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EMPIRICALL y ASSESSING STUDENTS' PERCEPTIONS OF THE IMPORTANCE OF STUDENT CHARACTERISTICS

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ABSTRACT

After at least four years of college, do students seeking entry-Ievel IS employment realize that employers consider many variables when making the hiring decision? Many employers look at GPA, but other variables, such as the business skills, ability to work with others, energy, drive, and enthusiasm, and analytical skills, are also important. This study empirically assesses students' perceptions of the importance of seven student characteristics in the hiring process. Subjects included 51 undergraduate and 28 graduate students. The methodology employs analysis that facilitates the examination of all seven characteristics simultaneously. Results show that the two most important variables were communication skills and the ability to work with others. While all seven variables were important, students perceived GPA to be the least important of the seven. Demographic variables such as gender and major had no effect on the results.

Keywords: IS Education, **IS** Hiring, Conjoint Analysis

I. INRODUCTION

As teachers, professors undoubtedly place heavy emphasis upon grades. Students grasp and extend this importance throughout their college years. Yet, when students near graduation and begin searching for jobs, they need to realize that, while grades are important, other characteristics will be scrutinized. Employers simply will not be satisfied with "good grades" alone. Students planning successful careers in Information Systems (IS) must possess many diverse skills. This study empirically assesses the importance that students believe IS employers place on seven student characteristics when they make hiring decisions.

2. BACKGROUND

Areas other than IS have often assessed the needs of their students. These assessments often identify needs for additional IS knowledge. For example, Boyer and McKe11 (1996) specifically examined the IS needs of *business management* students. But what about the needs of IS majors? Certainly they, too, need more than "good grades" in order to establish strong, successful careers. Cougar (1988) noted that students

need more than just IS skills to be successful. These needs have been accumulated and broadly translated into a *Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems* (1997). Other authors have also tried to determine which specific needs are important for CIS majors, and how important they are.

Van Slyke et al (1998) note that only minimal research has been conducted in examining the entry-Ievel skill requirements necessary for IS majors. They note that non-technical skills may be just as important as technical skills. They then evaluate the importance of IS skills vis-a.vis general skills and business skills. They found that, congruent with other research, general skills and business skills are more important than specific technical skills. This comes as no surprise, especially when one considers how quickly the needs for specific technical skills change. Jain and Paul (1998) emphasize these changes in skill requirements for IS professionals. They note that, regardless of their educational and work backgrounds, virtually all IS professionals need to retool. Indeed, IS faculty have long realized that IS students should be carefully counseled so as to properly design their study programs (Reich, 1996).

Most recently, Doke and Williams (1999) examined the perceived importance of 43 knowledge and skill items. Their task was to determine whether the 43 items are important, and then evaluate their relative importance. These determinations focus upon how importance varies across job classifications. Doke and Williams also noted that the most important skills tend to be organization skills, such as group dynamics and communication skills. The authors provide important exploratory results, but further research is necessary. Doke and Williams pinpointed each of the 43 items, one at a time, for subjects. Employers do not evaluate these skills one at a time. They evaluate them .'all at once"; they are bundled together in the form of an entry-Ievel job candidate. Further, the design of such exploratory research allows Doke and Williams to determine whether some of these items, examined "one-at-a-time," are more important than others, but they are limited in that they cannot ascertain which ones are important. Indeed, all 43 items might be important when hiring decisions are made.

The purpose of this research is to detennine whether students understand the perceived importance of such items. Do students understand that variables beyond grades may playa strong role in detennining whether they get the jobs they want? Much research asserts that variables beyond GPA are important, but GPA is still perceived as very important. Research in the accounting discipline (Baker and McGregor, 2000) has shown that accounting students perceive GP A and

energy, drive, and enthusiasm is the most important elements in obtaining entry-Ievel jobs. lain and Paul (1998) and Doke and Williams (1999) identified five other variables as being perceived as important for job success. We used the following seven characteristics (or variables), as obtained in the previous research, in this study: (1) Grade Point Average (GPA); (2) Technical Competence; (3) Communication Skills; (4) Energy, Drive, & Enthusiasm; (5) Business Skills; (6) Ability to Work With Others; and (7) Analytical Skills. These seven variables were used to form our research questions.

