

An Assessment of Learning Needs for Practicing Architects

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The following report presents the findings of a needs assessment prepared for use by the American Institute of Architects. It was conducted in part to support the pilot project of the AIA Continuing Education System. Anyone wishing to copy this report should contact the AIA for permission. Portions of this report will be submitted to academic conferences and journals for publication by the authors.

Purpose

This needs assessment was designed to determine the actual and perceived learning needs of AIA members. It gives a picture of what architects as a composite group believe they need to know and is analyzed according to respondents' years of experience, firm size, and Professional Interest Areas.

In this study actual learning needs were established before perceived needs were surveyed. Actual needs were assessed by identifying competencies architects must have in order to perform their job. For this purpose, the competencies identified were general, applying to the majority of architects. More specific needs can be addressed by future needs assessments. Perceived needs were assessed by determining the difference between what competencies architects desire to have and what their current competencies are. The discrepancy between desired competencies and current competencies identified their learning needs.

USE OF NEEDS ASSESSMENTS

A needs assessment is a tool used to describe problems or missing information. Needs assessments are performed by educators when they want to be sure they are planning the appropriate content for their potential participants in a course or program. It is important for program planners to find out what participants want to know and their present level of knowledge in order to define their learning gaps and fill them.

The objective of the needs assessment was to produce a model which can be used by AIA chapter components or continuing education providers to determine the learning needs of a group of members for meeting the criteria of CES quality levels two and three.

LITERATURE REVIEW

Adult Learning Theory

Needs assessments are an essential element of adult learning theory. Adult learning theory proposes that adults are motivated to learn when they come across a situation where they need to know something specific. Knowles (1980) states that adults engage in learning in response to pressures they feel from their current life situation. Because of this, adults are problem-oriented, or interested in solving problems rather than learning general concepts. Three sources of needs an interests must be considered in adult-education program planning: 1) the individuals, 2) the sponsoring organization, and 3) the society at large. To establish what these needs are, a needs assessment must be conducted (Knowles, 1980). Long states "one of the key elements in successful programming...is needs assessment" (1983, p. 178).

Literature on continuing professional education asserts that conducting a needs assessment is an essential element in planning effective programs. The goal of continuing professional education is to bring about a change in behavior which indicates learning (Fleisher 1974). In order for this learning to be directed to areas where it is needed, the areas of needed learning must be identified. Houle (1980) described a continuing education model with roots in social psychology. This model calls for current performance to be compared to the ideal and the minimally acceptable standards in order to highlight the "deficits of performance"(p. 232). Programs are then designed to correct the identified deficits.

Types of Learning Needs

Learning needs are categorized as different types of needs. The type of learning need felt by the learner is considered a *felt need*, *expressed need*, or *perceived need*. Felt needs are not adequate measures of the real needs of adult learners, because they are limited by the perceptions of the individuals (Wlodkowski, 1985 and Long, 1983). Real or actual needs are established by experts and are set as a requirement or minimum standard. A need is considered normative when it defines a deficiency or gap between a desirable standard and

the standard that actually exists. A normative need is considered an educational need when it represents the discrepancy between what individuals aspire to and their reality (Wlodkowski, 1985).

PROCEDURE

Assessing actual needs.

AIA staff members were contacted to determine the items of competency or actual learning needs for the AIA Needs Assessment. This included the AIA Professional Development (PD) staff and the professional interest area (PIA) directors. The goal was to collect five items of competencies from each PIA. This was done by a research associate who interviewed the PD and PIA staff in Washington, D.C. in December 1993. Following these interviews, the PIA chairs and vice chairs were contacted by phone for their input on competencies. The proposal for this needs assessment was presented on January 30, 1994 at the PIA Planning Retreat of the Grassroots conference in Washington, D.C., where more input was requested.

Survey form construction.

