	34
28. Prepare submittals for regulatory approval.	46	16	15	21	17	115	33
29. Evaluate opportunities and constraints of alternative sites.	15	2	2	10	5	34	18
30. Gather information about community concerns and issues that may impact proposed project.	12	4	3	7	5	31	15
31. Prepare building program.	6	2	0	4	3	15	6
32. Establish project design goals.	2	0	0	2	3	7	11
33. Prepare site analysis diagrams to document existing conditions, features, infrastructure, and regulatory requirements.	6	0	0	1	3	10	5
34. Prepare diagrams illustrating spatial relationships and functional adjacencies.	4	1	0	0	1	6	3
35. Prepare code analysis documentation.	14	1	3	6	5	29	25
36. Select technologies to develop and produce design and construction documentation.	14	2	2	2	6	26	23
37. Coordinate documentation of design team.	26	9	9	9	14	67	31
38. Manage project close-out procedures and documentation.	42	14	15	23	16	110	42
39. Perform quality control reviews throughout the documentation process.	41	14	15	22	16	108	39
40. Prepare Cost of Work estimates.	44	11	13	14	17	99	33
41. Update Cost of Work estimates.	43	14	16	22	17	112	40
42. Design for building structural system components.	3	1	0	2	1	7	10
43. Design for civil components of site.	24	8	6	11	8	57	27
44. Design for mechanical, electrical and plumbing system components.	7	1	4	2	3	17	11
45. Design for landscape elements for site.	7	1	3	7	2	20	9
46. Oversee design integration of building components and systems.	10	1	1	6	4	22	14
47. Select materials, finishes and systems based on technical properties and aesthetic requirements.	5	0	2	2	2	11	9
48. Select building performance modeling technologies to guide building design.	20	7	5	4	6	42	36
49. Prepare life cycle cost analysis.	24	9	8	12	10	63	39
50. Perform constructability review to determine ability to procure, sequence construction, and build proposed project.	39	13	14	13	17	96	36

TABLE B4. PERCENTAGE DISTRIBUTION OF REASON(S) WHY TASKS WERE NOT COVERED (CONT.)

Survey: EDU A Survey Population: Educators

TASK STATEMENT	REASON(S) NOT COVERED						
	NOT REQUIRED BY PROGRAM	NOT REQUIRED FOR ACCRED.	COVERED ELSEWHERE	I DON'T KNOW	OTHER	N – TOTAL REASONS NOT COVERED[1]	N – INDIVIDUALS TASK NOT COVERED[2]
51. Perform constructability reviews throughout the design process.	40	7	14	17	13	91	35
52. Prepare final procurement and contract documents.	42	14	18	12	13	99	29
53. Establish procedures to process documentation during contract administration.	39	14	23	9	14	99	41
54. Determine specific insurance requirements to meet contract or business needs.	41	14	16	13	14	98	39
55. Review results from field reports, third-party inspections and other test results for conformance with contract documents.	50	19	15	18	18	120	41
56. Manage modifications to the construction contract.	41	14	18	13	17	103	38
57. Prepare Owner-Contractor Agreement.	23	6	8	4	9	98	33
58. Respond to Contractor Requests for Information.	45	13	12	10	18	74	44
59. Prepare proposals for services in response to client requirements.	34	11	9	7	13	52	38
60. Prepare Owner-Architect Agreement.	23	5	9	5	10	58	41
61. Prepare Architect-Consultant Agreement.	28	7	9	5	9	85	43
62. Negotiate terms and conditions outlined in Owner-Architect Agreement.	36	12	13	10	14	44	19
63. Apply principles of historic preservation for projects involving building restoration or renovation.	19	9	5	5	6	51	30
64. Collaborate with stakeholders during design process to maintain design intent and comply with Owner requirements.	20	6	4	8	13	24	13
65. Present design concept to stakeholders.	9	2	3	3	7	81	26
66. Coordinate design work of consultants.	37	10	11	9	14	84	26
67. Select furniture, fixtures and equipment that meet client's design requirements and needs.	42	10	11	10	11	102	37
68. Establish procedures for providing post-occupancy services.	46	16	13	12	15	98	44
69. Negotiate terms and conditions of services outlined in Architect-Consultant Agreement.	48	10	15	9	16	109	39
70. Prepare staffing plan to meet project goals.	46	15	18	15	15	91	43
71. Establish procedures for documenting project decisions.	38	11	15	12	15	84	41
72. Monitor project schedule to maintain compliance with established milestones.	35	10	12	9	18	119	45
73. Evaluate staffing plan to ensure compliance with established milestones.	55	15	14	15	20	100	49
74. Manage client expectations to align with established milestones and final decision points.	48	13	11	10	18	123	37

TABLE B4. PERCENTAGE DISTRIBUTION OF REASON(S) WHY TASKS WERE NOT COVERED (CONT.)

Survey: EDU A Survey Population: Educators

TASK STATEMENT	REASON(S) NOT COVERED						
	NOT REQUIRED BY PROGRAM	NOT REQUIRED FOR ACCRED.	COVERED ELSEWHERE	I DON'T KNOW	OTHER	N – TOTAL REASONS NOT COVERED[1]	N – INDIVIDUALS TASK NOT COVERED[2]
75. Assist client in selecting contractors.	56	18	16	13	20	57	29
76. Manage implementation of sustainability criteria.	25	9	9	5	9	98	33
77. Identify changes in project scope that require additional services.	40	14	15	8	14	91	39
78. Assist Owner in obtaining necessary permits and approvals.	40	15	17	7	18	97	36
79. Coordinate testing of building performance and materials.	43	18	13	10	13	97	41
80. Review Application and Certificate for Payment.	36	12	14	9	16	87	42
81. Review shop drawings and submittals during construction for conformance with design intent.	28	10	9	8	12	67	33
82. Complete field reports to document field observations from site visit.	31	11	11	7	11	71	40
83. Manage information exchange during construction.	50	16	16	9	16	107	47
84. Resolve conflicts that may arise during design and construction process.	33	8	11	6	13	71	39
85. Manage project-specific bidding process.	44	15	14	7	16	96	38
86. Establish procedures for building commissioning.	48	15	13	8	15	99	48
87. Select design team consultants.	39	14	9	7	10	79	38
88. Conduct periodic progress meetings with design and project team.	40	11	7	2	14	74	41
89. Participate in pre-construction, pre-installation and regular progress meetings with design team.	45	14	16	5	20	100	46
90. Develop strategies to control risk and manage liability.	35	10	10	8	13	76	42
91. Determine billing rates.	40	12	13	11	12	88	42
92. Develop business plan for firm.	23	8	11	10	9	61	37
93. Develop and maintain effective and productive relationships with clients.	25	8	9	7	11	60	43
94. Develop procedures for responding to changes in project scope.	32	12	15	9	12	80	50
95. Develop procedures for responding to contractor requests (Requests for Information).	41	13	15	10	14	93	48
96. Develop strategies for responding to Owner requests (Requests for Proposal, Requests for Qualifications).	35	10	13	7	13	78	51
97. Understand firm's legal structure to comply with jurisdictional rules and regulations.	23	8	7	6	7	51	42
98. Understand implications of evolving sustainable design strategies and technologies.	5	3	2	1	1	12	17

TABLE B4. PERCENTAGE DISTRIBUTION OF REASON(S) WHY TASKS WERE NOT COVERED (CONT.)

Survey: EDU A Survey Population: Educators

TASK STATEMENT	REASON(S) NOT COVERED						
	NOT REQUIRED BY PROGRAM	NOT REQUIRED FOR ACCRED.	COVERED ELSEWHERE	I DON'T KNOW	OTHER	N – TOTAL REASONS NOT COVERED[1]	N – INDIVIDUALS TASK NOT COVERED[2]
99. Understand implications of project delivery technologies.	21	4	6	2	3	36	33
100. Understand implications of project delivery methods.	16	3	7	3	3	32	40
101. Prepare marketing documents that accurately communicate firm's experience and capabilities.	33	6	7	6	8	60	36
102. Adhere to ethical standards and codes of professional conduct.	4	1	1	1	1	8	19
103. Comply with laws and regulations governing the practice of architecture.	7	1	3	2	2	15	20
104. Understand implications of policies and procedures to ensure supervision of design work by architect in responsible charge/control.	18	6	7	2	10	43	51
MEAN	25.82	8.03	8.19	7.73	10.03	59.80	
MIN	1	0	0	0	1	5	
MAX	56	19	23	23	20	123	

[1] This column is a sum of all the reasons participants indicated why a task was not covered. Respondents were allowed to select as many of the reasons as applicable; therefore the number of reasons a task was not covered may exceed the number of participants who indicated a task was not covered.

[2] This column represents the number of individuals who indicated that the task was not covered.

TABLE B5. PERCENTAGE DISTRIBUTION OF EXTENT TO WHICH SURVEY RESPONDENTS PERFORMED TASKS BY COMPLETION OF THEIR PROGRAM, IF COVERED

Survey: EDU B Survey Population: Interns + Architects licensed in the past year

TASK STATEMENT	EXTENT PERFORMED						
	NOT INTRODUCED	INTRODUCED, NOT PERFORMED	PERFORMED WITH GUIDANCE & FEEDBACK	PERFORMED IND.	DON'T KNOW OR DON'T REMEMBER	PERCENT PERFORMED	TOTAL N
1. Gather information about client's vision, goals, budget, and schedule to validate project scope and program.	26.0%	29.5%	30.5%	12.0%	1.9%	42.5%	308
2. Prepare design alternatives for client review.	17.9%	13.0%	50.6%	17.2%	1.3%	67.9%	308
3. Determine methods for Architect-Client communication based on project scope of work.	42.2%	21.4%	23.4%	9.4%	3.6%	32.8%	308
4. Determine impact of applicable zoning and development ordinances to determine project constraints.	19.8%	25.3%	36.7%	15.9%	2.3%	52.6%	308
5. Determine scope of services.	32.8%	29.9%	25.0%	8.4%	3.9%	33.4%	308
6. Determine design fees.	55.8%	26.9%	11.4%	4.5%	1.3%	15.9%	308
7. Determine project schedule.	40.9%	32.1%	16.9%	7.5%	2.6%	24.4%	308
8. Evaluate results of feasibility studies to determine project's financial viability.	56.2%	23.1%	14.3%	4.9%	1.6%	19.2%	308
9. Evaluate results of feasibility studies to determine project's technical viability.	47.4%	22.7%	22.4%	5.5%	1.9%	27.9%	308
10. Determine impact of existing utilities infrastructure on site.	39.0%	22.4%	26.6%	9.1%	2.9%	35.7%	308
11. Determine impact of existing transportation infrastructure on site.	23.1%	22.1%	40.6%	12.0%	2.3%	52.6%	308
12. Assess environmental impact of design decisions.	12.3%	26.0%	48.1%	12.3%	1.3%	60.4%	308
13. Define requirements for site survey based on established project scope.	29.9%	19.2%	35.4%	12.3%	3.2%	47.7%	308
14. Assess socio-cultural context of the proposed site.	17.5%	15.3%	53.9%	11.4%	1.9%	65.3%	308
15. Analyze existing site conditions to determine impact on facility layout.	4.9%	8.1%	69.8%	16.2%	1.0%	86.0%	308
16. Consider recommendations from geotechnical studies when establishing design parameters.	47.1%	24.0%	19.8%	7.5%	1.6%	27.3%	308
17. Develop sustainability goals based on existing environmental conditions.	19.5%	23.7%	41.2%	13.6%	1.9%	54.9%	308
18. Establish sustainability goals affecting building performance.	17.5%	26.3%	41.2%	13.3%	1.6%	54.5%	308
19. Consider results of environmental studies when developing site.	25.3%	25.0%	38.0%	9.7%	1.9%	47.7%	308
20. Develop mitigation options to address adverse site conditions.	37.0%	20.1%	31.5%	8.1%	3.2%	39.6%	308

TABLE B5. PERCENTAGE DISTRIBUTION OF EXTENT TO WHICH SURVEY RESPONDENTS PERFORMED TASKS BY COMPLETION OF THEIR PROGRAM, IF COVERED (CONT.)

Survey: EDU B Survey Population: Interns + Architects licensed in the past year

TASK STATEMENT	EXTENT PERFORMED						
	NOT INTRODUCED	INTRODUCED, NOT PERFORMED	PERFORMED WITH GUIDANCE & FEEDBACK	PERFORMED IND.	DON'T KNOW OR DON'T REMEMBER	PERCENT PERFORMED	TOTAL N
21. Perform building code analysis.	25.3%	25.0%	29.9%	18.2%	1.6%	48.1%	308
22. Communicate design ideas to the client graphically through a variety of different media.	2.9%	2.6%	69.8%	23.7%	1.0%	93.5%	308
23. Communicate design ideas to the client using hand drawings.	3.9%	6.2%	64.6%	24.0%	1.3%	88.6%	308
24. Communicate design ideas to client with two-dimensional (2-D) computer aided design software.	4.9%	3.9%	61.4%	29.2%	0.6%	90.6%	308
25. Communicate design ideas to client with three-dimensional (3-D) computer aided design software.	7.8%	6.2%	54.9%	30.5%	0.6%	85.4%	308
26. Determine design parameters for building systems.	13.3%	25.0%	47.7%	11.4%	2.6%	59.1%	308
27. Develop conceptual project budget.	49.7%	25.3%	18.5%	5.5%	1.0%	24.0%	308
28. Prepare submittals for regulatory approval.	59.1%	16.6%	15.9%	7.8%	0.6%	23.7%	308
29. Evaluate opportunities and constraints of alternative sites.	33.4%	17.5%	36.0%	11.4%	1.6%	47.4%	308
30. Gather information about community concerns and issues that may impact proposed project.	21.1%	21.1%	46.1%	11.4%	0.3%	57.5%	308
31. Prepare building program.	6.2%	13.6%	64.3%	15.3%	0.6%	79.5%	308
32. Establish project design goals.	5.8%	11.4%	63.3%	17.9%	1.6%	81.2%	308
33. Prepare site analysis diagrams to document existing conditions, features, infrastructure, and regulatory requirements.	6.8%	11.0%	61.0%	20.5%	0.6%	81.5%	308
34. Prepare diagrams illustrating spatial relationships and functional adjacencies.	1.6%	3.2%	70.1%	24.4%	0.6%	94.5%	308
35. Prepare code analysis documentation.	37.0%	22.1%	24.7%	14.9%	1.3%	39.6%	308
36. Select technologies to develop and produce design and construction documentation.	23.1%	17.9%	37.7%	19.5%	1.9%	57.1%	308
37. Coordinate documentation of design team.	38.0%	19.2%	22.4%	18.5%	1.9%	40.9%	308
38. Manage project close-out procedures and documentation.	64.0%	16.6%	11.4%	7.5%	0.6%	18.8%	308
39. Perform quality control reviews throughout the documentation process.	57.5%	14.3%	17.5%	9.7%	1.0%	27.3%	308
40. Prepare Cost of Work estimates.	61.4%	20.1%	12.7%	5.2%	0.6%	17.9%	308

TABLE B5. PERCENTAGE DISTRIBUTION OF EXTENT TO WHICH SURVEY RESPONDENTS PERFORMED TASKS BY COMPLETION OF THEIR PROGRAM, IF COVERED (CONT.)

Survey: EDU B Survey Population: Interns + Architects licensed in the past year

TASK STATEMENT	EXTENT PERFORMED						
	NOT INTRODUCED	INTRODUCED, NOT PERFORMED	PERFORMED WITH GUIDANCE & FEEDBACK	PERFORMED IND.	DON'T KNOW OR DON'T REMEMBER	PERCENT PERFORMED	TOTAL N
41. Update Cost of Work estimates.	64.3%	20.1%	10.1%	4.5%	1.0%	14.6%	308
42. Design for building structural system components.	14.0%	19.2%	53.2%	11.7%	1.9%	64.9%	308
43. Design for civil components of site.	29.2%	26.3%	34.4%	8.1%	1.9%	42.5%	308
44. Design for mechanical, electrical and plumbing system components.	20.1%	26.9%	40.6%	11.0%	1.3%	51.6%	308
45. Design for landscape elements for site.	9.1%	17.2%	53.6%	18.8%	1.3%	72.4%	308
46. Oversee design integration of building components and systems.	21.8%	23.4%	40.6%	12.7%	1.6%	53.2%	308
47. Select materials, finishes and systems based on technical properties and aesthetic requirements.	7.8%	13.3%	53.2%	24.7%	1.0%	77.9%	308
48. Select building performance modeling technologies to guide building design.	47.7%	24.7%	18.2%	8.1%	1.3%	26.3%	308
49. Prepare life cycle cost analysis.	52.3%	35.1%	8.8%	3.2%	0.6%	12.0%	308
50. Perform constructability review to determine ability to procure, sequence construction, and build proposed project.	54.9%	23.4%	13.6%	5.2%	2.9%	18.8%	308
51. Perform constructability reviews throughout the design process.	53.9%	22.7%	16.6%	5.2%	1.6%	21.8%	308
52. Prepare final procurement and contract documents.	51.9%	20.8%	20.1%	5.8%	1.3%	26.0%	308
53. Establish procedures to process documentation during contract administration.	58.8%	20.1%	14.6%	5.5%	1.0%	20.1%	308
54. Determine specific insurance requirements to meet contract or business needs.	67.5%	24.0%	5.5%	2.3%	0.6%	7.8%	308
55. Review results from field reports, third-party inspections and other test results for conformance with contract documents.	60.7%	17.2%	13.0%	7.8%	1.3%	20.8%	308
56. Manage modifications to the construction contract.	64.3%	20.1%	9.7%	4.9%	1.0%	14.6%	308
57. Prepare Owner-Contractor Agreement.	53.6%	33.1%	10.4%	2.3%	0.6%	12.7%	308
58. Respond to Contractor Requests for Information.	54.2%	18.5%	11.4%	14.6%	1.3%	26.0%	308
59. Prepare proposals for services in response to client requirements.	56.2%	21.1%	13.0%	8.8%	1.0%	21.8%	308
60. Prepare Owner-Architect Agreement.	46.4%	38.3%	10.4%	3.9%	1.0%	14.3%	308

TABLE B5. PERCENTAGE DISTRIBUTION OF EXTENT TO WHICH SURVEY RESPONDENTS PERFORMED TASKS BY COMPLETION OF THEIR PROGRAM, IF COVERED (CONT.)

Survey: EDU B Survey Population: Interns + Architects licensed in the past year

TASK STATEMENT	EXTENT PERFORMED						
	NOT INTRODUCED	INTRODUCED, NOT PERFORMED	PERFORMED WITH GUIDANCE & FEEDBACK	PERFORMED IND.	DON'T KNOW OR DON'T REMEMBER	PERCENT PERFORMED	TOTAL N
61. Prepare Architect-Consultant Agreement.	50.6%	37.3%	7.8%	2.9%	1.3%	10.7%	308
62. Negotiate terms and conditions outlined in Owner-Architect Agreement.	58.1%	31.8%	5.8%	2.9%	1.3%	8.8%	308
63. Apply principles of historic preservation for projects involving building restoration or renovation.	31.5%	29.5%	29.5%	7.8%	1.6%	37.3%	308
64. Collaborate with stakeholders during design process to maintain design intent and comply with Owner requirements.	42.9%	23.7%	22.7%	8.8%	1.9%	31.5%	308
65. Present design concept to stakeholders.	33.8%	15.6%	39.9%	8.8%	1.9%	48.7%	308
66. Coordinate design work of consultants.	39.0%	25.6%	18.5%	15.9%	1.0%	34.4%	308
67. Select furniture, fixtures and equipment that meet client's design requirements and needs.	33.4%	20.8%	27.9%	16.6%	1.3%	44.5%	308
68. Establish procedures for providing post-occupancy services.	62.7%	23.4%	7.8%	4.2%	1.9%	12.0%	308
69. Negotiate terms and conditions of services outlined in Architect-Consultant Agreement.	64.0%	26.6%	6.5%	2.3%	0.6%	8.8%	308
70. Prepare staffing plan to meet project goals.	65.9%	16.6%	11.7%	4.9%	1.0%	16.6%	308
71. Establish procedures for documenting project decisions.	57.8%	16.9%	16.6%	6.8%	1.9%	23.4%	308
72. Monitor project schedule to maintain compliance with established milestones.	49.0%	22.7%	16.6%	10.7%	1.0%	27.3%	308
73. Evaluate staffing plan to ensure compliance with established milestones.	67.2%	16.9%	9.4%	5.5%	1.0%	14.9%	308
74. Manage client expectations to align with established milestones and final decision points.	57.1%	19.8%	15.3%	6.8%	1.0%	22.1%	308
75. Assist client in selecting contractors.	62.3%	19.8%	9.7%	6.2%	1.9%	15.9%	308
76. Manage implementation of sustainability criteria.	52.9%	21.4%	16.9%	7.5%	1.3%	24.4%	308
77. Identify changes in project scope that require additional services.	55.2%	21.8%	13.0%	8.8%	1.3%	21.8%	308
78. Assist Owner in obtaining necessary permits and approvals.	53.9%	22.4%	14.6%	8.4%	0.6%	23.1%	308

TABLE B5. PERCENTAGE DISTRIBUTION OF EXTENT TO WHICH SURVEY RESPONDENTS PERFORMED TASKS BY COMPLETION OF THEIR PROGRAM, IF COVERED (CONT.)

Survey: EDU B Survey Population: Interns + Architects licensed in the past year

TASK STATEMENT	EXTENT PERFORMED						
	NOT INTRODUCED	INTRODUCED, NOT PERFORMED	PERFORMED WITH GUIDANCE & FEEDBACK	PERFORMED IND.	DON'T KNOW OR DON'T REMEMBER	PERCENT PERFORMED	TOTAL N
79. Coordinate testing of building performance and materials.	59.4%	25.6%	10.7%	2.9%	1.3%	13.6%	308
80. Review Application and Certificate for Payment.	64.6%	18.5%	9.1%	6.8%	1.0%	15.9%	308
81. Review shop drawings and submittals during construction for conformance with design intent.	53.6%	17.5%	15.3%	13.0%	0.6%	28.2%	308
82. Complete field reports to document field observations from site visit.	46.8%	20.5%	17.5%	14.6%	0.6%	32.1%	308
83. Manage information exchange during construction.	55.2%	17.5%	13.3%	13.0%	1.0%	26.3%	308
84. Resolve conflicts that may arise during design and construction process.	48.1%	23.4%	16.6%	10.7%	1.3%	27.3%	308
85. Manage project-specific bidding process.	58.1%	22.7%	10.7%	6.8%	1.6%	17.5%	308
86. Establish procedures for building commissioning.	71.8%	15.9%	6.2%	4.5%	1.6%	10.7%	308
87. Select design team consultants.	56.5%	28.2%	10.1%	4.5%	0.6%	14.6%	308
88. Conduct periodic progress meetings with design and project team.	46.8%	20.5%	20.5%	11.4%	1.0%	31.8%	308
89. Participate in pre-construction, pre-installation and regular progress meetings with design team.	54.5%	18.5%	16.2%	9.1%	1.6%	25.3%	308
90. Develop strategies to control risk and manage liability.	62.0%	24.4%	7.1%	4.2%	2.3%	11.4%	308
91. Determine billing rates.	69.2%	17.9%	9.1%	2.3%	1.6%	11.4%	308
92. Develop business plan for firm.	62.0%	20.1%	12.3%	4.2%	1.3%	16.6%	308
93. Develop and maintain effective and productive relationships with clients.	48.4%	22.4%	14.6%	12.0%	2.6%	26.6%	308
94. Develop procedures for responding to changes in project scope.	54.9%	21.1%	15.6%	6.5%	1.9%	22.1%	308
95. Develop procedures for responding to contractor requests (Requests for Information).	56.5%	19.8%	12.3%	9.4%	1.9%	21.8%	308
96. Develop strategies for responding to Owner requests (Requests for Proposal, Requests for Qualifications).	55.8%	19.5%	12.7%	9.1%	2.9%	21.8%	308
97. Understand firm's legal structure to comply with jurisdictional rules and regulations.	49.0%	29.9%	13.6%	5.5%	1.9%	19.2%	308

TABLE B5. PERCENTAGE DISTRIBUTION OF EXTENT TO WHICH SURVEY RESPONDENTS PERFORMED TASKS BY COMPLETION OF THEIR PROGRAM, IF COVERED (CONT.)

Survey: EDU B Survey Population: Interns + Architects licensed in the past year

98. Understand implications of evolving sustainable design strategies and technologies.	30.5%	26.9%	29.5%	11.7%	1.3%	41.2%	308
99. Understand implications of project delivery technologies.	43.2%	25.0%	20.8%	8.1%	2.9%	28.9%	308
100. Understand implications of project delivery methods.	37.3%	30.8%	20.8%	7.5%	3.6%	28.2%	308
101. Prepare marketing documents that accurately communicate firm's experience and capabilities.	50.0%	17.5%	20.8%	9.7%	1.9%	30.5%	308
102. Adhere to ethical standards and codes of professional conduct.	15.6%	35.7%	33.1%	13.6%	1.9%	46.8%	308
103. Comply with laws and regulations governing the practice of architecture.	16.6%	37.3%	35.4%	9.7%	1.0%	45.1%	308
104. Understand implications of policies and procedures to ensure supervision of design work by architect in responsible charge/control.	29.9%	30.5%	30.2%	7.8%	1.6%	38.0%	308
MEAN	40.9%	21.5%	25.8%	10.2%	1.5%	36.0%	308.0
MIN	1.6%	2.6%	5.5%	2.3%	0.3%	7.8%	308
MAX	71.8%	38.3%	70.1%	30.5%	3.9%	94.5%	308

TABLE B6. LIST OF ALL EDU KNOWLEDGE/SKILL STATEMENTS

SKILL #	KNOWLEDGE/SKILL STATEMENT
1	Knowledge of oral, written, and visual presentation techniques to communicate project information.
2	Knowledge of master plans and their impact on building design.
3	Knowledge of method for project controls, e.g., scope of services, budget, billing, compensation.
4	Knowledge of factors that affect selection of project consultants.
5	Knowledge of strategies for delegating and monitoring task assignments, accountability and deadlines for project team.
6	Knowledge of client and project characteristics that influence contract agreements.
7	Knowledge of types of contracts and their designated uses.
8	Knowledge of standard forms of architectural service agreements for Owner-Architect, Architect-Consultant and Owner-Contractor.
9	Knowledge of effects of specific findings from feasibility studies on building design.
10	Knowledge of factors involved in selection of building systems and components.
11	Knowledge of effect of environmental factors on site development.
12	Knowledge of environmental policies and regulations and their implications for proposed construction.
13	Knowledge of processes involved in conducting a survey of existing conditions.
14	Knowledge of effects of specific findings from environmental impact studies on building design.
15	Skill in designing facility layout and site plan that meets site constraints.
16	Knowledge of methods required to mitigate adverse site conditions.
17	Knowledge of elements and processes for conducting a site analysis.
18	Knowledge of codes of professional conduct as related to architectural practice.
19	Knowledge of protocols and procedures for conducting a building code analysis.
20	Knowledge of building codes and their impact on building design.
21	Knowledge of land use codes and ordinances that govern land use decisions.
22	Skill in producing hand drawings of design ideas.
23	Knowledge of standards for graphic symbols and units of measurement in technical drawings.
24	Skill in producing two-dimensional (2-D) drawings using hand methods.
25	Skill in using software to produce two-dimensional (2-D) drawings.
26	Skill in using software to produce three-dimensional (3-D) models of building design.
27	Skill in producing physical scale models.
28	Skill in use of building information modeling (BIM) to develop and manage databases of building and construction information.
29	Knowledge of protocols and procedures for obtaining community input for proposed design.
30	Knowledge of computer aided design and drafting software for producing two-dimensional (2-D) drawings.
31	Knowledge of factors involved in selecting project appropriate computer based design technologies.
32	Knowledge of engineering properties of soils and their effect on building foundations and building design.
33	Knowledge of factors to be considered in adaptive reuse of existing buildings and materials.
34	Knowledge of building technologies which provide solutions for comfort, life safety and energy efficiency.
35	Knowledge of effect of thermal envelope in design of building systems.
36	Knowledge of principles of integrated project design.
37	Knowledge of strategies for anticipating, managing and preventing disputes and conflicts.
38	Knowledge of engineering design principles and their application to design and construction.
39	Knowledge of structural properties of construction products, materials and assemblies and their impact on building design and construction.
40	Knowledge of means and methods for building construction.
41	Knowledge of benefits and limitations of "fast track" or other forms of construction delivery methods.
42	Knowledge of methods and techniques for estimating construction costs.
43	Knowledge of structural load and load conditions that affect building design.
44	Knowledge of energy codes that impact construction.
45	Knowledge of methods and strategies for evidence based design (EBD).
46	Knowledge of impact of design on human behavior.
47	Knowledge of functional requirements of all building systems.
48	Knowledge of hazardous materials mitigation at building site.
49	Knowledge of principles of building operation and function.
50	Knowledge of content and format of specifications.
51	Knowledge of principles of interior design and their influences on building design.
52	Knowledge of principles of landscape design and their influences on building design.

TABLE B6. LIST OF ALL EDU KNOWLEDGE/SKILL STATEMENTS (CONT.)

53	Knowledge of site design principles and practices.
54	Knowledge of techniques for architectural programming to identify functional and operational requirements of scope of work.
55	Knowledge of procedures to develop project scheduling, phasing and deliverables for various building types.
56	Knowledge of relationship between constructability and aesthetics.
57	Knowledge of standards and specifications for building materials and methods of construction, e.g., ASTM, ANSI.
58	Knowledge of methods to perform life cycle cost analysis.
59	Knowledge of principles of value analysis and value engineering processes.
60	Knowledge of procedures and protocols of permit approval process.
61	Knowledge of principles of historic preservation.
62	Knowledge of processes and procedures for building commissioning.
63	Knowledge of design factors to consider in selecting furniture, fixtures and equipment (FFE).
64	Knowledge of methods and tools for space planning.
65	Knowledge of different project delivery methods and their impacts on project schedule, costs and project goals.
66	Knowledge of factors that impact construction management services.
67	Knowledge of fee structures, their attributes and implications for schedule, scope and profit.
68	Knowledge of consultant agreements and fee structures.
69	Knowledge of different building and construction types and their implications on design and construction schedules.
70	Knowledge of scheduling methods to establish project timeframes based on standard sequences of architectural operations in each phase.
71	Knowledge of business development strategies.
72	Knowledge of relationship between project scope and consultant capabilities to assemble project team.
73	Knowledge of purposes and types of professional liability insurance related to architectural practice.
74	Knowledge of format and protocols for efficient meeting management and information distribution.
75	Knowledge of strategies to assess project progress and verify its alignment with project schedule.
76	Knowledge of ways to translate project goals into specific tasks and measurable design criteria.
77	Knowledge of effective communication techniques to educate client with respect to roles and responsibilities of all parties.
78	Knowledge of formats and protocols to produce and distribute field reports to document construction progress.
79	Knowledge of site requirements for specific building types to determine client's site needs.
80	Knowledge of site analysis techniques to determine project parameters affecting design.
81	Knowledge of methods to prioritize or objectively evaluate design options based on project goals.
82	Knowledge of sustainability strategies and/or rating systems.
83	Knowledge of sustainability considerations related to building materials and construction processes.
84	Knowledge of techniques to integrate renewable energy systems into building design.
85	Knowledge of methods to identify scope changes that may require additional services.
86	Knowledge of procedures for processing requests for additional services.
87	Knowledge of appropriate documentation level required for construction documents.
88	Knowledge of close-out document requirements and protocols.
89	Knowledge of construction document technologies and their standards and applications.
90	Knowledge of building information modeling (BIM) and its impact on planning, financial management and construction documentation.
91	Knowledge of principles of computer assisted design and drafting (CADD) software and its uses in communicating design ideas.
92	Knowledge of American Institute of Architects (AIA) guidelines for contract agreements.
93	Knowledge of techniques to integrate model contract forms and documents.
94	Knowledge of methods for production of construction documentation and drawings.
95	Knowledge of standard methods for production of design development documentation.
96	Knowledge of standard methods for production of site plan documentation.
97	Knowledge of circumstances warranting further actions based on field reports, third party inspections and test results.
98	Knowledge of materials testing processes and protocols to be performed during the construction process.
99	Knowledge of building systems testing processes and protocols to be performed during the construction process.

TABLE B6. LIST OF ALL EDU KNOWLEDGE/SKILL STATEMENTS (CONT.)

100	Knowledge of formats and protocols to process shop drawings and submittals to ensure they meet design intent.
101	Knowledge of protocols for responding to Requests for Information (RFI).
102	Knowledge of roles, responsibilities and authorities of project team members during construction.
103	Knowledge of conflict resolution techniques and their applications throughout project.
104	Knowledge of bidding processes and protocols for different project delivery methods and their applications.
105	Knowledge of requirements for post-occupancy evaluation.
106	Knowledge of project risks for new and innovative products, materials, methods and technologies.
107	Knowledge of design decisions and their impact on constructability.
108	Knowledge of interpersonal skills necessary to elicit client needs and desired scope of services.
109	Knowledge of requirements of Intern Development Program (IDP).
110	Knowledge of techniques for staff development in architectural firms.
111	Knowledge of methods to manage human resources.
112	Knowledge of state board guidelines for licensing and professional practice.
113	Knowledge of strategies to create positive work environment that builds trust and encourages cooperation and teamwork.
114	Knowledge of principles of universal design.
115	Knowledge of purposes of and legal implications for different types of business entities.
116	Knowledge of innovative and evolving technologies and their impact on architectural practice.
117	Knowledge of training programs for professional development.
118	Knowledge of ethical standards relevant to architectural practice.
119	Knowledge of methods to facilitate information management in building design and construction.
120	Knowledge of factors involved in conducting an architectural practice in international markets.
121	Knowledge of components of standard business plan, e.g., revenue projection, staffing plan, overhead, profit plan.
122	Knowledge of methods and procedures for risk management.

TABLE B7. PERCENTAGE DISTRIBUTION OF RATINGS FOR WHEN SURVEY RESPONDENT FIRST ACQUIRED KNOWLEDGE

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/SKILL STATEMENT	WHEN FIRST ACQUIRED				
	NOT ACQUIRED	BY COMPLETION OF ACCREDITED ARCHITECTURE DEGREE PROGRAM	DURING INTERNSHIP	AFTER LICENSURE	TOTAL N
1. Knowledge of oral, written, and visual presentation techniques to communicate project information.	0.7%	68.4%	28.4%	2.4%	450
2. Knowledge of master plans and their impact on building design.	4.0%	37.1%	51.3%	7.6%	450
3. Knowledge of method for project controls, e.g., scope of services, budget, billing, compensation.	5.6%	2.4%	63.8%	28.2%	450
4. Knowledge of factors that affect selection of project consultants.	11.6%	1.1%	63.1%	24.2%	450
5. Knowledge of strategies for delegating and monitoring task assignments, accountability and deadlines for project team.	4.9%	7.6%	66.2%	21.3%	450
6. Knowledge of client and project characteristics that influence contract agreements.	11.3%	2.7%	51.8%	34.2%	450
7. Knowledge of types of contracts and their designated uses.	9.1%	13.8%	53.6%	23.6%	450
8. Knowledge of standard forms of architectural service agreements for Owner-Architect, Architect-Consultant and Owner-Contractor.	6.0%	19.1%	59.3%	15.6%	450
9. Knowledge of effects of specific findings from feasibility studies on building design.	14.0%	9.8%	60.4%	15.8%	450
10. Knowledge of factors involved in selection of building systems and components.	1.8%	23.3%	65.8%	9.1%	450
11. Knowledge of effect of environmental factors on site development.	1.8%	45.1%	43.3%	9.8%	450
12. Knowledge of environmental policies and regulations and their implications for proposed construction.	8.0%	9.8%	62.7%	19.6%	450
13. Knowledge of processes involved in conducting a survey of existing conditions.	2.7%	18.4%	72.9%	6.0%	450
14. Knowledge of effects of specific findings from environmental impact studies on building design.	17.6%	11.6%	54.2%	16.7%	450
15. Skill in designing facility layout and site plan that meets site constraints.	0.9%	47.3%	48.4%	3.3%	450
16. Knowledge of methods required to mitigate adverse site conditions.	9.8%	18.4%	58.4%	13.3%	450
17. Knowledge of elements and processes for conducting a site analysis.	5.1%	48.4%	41.8%	4.7%	450
18. Knowledge of codes of professional conduct as related to architectural practice.	1.8%	27.6%	62.0%	8.7%	450
19. Knowledge of protocols and procedures for conducting a building code analysis.	2.0%	7.3%	82.2%	8.4%	450
20. Knowledge of building codes and their impact on building design.	0.2%	13.8%	82.0%	4.0%	450
21. Knowledge of land use codes and ordinances that govern land use decisions.	7.1%	12.9%	68.9%	11.1%	450
22. Skill in producing hand drawings of design ideas.	0.9%	88.2%	10.7%	0.2%	450
23. Knowledge of standards for graphic symbols and units of measurement in technical drawings.	0.0%	56.7%	43.3%	0.0%	450
24. Skill in producing two-dimensional (2-D) drawings using hand methods.	1.3%	88.7%	9.6%	0.4%	450

TABLE B7. PERCENTAGE DISTRIBUTION OF RATINGS FOR WHEN SURVEY RESPONDENT FIRST ACQUIRED KNOWLEDGE (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/SKILL STATEMENT	WHEN FIRST ACQUIRED				
	NOT ACQUIRED	BY COMPLETION OF ACCREDITED ARCHITECTURE DEGREE PROGRAM	DURING INTERNSHIP	AFTER LICENSURE	TOTAL N
25. Skill in using software to produce two-dimensional (2-D) drawings.	1.3%	54.0%	42.2%	2.4%	450
26. Skill in using software to produce three-dimensional (3-D) models of building design.	10.7%	45.6%	32.0%	11.8%	450
27. Skill in producing physical scale models.	1.3%	93.6%	4.9%	0.2%	450
28. Skill in use of building information modeling (BIM) to develop and manage databases of building and construction information.	34.0%	4.9%	37.1%	24.0%	450
29. Knowledge of protocols and procedures for obtaining community input for proposed design.	16.9%	15.3%	53.3%	14.4%	450
30. Knowledge of computer aided design and drafting software for producing two-dimensional (2-D) drawings.	1.3%	57.3%	39.1%	2.2%	450
31. Knowledge of factors involved in selecting project appropriate computer based design technologies.	8.9%	22.0%	57.1%	12.0%	450
32. Knowledge of engineering properties of soils and their effect on building foundations and building design.	9.3%	21.1%	60.2%	9.3%	450
33. Knowledge of factors to be considered in adaptive reuse of existing buildings and materials.	8.0%	18.2%	62.2%	11.6%	450
34. Knowledge of building technologies which provide solutions for comfort, life safety and energy efficiency.	1.1%	27.6%	61.6%	9.8%	450
35. Knowledge of effect of thermal envelope in design of building systems.	2.0%	40.9%	48.4%	8.7%	450
36. Knowledge of principles of integrated project design.	15.3%	14.2%	47.3%	23.1%	450
37. Knowledge of strategies for anticipating, managing and preventing disputes and conflicts.	11.6%	10.4%	54.4%	23.6%	450
38. Knowledge of engineering design principles and their application to design and construction.	2.2%	38.9%	54.9%	4.0%	450
39. Knowledge of structural properties of construction products, materials and assemblies and their impact on building design and construction.	1.3%	45.6%	48.4%	4.7%	450
40. Knowledge of means and methods for building construction.	1.3%	32.2%	64.7%	1.8%	450
41. Knowledge of benefits and limitations of "fast track" or other forms of construction delivery methods.	7.6%	16.9%	61.3%	14.2%	450
42. Knowledge of methods and techniques for estimating construction costs.	13.1%	10.7%	64.7%	11.6%	450
43. Knowledge of structural load and load conditions that affect building design.	2.2%	59.1%	35.1%	3.6%	450
44. Knowledge of energy codes that impact construction.	6.9%	6.4%	68.7%	18.0%	450
45. Knowledge of methods and strategies for evidence based design (EBD).	62.2%	6.4%	18.0%	13.3%	450
46. Knowledge of impact of design on human behavior.	6.7%	68.7%	20.7%	4.0%	450
47. Knowledge of functional requirements of all building systems.	2.0%	36.7%	54.4%	6.9%	450
48. Knowledge of hazardous materials mitigation at building site.	17.8%	8.0%	61.8%	12.4%	450
49. Knowledge of principles of building operation and function.	5.3%	30.7%	56.0%	8.0%	450
50. Knowledge of content and format of specifications.	1.8%	9.8%	80.4%	8.0%	450

TABLE B7. PERCENTAGE DISTRIBUTION OF RATINGS FOR WHEN SURVEY RESPONDENT FIRST ACQUIRED KNOWLEDGE (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/SKILL STATEMENT	WHEN FIRST ACQUIRED				
	NOT ACQUIRED	BY COMPLETION OF ACCREDITED ARCHITECTURE DEGREE PROGRAM	DURING INTERNSHIP	AFTER LICENSURE	TOTAL N
51. Knowledge of principles of interior design and their influences on building design.	5.8%	36.4%	55.1%	2.7%	450
52. Knowledge of principles of landscape design and their influences on building design.	6.9%	46.4%	42.9%	3.8%	450
53. Knowledge of site design principles and practices.	2.0%	54.9%	40.9%	2.2%	450
54. Knowledge of techniques for architectural programming to identify functional and operational requirements of scope of work.	3.1%	44.0%	47.1%	5.8%	450
55. Knowledge of procedures to develop project scheduling, phasing and deliverables for various building types.	7.3%	6.2%	71.1%	15.3%	450
56. Knowledge of relationship between constructability and aesthetics.	1.1%	30.7%	61.8%	6.4%	450
57. Knowledge of standards and specifications for building materials and methods of construction, e.g., ASTM, ANSI.	2.0%	11.8%	75.8%	10.4%	450
58. Knowledge of methods to perform life cycle cost analysis.	30.4%	14.2%	40.4%	14.9%	450
59. Knowledge of principles of value analysis and value engineering processes.	6.4%	5.8%	76.4%	11.3%	450
60. Knowledge of procedures and protocols of permit approval process.	4.0%	3.3%	86.0%	6.7%	450
61. Knowledge of principles of historic preservation.	19.1%	33.6%	39.1%	8.2%	450
62. Knowledge of processes and procedures for building commissioning.	25.8%	3.1%	48.7%	22.4%	450
63. Knowledge of design factors to consider in selecting furniture, fixtures and equipment (FFE).	9.3%	8.7%	70.9%	11.1%	450
64. Knowledge of methods and tools for space planning.	2.7%	53.3%	41.6%	2.4%	450
65. Knowledge of different project delivery methods and their impacts on project schedule, costs and project goals.	7.6%	14.7%	64.7%	13.1%	450
66. Knowledge of factors that impact construction management services.	13.3%	7.3%	63.8%	15.6%	450
67. Knowledge of fee structures, their attributes and implications for schedule, scope and profit.	11.6%	6.7%	54.2%	27.6%	450
68. Knowledge of consultant agreements and fee structures.	8.9%	4.0%	61.3%	25.8%	450
69. Knowledge of different building and construction types and their implications on design and construction schedules.	3.1%	20.0%	68.2%	8.7%	450
70. Knowledge of scheduling methods to establish project timeframes based on standard sequences of architectural operations in each phase.	10.9%	6.7%	67.8%	14.7%	450
71. Knowledge of business development strategies.	24.4%	6.7%	37.6%	31.3%	450
72. Knowledge of relationship between project scope and consultant capabilities to assemble project team.	9.6%	2.9%	63.3%	24.2%	450
73. Knowledge of purposes and types of professional liability insurance related to architectural practice.	20.4%	11.8%	40.0%	27.8%	450
74. Knowledge of format and protocols for efficient meeting management and information distribution.	7.1%	4.9%	74.0%	14.0%	450
75. Knowledge of strategies to assess project progress and verify its alignment with project schedule.	7.8%	3.3%	67.6%	21.3%	450
76. Knowledge of ways to translate project goals into specific tasks and measurable design criteria.	7.6%	10.7%	65.1%	16.7%	450

TABLE B7. PERCENTAGE DISTRIBUTION OF RATINGS FOR WHEN SURVEY RESPONDENT FIRST ACQUIRED KNOWLEDGE (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/SKILL STATEMENT	WHEN FIRST ACQUIRED				
	NOT ACQUIRED	BY COMPLETION OF ACCREDITED ARCHITECTURE DEGREE PROGRAM	DURING INTERNSHIP	AFTER LICENSURE	TOTAL N
77. Knowledge of effective communication techniques to educate client with respect to roles and responsibilities of all parties.	6.9%	8.2%	66.0%	18.9%	450
78. Knowledge of formats and protocols to produce and distribute field reports to document construction progress.	6.7%	3.1%	81.1%	9.1%	450
79. Knowledge of site requirements for specific building types to determine client's site needs.	9.3%	19.6%	62.2%	8.9%	450
80. Knowledge of site analysis techniques to determine project parameters affecting design.	5.3%	41.3%	47.6%	5.8%	450
81. Knowledge of methods to prioritize or objectively evaluate design options based on project goals.	3.3%	29.1%	60.0%	7.6%	450
82. Knowledge of sustainability strategies and/or rating systems.	6.0%	22.9%	50.0%	21.1%	450
83. Knowledge of sustainability considerations related to building materials and construction processes.	4.2%	22.4%	52.7%	20.7%	450
84. Knowledge of techniques to integrate renewable energy systems into building design.	8.0%	25.1%	45.8%	21.1%	450
85. Knowledge of methods to identify scope changes that may require additional services.	3.1%	2.4%	74.2%	20.2%	450
86. Knowledge of procedures for processing requests for additional services.	9.6%	1.6%	66.9%	22.0%	450
87. Knowledge of appropriate documentation level required for construction documents.	0.9%	5.1%	90.0%	4.0%	450
88. Knowledge of close-out document requirements and protocols.	9.3%	1.8%	76.2%	12.7%	450
89. Knowledge of construction document technologies and their standards and applications.	3.3%	12.4%	80.2%	4.0%	450
90. Knowledge of building information modeling (BIM) and its impact on planning, financial management and construction documentation.	28.9%	2.0%	40.0%	29.1%	450
91. Knowledge of principles of computer assisted design and drafting (CADD) software and its uses in communicating design ideas.	0.9%	50.0%	45.8%	3.3%	450
92. Knowledge of American Institute of Architects (AIA) guidelines for contract agreements.	5.8%	26.0%	59.6%	8.7%	450
93. Knowledge of techniques to integrate model contract forms and documents.	20.0%	12.0%	50.7%	17.3%	450
94. Knowledge of methods for production of construction documentation and drawings.	0.9%	19.6%	78.9%	0.7%	450
95. Knowledge of standard methods for production of design development documentation.	1.6%	18.4%	78.4%	1.6%	450
96. Knowledge of standard methods for production of site plan documentation.	4.0%	25.3%	68.2%	2.4%	450
97. Knowledge of circumstances warranting further actions based on field reports, third party inspections and test results.	6.7%	3.1%	76.2%	14.0%	450
98. Knowledge of materials testing processes and protocols to be performed during the construction process.	8.0%	8.0%	71.8%	12.2%	450
99. Knowledge of building systems testing processes and protocols to be performed during the construction process.	10.7%	5.8%	70.2%	13.3%	450

TABLE B7. PERCENTAGE DISTRIBUTION OF RATINGS FOR WHEN SURVEY RESPONDENT FIRST ACQUIRED KNOWLEDGE (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/SKILL STATEMENT	WHEN FIRST ACQUIRED				
	NOT ACQUIRED	BY COMPLETION OF ACCREDITED ARCHITECTURE DEGREE PROGRAM	DURING INTERNSHIP	AFTER LICENSURE	TOTAL N
100. Knowledge of formats and protocols to process shop drawings and submittals to ensure they meet design intent.	0.7%	3.3%	92.2%	3.8%	450
101. Knowledge of protocols for responding to Requests for Information (RFI).	2.2%	2.7%	89.6%	5.6%	450
102. Knowledge of roles, responsibilities and authorities of project team members during construction.	0.7%	7.6%	88.7%	3.1%	450
103. Knowledge of conflict resolution techniques and their applications throughout project.	10.7%	11.1%	64.7%	13.6%	450
104. Knowledge of bidding processes and protocols for different project delivery methods and their applications.	4.7%	10.0%	76.0%	9.3%	450
105. Knowledge of requirements for post-occupancy evaluation.	21.3%	10.0%	53.8%	14.9%	450
106. Knowledge of project risks for new and innovative products, materials, methods and technologies.	12.7%	9.6%	60.9%	16.9%	450
107. Knowledge of design decisions and their impact on constructability.	0.9%	21.1%	73.1%	4.9%	450
108. Knowledge of interpersonal skills necessary to elicit client needs and desired scope of services.	4.0%	13.1%	69.3%	13.6%	450
109. Knowledge of requirements of Intern Development Program (IDP).	3.1%	35.8%	58.4%	2.7%	450
110. Knowledge of techniques for staff development in architectural firms.	18.4%	3.3%	60.2%	18.0%	450
111. Knowledge of methods to manage human resources.	32.2%	3.3%	44.0%	20.4%	450
112. Knowledge of state board guidelines for licensing and professional practice.	1.6%	13.6%	78.0%	6.9%	450
113. Knowledge of strategies to create positive work environment that builds trust and encourages cooperation and teamwork.	8.4%	15.1%	61.1%	15.3%	450
114. Knowledge of principles of universal design.	10.7%	32.2%	49.8%	7.3%	450
115. Knowledge of purposes of and legal implications for different types of business entities.	18.4%	20.9%	35.3%	25.3%	450
116. Knowledge of innovative and evolving technologies and their impact on architectural practice.	4.2%	25.1%	52.0%	18.7%	450
117. Knowledge of training programs for professional development.	6.7%	10.0%	63.3%	20.0%	450
118. Knowledge of ethical standards relevant to architectural practice.	2.7%	39.1%	51.1%	7.1%	450
119. Knowledge of methods to facilitate information management in building design and construction.	9.8%	6.2%	71.6%	12.4%	450
120. Knowledge of factors involved in conducting an architectural practice in international markets.	66.2%	4.0%	18.9%	10.9%	450
121. Knowledge of components of standard business plan, e.g., revenue projection, staffing plan, overhead, profit plan.	33.1%	10.0%	28.7%	28.2%	450
122. Knowledge of methods and procedures for risk management.	24.4%	6.0%	43.1%	26.4%	450
MEAN	9.0%	21.4%	57.3%	12.3%	450.0
MIN	0.0%	1.1%	4.9%	0.0%	450
MAX	66.2%	93.6%	92.2%	34.2%	450

TABLE B8. PERCENTAGE DISTRIBUTION OF RATINGS FOR HOW SURVEY RESPONDENTS TYPICALLY USE KNOWLEDGE

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/SKILL STATEMENT	HOW TYPICALLY USED				
	UNDERSTAND	APPLY	EVALUATE	DO NOT USE KNOWLEDGE OR SKILL	TOTAL N
1. Knowledge of oral, written, and visual presentation techniques to communicate project information.	16.2%	55.3%	27.1%	1.3%	450
2. Knowledge of master plans and their impact on building design.	26.0%	35.8%	29.6%	8.7%	450
3. Knowledge of method for project controls, e.g., scope of services, budget, billing, compensation.	25.3%	50.4%	15.1%	9.1%	450
4. Knowledge of factors that affect selection of project consultants.	22.2%	42.4%	19.3%	16.0%	450
5. Knowledge of strategies for delegating and monitoring task assignments, accountability and deadlines for project team.	10.2%	61.3%	20.9%	7.6%	450
6. Knowledge of client and project characteristics that influence contract agreements.	28.9%	32.7%	20.7%	17.8%	450
7. Knowledge of types of contracts and their designated uses.	34.9%	35.1%	12.0%	18.0%	450
8. Knowledge of standard forms of architectural service agreements for Owner-Architect, Architect-Consultant and Owner-Contractor.	34.2%	42.9%	8.0%	14.9%	450
9. Knowledge of effects of specific findings from feasibility studies on building design.	22.7%	29.6%	29.6%	18.2%	450
10. Knowledge of factors involved in selection of building systems and components.	16.4%	47.8%	32.7%	3.1%	450
11. Knowledge of effect of environmental factors on site development.	23.6%	40.4%	31.3%	4.7%	450
12. Knowledge of environmental policies and regulations and their implications for proposed construction.	26.7%	35.6%	26.4%	11.3%	450
13. Knowledge of processes involved in conducting a survey of existing conditions.	19.3%	49.1%	27.8%	3.8%	450
14. Knowledge of effects of specific findings from environmental impact studies on building design.	25.6%	30.2%	22.4%	21.8%	450
15. Skill in designing facility layout and site plan that meets site constraints.	9.1%	55.3%	32.4%	3.1%	450
16. Knowledge of methods required to mitigate adverse site conditions.	16.4%	42.0%	28.7%	12.9%	450
17. Knowledge of elements and processes for conducting a site analysis.	27.8%	37.8%	27.1%	7.3%	450
18. Knowledge of codes of professional conduct as related to architectural practice.	32.7%	48.9%	15.8%	2.7%	450
19. Knowledge of protocols and procedures for conducting a building code analysis.	14.2%	54.2%	28.4%	3.1%	450
20. Knowledge of building codes and their impact on building design.	11.3%	54.4%	32.7%	1.6%	450
21. Knowledge of land use codes and ordinances that govern land use decisions.	23.1%	42.4%	21.6%	12.9%	450
22. Skill in producing hand drawings of design ideas.	16.0%	48.7%	28.7%	6.7%	450
23. Knowledge of standards for graphic symbols and units of measurement in technical drawings.	16.2%	66.2%	17.3%	0.2%	450
24. Skill in producing two-dimensional (2-D) drawings using hand methods.	14.4%	53.1%	19.1%	13.3%	450
25. Skill in using software to produce two-dimensional (2-D) drawings.	6.7%	63.8%	26.9%	2.7%	450
26. Skill in using software to produce three-dimensional (3-D) models of building design.	12.0%	42.4%	28.0%	17.6%	450
27. Skill in producing physical scale models.	15.3%	30.2%	20.7%	33.8%	450
28. Skill in use of building information modeling (BIM) to develop and manage databases of building and construction information.	11.1%	30.2%	17.6%	41.1%	450

TABLE B8. PERCENTAGE DISTRIBUTION OF RATINGS FOR HOW SURVEY RESPONDENTS TYPICALLY USE KNOWLEDGE (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/SKILL STATEMENT	HOW TYPICALLY USED				
	UNDERSTAND	APPLY	EVALUATE	DO NOT USE KNOWLEDGE OR SKILL	TOTAL N
29. Knowledge of protocols and procedures for obtaining community input for proposed design.	28.2%	27.1%	20.0%	24.7%	450
30. Knowledge of computer aided design and drafting software for producing two-dimensional (2-D) drawings.	6.4%	66.4%	24.7%	2.4%	450
31. Knowledge of factors involved in selecting project appropriate computer based design technologies.	20.2%	39.1%	30.7%	10.0%	450
32. Knowledge of engineering properties of soils and their effect on building foundations and building design.	37.8%	29.6%	16.7%	16.0%	450
33. Knowledge of factors to be considered in adaptive reuse of existing buildings and materials.	22.7%	38.9%	27.6%	10.9%	450
34. Knowledge of building technologies which provide solutions for comfort, life safety and energy efficiency.	16.9%	53.8%	26.7%	2.7%	450
35. Knowledge of effect of thermal envelope in design of building systems.	19.3%	49.8%	27.3%	3.6%	450
36. Knowledge of principles of integrated project design.	25.3%	31.1%	21.1%	22.4%	450
37. Knowledge of strategies for anticipating, managing and preventing disputes and conflicts.	25.8%	36.9%	22.9%	14.4%	450
38. Knowledge of engineering design principles and their application to design and construction.	28.9%	42.4%	23.8%	4.9%	450
39. Knowledge of structural properties of construction products, materials and assemblies and their impact on building design and construction.	23.6%	45.8%	26.0%	4.7%	450
40. Knowledge of means and methods for building construction.	22.4%	49.1%	25.8%	2.7%	450
41. Knowledge of benefits and limitations of "fast track" or other forms of construction delivery methods.	34.4%	31.6%	19.6%	14.4%	450
42. Knowledge of methods and techniques for estimating construction costs.	30.4%	32.7%	16.0%	20.9%	450
43. Knowledge of structural load and load conditions that affect building design.	36.0%	35.1%	18.2%	10.7%	450
44. Knowledge of energy codes that impact construction.	28.4%	42.2%	20.0%	9.3%	450
45. Knowledge of methods and strategies for evidence based design (EBD).	15.1%	9.8%	8.0%	67.1%	450
46. Knowledge of impact of design on human behavior.	30.0%	31.8%	27.3%	10.9%	450
47. Knowledge of functional requirements of all building systems.	28.2%	45.3%	23.1%	3.3%	450
48. Knowledge of hazardous materials mitigation at building site.	34.7%	30.0%	12.0%	23.3%	450
49. Knowledge of principles of building operation and function.	33.6%	38.4%	20.9%	7.1%	450
50. Knowledge of content and format of specifications.	21.1%	60.2%	15.1%	3.6%	450
51. Knowledge of principles of interior design and their influences on building design.	23.1%	50.7%	19.8%	6.4%	450
52. Knowledge of principles of landscape design and their influences on building design.	30.9%	38.7%	19.3%	11.1%	450
53. Knowledge of site design principles and practices.	22.4%	46.7%	26.9%	4.0%	450
54. Knowledge of techniques for architectural programming to identify functional and operational requirements of scope of work.	19.3%	44.0%	31.3%	5.3%	450
55. Knowledge of procedures to develop project scheduling, phasing and deliverables for various building types.	28.2%	44.9%	17.1%	9.8%	450
56. Knowledge of relationship between constructability and aesthetics.	12.7%	49.6%	36.4%	1.3%	450

TABLE B8. PERCENTAGE DISTRIBUTION OF RATINGS FOR HOW SURVEY RESPONDENTS TYPICALLY USE KNOWLEDGE (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/SKILL STATEMENT	HOW TYPICALLY USED				
	UNDERSTAND	APPLY	EVALUATE	DO NOT USE KNOWLEDGE OR SKILL	TOTAL N
57. Knowledge of standards and specifications for building materials and methods of construction, e.g., ASTM, ANSI.	35.1%	46.9%	14.2%	3.8%	450
58. Knowledge of methods to perform life cycle cost analysis.	33.8%	16.4%	13.8%	36.0%	450
59. Knowledge of principles of value analysis and value engineering processes.	22.0%	42.4%	27.1%	8.4%	450
60. Knowledge of procedures and protocols of permit approval process.	17.3%	59.3%	16.4%	6.9%	450
61. Knowledge of principles of historic preservation.	29.1%	29.3%	12.9%	28.7%	450
62. Knowledge of processes and procedures for building commissioning.	34.7%	21.1%	10.0%	34.2%	450
63. Knowledge of design factors to consider in selecting furniture, fixtures and equipment (FFE).	25.3%	46.4%	14.2%	14.0%	450
64. Knowledge of methods and tools for space planning.	16.9%	52.4%	26.4%	4.2%	450
65. Knowledge of different project delivery methods and their impacts on project schedule, costs and project goals.	32.2%	36.9%	20.9%	10.0%	450
66. Knowledge of factors that impact construction management services.	38.0%	28.7%	18.0%	15.3%	450
67. Knowledge of fee structures, their attributes and implications for schedule, scope and profit.	31.6%	34.0%	17.3%	17.1%	450
68. Knowledge of consultant agreements and fee structures.	36.0%	35.8%	12.9%	15.3%	450
69. Knowledge of different building and construction types and their implications on design and construction schedules.	27.3%	44.9%	23.3%	4.4%	450
70. Knowledge of scheduling methods to establish project timeframes based on standard sequences of architectural operations in each phase.	29.3%	41.3%	14.2%	15.1%	450
71. Knowledge of business development strategies.	24.0%	29.6%	16.2%	30.2%	450
72. Knowledge of relationship between project scope and consultant capabilities to assemble project team.	31.3%	35.8%	18.9%	14.0%	450
73. Knowledge of purposes and types of professional liability insurance related to architectural practice.	44.9%	14.4%	10.7%	30.0%	450
74. Knowledge of format and protocols for efficient meeting management and information distribution.	20.9%	58.2%	13.6%	7.3%	450
75. Knowledge of strategies to assess project progress and verify its alignment with project schedule.	28.4%	43.6%	18.9%	9.1%	450
76. Knowledge of ways to translate project goals into specific tasks and measurable design criteria.	20.0%	48.7%	23.3%	8.0%	450
77. Knowledge of effective communication techniques to educate client with respect to roles and responsibilities of all parties.	21.3%	54.0%	16.4%	8.2%	450
78. Knowledge of formats and protocols to produce and distribute field reports to document construction progress.	20.4%	56.2%	14.0%	9.3%	450
79. Knowledge of site requirements for specific building types to determine client's site needs.	30.0%	37.3%	22.0%	10.7%	450
80. Knowledge of site analysis techniques to determine project parameters affecting design.	24.7%	41.8%	26.2%	7.3%	450
81. Knowledge of methods to prioritize or objectively evaluate design options based on project goals.	18.0%	45.8%	32.0%	4.2%	450
82. Knowledge of sustainability strategies and/or rating systems.	24.2%	38.7%	25.3%	11.8%	450

TABLE B8. PERCENTAGE DISTRIBUTION OF RATINGS FOR HOW SURVEY RESPONDENTS TYPICALLY USE KNOWLEDGE (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/SKILL STATEMENT	HOW TYPICALLY USED				
	UNDERSTAND	APPLY	EVALUATE	DO NOT USE KNOWLEDGE OR SKILL	TOTAL N
83. Knowledge of sustainability considerations related to building materials and construction processes.	22.7%	42.9%	26.0%	8.4%	450
84. Knowledge of techniques to integrate renewable energy systems into building design.	29.1%	32.4%	22.2%	16.2%	450
85. Knowledge of methods to identify scope changes that may require additional services.	23.1%	53.3%	19.1%	4.4%	450
86. Knowledge of procedures for processing requests for additional services.	26.9%	47.8%	13.3%	12.0%	450
87. Knowledge of appropriate documentation level required for construction documents.	9.1%	63.6%	25.8%	1.6%	450
88. Knowledge of close-out document requirements and protocols.	23.1%	54.9%	10.7%	11.3%	450
89. Knowledge of construction document technologies and their standards and applications.	16.7%	58.9%	20.4%	4.0%	450
90. Knowledge of building information modeling (BIM) and its impact on planning, financial management and construction documentation.	19.8%	25.1%	16.0%	39.1%	450
91. Knowledge of principles of computer assisted design and drafting (CADD) software and its uses in communicating design ideas.	10.2%	61.6%	26.7%	1.6%	450
92. Knowledge of American Institute of Architects (AIA) guidelines for contract agreements.	39.3%	39.3%	8.7%	12.7%	450
93. Knowledge of techniques to integrate model contract forms and documents.	35.6%	29.3%	8.9%	26.2%	450
94. Knowledge of methods for production of construction documentation and drawings.	8.2%	66.0%	24.7%	1.1%	450
95. Knowledge of standard methods for production of design development documentation.	8.9%	69.3%	19.6%	2.2%	450
96. Knowledge of standard methods for production of site plan documentation.	17.1%	61.6%	14.0%	7.3%	450
97. Knowledge of circumstances warranting further actions based on field reports, third party inspections and test results.	26.4%	42.9%	22.0%	8.7%	450
98. Knowledge of materials testing processes and protocols to be performed during the construction process.	34.4%	38.4%	14.0%	13.1%	450
99. Knowledge of building systems testing processes and protocols to be performed during the construction process.	40.4%	29.3%	14.0%	16.2%	450
100. Knowledge of formats and protocols to process shop drawings and submittals to ensure they meet design intent.	10.7%	65.6%	22.0%	1.8%	450
101. Knowledge of protocols for responding to Requests for Information (RFI).	12.9%	64.0%	19.3%	3.8%	450
102. Knowledge of roles, responsibilities and authorities of project team members during construction.	24.9%	54.4%	19.1%	1.6%	450
103. Knowledge of conflict resolution techniques and their applications throughout project.	28.9%	40.4%	18.7%	12.0%	450
104. Knowledge of bidding processes and protocols for different project delivery methods and their applications.	31.8%	46.4%	14.4%	7.3%	450
105. Knowledge of requirements for post-occupancy evaluation.	34.0%	25.3%	10.0%	30.7%	450
106. Knowledge of project risks for new and innovative products, materials, methods and technologies.	35.8%	26.4%	22.9%	14.9%	450
107. Knowledge of design decisions and their impact on constructability.	16.2%	47.1%	35.6%	1.1%	450

TABLE B8. PERCENTAGE DISTRIBUTION OF RATINGS FOR HOW SURVEY RESPONDENTS TYPICALLY USE KNOWLEDGE (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/SKILL STATEMENT	HOW TYPICALLY USED				
	UNDERSTAND	APPLY	EVALUATE	DO NOT USE KNOWLEDGE OR SKILL	TOTAL N
108. Knowledge of interpersonal skills necessary to elicit client needs and desired scope of services.	20.9%	52.7%	20.7%	5.8%	450
109. Knowledge of requirements of Intern Development Program (IDP).	33.8%	45.1%	14.0%	7.1%	450
110. Knowledge of techniques for staff development in architectural firms.	31.3%	32.0%	14.2%	22.4%	450
111. Knowledge of methods to manage human resources.	30.9%	21.6%	12.2%	35.3%	450
112. Knowledge of state board guidelines for licensing and professional practice.	44.2%	45.6%	8.0%	2.2%	450
113. Knowledge of strategies to create positive work environment that builds trust and encourages cooperation and teamwork.	27.6%	46.0%	18.4%	8.0%	450
114. Knowledge of principles of universal design.	26.7%	42.9%	19.6%	10.9%	450
115. Knowledge of purposes of and legal implications for different types of business entities.	48.7%	19.1%	8.4%	23.8%	450
116. Knowledge of innovative and evolving technologies and their impact on architectural practice.	39.8%	30.0%	23.8%	6.4%	450
117. Knowledge of training programs for professional development.	39.1%	42.4%	10.4%	8.0%	450
118. Knowledge of ethical standards relevant to architectural practice.	40.0%	47.3%	9.8%	2.9%	450
119. Knowledge of methods to facilitate information management in building design and construction.	29.1%	45.6%	14.9%	10.4%	450
120. Knowledge of factors involved in conducting an architectural practice in international markets.	14.0%	9.1%	6.0%	70.9%	450
121. Knowledge of components of standard business plan, e.g., revenue projection, staffing plan, overhead, profit plan.	28.0%	19.8%	12.9%	39.3%	450
122. Knowledge of methods and procedures for risk management.	39.3%	22.0%	12.9%	25.8%	450
MEAN	25.1%	42.2%	20.0%	12.7%	450.0
MIN	6.4%	9.1%	6.0%	0.2%	450
MAX	48.7%	69.3%	36.4%	70.9%	450

TABLE B9. PERCENTAGE DISTRIBUTION OF RATINGS FOR REASON(S) A KNOWLEDGE WAS NOT USED

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/ SKILL STATEMENT	REASON(S) NOT USED							
	NOT USED IN PRACTICE	NOT ALLOWED BY JURIS.	NOT REC. BY LEGAL COUNSEL OR INSURANCE CARRIER	PROVIDED BY CONSULTANT(S)	LACK OF EXP.	OTHER	N – TOTAL REASONS NOT USED[1]	N – INDIVIDUALS NOT USED[2]
1. Knowledge of oral, written, and visual presentation techniques to communicate project information.	2	0	0	0	3	3	8	6
2. Knowledge of master plans and their impact on building design.	27	0	0	3	12	6	48	39
3. Knowledge of method for project controls, e.g., scope of services, budget, billing, compensation.	1	0	0	0	28	14	43	41
4. Knowledge of factors that affect selection of project consultants.	7	0	0	1	45	20	73	72
5. Knowledge of strategies for delegating and monitoring task assignments, accountability and deadlines for project team.	12	0	0	1	17	8	38	34
6. Knowledge of client and project characteristics that influence contract agreements.	6	2	0	1	55	20	84	80
7. Knowledge of types of contracts and their designated uses.	13	2	2	2	52	20	91	81
8. Knowledge of standard forms of architectural service agreements for Owner-Architect, Architect-Consultant and Owner-Contractor.	16	0	1	3	39	17	76	67
9. Knowledge of effects of specific findings from feasibility studies on building design.	39	0	0	5	34	10	88	82
10. Knowledge of factors involved in selection of building systems and components.	5	0	0	7	5	3	20	14
11. Knowledge of effect of environmental factors on site development.	8	0	0	3	5	6	22	21
12. Knowledge of environmental policies and regulations and their implications for proposed construction.	11	0	0	12	29	4	56	51
13. Knowledge of processes involved in conducting a survey of existing conditions.	5	0	0	5	6	4	20	17
14. Knowledge of effects of specific findings from environmental impact studies on building design.	44	0	1	22	41	4	112	98
15. Skill in designing facility layout and site plan that meets site constraints.	7	0	0	3	5	3	18	14
16. Knowledge of methods required to mitigate adverse site conditions.	17	0	0	21	29	4	71	58

TABLE B9. PERCENTAGE DISTRIBUTION OF RATINGS FOR REASON(S) A KNOWLEDGE WAS NOT USED (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/ SKILL STATEMENT	REASON(S) NOT USED							
	NOT USED IN PRACTICE	NOT ALLOWED BY JURIS.	NOT REC. BY LEGAL COUNSEL OR INSURANCE CARRIER	PROVIDED BY CONSULTANT(S)	LACK OF EXP.	OTHER	N – TOTAL REASONS NOT USED[1]	N – INDIVIDUALS NOT USED[2]
17. Knowledge of elements and processes for conducting a site analysis.	12	0	1	13	13	2	41	33
18. Knowledge of codes of professional conduct as related to architectural practice.	3	0	0	0	7	4	14	12
19. Knowledge of protocols and procedures for conducting a building code analysis.	3	0	0	4	5	4	16	14
20. Knowledge of building codes and their impact on building design.	1	0	0	2	5	2	10	7
21. Knowledge of land use codes and ordinances that govern land use decisions.	19	0	0	20	23	4	66	58
22. Skill in producing hand drawings of design ideas.	15	0	0	0	9	10	34	30
23. Knowledge of standards for graphic symbols and units of measurement in technical drawings.	0	0	0	0	0	1	1	1
24. Skill in producing two-dimensional (2-D) drawings using hand methods.	50	0	0	1	1	13	65	60
25. Skill in using software to produce two-dimensional (2-D) drawings.	4	0	0	1	1	9	15	12
26. Skill in using software to produce three-dimensional (3-D) models of building design.	24	0	0	10	33	22	89	79
27. Skill in producing physical scale models.	119	1	0	17	3	26	166	152
28. Skill in use of building information modeling (BIM) to develop and manage databases of building and construction information.	106	1	1	5	83	26	222	185
29. Knowledge of protocols and procedures for obtaining community input for proposed design.	63	0	0	8	50	9	130	111
30. Knowledge of computer aided design and drafting software for producing two-dimensional (2-D) drawings.	4	0	0	1	1	5	11	11
31. Knowledge of factors involved in selecting project appropriate computer based design technologies.	14	0	0	2	16	17	49	45
32. Knowledge of engineering properties of soils and their effect on building foundations and building design.	11	0	0	51	18	5	85	72

TABLE B9. PERCENTAGE DISTRIBUTION OF RATINGS FOR REASON(S) A KNOWLEDGE WAS NOT USED (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/ SKILL STATEMENT	REASON(S) NOT USED							
	NOT USED IN PRACTICE	NOT ALLOWED BY JURIS.	NOT REC. BY LEGAL COUNSEL OR INSURANCE CARRIER	PROVIDED BY CONSULTANT(S)	LACK OF EXP.	OTHER	N – TOTAL REASONS NOT USED[1]	N – INDIVIDUALS NOT USED[2]
33. Knowledge of factors to be considered in adaptive reuse of existing buildings and materials.	27	0	0	4	24	3	58	49
34. Knowledge of building technologies which provide solutions for comfort, life safety and energy efficiency.	2	0	0	7	5	3	17	12
35. Knowledge of effect of thermal envelope in design of building systems.	5	0	1	9	5	1	21	16
36. Knowledge of principles of integrated project design.	59	0	2	2	43	9	115	101
37. Knowledge of strategies for anticipating, managing and preventing disputes and conflicts.	9	1	0	3	51	7	71	65
38. Knowledge of engineering design principles and their application to design and construction.	1	0	1	17	6	2	27	22
39. Knowledge of structural properties of construction products, materials and assemblies and their impact on building design and construction.	2	0	0	14	5	2	23	21
40. Knowledge of means and methods for building construction.	1	0	4	2	3	4	14	12
41. Knowledge of benefits and limitations of "fast track" or other forms of construction delivery methods.	39	0	3	1	27	5	75	65
42. Knowledge of methods and techniques for estimating construction costs.	18	0	3	34	50	12	117	94
43. Knowledge of structural load and load conditions that affect building design.	5	0	1	36	10	5	57	48
44. Knowledge of energy codes that impact construction.	5	1	0	22	17	2	47	42
45. Knowledge of methods and strategies for evidence based design (EBD).	139	0	0	8	154	34	335	302
46. Knowledge of impact of design on human behavior.	22	0	0	0	28	4	54	49
47. Knowledge of functional requirements of all building systems.	1	0	0	8	6	4	19	15
48. Knowledge of hazardous materials mitigation at building site.	32	0	5	41	48	4	130	105

TABLE B9. PERCENTAGE DISTRIBUTION OF RATINGS FOR REASON(S) A KNOWLEDGE WAS NOT USED (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/ SKILL STATEMENT	REASON(S) NOT USED							
	NOT USED IN PRACTICE	NOT ALLOWED BY JURIS.	NOT REC. BY LEGAL COUNSEL OR INSURANCE CARRIER	PROVIDED BY CONSULTANT(S)	LACK OF EXP.	OTHER	N – TOTAL REASONS NOT USED[1]	N – INDIVIDUALS NOT USED[2]
49. Knowledge of principles of building operation and function.	10	0	0	7	18	2	37	32
50. Knowledge of content and format of specifications.	7	0	0	1	9	3	20	16
51. Knowledge of principles of interior design and their influences on building design.	11	0	0	12	13	4	40	29
52. Knowledge of principles of landscape design and their influences on building design.	13	1	0	32	12	4	62	50
53. Knowledge of site design principles and practices.	11	0	0	5	3	4	23	18
54. Knowledge of techniques for architectural programming to identify functional and operational requirements of scope of work.	7	0	0	1	11	6	25	24
55. Knowledge of procedures to develop project scheduling, phasing and deliverables for various building types.	8	0	0	4	29	10	51	44
56. Knowledge of relationship between constructability and aesthetics.	3	0	0	0	4	2	9	6
57. Knowledge of standards and specifications for building materials and methods of construction, e.g., ASTM, ANSI.	1	0	0	6	11	3	21	17
58. Knowledge of methods to perform life cycle cost analysis.	64	0	0	34	86	11	195	162
59. Knowledge of principles of value analysis and value engineering processes.	13	0	0	6	23	7	49	38
60. Knowledge of procedures and protocols of permit approval process.	5	0	0	3	21	6	35	31
61. Knowledge of principles of historic preservation.	98	0	0	8	39	4	149	129
62. Knowledge of processes and procedures for building commissioning.	60	0	1	47	72	8	188	154
63. Knowledge of design factors to consider in selecting furniture, fixtures and equipment (FFE).	23	0	0	23	17	9	72	63
64. Knowledge of methods and tools for space planning.	6	0	0	1	8	5	20	19

TABLE B9. PERCENTAGE DISTRIBUTION OF RATINGS FOR REASON(S) A KNOWLEDGE WAS NOT USED (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/ SKILL STATEMENT	REASON(S) NOT USED							
	NOT USED IN PRACTICE	NOT ALLOWED BY JURIS.	NOT REC. BY LEGAL COUNSEL OR INSURANCE CARRIER	PROVIDED BY CONSULTANT(S)	LACK OF EXP.	OTHER	N – TOTAL REASONS NOT USED[1]	N – INDIVIDUALS NOT USED[2]
65. Knowledge of different project delivery methods and their impacts on project schedule, costs and project goals.	9	0	0	3	33	8	53	45
66. Knowledge of factors that impact construction management services.	24	0	0	7	41	7	79	69
67. Knowledge of fee structures, their attributes and implications for schedule, scope and profit.	6	1	0	0	65	14	86	77
68. Knowledge of consultant agreements and fee structures.	9	1	0	1	51	15	77	69
69. Knowledge of different building and construction types and their implications on design and construction schedules.	4	0	0	1	16	2	23	20
70. Knowledge of scheduling methods to establish project timeframes based on standard sequences of architectural operations in each phase.	11	0	0	7	48	13	79	68
71. Knowledge of business development strategies.	18	2	0	1	109	22	152	136
72. Knowledge of relationship between project scope and consultant capabilities to assemble project team.	9	1	0	3	48	11	72	63
73. Knowledge of purposes and types of professional liability insurance related to architectural practice.	13	1	1	4	103	24	146	135
74. Knowledge of format and protocols for efficient meeting management and information distribution.	8	0	0	0	23	3	34	33
75. Knowledge of strategies to assess project progress and verify its alignment with project schedule.	10	0	0	1	25	9	45	41
76. Knowledge of ways to translate project goals into specific tasks and measurable design criteria.	8	0	0	0	28	2	38	36
77. Knowledge of effective communication techniques to educate client with respect to roles and responsibilities of all parties.	4	0	0	0	28	6	38	37
78. Knowledge of formats and protocols to produce and distribute field reports to document construction progress.	17	1	0	1	19	8	46	42

TABLE B9. PERCENTAGE DISTRIBUTION OF RATINGS FOR REASON(S) A KNOWLEDGE WAS NOT USED (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/ SKILL STATEMENT	REASON(S) NOT USED							
	NOT USED IN PRACTICE	NOT ALLOWED BY JURIS.	NOT REC. BY LEGAL COUNSEL OR INSURANCE CARRIER	PROVIDED BY CONSULTANT(S)	LACK OF EXP.	OTHER	N – TOTAL REASONS NOT USED[1]	N – INDIVIDUALS NOT USED[2]
79. Knowledge of site requirements for specific building types to determine client's site needs.	16	0	0	9	26	7	58	48
80. Knowledge of site analysis techniques to determine project parameters affecting design.	8	0	0	9	17	4	38	33
81. Knowledge of methods to prioritize or objectively evaluate design options based on project goals.	4	0	0	1	14	2	21	19
82. Knowledge of sustainability strategies and/or rating systems.	27	0	1	6	26	5	65	53
83. Knowledge of sustainability considerations related to building materials and construction processes.	16	0	0	2	19	5	42	38
84. Knowledge of techniques to integrate renewable energy systems into building design.	31	0	0	16	31	10	88	73
85. Knowledge of methods to identify scope changes that may require additional services.	1	0	0	0	14	7	22	20
86. Knowledge of procedures for processing requests for additional services.	4	0	0	0	43	10	57	54
87. Knowledge of appropriate documentation level required for construction documents.	2	0	0	1	2	2	7	7
88. Knowledge of close-out document requirements and protocols.	8	0	0	1	39	6	54	51
89. Knowledge of construction document technologies and their standards and applications.	3	0	0	0	11	5	19	18
90. Knowledge of building information modeling (BIM) and its impact on planning, financial management and construction documentation.	108	0	1	4	85	18	216	176
91. Knowledge of principles of computer assisted design and drafting (CADD) software and its uses in communicating design ideas.	4	0	0	1	0	3	8	7
92. Knowledge of American Institute of Architects (AIA) guidelines for contract agreements.	16	0	1	1	30	16	64	57

TABLE B9. PERCENTAGE DISTRIBUTION OF RATINGS FOR REASON(S) A KNOWLEDGE WAS NOT USED (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/ SKILL STATEMENT	REASON(S) NOT USED							
	NOT USED IN PRACTICE	NOT ALLOWED BY JURIS.	NOT REC. BY LEGAL COUNSEL OR INSURANCE CARRIER	PROVIDED BY CONSULTANT(S)	LACK OF EXP.	OTHER	N – TOTAL REASONS NOT USED[1]	N – INDIVIDUALS NOT USED[2]
93. Knowledge of techniques to integrate model contract forms and documents.	20	1	4	2	87	18	132	118
94. Knowledge of methods for production of construction documentation and drawings.	2	0	0	1	0	2	5	5
95. Knowledge of standard methods for production of design development documentation.	4	0	0	0	4	4	12	10
96. Knowledge of standard methods for production of site plan documentation.	8	0	0	15	10	4	37	33
97. Knowledge of circumstances warranting further actions based on field reports, third party inspections and test results.	5	0	0	5	28	4	42	39
98. Knowledge of materials testing processes and protocols to be performed during the construction process.	13	0	2	17	29	5	66	59
99. Knowledge of building systems testing processes and protocols to be performed during the construction process.	16	0	2	22	41	4	85	73
100. Knowledge of formats and protocols to process shop drawings and submittals to ensure they meet design intent.	3	0	0	1	3	2	9	8
101. Knowledge of protocols for responding to Requests for Information (RFI).	7	0	0	0	9	4	20	17
102. Knowledge of roles, responsibilities and authorities of project team members during construction.	2	0	0	0	4	1	7	7
103. Knowledge of conflict resolution techniques and their applications throughout project.	11	1	1	0	41	6	60	54
104. Knowledge of bidding processes and protocols for different project delivery methods and their applications.	12	0	0	1	20	7	40	33
106. Knowledge of project risks for new and innovative products, materials, methods and technologies.	28	0	1	4	43	5	81	67
107. Knowledge of design decisions and their impact on constructability.	0	0	0	1	3	2	6	5

TABLE B9. PERCENTAGE DISTRIBUTION OF RATINGS FOR REASON(S) A KNOWLEDGE WAS NOT USED (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/ SKILL STATEMENT	REASON(S) NOT USED							
	NOT USED IN PRACTICE	NOT ALLOWED BY JURIS.	NOT REC. BY LEGAL COUNSEL OR INSURANCE CARRIER	PROVIDED BY CONSULTANT(S)	LACK OF EXP.	OTHER	N – TOTAL REASONS NOT USED[1]	N – INDIVIDUALS NOT USED[2]
108. Knowledge of interpersonal skills necessary to elicit client needs and desired scope of services.	4	0	0	0	21	7	32	26
109. Knowledge of requirements of Intern Development Program (IDP).	7	0	0	0	9	17	33	32
110. Knowledge of techniques for staff development in architectural firms.	37	1	0	0	51	18	107	101
111. Knowledge of methods to manage human resources.	48	2	0	3	95	27	175	159
112. Knowledge of state board guidelines for licensing and professional practice.	0	0	0	0	5	5	10	10
113. Knowledge of strategies to create positive work environment that builds trust and encourages cooperation and teamwork.	11	1	0	0	20	9	41	36
114. Knowledge of principles of universal design.	16	0	0	1	26	14	57	49
115. Knowledge of purposes of and legal implications for different types of business entities.	24	1	3	5	80	8	121	107
116. Knowledge of innovative and evolving technologies and their impact on architectural practice.	12	0	0	0	14	4	30	29
117. Knowledge of training programs for professional development.	17	0	0	0	20	5	42	36
118. Knowledge of ethical standards relevant to architectural practice.	4	0	0	0	8	3	15	13
119. Knowledge of methods to facilitate information management in building design and construction.	12	0	0	4	32	9	57	47

TABLE B9. PERCENTAGE DISTRIBUTION OF RATINGS FOR REASON(S) A KNOWLEDGE WAS NOT USED (CONT.)

Survey: EDU D Survey Population: Interns + Architects licensed in the past year + Architects licensed 2-10 years

KNOWLEDGE/ SKILL STATEMENT	REASON(S) NOT USED							
	NOT USED IN PRACTICE	NOT ALLOWED BY JURIS.	NOT REC. BY LEGAL COUNSEL OR INSURANCE CARRIER	PROVIDED BY CONSULTANT(S)	LACK OF EXP.	OTHER	N – TOTAL REASONS NOT USED[1]	N – INDIVIDUALS NOT USED[2]
120. Knowledge of factors involved in conducting an architectural practice in international markets.	224	1	1	1	126	13	366	319
121. Knowledge of components of standard business plan, e.g., revenue projection, staffing plan, overhead, profit plan.	27	2	0	2	135	34	200	177
122. Knowledge of methods and procedures for risk management.	18	1	0	4	98	7	128	116
MEAN	20.01	0.22	0.37	6.57	30.00	8.16	65.33	
MIN	0	0	0	0	0	1	1	
MAX	224	2	5	51	154	34	366	

[1] This column is a sum of all the reasons participants did not use a knowledge or skill. Respondents were allowed to select as many of the reasons not used as applicable; therefore the reason a knowledge was not used may exceed the number of participants who do not use a particular knowledge or skill.

[2] This column represents the number of individuals who indicated that they do not use the knowledge or skill.

TABLE B10. PERCENTAGE DISTRIBUTION OF WHEN KNOWLEDGE/SKILLS SHOULD FIRST BE ACQUIRED

Survey: EDU C Survey Population: Educators + All licensed architects

KNOWLEDGE/SKILL STATEMENT	WHEN KNOWLEDGE/SKILL SHOULD FIRST BE ACQUIRED					
	BY COMPLETION OF ACCREDITED ARCHITECTURE EDUCATION PROGRAM	DURING INTERNSHIP	AFTER LICENSURE	ACQUISITION NOT NEEDED	I DON'T KNOW	TOTAL N
1. Knowledge of oral, written, and visual presentation techniques to communicate project information.	80.2%	17.7%	1.1%	0.4%	0.6%	1,086
2. Knowledge of master plans and their impact on building design.	65.2%	29.2%	2.9%	0.9%	1.8%	1,086
3. Knowledge of method for project controls, e.g., scope of services, budget, billing, compensation.	20.9%	61.2%	16.9%	0.4%	0.6%	1,086
4. Knowledge of factors that affect selection of project consultants.	11.9%	64.2%	22.7%	0.7%	0.5%	1,086
5. Knowledge of strategies for delegating and monitoring task assignments, accountability and deadlines for project team.	13.3%	56.1%	29.1%	0.8%	0.7%	1,086
6. Knowledge of client and project characteristics that influence contract agreements.	13.9%	51.7%	33.3%	0.2%	0.8%	1,086
7. Knowledge of types of contracts and their designated uses.	32.4%	49.4%	17.6%	0.3%	0.4%	1,086
8. Knowledge of standard forms of architectural service agreements for Owner-Architect, Architect-Consultant and Owner-Contractor.	39.0%	45.6%	14.6%	0.3%	0.5%	1,086
9. Knowledge of effects of specific findings from feasibility studies on building design.	31.0%	50.4%	14.7%	1.1%	2.8%	1,086
10. Knowledge of factors involved in selection of building systems and components.	61.3%	33.1%	5.2%	0.2%	0.3%	1,086
11. Knowledge of effect of environmental factors on site development.	76.7%	18.7%	3.6%	0.4%	0.6%	1,086
12. Knowledge of environmental policies and regulations and their implications for proposed construction.	33.3%	49.9%	15.2%	0.6%	0.9%	1,086
13. Knowledge of processes involved in conducting a survey of existing conditions.	37.6%	57.0%	4.3%	0.7%	0.4%	1,086
14. Knowledge of effects of specific findings from environmental impact studies on building design.	30.3%	52.3%	14.5%	1.2%	1.7%	1,086
15. Skill in designing facility layout and site plan that meets site constraints.	74.7%	20.5%	4.4%	0.1%	0.3%	1,086
16. Knowledge of methods required to mitigate adverse site conditions.	39.1%	41.7%	17.2%	1.0%	0.9%	1,086
17. Knowledge of elements and processes for conducting a site analysis.	71.1%	23.9%	3.9%	0.4%	0.7%	1,086
18. Knowledge of codes of professional conduct as related to architectural practice.	53.6%	42.2%	3.7%	0.4%	0.2%	1,086
19. Knowledge of protocols and procedures for conducting a building code analysis.	40.5%	55.0%	4.1%	0.1%	0.4%	1,086
20. Knowledge of building codes and their impact on building design.	60.6%	35.3%	3.7%	0.1%	0.3%	1,085

TABLE B10. PERCENTAGE DISTRIBUTION OF WHEN KNOWLEDGE/SKILLS SHOULD FIRST BE ACQUIRED (CONT.)

Survey: EDU C Survey Population: Educators + All licensed architects

KNOWLEDGE/SKILL STATEMENT	WHEN KNOWLEDGE/SKILL SHOULD FIRST BE ACQUIRED					
	BY COMPLETION OF ACCREDITED ARCHITECTURE EDUCATION PROGRAM	DURING INTERNSHIP	AFTER LICENSURE	ACQUISITION NOT NEEDED	I DON'T KNOW	TOTAL N
21. Knowledge of land use codes and ordinances that govern land use decisions.	41.9%	43.9%	12.7%	0.8%	0.6%	1,086
22. Skill in producing hand drawings of design ideas.	92.0%	4.0%	0.3%	3.1%	0.6%	1,086
23. Knowledge of standards for graphic symbols and units of measurement in technical drawings.	78.3%	20.7%	0.2%	0.5%	0.4%	1,086
24. Skill in producing two-dimensional (2-D) drawings using hand methods.	88.9%	3.3%	0.2%	6.9%	0.7%	1,086
25. Skill in using software to produce two-dimensional (2-D) drawings.	88.6%	9.2%	0.3%	1.4%	0.6%	1,086
26. Skill in using software to produce three-dimensional (3-D) models of building design.	81.7%	13.1%	1.0%	3.1%	1.1%	1,086
27. Skill in producing physical scale models.	86.3%	3.9%	0.5%	8.8%	0.6%	1,086
28. Skill in use of building information modeling (BIM) to develop and manage databases of building and construction information.	40.1%	43.5%	7.5%	5.1%	3.9%	1,086
29. Knowledge of protocols and procedures for obtaining community input for proposed design.	26.1%	50.6%	20.0%	1.8%	1.5%	1,086
30. Knowledge of computer aided design and drafting software for producing two-dimensional (2-D) drawings.	85.7%	11.3%	0.4%	1.8%	0.7%	1,086
31. Knowledge of factors involved in selecting project appropriate computer based design technologies.	36.2%	43.7%	11.8%	4.3%	4.0%	1,086
32. Knowledge of engineering properties of soils and their effect on building foundations and building design.	56.7%	31.1%	8.9%	2.5%	0.7%	1,086
33. Knowledge of factors to be considered in adaptive reuse of existing buildings and materials.	51.3%	34.3%	11.7%	1.3%	1.4%	1,086
34. Knowledge of building technologies which provide solutions for comfort, life safety and energy efficiency.	65.9%	28.2%	5.2%	0.2%	0.5%	1,086
35. Knowledge of effect of thermal envelope in design of building systems.	75.7%	18.9%	4.6%	0.4%	0.5%	1,086
36. Knowledge of principles of integrated project design.	45.0%	36.4%	12.2%	1.9%	4.5%	1,086
37. Knowledge of strategies for anticipating, managing and preventing disputes and conflicts.	18.7%	45.3%	32.2%	1.7%	2.0%	1,086
38. Knowledge of engineering design principles and their application to design and construction.	75.9%	19.2%	4.0%	0.5%	0.6%	1,086
39. Knowledge of structural properties of construction products, materials and assemblies and their impact on building design and construction.	78.0%	17.9%	2.8%	0.8%	0.6%	1,086
40. Knowledge of means and methods for building construction.	64.6%	30.1%	3.5%	1.2%	0.6%	1,086

TABLE B10. PERCENTAGE DISTRIBUTION OF WHEN KNOWLEDGE/SKILLS SHOULD FIRST BE ACQUIRED (CONT.)

Survey: EDU C Survey Population: Educators + All licensed architects

KNOWLEDGE/SKILL STATEMENT	WHEN KNOWLEDGE/SKILL SHOULD FIRST BE ACQUIRED					
	BY COMPLETION OF ACCREDITED ARCHITECTURE EDUCATION PROGRAM	DURING INTERNSHIP	AFTER LICENSURE	ACQUISITION NOT NEEDED	I DON'T KNOW	TOTAL N
41. Knowledge of benefits and limitations of "fast track" or other forms of construction delivery methods.	29.7%	50.6%	16.6%	1.9%	1.3%	1,086
42. Knowledge of methods and techniques for estimating construction costs.	33.0%	50.1%	13.5%	3.1%	0.3%	1,086
43. Knowledge of structural load and load conditions that affect building design.	81.7%	12.7%	3.5%	1.5%	0.6%	1,086
44. Knowledge of energy codes that impact construction.	56.4%	37.6%	4.8%	0.8%	0.4%	1,086
45. Knowledge of methods and strategies for evidence based design (EBD).	28.9%	27.3%	11.0%	6.8%	26.1%	1,086
46. Knowledge of impact of design on human behavior.	82.0%	8.3%	3.9%	2.9%	2.9%	1,086
47. Knowledge of functional requirements of all building systems.	67.9%	24.0%	5.8%	1.2%	1.1%	1,086
48. Knowledge of hazardous materials mitigation at building site.	20.2%	48.4%	21.5%	6.8%	3.0%	1,086
49. Knowledge of principles of building operation and function.	46.2%	34.5%	14.1%	2.7%	2.5%	1,086
50. Knowledge of content and format of specifications.	41.8%	51.9%	4.9%	0.6%	0.7%	1,086
51. Knowledge of principles of interior design and their influences on building design.	71.3%	19.9%	4.1%	2.8%	2.0%	1,086
52. Knowledge of principles of landscape design and their influences on building design.	78.1%	15.2%	3.7%	1.7%	1.4%	1,086
53. Knowledge of site design principles and practices.	86.6%	12.2%	0.6%	0.3%	0.5%	1,086
54. Knowledge of techniques for architectural programming to identify functional and operational requirements of scope of work.	71.7%	22.5%	4.4%	0.2%	1.2%	1,086
55. Knowledge of procedures to develop project scheduling, phasing and deliverables for various building types.	18.6%	56.8%	23.0%	0.9%	0.6%	1,086
56. Knowledge of relationship between constructability and aesthetics.	65.0%	29.2%	3.5%	0.6%	1.7%	1,086
57. Knowledge of standards and specifications for building materials and methods of construction, e.g., ASTM, ANSI.	35.8%	51.2%	10.5%	1.4%	1.1%	1,086
58. Knowledge of methods to perform life cycle cost analysis.	30.8%	37.9%	23.8%	5.2%	2.2%	1,086
59. Knowledge of principles of value analysis and value engineering processes.	21.1%	49.7%	24.3%	2.9%	2.0%	1,086
60. Knowledge of procedures and protocols of permit approval process.	12.0%	72.8%	13.5%	0.9%	0.7%	1,086
61. Knowledge of principles of historic preservation.	58.0%	22.8%	9.3%	6.7%	3.1%	1,086
62. Knowledge of processes and procedures for building commissioning.	20.9%	43.8%	23.2%	7.0%	5.1%	1,086

TABLE B10. PERCENTAGE DISTRIBUTION OF WHEN KNOWLEDGE/SKILLS SHOULD FIRST BE ACQUIRED (CONT.)

Survey: EDU C Survey Population: Educators + All licensed architects

KNOWLEDGE/SKILL STATEMENT	WHEN KNOWLEDGE/SKILL SHOULD FIRST BE ACQUIRED					
	BY COMPLETION OF ACCREDITED ARCHITECTURE EDUCATION PROGRAM	DURING INTERNSHIP	AFTER LICENSURE	ACQUISITION NOT NEEDED	I DON'T KNOW	TOTAL N
63. Knowledge of design factors to consider in selecting furniture, fixtures and equipment (FFE).	26.5%	48.1%	14.0%	7.6%	3.8%	1,086
64. Knowledge of methods and tools for space planning.	72.2%	21.2%	3.5%	1.3%	1.8%	1,086
65. Knowledge of different project delivery methods and their impacts on project schedule, costs and project goals.	30.1%	48.6%	18.9%	0.9%	1.5%	1,086
66. Knowledge of factors that impact construction management services.	16.5%	49.0%	28.1%	3.8%	2.7%	1,086
67. Knowledge of fee structures, their attributes and implications for schedule, scope and profit.	19.3%	46.3%	32.5%	0.5%	1.4%	1,086
68. Knowledge of consultant agreements and fee structures.	15.2%	48.9%	34.8%	0.5%	0.6%	1,086
69. Knowledge of different building and construction types and their implications on design and construction schedules.	46.5%	42.4%	9.8%	0.6%	0.6%	1,086
70. Knowledge of scheduling methods to establish project timeframes based on standard sequences of architectural operations in each phase.	16.9%	55.1%	24.4%	1.7%	1.9%	1,086
71. Knowledge of business development strategies.	19.9%	28.6%	44.8%	3.6%	3.0%	1,086
72. Knowledge of relationship between project scope and consultant capabilities to assemble project team.	8.7%	48.3%	39.8%	1.0%	2.2%	1,086
73. Knowledge of purposes and types of professional liability insurance related to architectural practice.	19.6%	35.1%	43.4%	0.8%	1.1%	1,086
74. Knowledge of format and protocols for efficient meeting management and information distribution.	12.3%	56.6%	25.0%	2.9%	3.0%	1,086
75. Knowledge of strategies to assess project progress and verify its alignment with project schedule.	8.7%	60.0%	28.5%	1.3%	1.5%	1,086
76. Knowledge of ways to translate project goals into specific tasks and measurable design criteria.	25.5%	44.7%	24.4%	2.1%	3.3%	1,086
77. Knowledge of effective communication techniques to educate client with respect to roles and responsibilities of all parties.	21.0%	50.2%	26.7%	1.0%	1.1%	1,086
78. Knowledge of formats and protocols to produce and distribute field reports to document construction progress.	6.6%	76.0%	14.7%	1.5%	1.2%	1,086
79. Knowledge of site requirements for specific building types to determine client's site needs.	40.0%	43.3%	13.4%	1.1%	2.2%	1,086
80. Knowledge of site analysis techniques to determine project parameters affecting design.	63.4%	27.2%	7.0%	1.0%	1.5%	1,086

TABLE B10. PERCENTAGE DISTRIBUTION OF WHEN KNOWLEDGE/SKILLS SHOULD FIRST BE ACQUIRED (CONT.)

Survey: EDU C Survey Population: Educators + All licensed architects

KNOWLEDGE/SKILL STATEMENT	WHEN KNOWLEDGE/SKILL SHOULD FIRST BE ACQUIRED					
	BY COMPLETION OF ACCREDITED ARCHITECTURE EDUCATION PROGRAM	DURING INTERNSHIP	AFTER LICENSURE	ACQUISITION NOT NEEDED	I DON'T KNOW	TOTAL N
81. Knowledge of methods to prioritize or objectively evaluate design options based on project goals.	53.4%	31.9%	11.6%	1.0%	2.1%	1,086
82. Knowledge of sustainability strategies and/or rating systems.	62.5%	22.2%	8.9%	4.2%	2.1%	1,086
83. Knowledge of sustainability considerations related to building materials and construction processes.	61.6%	26.1%	7.0%	3.9%	1.5%	1,086
84. Knowledge of techniques to integrate renewable energy systems into building design.	63.4%	21.5%	8.9%	4.1%	2.2%	1,086
85. Knowledge of methods to identify scope changes that may require additional services.	7.4%	60.1%	30.7%	0.9%	0.9%	1,086
86. Knowledge of procedures for processing requests for additional services.	5.3%	55.4%	37.3%	0.7%	1.2%	1,086
87. Knowledge of appropriate documentation level required for construction documents.	22.1%	69.8%	7.3%	0.1%	0.7%	1,086
88. Knowledge of close-out document requirements and protocols.	7.2%	68.3%	22.0%	1.0%	1.5%	1,086
89. Knowledge of construction document technologies and their standards and applications.	31.2%	57.7%	7.5%	0.6%	2.9%	1,086
90. Knowledge of building information modeling (BIM) and its impact on planning, financial management and construction documentation.	32.2%	38.5%	16.1%	7.1%	6.1%	1,086
91. Knowledge of principles of computer assisted design and drafting (CADD) software and its uses in communicating design ideas.	79.3%	16.5%	1.2%	1.6%	1.5%	1,086
92. Knowledge of American Institute of Architects (AIA) guidelines for contract agreements.	35.5%	47.1%	13.6%	2.9%	0.8%	1,086
93. Knowledge of techniques to integrate model contract forms and documents.	15.4%	51.7%	26.9%	2.6%	3.5%	1,086
94. Knowledge of methods for production of construction documentation and drawings.	42.8%	54.3%	2.1%	0.1%	0.6%	1,086
95. Knowledge of standard methods for production of design development documentation.	41.1%	56.1%	2.2%	0.1%	0.6%	1,086
96. Knowledge of standard methods for production of site plan documentation.	40.4%	55.1%	2.1%	1.2%	1.2%	1,086
97. Knowledge of circumstances warranting further actions based on field reports, third party inspections and test results.	6.1%	62.2%	28.7%	0.9%	2.0%	1,086
98. Knowledge of materials testing processes and protocols to be performed during the construction process.	15.9%	60.1%	19.8%	2.5%	1.7%	1,086

TABLE B10. PERCENTAGE DISTRIBUTION OF WHEN KNOWLEDGE/SKILLS SHOULD FIRST BE ACQUIRED (CONT.)

Survey: EDU C Survey Population: Educators + All licensed architects

KNOWLEDGE/SKILL STATEMENT	WHEN KNOWLEDGE/SKILL SHOULD FIRST BE ACQUIRED					
	BY COMPLETION OF ACCREDITED ARCHITECTURE EDUCATION PROGRAM	DURING INTERNSHIP	AFTER LICENSURE	ACQUISITION NOT NEEDED	I DON'T KNOW	TOTAL N
99. Knowledge of building systems testing processes and protocols to be performed during the construction process.	13.0%	60.5%	20.9%	3.0%	2.6%	1,086
100. Knowledge of formats and protocols to process shop drawings and submittals to ensure they meet design intent.	9.0%	81.4%	8.6%	0.4%	0.6%	1,086
101. Knowledge of protocols for responding to Requests for Information (RFI).	7.6%	80.4%	10.8%	0.2%	1.1%	1,086
102. Knowledge of roles, responsibilities and authorities of project team members during construction.	21.6%	68.3%	9.2%	0.4%	0.5%	1,086
103. Knowledge of conflict resolution techniques and their applications throughout project.	17.7%	47.3%	31.1%	1.6%	2.3%	1,086
104. Knowledge of bidding processes and protocols for different project delivery methods and their applications.	21.3%	58.7%	18.4%	0.6%	1.1%	1,086
105. Knowledge of requirements for post-occupancy evaluation.	15.1%	47.5%	27.7%	5.7%	4.0%	1,086
106. Knowledge of project risks for new and innovative products, materials, methods and technologies.	23.2%	41.6%	28.9%	2.7%	3.6%	1,086
107. Knowledge of design decisions and their impact on constructability.	55.7%	37.2%	6.3%	0.1%	0.7%	1,086
108. Knowledge of interpersonal skills necessary to elicit client needs and desired scope of services.	30.3%	46.8%	18.3%	2.1%	2.5%	1,086
109. Knowledge of requirements of Intern Development Program (IDP).	66.9%	24.8%	2.7%	2.7%	3.0%	1,086
110. Knowledge of techniques for staff development in architectural firms.	8.8%	35.5%	47.4%	4.7%	3.6%	1,086
111. Knowledge of methods to manage human resources.	5.6%	24.8%	56.0%	8.3%	5.3%	1,086
112. Knowledge of state board guidelines for licensing and professional practice.	33.3%	59.9%	4.9%	1.2%	0.7%	1,086
113. Knowledge of strategies to create positive work environment that builds trust and encourages cooperation and teamwork.	21.8%	36.4%	33.9%	4.2%	3.7%	1,086
114. Knowledge of principles of universal design.	65.1%	20.1%	4.4%	2.9%	7.6%	1,086
115. Knowledge of purposes of and legal implications for different types of business entities.	23.5%	23.8%	42.1%	5.5%	5.2%	1,086
116. Knowledge of innovative and evolving technologies and their impact on architectural practice.	40.3%	29.3%	25.0%	2.0%	3.3%	1,086
117. Knowledge of training programs for professional development.	18.0%	51.7%	25.5%	2.6%	2.2%	1,086
118. Knowledge of ethical standards relevant to architectural practice.	60.4%	32.5%	5.6%	0.9%	0.6%	1,086

TABLE B10. PERCENTAGE DISTRIBUTION OF WHEN KNOWLEDGE/SKILLS SHOULD FIRST BE ACQUIRED (CONT.)

Survey: EDU C Survey Population: Educators + All licensed architects

KNOWLEDGE/SKILL STATEMENT	WHEN KNOWLEDGE/SKILL SHOULD FIRST BE ACQUIRED					
	BY COMPLETION OF ACCREDITED ARCHITECTURE EDUCATION PROGRAM	DURING INTERNSHIP	AFTER LICENSURE	ACQUISITION NOT NEEDED	I DON'T KNOW	TOTAL N
119. Knowledge of methods to facilitate information management in building design and construction.	21.5%	53.2%	16.3%	3.5%	5.4%	1,086
120. Knowledge of factors involved in conducting an architectural practice in international markets.	9.3%	14.5%	50.3%	15.4%	10.5%	1,086
121. Knowledge of components of standard business plan, e.g., revenue projection, staffing plan, overhead, profit plan.	19.2%	20.0%	52.8%	4.4%	3.7%	1,086
122. Knowledge of methods and procedures for risk management.	14.9%	36.2%	42.6%	2.4%	3.9%	1,086
MEAN	40.5%	39.8%	15.5%	2.2%	2.0%	1086.0
MIN	5.3%	3.3%	0.2%	0.1%	0.2%	1085
MAX	92.0%	81.4%	56.0%	15.4%	26.1%	1086

TABLE B11. PERCENTAGE DISTRIBUTION OF RATINGS FOR LEVEL AT WHICH KNOWLEDGE/SKILLS SHOULD FIRST BE ACQUIRED

Survey: EDU C Survey Population: Educators + All licensed architects

KNOWLEDGE/SKILL STATEMENT	LEVEL AT WHICH KNOWLEDGE/SKILL SHOULD BE ACQUIRED			
	UNDERSTAND	APPLY	EVALUATE	TOTAL N
1. Knowledge of oral, written, and visual presentation techniques to communicate project information.	18.6%	45.5%	35.9%	871
2. Knowledge of master plans and their impact on building design.	39.7%	36.3%	24.0%	708
3. Knowledge of method for project controls, e.g., scope of services, budget, billing, compensation.	69.2%	16.3%	14.5%	227
4. Knowledge of factors that affect selection of project consultants.	68.2%	17.1%	14.7%	129
5. Knowledge of strategies for delegating and monitoring task assignments, accountability and deadlines for project team.	31.3%	53.5%	15.3%	144
6. Knowledge of client and project characteristics that influence contract agreements.	67.5%	19.9%	12.6%	151
7. Knowledge of types of contracts and their designated uses.	77.3%	16.2%	6.5%	352
8. Knowledge of standard forms of architectural service agreements for Owner-Architect, Architect-Consultant and Owner-Contractor.	80.0%	14.9%	5.2%	424
9. Knowledge of effects of specific findings from feasibility studies on building design.	40.1%	41.2%	18.7%	337
10. Knowledge of factors involved in selection of building systems and components.	34.7%	46.4%	18.9%	666
11. Knowledge of effect of environmental factors on site development.	30.6%	41.4%	28.0%	833
12. Knowledge of environmental policies and regulations and their implications for proposed construction.	56.9%	29.8%	13.3%	362
13. Knowledge of processes involved in conducting a survey of existing conditions.	33.8%	45.3%	20.8%	408
14. Knowledge of effects of specific findings from environmental impact studies on building design.	55.0%	28.3%	16.7%	329
15. Skill in designing facility layout and site plan that meets site constraints.	13.6%	47.1%	39.3%	811
16. Knowledge of methods required to mitigate adverse site conditions.	43.3%	38.6%	18.1%	425
17. Knowledge of elements and processes for conducting a site analysis.	29.7%	43.9%	26.4%	772
18. Knowledge of codes of professional conduct as related to architectural practice.	59.5%	25.4%	15.1%	582
19. Knowledge of protocols and procedures for conducting a building code analysis.	41.8%	42.7%	15.5%	440
20. Knowledge of building codes and their impact on building design.	38.9%	45.1%	16.0%	658
21. Knowledge of land use codes and ordinances that govern land use decisions.	61.1%	27.9%	11.0%	455
22. Skill in producing hand drawings of design ideas.	11.3%	42.2%	46.4%	999
23. Knowledge of standards for graphic symbols and units of measurement in technical drawings.	15.2%	51.6%	33.2%	850
24. Skill in producing two-dimensional (2-D) drawings using hand methods.	11.8%	50.5%	37.7%	965
25. Skill in using software to produce two-dimensional (2-D) drawings.	7.4%	62.0%	30.7%	962
26. Skill in using software to produce three-dimensional (3-D) models of building design.	11.4%	60.9%	27.7%	887
27. Skill in producing physical scale models.	11.5%	55.9%	32.6%	937
28. Skill in use of building information modeling (BIM) to develop and manage databases of building and construction information.	35.6%	46.8%	17.7%	436
29. Knowledge of protocols and procedures for obtaining community input for proposed design.	64.0%	24.0%	12.0%	283
30. Knowledge of computer aided design and drafting software for producing two-dimensional (2-D) drawings.	12.1%	60.4%	27.5%	931
31. Knowledge of factors involved in selecting project appropriate computer based design technologies.	37.7%	39.4%	22.9%	393
32. Knowledge of engineering properties of soils and their effect on building foundations and building design.	66.7%	24.2%	9.1%	616

TABLE B11. PERCENTAGE DISTRIBUTION OF RATINGS FOR LEVEL AT WHICH KNOWLEDGE/SKILLS SHOULD FIRST BE ACQUIRED (CONT.)

Survey: EDU C Survey Population: Educators + All licensed architects

KNOWLEDGE/SKILL STATEMENT	LEVEL AT WHICH KNOWLEDGE/SKILL SHOULD BE ACQUIRED			
	UNDERSTAND	APPLY	EVALUATE	TOTAL N
33. Knowledge of factors to be considered in adaptive reuse of existing buildings and materials.	60.1%	28.5%	11.3%	557
34. Knowledge of building technologies which provide solutions for comfort, life safety and energy efficiency.	44.7%	36.9%	18.4%	716
35. Knowledge of effect of thermal envelope in design of building systems.	41.5%	38.9%	19.6%	822
36. Knowledge of principles of integrated project design.	58.9%	25.2%	16.0%	489
37. Knowledge of strategies for anticipating, managing and preventing disputes and conflicts.	70.9%	16.3%	12.8%	203
38. Knowledge of engineering design principles and their application to design and construction.	51.3%	35.8%	12.9%	824
39. Knowledge of structural properties of construction products, materials and assemblies and their impact on building design and construction.	43.6%	40.3%	16.2%	847
40. Knowledge of means and methods for building construction.	49.4%	33.0%	17.5%	702
41. Knowledge of benefits and limitations of "fast track" or other forms of construction delivery methods.	84.2%	8.7%	7.1%	322
42. Knowledge of methods and techniques for estimating construction costs.	64.8%	29.1%	6.1%	358
43. Knowledge of structural load and load conditions that affect building design.	46.7%	39.5%	13.9%	887
44. Knowledge of energy codes that impact construction.	54.8%	33.4%	11.7%	613
45. Knowledge of methods and strategies for evidence based design (EBD).	72.9%	18.2%	8.9%	314
46. Knowledge of impact of design on human behavior.	47.1%	28.1%	24.8%	890
47. Knowledge of functional requirements of all building systems.	50.9%	33.8%	15.3%	737
48. Knowledge of hazardous materials mitigation at building site.	81.3%	8.7%	10.0%	219
49. Knowledge of principles of building operation and function.	62.5%	21.9%	15.5%	502
50. Knowledge of content and format of specifications.	63.0%	29.1%	7.9%	454
51. Knowledge of principles of interior design and their influences on building design.	37.0%	46.5%	16.5%	774
52. Knowledge of principles of landscape design and their influences on building design.	45.4%	40.3%	14.3%	848
53. Knowledge of site design principles and practices.	26.9%	49.8%	23.3%	940
54. Knowledge of techniques for architectural programming to identify functional and operational requirements of scope of work.	28.4%	44.8%	26.8%	779
55. Knowledge of procedures to develop project scheduling, phasing and deliverables for various building types.	65.8%	24.3%	9.9%	202
56. Knowledge of relationship between constructability and aesthetics.	37.1%	35.6%	27.3%	706
57. Knowledge of standards and specifications for building materials and methods of construction, e.g., ASTM, ANSI.	72.5%	21.6%	5.9%	389
58. Knowledge of methods to perform life cycle cost analysis.	71.3%	20.0%	8.7%	335
59. Knowledge of principles of value analysis and value engineering processes.	69.0%	18.3%	12.7%	229
60. Knowledge of procedures and protocols of permit approval process.	76.9%	11.5%	11.5%	130
61. Knowledge of principles of historic preservation.	68.7%	21.7%	9.5%	630
62. Knowledge of processes and procedures for building commissioning.	81.1%	12.3%	6.6%	227
63. Knowledge of design factors to consider in selecting furniture, fixtures and equipment (FFE).	62.2%	29.9%	8.0%	288
64. Knowledge of methods and tools for space planning.	29.6%	46.3%	24.1%	784

TABLE B11. PERCENTAGE DISTRIBUTION OF RATINGS FOR LEVEL AT WHICH KNOWLEDGE/SKILLS SHOULD FIRST BE ACQUIRED (CONT.)

Survey: EDU C Survey Population: Educators + All licensed architects

KNOWLEDGE/SKILL STATEMENT	LEVEL AT WHICH KNOWLEDGE/SKILL SHOULD BE ACQUIRED			
	UNDERSTAND	APPLY	EVALUATE	TOTAL N
65. Knowledge of different project delivery methods and their impacts on project schedule, costs and project goals.	78.3%	14.4%	7.3%	327
66. Knowledge of factors that impact construction management services.	78.8%	12.3%	8.9%	179
67. Knowledge of fee structures, their attributes and implications for schedule, scope and profit.	83.8%	8.6%	7.6%	210
68. Knowledge of consultant agreements and fee structures.	84.8%	7.3%	7.9%	165
69. Knowledge of different building and construction types and their implications on design and construction schedules.	63.6%	24.2%	12.3%	505
70. Knowledge of scheduling methods to establish project timeframes based on standard sequences of architectural operations in each phase.	65.6%	23.5%	10.9%	183
71. Knowledge of business development strategies.	76.9%	14.8%	8.3%	216
72. Knowledge of relationship between project scope and consultant capabilities to assemble project team.	76.8%	11.6%	11.6%	95
73. Knowledge of purposes and types of professional liability insurance related to architectural practice.	88.3%	6.6%	5.2%	213
74. Knowledge of format and protocols for efficient meeting management and information distribution.	59.7%	26.9%	13.4%	134
75. Knowledge of strategies to assess project progress and verify its alignment with project schedule.	63.8%	24.5%	11.7%	94
76. Knowledge of ways to translate project goals into specific tasks and measurable design criteria.	42.2%	41.5%	16.2%	277
77. Knowledge of effective communication techniques to educate client with respect to roles and responsibilities of all parties.	52.2%	31.6%	16.2%	228
78. Knowledge of formats and protocols to produce and distribute field reports to document construction progress.	69.4%	18.1%	12.5%	72
79. Knowledge of site requirements for specific building types to determine client's site needs.	46.8%	33.6%	19.6%	434
80. Knowledge of site analysis techniques to determine project parameters affecting design.	39.1%	40.6%	20.3%	688
81. Knowledge of methods to prioritize or objectively evaluate design options based on project goals.	29.0%	41.7%	29.3%	580
82. Knowledge of sustainability strategies and/or rating systems.	50.7%	35.3%	14.0%	679
83. Knowledge of sustainability considerations related to building materials and construction processes.	55.3%	30.5%	14.2%	669
84. Knowledge of techniques to integrate renewable energy systems into building design.	58.0%	29.8%	12.2%	688
85. Knowledge of methods to identify scope changes that may require additional services.	76.3%	11.3%	12.5%	80
86. Knowledge of procedures for processing requests for additional services.	70.7%	12.1%	17.2%	58
87. Knowledge of appropriate documentation level required for construction documents.	44.6%	35.4%	20.0%	240
88. Knowledge of close-out document requirements and protocols.	73.1%	17.9%	9.0%	78
89. Knowledge of construction document technologies and their standards and applications.	58.4%	30.1%	11.5%	339
90. Knowledge of building information modeling (BIM) and its impact on planning, financial management and construction documentation.	70.0%	19.4%	10.6%	350
91. Knowledge of principles of computer assisted design and drafting (CADD) software and its uses in communicating design ideas.	26.0%	54.0%	20.0%	861
92. Knowledge of American Institute of Architects (AIA) guidelines for contract agreements.	80.8%	12.7%	6.5%	386

TABLE B11. PERCENTAGE DISTRIBUTION OF RATINGS FOR LEVEL AT WHICH KNOWLEDGE/SKILLS SHOULD FIRST BE ACQUIRED (CONT.)

Survey: EDU C Survey Population: Educators + All licensed architects

KNOWLEDGE/SKILL STATEMENT	LEVEL AT WHICH KNOWLEDGE/SKILL SHOULD BE ACQUIRED			
	UNDERSTAND	APPLY	EVALUATE	TOTAL N
93. Knowledge of techniques to integrate model contract forms and documents.	80.8%	9.0%	10.2%	167
94. Knowledge of methods for production of construction documentation and drawings.	46.0%	42.2%	11.8%	465
95. Knowledge of standard methods for production of design development documentation.	38.6%	47.1%	14.3%	446
96. Knowledge of standard methods for production of site plan documentation.	43.7%	44.9%	11.4%	439
97. Knowledge of circumstances warranting further actions based on field reports, third party inspections and test results.	74.2%	12.1%	13.6%	66
98. Knowledge of materials testing processes and protocols to be performed during the construction process.	83.8%	9.2%	6.9%	173
99. Knowledge of building systems testing processes and protocols to be performed during the construction process.	83.0%	9.2%	7.8%	141
100. Knowledge of formats and protocols to process shop drawings and submittals to ensure they meet design intent.	70.4%	19.4%	10.2%	98
101. Knowledge of protocols for responding to Requests for Information (RFI).	75.6%	12.2%	12.2%	82
102. Knowledge of roles, responsibilities and authorities of project team members during construction.	78.3%	12.8%	8.9%	235
103. Knowledge of conflict resolution techniques and their applications throughout project.	70.3%	18.2%	11.5%	192
104. Knowledge of bidding processes and protocols for different project delivery methods and their applications.	85.3%	8.7%	6.1%	231
105. Knowledge of requirements for post-occupancy evaluation.	83.5%	10.4%	6.1%	164
106. Knowledge of project risks for new and innovative products, materials, methods and technologies.	81.7%	8.7%	9.5%	252
107. Knowledge of design decisions and their impact on constructability.	44.1%	33.2%	22.6%	605
108. Knowledge of interpersonal skills necessary to elicit client needs and desired scope of services.	46.2%	37.7%	16.1%	329
109. Knowledge of requirements of Intern Development Program (IDP).	53.9%	26.0%	20.1%	726
110. Knowledge of techniques for staff development in architectural firms.	81.3%	9.4%	9.4%	96
111. Knowledge of methods to manage human resources.	72.1%	9.8%	18.0%	61
112. Knowledge of state board guidelines for licensing and professional practice.	69.1%	17.4%	13.5%	362
113. Knowledge of strategies to create positive work environment that builds trust and encourages cooperation and teamwork.	51.5%	32.5%	16.0%	237
114. Knowledge of principles of universal design.	43.1%	38.3%	18.5%	707
115. Knowledge of purposes of and legal implications for different types of business entities.	85.5%	8.6%	5.9%	255
116. Knowledge of innovative and evolving technologies and their impact on architectural practice.	71.9%	16.4%	11.6%	438
117. Knowledge of training programs for professional development.	73.0%	15.3%	11.7%	196
118. Knowledge of ethical standards relevant to architectural practice.	62.5%	24.2%	13.3%	656
119. Knowledge of methods to facilitate information management in building design and construction.	64.1%	21.8%	14.1%	234
120. Knowledge of factors involved in conducting an architectural practice in international markets.	87.1%	5.9%	6.9%	101

TABLE B11. PERCENTAGE DISTRIBUTION OF RATINGS FOR LEVEL AT WHICH KNOWLEDGE/SKILLS SHOULD FIRST BE ACQUIRED (CONT.)

Survey: EDU C Survey Population: Educators + All licensed architects

KNOWLEDGE/SKILL STATEMENT	LEVEL AT WHICH KNOWLEDGE/SKILL SHOULD BE ACQUIRED			
	UNDERSTAND	APPLY	EVALUATE	TOTAL N
121. Knowledge of components of standard business plan, e.g., revenue projection, staffing plan, overhead, profit plan.	76.9%	14.4%	8.7%	208
122. Knowledge of methods and procedures for risk management.	79.0%	14.2%	6.8%	162
MEAN	56.7%	28.1%	15.2%	439.4
MIN	7.4%	5.9%	5.2%	58
MAX	88.3%	62.0%	46.4%	999