

LEED Accreditation: A Benefit Analysis

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Leadership in Energy and Environmental Design (LEED) has been integrated into the curriculum of most construction programs. Some of these programs are now contemplating requiring their students to take the LEED Accredited Professional (AP) exam, which has led many of their students to question the benefits of LEED accreditation for the constructor. A literature search revealed that no work has been published on this topic. Therefore, the benefits of LEED accreditation, from both the student and the LEED AP constructor's perspective, have been researched and are discussed in this paper. The results of two surveys, one for the students and another for the LEED AP constructors, show that both groups see LEED accreditation mainly as a career benefit in term of increasing job marketability more so than constructing sustainable buildings.

Keywords: LEED Accreditation, LEED Accredited Professional (AP), Benefits, Constructors, Student Perception

Introduction

Construction programs across the US are integrating Leadership in Energy and Environmental Design (LEED) into their curriculum (Tinker & Burt, 2004). Some of these programs are now contemplating requiring their students to take the LEED Accredited Professional exam. This has led many students to question the wisdom of such a decision. The question most frequently asked by these students is what are the benefits of being a LEED Accredited Professional or LEED AP for the constructor, that is, a construction professional? The purpose of this exploratory study is to answer this question.

Background

The LEED Accreditation exam was launched by the U.S. Green Building Council (USGBC) in 2001. The purpose of the exam is to test one's understanding of green building practices and principles, and LEED requirements, resources and processes. Neither professional experience nor educational qualification is a prerequisite for the exam. However, USGBC (2006) recommends the following qualifications prior to taking the exam:

1. "Tenure in green building and construction industry knowledge.
2. Familiarity with documentation process for LEED certified projects.
3. Knowledge of LEED credit intents, requirements, submittals, technologies and strategies within your discipline.
4. Practical experience working with multiple design disciplines.
5. Understanding of life cycle cost and benefits of LEED.
6. Familiarity with LEED resources and processes."

It is further suggested that interested individuals attend a LEED Training Workshop, review exam study guides, and study the LEED Reference Guide. The cost of the exam is currently \$250 for USGBC members and \$350 for nonmembers (USGBC, 2006). There are approximately 30,000 LEED APs (architects, engineers, planners, public officials, and etc.) worldwide of which less than 500 are constructors. Constructors that have taken the exam and passed it, say that they've spent approximately 40 hours studying and preparing for the exam.

USGBC (2006) states that the benefits of LEED Professional Accreditation for individuals are "valuable and marketable credential for employers, prospective employers, or clients; listing on USGBC web site directory of LEED Accredited Professionals; LEED Accredited Professional certificate; earn a project one point towards LEED Certification; and recognition for involvement in LEED project." The benefits for employers are: "become eligible for projects and owners mandating the participation of a LEED Accredited Professional; strengthens qualifications when responding to RFPs requiring LEED Accredited Professionals; and encourages employees to continue increasing their knowledge and understanding of green building and LEED." The benefits for the building industry are: "encourages and promotes a higher understanding of LEED and supports USGBC's mission of transforming the built environment." Nowhere in the literature is USGBC's claim of benefits, for the constructor, neither substantiated nor disproved. In fact, there is no published work on this topic.