3. RESEARCH QUESTIONS

The following research question served as a beginning point for the analysis:

(RQ l) Do students perceive that any of these seven characteristics are important to employers who hire IS students?

This question is designed to detennine whether educators have convinced students that at least one of the seven characteristics is important. Further, this question is used to detennine whether the students who participated in the study took the research task seriously. Certainly, at least one of the seven characteristics would be important to employers who are making hiring decisions. If so, the following (more relevant) question arises:

(RQ2) Do students perceive that some characteristics are more important than other characteristics to employers who hire IS students?

The purpose of this question is to detennine which characteristics are important, and whether some characteristics are more important than others. Answers to this question can provide strong benefits to educators. If some variables are perceived to be more important, perhaps they should receive more attention in the students' education. Further, if students perceive that some variables are unimportant, yet they prove to be important in the hiring process, educators might decide to spend time, in advising and in the classroom, emphasizing their real importance.

(RQ3) Does the relative importance of the characteristics of IS students vary across demographic variables?

A priori, no differences in responses due to demographic variables would be expected. If such differences are found, educators may decide to spend extra time with particular groups, or at least examine their current approaches to pedagogy. If the differences are due to timing (e.g., juniors versus

seniors), educators may want to adjust the timing of their advising sessions.

4. **METHODOLOGY**

In this section, the methods used to address the research questions are presented and discussed. The subjects and the design are described. Then, the experimental task is outlined. Finally, the approach to answering the research questions is delineated.

Subjects Subjects, all of whom volunteered to participate in the research, were from a University in the Southern United States. They were enrolled in one of two courses: (1) an upper-division undergraduate course in IS, or (2) a graduate course in IS. Students in the undergraduate course were all juniors or seniors. Most of the students in the undergraduate course, Systems Analysis and Design, were IS majors. The graduate course was a Management Information Systems course designed for MBA students. Fifty-one students from the undergraduate course participated. Twenty-nine students from the graduate course participated; the responses of one of the graduate students were eliminated because they were incomplete. Thus, analyses are performed on the responses of 51 undergraduate students and 28 graduate students. All students were instructed to play the role of an employer of IS students. Table I shows the demographic variables for the subjects in this study.

TABLE! DEMOGRAPmC V **ARIABLES FOR SUBJECTS**

	Juniors	Seniors	Master's	Total
Male	15	10		25
Female	206			26
	13	15		28
	48	31		79

Note: Thirty-eight of the 51 undergraduate students were IS majors.

Research Design All seven variables were assessed using three levels: (I) below average, (2) average, and (3) above average. For GPA, it was determined that the terms below average, average, and above average might not possess external validity. Therefore, numerical ranges were used for GPA. The below-average range was 2.50- 2.99. For average GPA, the range was 3.00-3.49. The above-average range was 3.50-4.00.

Hypothetical student descriptions (cards) were created by varying these characteristics on the variables. A **full**

replication of the seven characteristics would have necessitated the creation of 2, 187 cards (31. Instead, an orthogonal array was developed for the seven student characteristics that required only 18 cards (Addelman). The correlations between the characteristics in the array are all zero, so that the effects of the characteristics can be examined without full replication.

Th§.k
Subjects were initially instructed to divide the 18 cards, each card describing one hypothetical student in tenns of the student characteristics, into better and worse students. Then, each subject was asked to rank the hypothetical students from 1 (most desirable) to 18 (least desirable) as potential employees. Each card had a two-digit student number, which the subject could write next to the appropriate rank.

