

OS&H Internships

What graduates are saying about their experience

By Charles W. McGlothlin Jr.

AS THE 21ST CENTURY OPENS, forward-thinking scholars have suggested a new paradigm for higher education. This model emphasizes developing interdependent collaborations with employers—industries, businesses, public organizations and organized labor groups—to move toward excellence in higher education (Finn; Freeland, et al; Hall; Hutcheson; Itin; NCCE). According to Freeland, et al, “The beginning of the 21st century represents an era of unprecedented opportunities and challenges for co-op institutions in the United States” (17). Social, economic and historic forces are making cooperative education more relevant than ever. “The most exciting aspect of this situation is the new emphasis of cooperation among universities, industry and government, as these institutions break down barriers and forge new alliances that will benefit student, industry, society and the economy” (Freeland, et al 19).

Cooperation between universities and private- and public-sector employers can be achieved through various types of cooperative education programs. Internships are a prime example of these stakeholders working together to provide a high-quality cooperative educational experience to college students. Excellent career opportunities are currently available to students involved in internship programs. Businesses and industries are now emphasizing education and training of the future workforce. Partnerships between institutions of higher education and both public- and private-sector employers abound. These highly interdependent collaborations will likely move education to a new level of excellence in this century (California State University; Equinoa and Shibata; Hall; Northeastern University; NSC; NSEE; University of Cincinnati).

Quality assurance must be maintained within cooperative education work experiences so that credibility with accrediting bodies such as the Accreditation Board for Engineering and Technology (ABET) is upheld (ABET). Research shows that many internship/cooperative work experience programs are

effective. However, a meaningful and satisfactory work experience requires more than merely being physically present at a worksite (Premont; Canale and Duwart; Northeastern University; Page, et al). Thus, it is necessary to identify those elements of the internship experience that contribute most to student learning. In addition, programs that provide internships need to know what jobsite characteristics to consider, plan for and monitor (Canale, et al; Ciofalo; Ferguson; Girard; Kraemer; Wilson).

An assessment of graduate perceptions of the internship experience may provide information needed to develop or revise internship programs at institutions with ABET-accredited occupational safety and health (OS&H) degree programs. In addition, student perceptions of the experiential learning component of their education is an essential part of the ongoing ABET accreditation process, and may provide universities with a support basis for accreditation of their internship program (Canale, et al).

Study Summary

A recent study at Colorado State University assessed the degree to which the OS&H internship experience provided personal, professional and career value (hereafter referred to simply as value) for OS&H graduates; determined which characteristics contributed most to a worthwhile internship experience for those graduates; ascertained the extent to which the participants were satisfied with the accomplishments of specific characteristics

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Table 1

OS&H Internship Experience Attributes*

Rank Order of Importance	Ranked Level of Satisfaction
1) Learning skills from experience	1
2) Interaction with management	6
3) Confidence in technical skills	5
4) Career-related experience	3
5) On-site orientation	13
6) Academic to real-world applications	8
7) Job description	16
8) Challenging assignments	7
9) Working with others	2
10) Development of basic skills	4
11) Take responsibility for actions	9
12) Explore career interests	10
13) Identify strengths and weaknesses	12
14) Future job possibilities	14
15) Compensation benefits	15
16) Contact with faculty coordinator	11
17) Special on-the-job training	17
18) Pre-employment information	18

*Dependent variables, survey questions 15 to 32 and 33 to 50. $n = 193$.
Note: 1 = highest ranked, most importance and most satisfaction.

related to the experience; and identified those demographic and internship characteristics that contributed most to overall satisfaction with the internship experience. This study replicated a 1992 study conducted at Murray State University by Dr. David G. Kraemer and expanded that study per its recommendations for future research.

Fourteen research questions identified to address the purpose of this study were explored using an ex-post facto (nonexperimental) survey questionnaire research design. The questionnaire was analyzed primarily in the quantitative domain using descriptive, comparative, associative and complex associative research analytical approaches to answer the 13 quantitative research questions; constant comparative analysis was used to address the one qualitative research question. The questionnaire consisted of 62 quantitative questions developed to gather demographic and internship data and responses regarding perceptions relative to the OS&H internship experience. A Likert-type rating scale indicated the degree to which respondents agreed or disagreed with statements in the questionnaire.

The survey also collected qualitative data via five open-ended questions that allowed respondents to address issues relative to value, satisfaction and key characteristics that may not have been reflected in the quantitative areas of the questionnaire. Analysis of this data provided significant understanding of graduate perceptions regarding the internship experience.

The variables selected for this study consisted of 14 attribute independent (predictor) variables and five dependent (criterion) variables designed to address the perceived value of and satisfaction with the OS&H internship experience. The independent

variables were identified in Part I—Demographic Data and Internship Information—on the survey; the five dependent variables were measured on several summated five-point Likert-type scale questions in Part II. The dependent variables were considered to be scale data for analytical purposes. The validity and reliability of the research instrument used was established through a literature review and the empirical research results of the original Kraemer study coupled with the current findings.