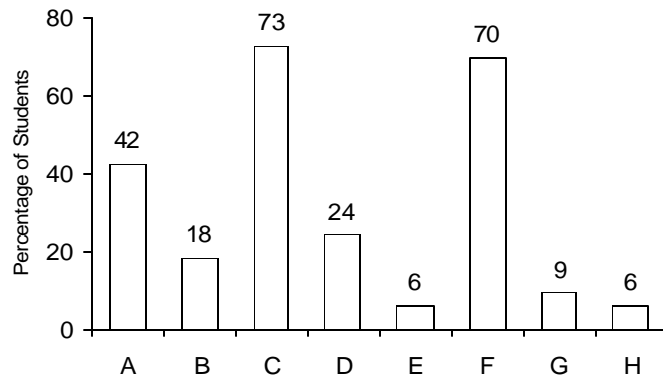
Methodology

This study was conducted in two stages. In the first stage, students attending a LEED training workshop were surveyed to ascertain what they perceive to be the benefits of having LEED accreditation. This workshop, sponsored by USGBC, covered the LEED rating system for new construction. The workshop also served as a test prep course for those students interested in taking the LEED Professional Accreditation exam. In the second stage, practicing LEED AP constructors were surveyed to ascertain the actual or experienced benefits of having a LEED accreditation. The procedure for this research was as follows: a literature search was conducted to gather data on documented benefits of LEED accreditation for constructors. Two survey instruments were then developed and pilot tested: one for students and another for constructors as shown in Appendices A and B, respectively. For the first stage of this research, the participants were the 42 student attendees of the LEED training workshop. The sample frame for the second stage of this research consists of LEED AP constructors listed on USGBC web site directory. The survey instrument was mailed to 150 randomly selected constructors listed in the directory.

Results

The LEED training workshop student survey given to 42 student attendees of the workshop produced a 100% response rate. The first question of the survey asked the students why they were attending the workshop. The student responses were as follows: 9 of the 42 students or 21.4% attended the workshop just to learn about the LEED rating system with no intention of taking the LEED AP exam; another 9 or 21.4% attended just to prepare for the LEED AP exam,

that is, to find out what to expect on the exam; and the remaining 24 students or 57.2% attended the workshop to do both, that is, to learn about the LEED rating system and to prepare for the exam. The second question of the survey asked those students interested in taking the exam to indicate the reasons why. The respondents were given seven choices and asked to mark all that apply which is why the total number of responses is greater than the number of respondents, and why the total percentage of students/responses do not add up to 100%. The results are summarized in Figure 1.



Where:

A= Increase in entry level salary

B= Job promotion

C= Increase job marketability

D= Change/Increase job responsibility

E= Job requirement

F= Prestige/Credibility

G= Other: Help the environment

H= Other: Build better buildings

Figure 1: Students' reasons for taking the LEED AP exam.

To ensure that the difference in the number of responses for each choice is not due to chance, a chi-square test was performed. The null hypothesis is that there is no difference in the number of responses for each choice. The alternate hypothesis is that the difference in the number of responses for each choice is significant. The results are summarized in Table 1.

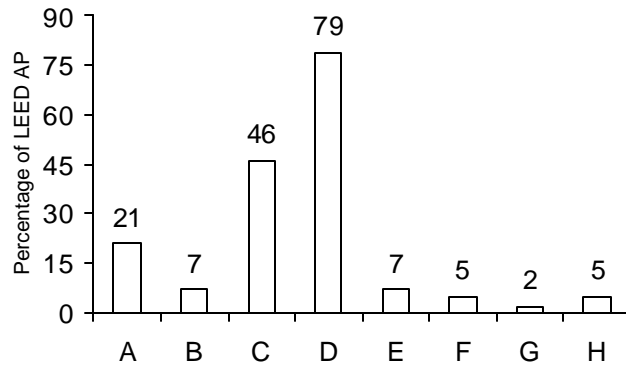
Table 1

Data and statistics for reasons why students take the LEED AP exam

	No. of Responses (O_i)	No. Surveyed (NS)	Percent [NS/231] (P)	Expected Frequencies [P x 82] (E_i)	Chi-Square Test [$O_i - E_i$] ² / E_i
Increase in entry level salary	14	33	14.29	11.71	0.45
Job promotion	6	33	14.29	11.71	2.79
Increase job marketability	24	33	14.29	11.71	12.89
Change/Increase job responsibility	8	33	14.29	11.71	1.18
Job requirement	2	33	14.29	11.71	8.06
Prestige/Credibility	23	33	14.29	11.71	10.87
Other	5	33	14.29	11.71	3.85
Total	82	231	100	82	40.07

The calculated value of chi-square is 40.07. With a level of significance of 0.001 and a number of degrees of freedom of 6, the critical test value is 22.46. Since the calculated value is greater than the critical value, reject the null hypothesis and accept the alternate hypothesis. That is, the distribution of the responses is not due to chance, and thus one can rank the benefits in terms of the number of responses.