Conioint Analysis ADDroach The responses for the 18 cards were examined using conjoint analysis (Green, 1997; Green and Srinivasan, 1978; Green and Wind, 1975). Conjoint analysis develops measures of utility that represent the importance of the various levels of the independent variables. The analysis was performed using ordinary least squares regression (Green & Helsen, 1989; lain et al, 1979). The regression was designed such that the seven characteristics were independent variables and the responses were dependent variables (see the Appendix). The beta coefficients derived from the regression model are measures of utility .

The characteristics were coded beginning with the levels of the characteristics that were perceived to be least desirable. *A priori*, the least desirable level for **all** seven characteristics was the "below-average" level. Thus, the below-average levels served as the base for coding the orthogonal array. Each of the characteristics was coded using two variables to represent the three levels: "below average", "average", and "above average". "Below average" was coded with zeroes for both dummy variables. "Average" was coded with a one for the first dummy variable and a zero for the second dummy variable. " Above average" was coded using a zero for the first dummy variable and a one for the second variable. Thus, the regression was coded such that, for each non-base level of each characteristic, a one was present if the level was present, and a zero was present otherwise. Thus, conjoints (beta coefficients) were derived for each level of each characteristic. They measure the utility of any particular level relative to the base (below average) level. Utility was not measured for the base *(a priori*, below-average) level. Base levels are essentially starting points from which utility can be measured.

The non-base levels of each characteristic will have a measure of utility, and the sum of these represents a total measure of utility for the seven characteristics. The measures for some levels will contribute more to this total utility than others. Heuristically, if one level contributes more to total utility than another level, that level was more imRortant than the other level. Further, if the conjoint was negative, then the level is less important than the base level. Thus conjoints provided measures of importance. There were fourteen conjoints in this study. Conjoint analysis can be applied to a group of persons, or even to a single individual, depending upon whose utility is to be measured.

In this study, the utility of the seven characteristics was examined. Regression results showing a model that was significant overall would imply that *at least one* of the levels of the seven characteristics was important to the students. Then, individual coefficients can be examined to determine *which* variables were important. These measures of importance can be compared to each other. Analyses are also conducted, using MANOV A, to determine the effects of various demographic variables on the subjects' rankings of the hypothetical students used in the study.

5. **RESULTS**

RQl considers students' perceptions of the importance of each of the seven characteristics. The results of the conjoint analysis are reported in Table 2. All of the conjoints are significantly greater than zero (with p- values < .0001). Therefore, all of the characteristics provide utility at both the average and above-average levels. While playing the role of employer, students perceived each of the characteristics as important, and they used all levels of all seven characteristics when deciding which students they would prefer to hire.

In conjunction with RQ2, some characteristics are more important to students than others. Even though GPAs varied from 2.50 to 4.00, students believe that each of the six remaining variables is more important than GP A. They evidently understand that, while grades are important, other skills and traits are more important when considering employment. The average level conjoints for all of the six remaining variables are greater than the above average conjoint for GPA. The most important of the remaining variables is "Ability to Work with Others." Conjoints for average and above-average levels of "Ability to Work with Others" are more than twice as large as the corresponding conjoints for GP A. Students also recognize the importance of "Communication Skills"; it is the second-most important variable. Students even realize that average communication skills are essential.

While the above average conjoint for " Ability to Work with Others" is higher than that for "Communication Skills," the average conjoint for "Communication Skills" is higher than any other average conjoint. Students also believe that "Energy, Drive, and Enthusiasm" is very important. Each of the remaining variables, "Technical Competence," "Business Skills," and "Analytical Skills," is about one-and-one-half times as important as GP A. Notice, too, that students perceived" Analytical Skills" to be slightly more important than "Technical Competence" or "Business Skills."

RQ3 addresses various demographic variables and their effects on the conjoints. The demographic variables considered are Gender, Class Status (Junior, Senior, or Postgraduate), and (for the undergraduate students), Major (IS or Non-IS). Demographic data for the 79 students are summarized in Table 2. MANOV As are used to assess the impact of these variables. None of the demographic variables affected the conjoints (p-values all > 0.6).

6. CONCLUSIONS

Students perceived that grades (GPAs) are important to employers who are hiring entry-Ievel IS students. Students also perceived that the remaining six characteristics are important. Students perceived "Ability to Work with Others" and "Communication Skills" to be the most important variables, followed by "Energy, Drive, and Enthusiasm." Three additional variables, (I) "Analytical Skills," (2) "Business Skills," and (3) "Technical Competence," are perceived to be somewhat equal in importance. It should be noted that **all** six of these variables are perceived as more important than GPA. Data were examined for influence due to class status, major, and gender, but these variables had no effect on the results.

These findings indicate that students do perceive that grades are important, and that other variables may be even more important for students seeking IS employment. We recognize that this study concentrated on students from a single university. While this may limit the study, it does not negate their results. We are attempting to replicate the study at other universities. Additional research is necessary to answer several important questions. Are the perceptions of employers congruent with those of students? Do IS faculty have similar perceptions? Can these measures of importance be used to establish advising priorities and changes in curricula? Answers to these questions are important elements of understanding precisely which characteristics are important for graduates entering the IS workplace.

TABLE 2 CONJOINTS (MEASURES OF IMPORTANCE) Variable Conjoint

Grade Point Average (GPA): Average (3.00-3.49)
Above Average (3.50-4.00)

Technical Competence: Average
Above Average

1.0759 2.1983

2.3587 3.0105

Communication Skills: Average
Above Average
Energy, Drive, & **Enthusiasm:** Average
Above Average

3.7173 **4.8544**

3.1646 4.1920

Business Skills: Average
Above Average

2.4283 3.0169

Ability to Work With Others: Average
Above Average

3.5970 5.0127

Analytical Skills: Average
Above Average

2.6498 3.8017

Note: All of these conjoints are significantly (p- values all < 0.0001) greater than zero; i.e., these levels are all significantly more important than
the corresponding below-average levels.

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APPENDIX CONJOINT ANAL YSIS MODEL

Rank = **ao** + **aldl** + **a2d2** + **a3d3** + **a4d4** + **a5d5** + **a6d6** + **a7d7** + **a8d8** + **a9d9** + **alodlo** + **alldll** + **a12d12** + **a13d13** + **a14d14** + a **where**

Rank = the dependent variable, as affected by the characteristic levels and there conjoints.

dl = 1 if student **has average GPA and** O **otherwise**

d2 = 1 **if student has above-average GP** A **and** O **otherwise**

dJ = I **if student has average technical competence and** O **otherwise**

~ = 1 **if student has above-average technical competence and** O **otherwise**

ds = I **if student has average communication skills and** O **otherwise**

~ = I **if student has above-average communication skills and** O **otherwise**

d7 = 1 **if student has average energy, drive,** & **enthusiasm and** O **otherwise**

d8 = 1 **if student has above-average energy, drive,** & **enthusiasm and** O **otherwise**

d9 = I **if student has average business skills and** O **otherwise**

d1O = I **if student has above-average business skills and** O **otherwise**

d II = I **if student has average ability to work with others and** O **otherwise**

dl2 = I **if student has above-average ability to work with others and** O **otherwise**

dlJ = I if student **has average analytical skills and** O **otherwise**

dl4 = I **if student had above-average analytical skills and** O **otherwise**

a = **unexplained error**

~ = a **parameter that adjusts the remainder of the model to the ranking scheme**

a; = **the jth parameter (where** i= I **-13, a; is the conjoint corresponding to the "jth" variable above).**

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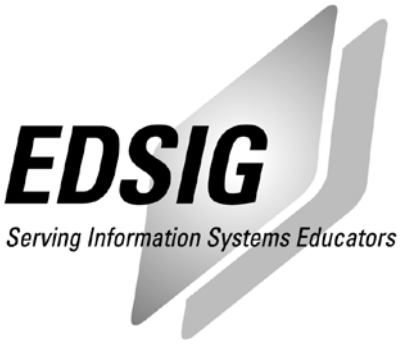

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