Descriptive statistics analyzed the general univariate pattern of the data. Descriptive statistics—frequencies, percentages, ranges, means and standard deviations—were calculated to analyze the demographic and internship information responses. The Pearson product moment correlation coefficient measured the strength and direction of relationship between variables. Analysis of variance (ANOVA) and Fisher LSD post-hoc test examined the differences between the independent variables and mean value and mean satisfaction scores. Multiple linear regression determined the relationship between the various predictor and criterion

variables. Open-ended questions with associated narrative responses were analyzed in the qualitative research domain using constant comparative analysis. (For definitions of these statistical terms, see the sidebar on pg. 43.)

Research Findings

The 193 study participants were recent graduates (1997 to 2001) of the five universities that offer ABET-accredited OS&H degree programs: Indiana University of Pennsylvania, Marshall University, Millersville University, Murray State University and West Virginia University. The population was typically a 25.13-year-old, single white male who completed his first internship while receiving a bachelor's degree. The typical internship sites were manufacturing, other sites (university, pulp and paper, trucking, utilities and healthcare) and government agencies. Two-thirds of the interns had responsibility as safety generalists. The geographical locations of the internship sites were evenly distributed over urban, rural and suburban areas. The number of employees at the sites varied widely—from five to more than 10,000—with a mean of 1,199 employees. The interns' salary level ranged from zero to \$38 per hour, with a mean salary of \$10.12 per hour. Of the 193 respondents, 73 were offered full-time employment following the internship; of these, 48 (65.8 percent) accepted the offer.

Data analysis indicated that the mean-summed value score was 4.11 (SD 0.93) on the five-point Likert-type scale (with 1 = strongly disagree and 5 = strongly agree). Of the 193 respondents, 149 (77.2 percent) rated the internship a 4 or 5, indicating moderate to strong agreement that it provided value.

Key Statistical Terms

ANOVA: A statistical method that uses the sums of the squares of the deviations from the means to test the differences among two or more groups. The simplest case ANOVA compares the variability between groups to variability within groups.

Confidence Interval: A range of values within which there is a predetermined probability (95 percent) that the population parameters may fall.

Cronbach Alpha: A method to determine internal consistency for measures with several items with ordered responses that will be summed to make a composite scale with the Internship Survey Questionnaire.

Dependent Variable: The dependent variable is the presumed outcome or criterion. It is assumed to measure or assess the effect of the independent variable.

Descriptive Statistics: Procedures for summarizing, organizing, graphing and describing quantitative information. Often contrasted with inferential statistics, which are used to make inferences about a population based on information about a sample drawn from that population.

Independent Variable: The presumed cause in a study. Also a variable that can be used to predict the values of another variable.

Inferential Statistics: Statistics that allow one to draw conclusions or inferences from data. Usually this means coming to conclusions about a population on the basis of data that describe a sample.

Likert-Type Rating Scale: Individual items whose responses indicate the degree of agreement: usually strongly agree, agree, neutral, disagree, strongly disagree.

Multiple Regression: A complex associational statistic used to predict a normally distributed outcome of dependent variable from several normally distributed or dichotomous independent prediction variables.

Pearson Product Moment Correlation: Degree of linear relationship or association between two variables that are normally distributed and meet other assumptions. The correlation may be positive, negative or zero. The correlation coefficient is numbered between -1.0 and +1.0 that express the strength and direction of the relationship.

Post Hoc Test: A post hoc test is a necessary final test in many analyses. When an overall statistic is identified as being significant (ANOVA), a post hoc test (Fisher LSD) helps identify where the significance occurs.

Qualitative Data: Subjective observations that are difficult to score or classify. Such data are typically collected through open-ended interviews, observations and documents.

Quantitative Data: Observations of phenomenon, attributes or behavior that can be numerically scored, rated or scaled.

Questionnaire: A general term for a data collection technique in which respondents answer a series of questions in writing. The types of responses requested varies from multiple choice to open-ended.

Significance Level ($p = 0.05$): The probability of committing a type I error. The probability of rejecting a true null hypothesis.

Standard Deviation (SD): A measure of the variance or spread of scores around the mean within a distribution.

t-Test: A common parametric statistic that compares two separate groups by computing the ratio of the variance between groups to the variation within groups to determine whether a significant difference exists between the means of the two groups.

Source: Gliner, J. and G. Morgan. Research Methods in Applied Settings.

Through a literature review, Kraemer identified 18 key attributes necessary for an effective internship experience; these were affirmed in this study. Nearly 89 percent indicated that each attribute was somewhat to very important to the internship experience, with a mean importance score of 4.31 (SD 0.91) on the five-point Likert-type scale. The 10 attributes with the highest levels of perceived importance were:

- learning skills from experience = 4.63 (SD 0.75);
- interacting with management = 4.58 (SD 0.75);
- gaining confidence in technical skills = 4.50 (SD 0.71);
- obtaining career-related experience (for resume-building) = 4.46 (SD 0.79);
- receiving on-site orientation = 4.45 (SD 0.83);
- applying academic knowledge and skills to real situations = 4.44 (SD 0.77);
- having a well-defined job description = 4.39 (SD 0.90);
- performing challenging work assignments = 4.39 (SD 0.76);
- working cooperatively with others = 4.39 (SD 0.83);
- using and developing basic skills = 4.39 (SD 0.87).