For the second stage of this study, 150 survey instruments were sent out to LEED AP constructors of which 56 responded; giving a response rate of 37.3 percent. In the first question of the survey, the respondents were given five choices for becoming a LEED AP. They were asked to mark all that apply, which is why the total number of responses is greater than the number of respondents, and why the total percentage of LEED APs/responses do not add up to 100%. The results are summarized in Figure 2.



where:

A=Job requirement

B=Increase salary/promotion

C=Prestige/Credibility

D=Increase job marketability

E=Other: Interested in sustainability

F=Other: Increase knowledge/explore exotic solutions

G=Other: Exam expenses covered by company

H=Other: Preserve the planet/environment

Figure 2: Constructors' reasons for becoming a LEED AP.

To ensure that the difference in the number of responses for each choice is not due to chance, a chi-square test was performed. The null hypothesis is that there is no difference in the number of responses between the choices and the alternate hypothesis is that there is a significant difference in the number of responses between the choices. The results are summarized in Table 2.

Table 2

Data and statistics for reasons why constructors become a LEED AP

	No. of Responses (O_i)	No. Surveyed (NS)	Percent [NS/280] (P)	Expected Frequencies [P x 97] (E_i)	Chi-Square Test [$O_i - E_i$] ² / E_i
Job requirement	12	56	20	19.4	2.82
Increase salary/promotion	4	56	20	19.4	12.22
Prestige/Credibility	26	56	20	19.4	2.25
Increase job marketability	44	56	20	19.4	31.19
Other	11	56	20	19.4	3.64
Total	97	280	100	97	52.12

The calculated value of chi-square is 52.12. With a level of significance of 0.001 and a number of degrees of freedom of 4, the critical test value is 18.46. Since the calculated value is greater than the critical value, reject the null hypothesis and accept the alternate hypothesis. That is, the distribution of the responses is not due to chance, and thus one can rank the benefits in terms of the number of responses.

The constructors were then asked how much their job responsibility increased by being a LEED AP; 54 out of 56 responded to this question. Of which, 39 or 72.2% said their job responsibility increased between 0 to 10%, 9 or 16.7% said between 11 to 20%, 5 or 9.3% said between 21 to 30%, and one or 1.8% said between 31 to 40 %. Of the 54 respondents, 100% said their job responsibility increased; the average increase being approximately 10%.

The third question of the survey asked the constructors whether or not they received any monetary benefits by obtaining a LEED accreditation. Their responses are summarized in Table 3.

Table 3

Monetary benefits received by constructors for having LEED accreditation

	Yes	No	Total	Comments
Salary increased immediately (%)	4 (7.14)	52 (92.86)	56	3 out of the 4 that said yes, their salary increased by 1 to 2%
Salary will increase in future (%)	10 (18.18)	45 (81.82)	55	6 out of the 10 that said yes will receive some undetermined/ unknown increase; the other 4 said 5-10%, 7%, ~ 10%, and 2-3%, respectively
Bonus / other incentives (%)	3 (5.66)	50 (94.34)	53	Those that said yes, their bonuses are: 1-unknown, 2-company paid continuing education fees, and 3-received a \$150 gift certificate

Question 4 of the survey asked the constructors whether or not they feel promotion will occur at a faster rate by having LEED accreditation; to which 54 responses were received. Of the 54 responses, 30 or 55.6% answered no, 16 or 29.6% answered yes, and 8 or 14.8% answered other. Those that said “other,” feel that there are many variables that determine a promotion; there is no direct correlation between promotion and LEED accreditation.