During February 1994 the the survey forms were developed. The survey was divided into two forms in order to keep the questionnaire short and increase the return rate. Some items appeared on both forms, stated slightly differently, which created a validity check. Each form consisted of 50 items including two to three competency statements from each professional interest area. The competency statements were in the center column of the page with a column on the left for rating of current competency level on a scale of one to five, and a column on the right for rating of desired competency level on a scale of one to five. The first page asked for demographic information of chapter, gender, size of firm, years of experience, position in the firm, type of work setting, primary duty, and professional interest areas. These forms were revised under the direction of the AIA and a final version was sent to the AIA for printing along with a draft of a cover letter to participants at the end of February.

Distribution of the surveys.

The two forms, form A and form B were each sent to 1,000 AIA members. Of these 2,000 forms, 500 form A and 500 form B were sent to randomly selected AIA members from the national roster excluding the ten components who cooperated as part of the AIA/CES Pilot Project. The remaining 500 form A and 500 form B were sent to AIA members from the ten cooperating components, Arizona, Central Arizona, Eastern Oklahoma, Houston, Kansas City, Louisiana, New Jersey, Seattle, West Virginia, and Washington D.C. One hundred members were randomly selected from each of these ten components. Random selection was done by the MIS office of the AIA. The forms were mailed out on March 31, 1994 along with a cover letter explaining the needs assessment and assuring anonymity from Richard Hobbs,

Group Vice President for Practice and Education of the AIA. A second mailing was sent approximately two weeks later

Analysis of the findings.

The surveys were returned to the AIA and the results were entered into computers using the Statistix program. The data was analyzed using the software program Statistix. For each competency item, the architect's perceived current level of competency was subtracted from their desired level of competency and a learning need was established. For each item the learning need was averaged, resulting in a mean. Higher learning needs were reflected by higher means. The standard deviation of each mean was also reported to show whether there was a wide spread in the ratings. A small deviation indicated that most of the respondents rated their competency level about the same, while a large deviation indicated that respondents varied in their rating of competency. These were reported for the entire group of respondents and again for those who responded to each professional interest area. Frequencies and percentages of responses were also tabulated.

FINDINGS

Demographics

The response rate was 38.5%, or 769 out of 2000 surveys were returned. There were 388 responses to form A (39%), and 381 responses to form B (38%). Responses came from 169 AIA components. Twenty five percent of the responses came from the ten chapters cooperating with the CES Pilot Project (19% of total sent out) and seventy five percent came from the remaining chapters (58% of total sent out). The majority of respondents were male, (92%), while a small percentage were female (06%), and a few (02%) did not identify their gender.

The size of firm where the respondents work was divided into three groups. Group one, firms with under ten employees, had the largest percentage of respondents (49%).

Group three, firms with thirty or more people, had 28% of the respondents. Group two, firms with 10 to 29 people, had 23% of the respondents. Firm size was not indicated by 57 respondents (07%)

Years of experience was also divided into three groups. The majority of respondents (62%) had more than twenty years experience. The group with five to nineteen years experience had 36% of the respondents. Only three respondents had less than four years experience, (0%). Years of experience was not indicated by 13 respondents (02%).

For primary work setting, 528 (69%) checked private architecture practice and 105 (14%) checked architecture/engineering. The other categories were marked by four percent or less of the respondents. For those in private design practice, 531 checked principal as their position. This was 69% of the total respondents, and 79% of the respondents to this question. Primary job or duty was checked as General Practice by 428 (56%) and Project Management by 108

(14%) of the respondents. Other categories were checked by five percent or less of the respondents.

Respondents were encouraged to check as many Professional Interest Areas as they were interested in. The PIA's with the most responses were Design (67%), Building Codes & Standards (55%), Computer Aided Practice (53%), Practice Management (48%), Housing (40%), Small Projects (36%), Documentation Technology (35%), Health Care Facilities (35%), Interiors (34%), Educational Facilities (34%), and Construction Management (33%). More detailed information on the demographics is listed in Table 1.

Learning Needs

Overall, the items with the largest learning need concerned computers and CAD, marketing and presentation skills, risk management, project delivery alternatives, interior environmental issues, cost analysis, negotiation, energy efficiency, fee structure, seismic construction, and code compliance. The top sixteen items for the entire group of respondents from each form are listed in Table 2.