The mean-summed satisfaction score for these 18 attributes was 3.85 (SD 1.02), which reflects that participants were neither satisfied nor dissatisfied to somewhat satisfied with the internship experience. Eight of the 10 most important internship attributes were also among the 10 highest-ranked attributes in satisfaction with the experience. The top-ranked attribute—learning skills from experience—was also ranked the number-one most satisfying characteristic. The other seven of these top 10 important attributes, also among the top 10 most satisfying attributes, were: interacting with management, gaining confidence in technical skills, career-related experience for resume-building, applying academic knowledge and skills to real situations, performing challenging work assignments, working cooperatively with others and developing basic skills. It should also be noted that two of the 10 most important attributes received low mean scores on the satisfaction scale:

- Receiving on-site orientation ranked number five as an important internship attribute, but ranked 13 of 18 on the mean satisfaction scale.
- Having a well-defined job description ranked seventh in importance, but ranked sixteenth on the satisfaction scale (Table 1).

An independent t-test demonstrated that the internship experience was significantly more important to female than to male interns. Additional independent sample t-tests were calculated to determine whether other differences existed between female and male interns. None were significant relative to internship salary, undergraduate GPA or the perceived degree to which the internship provided value.

An ANOVA was calculated on the dependent variable—value—and the internship independent variable—primary duties. The four job duty classifications—environmental health and safety, industrial hygiene, safety generalist and other—were com-

pared on the central tendency of the independent variable, perceived value of the internship experience. The ANOVA verified that no significant difference existed between any of the means of the various job classifications and the value and the internship.

An ANOVA with multiple comparisons test was calculated on the dependent variable—value—and the independent variable—internship site industry. A significant difference was found between the per-

Survey Excerpt: Part I

Demographic Data & Intern Information

- 1) Gender
 Female Male
- 2) Race
 American Indian
 Asian
 Black/African American
 Caucasian (white)
 Hispanic
 Other (please specify) _____
- 3) Degree received in occupational safety and health was
 B.S. (Bachelor of Science) year
 M.S. (Master of Science) year
- 4) Overall grade point average was

<u>B.S.</u>		<u>M.S.</u>
<input type="checkbox"/> 3.5 - 4.00		<input type="checkbox"/>
<input type="checkbox"/> 3.0 - 3.49		<input type="checkbox"/>
<input type="checkbox"/> 2.5 - 2.99		<input type="checkbox"/>
<input type="checkbox"/> 2.0 - 2.49		<input type="checkbox"/>
<input type="checkbox"/> other		<input type="checkbox"/>
- 5) Age at completion of your internship
 years
- 6) Marital status at time of your first internship
 married
 single (never married)
 other (please specify) _____
- 7) Semester and year when internship was performed
 Fall year
 Spring year
 Summer year
- 8) Classification at the completion of your first internship
 Sophomore Junior
 Senior Graduate
- 9) Type of site where internship was performed
 Chemical/petrochemical industry
 Construction industry
 Consulting firm
 Food industry
 Government agency
 Insurance industry
 Manufacturing industry
 Mining industry
 Other (please specify) _____
- 10) Your primary area of responsibility (duties) during your first internship was (pick just one).
 Environmental health and safety
 Industrial hygiene
 Safety generalist
 Other (please specify) _____
- 11) Geographical location of primary site location was
 rural suburban
 urban other (please specify) _____
- 12) Approximate number of total employees at your primary internship facility _____
- 13) Salary compensation for your first internship
 per hour
- 14) Within three months after graduation, did you receive a full-time job offer from your first internship organization?
 No Yes
 If yes, did you accept the offer?
 No Yes

ceived value of the experience and the various work-sites. The difference between the means of the chemical/petrochemical classification—4.25 (SD 0.529) and the service industries—3.79 (SD 0.789)—was statistically different at the $p = 0.05$ level. The second significant difference at that level was found between the means of construction/mining sites—4.25 (SD 0.606)—and the service industries—3.79 (SD 0.789). These results indicate that chemical, construction and mining sites are preferred to service industry sites (consulting, food and insurance industries).

As noted, interns worked at sites with a wide range of number of employees (five to more than 10,000) with a mean of 1,199 employees. Most (67.4 percent) worked for large companies (250+ employees). The Pearson product moment correlation coefficient determined the magnitude and relationship between number of employees at the worksite and the perceived degree to which the experience provided value. This correlation study showed no statistically significant relationship between these two factors.

Multiple linear regression analysis determined whether more than one independent variable at a time provided additional information to predict the value of the experience better than any one independent variable alone. The purpose of this analysis was to predict a scale-level dependent variable—value—from a combination of several scale and dichotomous independent or predictor variables—gender, GPA, age, number of employees, intern salary and full-time job offer. However, only one independent variable—intern salary—was statistically significant in predicting the value of the internship experience.