Question 5 of the survey asked constructors to rate the importance of having LEED accreditation on a scale of 1 to 5. Of the 56 respondents, 5 or 8.9% feel that it is highly important, 40 or 71.4% feel that it is important, 9 or 16.1% were neutral, and 2 or 3.6% feel that it is unimportant.

Discussion

Approximately 79% of the students attending the LEED training workshop did so to prepare for the LEED exam and therefore have an interest in becoming a LEED AP. The purpose of the second question on the student survey was to ascertain what these students perceived to be the benefits of being a LEED AP. The results of the survey revealed that the majority of the

perceived reasons/benefits students saw in having LEED accreditation are monetary benefits. The number one reason or benefit of becoming a LEED AP for students is to increase their job marketability (73%) followed by, in order of most votes, prestige/credibility (70%), increase in entry level salary (42%), change/increase job responsibility (24%), job promotion (18%), help the environment (9%), job requirement (6%), and build better buildings (6%). While 2 out of the 33 students think that LEED accreditation may be required for a job, 14 out of the 33 think that they will get a higher starting salary by having the accreditation and 24 out of the 33 think that having the LEED accreditation will be attractive to potential employers. Only 5 out of the 33 students thought of non-monetary benefits of having LEED accreditation, such as, the environment and sustainability.

The purpose of the first question on the LEED AP survey was to ascertain what constructors believe to be the benefits of LEED accreditation. Job marketability with 79% of the votes is the number one reason why constructors become a LEED AP; followed by, in order of most votes, prestige/credibility (46%), job requirement (21%), increase in salary/promotion (7%), interest in sustainability (7%), increase knowledge/explore exotic solutions (5%), preserve the planet/environment (5%), and solely because their company paid for the exam expenses (2%). The data revealed that the majority of the constructors become a LEED AP for either tangible or intangible monetary career benefits, while only 6 out of the 56 surveyed were also interested in sustainable design and/or construction and in preserving the environment. The respondents agreed unanimously that having LEED accreditation increases job responsibility; the amount of increase is approximately an average of 10%. The percent increase in job responsibility is directly proportional to their position in the company and/or to their job description. When respondents were asked about monetary benefits of being a LEED AP, approximately 93% said there was no immediate increase in salary while 7% received an immediate increase of 1 to 2%. When asked about future increase in salary for being a LEED AP, approximately 82% said they did not expect any; 11% said they expect some unknown increase, while 7% said they expect an increase of 2 to 10%. When asked about bonuses and/or other incentives they received for being a LEED AP, approximately 94% received none while 6% received reimbursement for continuing education courses or gift certificates. When asked if job promotion occurs at a faster rate by having LEED accreditation, approximately 56% said no while 30% said yes. The remaining 15% believe that there is no direct correlation between promotion and LEED accreditation since there are so many variables that affect promotion. When asked to rate the importance of having LEED accreditation, approximately 80% of the respondents feel that it is important while 4% think that it is unimportant and the remaining 16% were neutral.

A comparison of the results for the two stages of this study, that is, student perception of benefits associated with LEED accreditation versus those of LEED AP constructor's, is summarized in Table 4.

Table 4

LEED accreditation benefits: students' perception versus LEED AP constructors' experience

	Percent of Students	Percent of LEED APs	Are they in Agreement?
<i>Career benefits</i>			
Increase job marketability	73	79	Yes
Increase prestige / creditability	70	46	No
Immediate increase in salary	42	7	No
Increase in job responsibility	24	100	No
Increase in job promotion rate	18	30	No
Job requirement	6	21	No
<i>Personal interest in</i>			
Increasing knowledge	21	5	No
Preserving the environment	9	5	No
Sustainable design / construction	6	7	Yes