Learning Needs by Years of Experience and Firm Size - Form A.

Those with 20 years or more experience rated the top fifteen items very much the same as the entire group did. The respondents with 5 to 19 years of experience rated most of the top items the same as the aggregate group, but rated managing a small firm, analyzing cost, and budgeting projects higher on learning need.

When compared by firm size, the respondents from firms with 9 people or less rated most of the top items the same as the aggregate group, except for a higher learning need for international culture and managing a small firm. Those who worked in firms of 10 to 29 people rated most items similarly to the entire group, but indicated a need to know more about foreign culture and historic renovation and less about environmental impact and seismic construction. Those in firms of 30 or more indicated a much higher learning need on how to work with international culture, foreign markets, synthesize a quick set of plans and budget projects. They indicated less need for learning about evaluating potential clients, risk management, environmental impact, code compliance and seismic construction.

Learning Needs by Years of Experience and Firm Size - Form B.

When compared to the aggregate group, those with 20 years or more experience rated the same items highly with the addition of a slight need to know more about copyrightable works produced by architects. Those with 5 to 19 years of experience rated most of the items similarly, but rated a slightly higher need on financial forecasting, using conflict resolution methods, and managing an intentionally small firm.

Firm size showed a bit more difference, especially the rating by those in medium and large firms. Those in firms

of less than 10 rated their learning needs much the same as the aggregate group, but with more emphasis on marketing services and managing a firm's liability. Those in firms size 10 to 29 people indicated more learning need for expanding client services and managing a firm's liability, with less need for preparing accurate cost estimates than the aggregate group. Those in firms of 30 or more people indicated less need for learning about marketing and presenting to clients, and more need for structuring fees and preparing cost estimates than the aggregate group did.

Learning Needs by Professional Interest Area.

The learning need was calculated for each PIA by selecting everyone who checked interest in that PIA. For most PIAs the highest rated learning need was for integrating computer technology in the architectural process. Following that, each PIA showed some variation in the rank order of learning needs.

Some ratings of learning needs by PIAs showed minor differences when compared to the rating by the entire group of respondents. Computer Aided Practice had ratings very similar to the aggregate group. Building Codes & Standards and Design were similar to the aggregate group except for rating highly "use of conflict resolution methods." Small Projects was similar except for rating highly "long range planning." Housing rated highly "design a school for distance learning." Educational Facilities rated highly "design a school for distance learning," and "use conflict resolution methods." Practice Management rated "cultural norms of a foreign country highly." Documentation Technology rated highly "research potential of foreign markets."

Other PIAs showed more variation in rating of learning needs. International was markedly different from the aggregate group and other PIAs in that it rated "research potential foreign markets" and "cultural norms of a foreign country" as their highest learning needs. Historic Resources rated highly "use conflict resolution methods," "design a school for distance learning," "historic structures," and "accommodate new materials." Interiors rated highly "use conflict resolution methods," "analyze cost and schedule growth," and "long range planning." Religious Art & Architecture rated highly "design a school for distance learning," "long range maintenance planning," and "design excellence in architecture." Construction Management rating highly "marketing of construction services," "long range maintenance planning," and "cultural norms of a foreign culture." Justice Facilities rated highly "research potential of foreign markets," "design a school for distance learning," "cultural norms of a foreign country," "acquire public funding and financing," and "synthesize a quick set of plans." Regional & Urban Design rated highly "research potential of foreign markets," "cultural norms of a foreign country," and "successfully organize joint-venture." Risk Management rated highly "synthesize a quick set of plans," "use conflict resolution methods," and "long range maintenance planning." Public Architects rated highly "provide leadership in

the profession," "financial forecasting," "teaching courses at a university," "design a school for distance learning," "acquire public funding and financing," and "large scale planning projects." Design/Build rated highly "design churches," "successfully organize joint-ventures," "long range maintenance planning," "analyze cost and schedule growth," and "prepare financial forecasting." Education rated highly "research potential of foreign markets," "provide leadership in the profession," "acquire public funding and financing," "cultural norms of a foreign country," "design a school for distance learning," "long range maintenance planning," and "cultural norms of a foreign country." Health Care Facilities rated highly "health care facility types," "work in a team environment," "design a school for distance learning," "cultural norms of a foreign country," "economical delivery of health care," "analyze cost and schedule growth," "use conflict resolution methods," and "long range maintenance and planning." Corporate Architects rated highly "large-scale planning projects," "culture of a foreign country," "design a school for distance learning," "human resource development plan," "successfully organize joint ventures," "research potential foreign markets," "provide leadership in the profession," "culture of a foreign country," "synthesize a quick set of plans," and "prepare financial forecasting."

The lowest rated items are listed in Table 3. These were consistently rated low on learning need except for two items. A need for learning how to "stay current in the field while teaching course at a university" was ranked seventh by Public Architects. A need to learn how to "design churches in relation to their religious history" was ranked seventh by Design/Build.

Implications

The key points from this learning needs assessment are:

- many of the highest rated learning needs were consistent for all groups regardless of age, firm size, or Professional Interest Area.
- where the learning needs are the same, programs can be sponsored by several PIAs jointly.
- some actual needs developed by PIA representatives did not show up as perceived needs by the respondents who checked interest in those PIAs. This shows that this type of survey of perceived needs is useful in planning programs to assure that architects will be interested in attending programs.

CONCLUSIONS

The response rate of 38.5% to a 4 page questionnaire, indicates that AIA members are interested in discussing their learning needs. They overwhelmingly indicated a need to learn more about computers and CAD in relation to their architectural practice and marketing their firm. The other highly rated learning needs were on items dealing with risk management and environmental issues. It is important to look at the specific item statements which respondents rated

a high learning need. For the most part topics cannot be generalized. For example, some code issues were rated highly, other code issues were among the lowest rated items. When the actual learning needs were assessed by interviews with the PIA directors, chairs, and vice-chairs, the results were very specific items of competencies needed by architects on a wide range of topics. The results of the survey, constituting the perceived learning needs by AIA members, ranked several items on a topic closely, indicating a more general need for information or competence with certain topics such as computers and marketing. This is most likely because the survey was conducted on a large scale across the country. When this type of needs assessment is done by those who plan programs, it would be best to try to define specific learning needs of the target audience.

On each form there were eleven items rated low (below .70) on learning need, indicating the respondents perceived little need for learning about these items. It is possible that they are not aware of a need for learning in these areas. If the actual need for learning is established, then program planners will need to raise the consciousness of architects to make them aware of a need for learning. This could be done through short programs that present an overview of the topic, or through literature directed to architects.

It appears that Professional Interest Area makes only a slight difference in the perceived learning needs of architects. For most of the PIAs, the items that received the highest rating on learning need for the aggregate group were also rated highly by the PIAs. The PIA that varied the most from the others and the aggregate group was the International PIA. The two items they rated highly, "research and utilize data on potential foreign markets for architectural services" and "work within the cultural norms, language requirements and business practices when providing architectural services to a foreign country," may be very specific to their practice, but were ranked 27th and 30th on form A and 28th on form B by the aggregate group. These two items were also ranked in the top 15 by other PIAs; Education, Corporate Architects, Regional & Urban Design, Health Care Facilities, Justice Facilities, Practice Management, Construction Management, and Documentation Technology. This indicates that although the general population of architects has little need for learning in this area, architects in certain specialties, presumably those who market their services internationally, have a high need for learning in these areas. This information could be very helpful to the directors of these PIAs in designing a program to meet these learning needs and directing the program to the members who selected these PIAs.

Each AIA component and PIA can take this information and the questionnaire form to design a needs assessment specifically for their constituents. Needs assessments are a measure of interest at a specific point in time and are only current until conditions change. As the marketplace changes and architects attend programs or gain experience to raise their competence, their learning needs will change. Therefore, it is recommended that a needs assessment be con-

ducted on a regular basis at least once a year to stay abreast of the current conditions that affect the learning needs of architects. While this survey served to broadly identify key learning needs for a large population of architects, it can serve as a model for needs assessment of specific issues which can be identified in greater detail when used with smaller, targeted groups. The determination of actual needs can be gathered from interviews with officials and experts in specific areas or articles in architectural journals. In order to meet the specific learning needs of architects, programs will need to present in-depth information which will necessitate a length of several hours. The short overview programs do little to positively affect architects' practice.

Table 1 Information about the Respondents

Gender	N	Percent
Male	710	92%
Female	43	06%
not reported	16	02%

Firm Size	N	Percent
Fewer than nine	366	48%
Ten to Twenty nine	155	20%
Thirty or more	191	25%
not reported	57	07%

Years of Experience	N	Percent
Less than four	3	0%
Five to nineteen	280	36%
Twenty or more	473	62%
not reported	13	02%

Primary Work Setting	N	Percent
Private Architecture Practice	528	69%
Architecture/Engineering	105	14%
Corporate Architecture	32	04%
Government Agency	20	03%
Interiors	16	02%
Education	13	02%
Developer/Builder	9	01%
Design/Build	6	01%
Landscape Architect	1	00%
Other	32	04%

Position in a design practice	N	Percent
Principal	531	69%
Associate	69	09%
Staff	51	07%
Other	10	01%

N=number of responses

Total Number of Responses = 769

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Table 1 Information about the Respondents

Primary Job or Duty	N	Percent
General Practice	428	56%
Project Management	55	14%
Business Management	41	05%
Construction Documents/Specs	28	04%
Marketing	22	03%
Teaching/Academic Administration	11	01%
Construction Management	10	01%
Facility Management	10	01%
Planning	8	01%
Programming	2	00%
HRD/Training Coordination	1	00%
Other	36	05%
Professional Interest Areas	N	Percent
Design	512	67%
Building Codes & Standards	422	55%
Computer Aided Practice	411	53%
Practice Management	367	48%
Housing	309	40%
Small Projects	279	36%
Design/Build	276	36%
Documentation Technology	272	35%
Health Care Facilities	272	35%
Interiors	261	34%
Educational Facilities	258	34%
Construction Management	251	33%
Historic Resources	212	28%
Risk Management	206	27%
Regional & Urban Design	172	22%
Religious Art & Architecture	152	20%
Education	134	17%
International	128	17%
Justice Facilities	103	13%
Corporate Architects	99	13%
Public Architects	72	09%

N= number of responses

Table 2 Top Items for Aggregate Respondents

	Mean	S.D.	N
Form A (388 respondents)			
1. Integration of computer technology with existing methods	1.62	1.04	370
2. Develop a marketing program	1.40	1.28	373
3. Create positive name recognition of firm	1.33	1.03	370
4. Assess interior environmental health hazards	1.31	1.03	368
5. Evaluate potential clients in order to reduce risk	1.23	1.00	369
6. Advantages and disadvantages of different delivery methods	1.21	0.96	368
7. Facility management software (CAD or CAFM)	1.20	1.25	363
8. Life cycle cost analysis	1.19	1.10	369
9. Assess information on energy efficient technologies	1.16	0.92	371
10. Manage firm's liability exposure	1.14	1.03	374
11. Identify indoor air contaminant sources	1.13	1.04	370
12. Environmental impact of site decisions	1.07	0.84	372
13. Separating occupancies in a building	1.06	0.97	368
14. Expert knowledge of seismic construction	1.06	1.05	370
15. Determine your clients' expectations	1.05	0.82	367
16. Plan specific health care facility types	1.03	1.04	362
Form B (381 respondents)			
1. Computers for specific architectural purposes	1.70	1.26	361
2. Computer based scheduling and cost control	1.60	1.30	360
3. Work with client expectations on computer technology and delivery	1.34	1.14	359
4. Create positive name recognition for firm	1.21	1.08	357
5. Convey cost effectiveness of environmentally conscious design	1.21	1.09	363
6. Prepare accurate cost estimates	1.18	1.04	363
7. Negotiate contracts	1.15	1.04	365
8. Market services on a limited budget	1.14	1.21	360
9. Make formal presentation to clients and others	1.13	1.02	363
10. Structure fees for various delivery methods	1.12	1.27	356
11. Expert knowledge of interior environmental health hazards	1.11	1.11	360
12. Strategies to gain cooperation of groups	1.10	1.00	352
13. Identify indoor air contaminant sources	1.09	0.98	354
14. Expand your client services	1.09	1.06	358
15. Manage a firm's liability	1.09	1.11	360
16. Identify copyrightable works an architect produces	1.08	1.28	358

Table 3 Lowest Items for Aggregate Respondents

Form A (388 respondents)	Mean	S.D.	N
50. Layout and order systems furniture	0.39	0.87	359
49. Design safe egress routes	0.47	0.86	365
48. Start your own firm	0.51	1.27	358
47. Control systems for correctional facilities	0.52	0.88	359
46. Interior space planning	0.58	0.85	368
45. Significant architectural styles	0.61	0.97	367
44. Design church building	0.62	0.90	369
43. Teaching courses at a university	0.65	1.08	343
42. Builders and developers	0.67	0.92	374
41. School design with learning strategies	0.69	0.94	342
40. Code and safety requirements	0.69	0.75	374
Form B (381 respondents)	Mean	S.D.	N
50. Start your own firm	0.17	1.52	338
49. Design churches	0.32	2.44	357
48. Teach courses at a university	0.37	0.99	337
47. Correctional facility	0.45	0.90	352
46. Cultural traditions	0.61	0.99	361
45. Do interior programming and space planning	0.64	0.87	362
44. Conduct environmental hazard assessments	0.65	0.99	361
43. Fire resistant materials and assemblies	0.65	0.86	362
42. Provide leadership in the profession	0.68	1.04	363
41. Design communities	0.69	1.04	362
40. Construction mgt. and contract admin. services	0.69	1.17	360

Table 4 Ranking of Items by Firm Size and Years of Experience

Form A Ranking of Items	Firm	Firm	Firm	Exp	Exp
Aggregate Group	1-9	10-29	30+	5-19	20+
1. Integration of computer technology with existing methods	1	1	1	1	1
2. Develop a marketing program	2	3	5	2	3
3. Create positive name recognition of firm	4	2	4	3	4
4. Assess interior environmental health hazards	3	5	7	10	2
5. Evaluate potential clients in order to reduce risk	5	8	13	5	6
6. Cost, time, and risk of different delivery methods	12	7	3	7	7
7. Facility management software (CAD or CAFM)	14	4	2	11	5
8. Life cycle cost analysis	6	10	11	4	10
9. Assess information on energy efficient technologies	9	9	8	8	9
10. Manage firm's liability exposure	11	12	20	6	11
11. Identify indoor air contaminant sources	7	14	14	15	8
12. Environmental impact of site decisions	16	17	18	17	12
13. Separating occupancies in a building	15	16	25	13	15
14. Expert knowledge of seismic construction	13	22	26	19	13
15. Determine your clients' expectations	19	13	17	14	16

Form B Ranking of Items	Firm	Firm	Firm	Exp	Exp
Aggregate Group	0-9	10-29	30+	5-19	20+
1. Computers for specific architectural purposes	1	1	2	1	1
2. Computer based scheduling and cost control	2	2	1	2	2
3. Work with computer technology and delivery	3	5	5	13	3
4. Create positive name recognition for firm	4	3	12	7	5
5. Convey cost effectiveness of environmentally conscious design	5	4	11	11	4
6. Prepare accurate cost estimates	7	15	4	4	7
7. Negotiate contracts	9	10	7	3	16
8. Market services on a limited budget	6	6	19	6	12
9. Make formal presentation to clients and others	10	7	10	8	11
10. Structure fees for various delivery methods	15	12	3	16	6
11. Expert knowledge of interior environmental health hazards	12	13	8	15	10
12. Strategies to gain cooperation of groups	11	14	6	18	8
13. Identify indoor air contaminant sources	13	11	13	10	15
14. Expand your client services	14	9	9	14	13
15. Manage a firm's liability	8	8	14	5	18