Multiple linear regression analysis was also applied to determine whether a combination of scale and dichotomous independent variables predicted the perceived degree of satisfaction with the internship experience better than any one independent variable alone. This regression analysis was performed to predict a scale-level dependent variable—satisfaction with the experience—from a combination of several scale and dichotomous independent or predictor variables—gender, GPA, age, number of employees, intern salary and full-time job offer. Again, only one independent variable—intern salary—was statistically significant in predicting satisfaction.

As a result of qualitative analysis, the definition of a core category that represents the central phenomenon or main theme emerged: Students must assume personal responsibility for selecting and preparing for the internship experience, and ensure that job duties, learning outcomes, employment benefits, responsibilities of stakeholders and assessment of learning are clearly established in order to provide an opportunity to apply classroom learning to real situations and ensure value of and satisfaction with the OS&H internship experience.

Comparison with Kraemer's Study

Results of this study were compared with those of Kraemer's 1992 study. The research sample in that study consisted of students who had received a bachelor's and master's degree between 1978 and

Survey Excerpt: Part II

Graduate Internship Perceptions

A) How important do you feel the following attributes are to a worthwhile occupational safety and health internship program?

- 15) Receiving pre-employment information (brochures, videos)
- 16) Obtaining compensation benefits (salary, housing, etc.)
- 17) Having a well-defined job description
- 18) Receiving on-site orientation
- 19) Interacting with management
- 20) Having contact with faculty coordinator
- 21) Receiving special training (computers, leadership)
- 22) Using and developing basic skills (writing, speaking, people skills)
- 23) Gaining confidence in technical skills
- 24) Identifying personal strengths and weaknesses
- 25) Exploring career interests
- 26) Obtaining career-related experience for resume building
- 27) Obtaining contacts for future job possibilities
- 28) Obtaining ability to take responsibility, acknowledge consequences of actions
- 29) Applying academic knowledge and skills to real situations
- 30) Learning skills from experience (to observe, ask questions, synthesize)
- 31) Working cooperatively with others
- 32) Performing challenging work assignments

B) How satisfied were you with the following attributes of your internship? (If you had more than one internship, then use your first internship to answer this question.)

- 33) Receiving pre-employment informa-

- tion (brochures, videos)
- 34) Obtaining compensation benefits (salary, housing, etc.)
- 35) Having a well-defined job description
- 36) Receiving on-site orientation
- 37) Interacting with management
- 38) Having contact with faculty coordinator
- 39) Receiving special training (computers, leadership)
- 40) Using and developing basic skills (writing, speaking, people skills)
- 41) Gaining confidence in technical skills
- 42) Identifying personal strengths and weaknesses
- 43) Exploring career interests
- 44) Obtaining career-related experience for resume building
- 45) Obtaining contacts for future job possibilities
- 46) Obtaining ability to take responsibility, acknowledge consequences of actions
- 47) Applying academic knowledge and skills to real situations
- 48) Learning skills from experience (to observe, ask questions, synthesize)
- 49) Working cooperatively with others
- 50) Performing challenging work assignments

C) Please [indicate] the one answer that best indicates the extent to which you agree or disagree with each of the following statements regarding your perceptions of the internship experience.

- 51) My internship experience clearly indicated how important basic communication (speaking and writing) skills are to success in the profession.
- 52) Through internship work experience, I was able to identify some of my personal strengths and weaknesses.
- 53) The internship helped me better

understand myself, my interests and my goals.

54) During the internship placement, I was able to further develop my personal qualities of cooperation, courtesy and work attitudes.

55) Classes related to my area of study became more relevant after completing my internship experience.

56) My internship experience was a positive educational experience.

57) The job experience I received while in the internship program enabled me to gain confidence in my technical skills.

58) My internship experience increased my awareness of the importance of human relations in a work environment.

59) My internship experience enabled me to improve my problem-solving ability.

60) My internship provided career-related experience for resume development.

61) The work experience I received while on internship placement better prepared me to make a career choice after graduation.

62) The work experience received while on internship placement enabled me to obtain contacts for future job possibilities.

D) Please respond to the following questions.

63) What did you like best about your internship experience?

64) What did you like least about your internship/co-op experience?

65) What would you do differently about your internship experience if given the choice to do it over?

Before:

During:

After:

66) What three key insights would you share with an occupational safety and health student who is pursuing an internship experience?

Additional comments:

1991 from Murray State University's OS&H program and who had completed at least one internship experience. Although Murray State offers an ABET-accredited OS&H program, Kraemer's first recommendation for future research was to conduct a study of a larger population of interns from ABET-accredited schools to allow for more generalizability of the research findings. The current study satisfied that recommendation by including all five ABET-accredited universities. Each institution saw value in the current research and agreed to participate.

The typical intern in Kraemer's study was 24.33 years old, white (93.6 percent), male (78 percent) and single (80.3 percent) who had completed his first internship while earning a bachelor's degree. Respondents to the current study had a similar profile—25.13 year old, white (95.8 percent), male (79.2 percent) and single (80.6 percent) who completed his internship as an undergraduate.

In both studies, the typical internship sites were manufacturing, other sites, government and chemical; more than half of the interns worked as generalists. The average per-hour salary was \$8.14 in the

Kraemer study and \$10.12 in the current study. However, when the 1992 average is adjusted for inflation based on the Consumer Price Index, that value becomes \$10.16 in 2001 (see www.westegg.com/inflation). Of the 173 participants in Kraemer's study, 57 (32.9 percent) received job offers from their internship employer following graduation. Of the 193 participants in the current study, 73 (38 percent) received such offers.

In the current study, the mean score for perceived value of the internship experience was 4.11 (SD 0.93) compared to a finding of 4.27 (SD 2.44) on this same scale in the Kraemer study. In both studies, these scores indicate that participants moderately to strongly agreed that the internship provided value.

Each of the 18 identified internship attributes were rated in both studies as somewhat important to very important, with a mean score of 4.31 (SD 0.91) in the current study and a mean score of 4.51 (SD 0.79) in the Kraemer study. Nine of the top 10 most important internship attributes were the same in both studies as well. Although ranked somewhat differently within the top 10 most important attrib-

Part A scale: 1) Very unimportant; 2) Somewhat unimportant; 3) Neither important nor unimportant; 4) Somewhat important; 5) Very important.

Part B scale: 1) Very dissatisfied; 2) Somewhat dissatisfied; 3) Neither satisfied nor dissatisfied; 4) Somewhat satisfied; 5) Very satisfied.

Part C scale: 1) Strongly disagree; 2) Moderately disagree; 3) Neither agree nor disagree; 4) Moderately agree; 5) Strongly agree.

To ensure a valuable learning experience, students must assume personal responsibility for selecting and preparing for the internship.

utes, two of the top three highest-ranked attributes in both studies were “learning skills from experience” and “gaining confidence in technical skills.”

The mean-summed score for satisfaction with the important attributes of the internship experience was lower than the value and importance scores in both studies, with a mean of 3.85 (SD 1.02) in the current study and 3.96 (SD 0.60) in the Kraemer study. These scores indicate that participants were neither satisfied nor dissatisfied to somewhat satisfied with the experience.

Furthermore, the current study expanded the original study by evaluating the satisfaction levels with each of the top 10 most important internship attributes. Eight of these 10 attributes were also among the 10 highest-ranked attributes in satisfaction with the internship experience. As noted, however, two of them received low mean scores on the satisfaction scale, which accounted for the lower overall mean average for satisfaction.

In both studies, significant positive correlations were found between salary earned and value scores, and between salary earned and satisfaction scores. A significant difference was found at the $p < 0.05$ level between perceived value of the internship experience and the various internship sites in both studies as well. The difference between the chemical classification and service industries, and that between construction/mining sites and the service industries were statistically different in the current study. In Kraemer, chemical, manufacturing and other sites were statistically significantly different and preferred over service industry sites. In combined studies results, chemical, manufacturing, other, construction and mining industries were clearly preferred over service industry sites.

In addition, the current study was expanded to look for differences between female and male interns relative to perceived importance of the experience, salary and undergraduate GPA and the perceived degree to which the internship provided value. An independent t-test demonstrated that the experience was significantly more important to females than to males. No other differences between the genders were statistically significant on the perceived degree to which the internship provided value.

Multiple linear regression analysis was applied in both studies to determine whether more than one independent variable at a time provides additional information to predict the perceived value of or satisfaction with the internship experience better than any one independent variable alone. In both studies, only one independent variable—intern salary—made a statistically significant contribution above that of the other variables in combination to predicting the value of or satisfaction with the experience.

Kraemer also recommended that qualitative studies be conducted to assess the strengths and weaknesses of the OS&H internship program. This study did so, expanding the qualitative analysis of the questionnaire data through a constant comparative analysis technique. This analysis provided a rich source of information on strengths and weaknesses

that did not surface from quantitative analysis of questionnaire data in either study. The major constructs that emerged were:

1) Students must assume responsibility for researching the internship hosting company, job position duties, reporting responsibilities, compensation, site location and type of industry to determine how these characteristics align with the students’ personal interests and professional development needs.

2) Students must prepare for the assignment by researching and acquiring knowledge of a site’s SH&E-related issues and applicable regulations.

3) Responsibilities for all internship stakeholders—student, employer and university—must be clearly defined to maximize learning outcomes. A well-defined job description, clearly stated learning objectives, effective communications responsibilities and definition of the assessment process were key to student satisfaction and success.

4) Students must assume responsibility for accomplishing their learning outcomes through the internship experience by pursuing increasingly more responsible job assignments; taking advantage of opportunities to interact with management, employees and the community; and interacting with site and faculty internship coordinators to ensure that learning objectives are being met.

5) The internship experience was valuable in providing the opportunity to apply classroom learning to real situations; developing basic communications and people skills; determining career direction and employment opportunities; learning new technical skills; and building resume-quality experience.

6) The internship was a satisfying experience when the intern was involved with management, staff and employees while performing career-related, challenging work assignments.

7) Students were dissatisfied with the experience when important characteristics of the internship were lacking or did not meet personal and/or professional development needs. Key dissatisfactions included inadequate compensation (salary, housing, travel reimbursement); lack of internship organization, orientation and well-defined job duties; lack of interaction with site and faculty internship coordinators; personally disruptive work locations; performing non-career-related and nonchallenging work assignments; lack of assigned jobsite responsibility; and limited opportunity to work with others at the site.

The core category that represented the main theme around which these constructs were integrated emerged as follows: Students must assume personal responsibility for selecting and preparing for the internship experience, and ensure that job duties, learning outcomes, employment benefits, responsibilities of all stakeholders, and assessment of learning are clearly established to provide an opportunity to apply classroom learning to real-life situations and ensure value of and satisfaction with the OS&H internship experience.

The consistency of results between the current study and the Kraemer study indicate that the original results are representative of the larger population of all five ABET-accredited OS&H degree programs. These results also indicate that the Kraemer Internship Survey Questionnaire, which was modified for this study, is a reliable instrument to determine value of and satisfaction with important attributes of an ABET-accredited OS&H internship experience.

Discussion & Conclusions

Study results were used to assess graduate perceptions of the internship experience; determine which attributes contributed most to a worthwhile experience; and identify those demographic and internship characteristics that contributed most to the satisfaction with the experience. These results reflect only the perceptions of graduates from ABET-accredited OS&H degree programs and may not be representative of interns from non-ABET-accredited OS&H programs or interns in other engineering or healthcare-related degree programs. However, these results and conclusions may be of interest to college or university programs considering ABET accreditation for a degree program in OS&H or other engineering or healthcare-related areas.

Reliability & Future Use of the Instrument

The results from the current study and Kraemer's study results are very similar, with no significant variances. The number of participants was comparable—173 and 193—and both used a research sample of graduates from ABET-accredited OS&H degree programs who had completed at least one internship. Reliability of the survey questionnaire instrument developed by Kraemer and used in this study was affirmed by a Kraemer pilot study, the Kraemer survey results and the current survey results. In each measure of reliability, the Cronbach alphas were high (Gliner and Morgan) for each of the summed scales from the survey questionnaire designed to measure value of the internship; importance of internship attributes; and satisfaction with these attributes. These results indicate a high level of item correlation and good internal consistency of the survey instrument.

This high level of internal consistency, coupled with verified reproducibility of research results from this study, indicates that the Kraemer Internship Survey Questionnaire is a reliable instrument to determine value of and satisfaction with OS&H internship experience and to identify key attributes that contribute to the strength or weakness of an ABET-accredited OS&H internship experience. Therefore, it is concluded that ongoing administration of the questionnaire to students completing an OS&H internship should provide colleges and universities a means to evaluate the experience; assess learning outcomes; and improve the process to the benefit of students, employers and the university. In addition, administration of the survey to participants in ABET-accredited OS&H degree programs should provide strong evidence of the level of learn-

ing and the value of the experiential learning component required in ABET's outcomes-based accreditation process.

Based on research at the University of Cincinnati and Northeastern University (Canale, et al), it is concluded that additional evidence of the learning outcomes of an ABET-accredited OS&H internship experience could be provided by ongoing, concurrent administration of the survey research instrument developed by Cheryl Cates at the University of Cincinnati (personal communication, May 28, 2002). This tool is providing the University of Cincinnati and Northeastern University with evidence of student development of the ABET-required attributes that support ABET outcomes-based accreditation at these institutions. (One note: To use the Cincinnati instrument in an ABET-accredited OS&H program, one must modify it to reflect the attributes of a safety-related graduate rather than those of an engineering graduate.)

Internship Value & Satisfaction

Survey participants were in strong agreement that the internship experience provided value to their educational experience, with many commenting that it was the most valuable and most important part of their undergraduate education. They found that the internship provided the opportunity to apply classroom learning to real situations, and helped them develop basic communications and people skills, determine career direction and employment opportunities, learn new technical skills and gain resume-quality experience.

Both quantitative and qualitative results indicate that the internship experience was of great value to these respondents—with one caveat. The level of satisfaction with selected important internship characteristics or attributes was not as high as the value score, which indicated that interns were neither satisfied nor dissatisfied to somewhat satisfied with these important attributes. However, as noted, two of the top 10 most important attributes were ranked very low on the satisfaction scale. Without these two low scores, the mean satisfaction score would have indicated the interns were somewhat to very satisfied with the top 10 most important attributes of the internship experience.

In addition, both of these attributes should have been addressed in the preparation phase—before the work phase of the internship began. Based on both the quantitative and the qualitative findings, it is clear that university preparation of students for an internship is, in some cases, lacking and that some students are not assuming personal responsibility for this learning opportunity.

These findings also indicate that some intern employers are not providing a quality learning experience. The ultimate responsibility for this failing lies with the institution of higher education. For the internship to be an effective outcomes-based learning experience, the responsibilities for all stakeholders—students, employer and university—must be clearly defined by the institution and must clearly

Poor structure and poorly defined learning objectives may contribute to dissatisfaction with the internship experience.

address the key attributes of the internship and established learning outcomes.

Although a statistically significant positive quantitative correlation was found between intern salary and perceived value of and satisfaction with the internship, the qualitative results suggest that low intern compensation (salary, travel reimbursement, housing, bonuses, other benefits) has a clear relationship to both perceived low value of and satisfaction with the internship; however, it should also be noted that acceptable to high compensation does not necessarily have a positive effect on the perceived value and satisfaction ratings. These qualitative results indicate that when the perceived value and satisfaction are high, other key attributes—such as involvement with management and other employees while performing challenging work assignments—were the reasons for the high levels of value and satisfaction.

Of the 188 participants in the current study who responded to salary-related survey questions, 34 (18.1 percent) received no salary during their internship and another three (1.6 percent) received less than minimum wage. It is reasonable to assume that these interns are the same 19.7 percent who were very dissatisfied to neither satisfied nor dissatisfied with their internship compensation. Nothing in the qualitative findings indicates that these low earning levels were offset by any other form of compensation. Therefore, it is concluded that low compensation was directly related to low levels of value and satisfaction and that high levels of compensation were not necessarily related to high levels of value and satisfaction.

Internship site location also had a positive correlation with both perceived value of and satisfaction with the internship experience. Again, the qualitative analysis provided insight regarding why statistically significant quantitative differences existed between manufacturing, other sites, government and chemical sites when compared to service industry sites. It appears from both the qualitative analysis and Kraemer's conclusions relative to similar findings that lower average salary, longer working hours and travel times, lack of structure, poorly defined job duties, limited opportunities to work with others, and performing less-challenging work at service industry sites may account for the lower levels of value and satisfaction.

It is reasonable to conclude that a lack of student research into job duties as they relate to personal and professional development interests and needs, lack of internship structure, poorly defined stakeholder responsibilities and the lack of well-defined learning objectives may have been the root cause of dissatisfaction with these sites.

Other Key Internship Attributes

The questionnaire identified 18 important characteristics or attributes for a successful internship experience. This study focused on the attributes that the sample population perceived as being most important and those providing greatest satisfaction or dissatis-

faction. With the exception of two (receiving on-site orientation and having a well-defined job description), the most important attributes were also the most satisfying attributes in the top 10 of each category.

Several attributes were ranked lower in terms of importance and satisfaction. These eight attributes had a mean importance score of 4.11 (SD 0.97), which indicates that respondents perceived them to be somewhat to very important. It is important to note that seven of these eight attributes should be addressed in the preparation phase of the internship; these are taking responsibility, exploring career interests, identifying personal strengths and weaknesses, compensation benefits, contact with faculty coordinator, special training required and pre-employment information. The corresponding low satisfaction scores related to these eight attributes indicate a need for attention to the preparation phase of the internship experience.

Based on these findings, it is reasonable to conclude that the university preparation of students for internships is lacking and that some students are not assuming personal responsibility for researching and understanding key internship attributes before reporting to their sites. Furthermore, this lack of research into job duties as they relate to personal/professional interests and needs, a lack of internship structure and poorly defined stakeholder responsibilities may explain the dissatisfaction associated with internship attributes; these issues could effectively be addressed in the preparation stage.

Recommendations for Stakeholders Students

These recommendations are based on the current and Kraemer findings, conclusions drawn based on these findings, and research support found in the literature. The literature supports the statement that the internship experience has significant advantages for all stakeholders (NCCE). The primary purpose of an internship is to bridge the gap between an intern's classroom education and the actual workplace (ASSE; Ferguson). The following recommendations for students will help make this transition effective:

1) Take personal responsibility for researching, selecting, preparing for, participating in and learning from this important educational component of an ABET-accredited OS&H curriculum.

2) Insist on a well-defined job description, clearly stated learning objectives, defined communications and reporting responsibilities, availability of an on-site SH&E professional mentor, and understanding of the evaluation and assessment of the learning process.

3) Make sure compensation and employment benefits are acceptable from a personal standpoint.

4) Assume responsibility for defining and accomplishing detailed experiential learning objectives that align with the educational outcomes expected of a graduate from an ABET-accredited OS&H program. Do not assume that it is the faculty or internship site coordinator's responsibility to ensure an effective, outcomes-based learning experience.

5) Prepare for the internship by acquiring knowledge about site- and industry-specific SH&E-related issues and reviewing relevant regulations.

6) Get involved. Seek and accept higher levels of complexity in work assignments and take advantage of opportunities to interact with management and employees at all levels.

Employers

ASSE, National Safety Council and the Board of Certified Safety Professionals have all recognized that the SH&E profession must attract individuals with the education necessary to compete and work effectively in the field. This challenge can best be met by colleges and universities that offer ABET-accredited OS&H degrees. A required and critical part of those accredited degrees is the experiential learning component.

Employers must understand the crucial role they play in partnering with accredited colleges and universities to ensure a high-quality educational experience that will meet the projected future demand for qualified SH&E professionals. These recommendations will help employers meet this responsibility.

1) Partner with colleges and universities that offer ABET-accredited OS&H degree programs to support the development and implementation of high-quality internships.

2) Recognize the important attributes that characterize a worthwhile experience. Addressing each will not only ensure a valuable learning experience for the intern, but will also produce an intern able to complete challenging work assignments with direct benefit to the employer.

3) Recognize the ABET-established attributes of a graduate from an ABET-accredited degree program and work with the college/university to incorporate the learning outcomes necessary to support development of those attributes during the internship.

4) Review the findings of this study and recognize the importance of the key internship attributes that are directly related to the intern employer and the internship site coordinator. These include learning and gaining confidence in safety-related skills from experience; compensation (salary, housing, travel reimbursement, other employment benefits); interaction with management and all levels of employees; on-site orientation; well-defined job description; variety of challenging safety-related work assignments; and working with an on-site SH&E mentor.

5) Actively participate with the faculty internship coordinator and the intern in his/her ongoing reflection on the work experience as it relates to classroom learning, and participate in the evaluation and assessment of the intern's learning progress.

6) Become an active participant with the college or university internship coordinator in reflecting on the internship experience and recommending ways to improve the learning experience and to ensure a valuable benefit to the employer.

7) Develop long-term partnerships with those colleges or universities that offer accredited OS&H degrees in order to research site- or industry-specific SH&E issues; this could provide ongoing intern

and faculty involvement and increase the body of knowledge relative to these issues for the benefit of both employer and industry.

Institutions

The following recommendations for ABET-accredited OS&H degree programs—or those considering accreditation—should help to make the required experiential learning/internship component more effective.

1) Adopt and implement an internship model that incorporates the recommendations of the National Commission for Cooperative Education, and key experiential learning components of two leaders in cooperative education, Northeastern University and the University of Cincinnati; and satisfies ASSE guidelines for an academic internship program in OS&H (ASSE).

2) Make students and intern employers working partners in developing learning outcomes that meet the students' personal/professional/career needs and the ABET-established outcomes, thereby ensuring a high-quality internship that provides value and satisfaction.

3) Recognize the attributes identified by Kraemer and ABET as necessary for a worthwhile internship experience when developing learning objectives that will ensure value and satisfaction with the experience and support development of the ABET-established attributes.

4) Work with internship stakeholders to establish clear duties and responsibilities for student interns, internship site coordinators and faculty coordinators to ensure an effective outcomes-based learning experience.

5) Diligently select internship sites using ASSE's site selection guidelines; assume ultimate responsibility for any employers that fail to provide a suitable educational experience and take appropriate corrective action.

6) Examine the results of this study and initiate appropriate changes in the OS&H internship to ensure perceived value of and satisfaction with this important education component.

Recommendations for Future Research

The following recommendations for future research are based on the current research findings and conclusions supported by research findings from the literature review that supported this research. Qualitative data gathered suggest that significant differences may exist in the internship experience at the various universities that participated in this study. Therefore, a similar study of the same five programs should be conducted, with the survey questionnaire modified to allow for identification of each respondent's university; this will allow researchers to determine whether significant differences exist between the various universities' with respect to interns' perceptions of value of or perceived satisfaction with the internship experience.

In addition, the survey instrument should be administered to a sample population immediately

following the internship experience, not to one spread over several years as was done in both this study and the original Kraemer study. To compare findings, quantitative and qualitative methodologies similar to those used in these first two studies should be used.

The second recommendation is to conduct a similar study using the questionnaire with graduates of one or more non-ABET-accredited OS&H degree programs; this will enable the researchers to determine whether a significant difference exists between the two types of programs. Again, similar quantitative and qualitative methodologies should be used to allow a comparison of findings.

The final recommendation for future research is to conduct a qualitative research case study (Creswell) at one or more of the five participating universities to develop a greater in-depth understanding of those internship characteristics that contribute to student development through experiential learning than may have occurred through the primarily quantitative approach used in the current study.

Conclusion

The Kraemer-developed questionnaire, as modified for this study, provides a statistically reliable means to evaluate graduate perceptions regarding the value of and satisfaction with key attributes of an OS&H internship and to identify those attributes that contribute to or detract from an ABET-accredited OS&H internship experience. Used in conjunction with the research instrument developed by University of Cincinnati, it could provide considerable insight into experiential learning outcomes as they relate to ABET's outcomes-based accreditation criteria.

Learning outcomes of every aspect of today's educational experience is the focus of both public- and private-sector educational stakeholders. Although the current findings may be particularly helpful to the SH&E profession, they may also serve as a framework for examining perceptions of internship experiences for the health education professions, as well as other career and technical education fields. Ongoing survey research of student/recent graduate perceptions of the value of and satisfaction with their educational experiences will continue to play an important role in the assessment of an outcomes-based education. ■

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