The LEED APs concur with the students' perception of LEED accreditation as being a marketing tool; the constructors feel that LEED accreditation has qualified them to work on more projects within their company, giving them an advantage over those that are not LEED AP. Students' perception of LEED accreditation increasing their prestige and/or creditability in the construction industry is not in agreement to the same extent as what the LEED AP constructors have experienced. The LEED AP constructors are in disagreement with the students' perception of immediate increase in salary and increase in job promotion rate. The constructors feel that, with LEED accreditation, promotion occurs at a faster rate than an immediate increase in salary. The general consensus among practitioners is that, since there are so many variables that affect promotion and salary increase, it is difficult to attribute either to LEED accreditation. LEED APs unanimously agree that job responsibility increases with LEED accreditation status. LEED AP constructors feel that they take on a more prevalent role in the company since they may be the only one in the company with LEED accreditation. Student perception of LEED accreditation being a job requirement is not as high as what the LEED APs are experiencing. Most public projects are now required to have LEED certification (USGBC, 2006). Thus for the general contractor, the LEED process becomes easier if a LEED AP, who is familiar with the LEED requirements, is on staff during both the preconstruction and construction phase of a project. The students and the practitioners have about the same interest in sustainable design and/or construction. The students have more of an interest in increasing their knowledge of LEED's application and in preserving the environment than the practitioners.

Conclusions

The results of the study show that 73% of the students and 79% of the constructors see having LEED accreditation as a job marketing tool or increasing job marketability. The results of this study further show that 6% of the students and 7% of the constructors are interested in LEED accreditation because they have an interest in sustainable construction. It can thus be concluded that both the students and the LEED AP constructors see LEED accreditation as a career benefit in term of increasing job marketability more so than constructing sustainable buildings.

References

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USGBC, (2006). U.S. Green Building Council website [WWW document]. Retrieved December 20, 2006: <http://www.usgbc.org>

Appendix A LEED Training Workshop Student Survey

Why are you attending this workshop? (Check all that apply)

? Learn about LEED® ? Prepare for LEED® AP exam ? Other (specify): _____

**If you are planning to take the exam, please indicate the reasons why.
(Check all that apply)**

? Increase in Entry level salary.

? Job promotion

? Increase job marketability

? Change / Increase job responsibility

? Job requirement

? Prestige / Credibility

? Other (specify): _____

If you would like to have the summary of the results of the survey, please provide your email address here:

_____.

Appendix B Survey on Benefits of LEED Accredited Professionals

Directions: Please respond to the following questions by checking / marking the appropriate response.

1. Are you a LEED® Accredited professional?

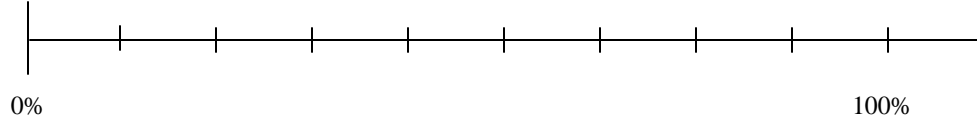
? Yes ? No

If No please proceed to question 5.

If Yes, why did you become a LEED® Accredited Professional (AP)? (Please check all that apply)

- ? Job requirement ? Increased salary/promotion
 ? Prestige/Creditability ? Other: _____
 ? Increase job marketability

2. How much has your job responsibility increased by being a LEED accredited professional? Place an **X** at the appropriate percentage.



3. Did you receive any monetary benefits by obtaining LEED® accreditation (please check all that apply and mark **X** at the appropriate percentage of increase)

- ? Salary increased immediately, by 0%
- ? Salary will increase in future, by 0%
- ? Bonus / other incentives, please specify _____

4. Do you feel that promotion occurs at a faster rate by having LEED® accreditation?

? Yes ? No ? Others, _____

5. Please rate the importance of having LEED® accreditation on a scale of 1 to 5.

(Ranking Scale: 1- Highly Unimportant, 2 – Unimportant, 3 – Neutral, 4 – Important, & 5 – Highly Important)

1 2 3 4 5

6. If you would like a summary of the results of this survey, please provide;

Name (Optional):

Email address:

Fax Number: