HFES Members' and Students' Career Influences: A Survey

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ABSTRACT

Surveys were sent to 150 members and 150 student affiliates of HFES asking how they first learned about the field and what or who was the major influence in choosing their career. Approximately half learned about it as undergraduates and about a third as graduate students, usually from a professor. About a third learned about it during work or internship. The survey also asked respondents to indicate what examples they would use to represent the field to a naïve listener. Most freqnently cited examples included applications in human-computer interaction, aviation/space, ground transportation, and the workplace.

INTRODUCTION

What influences people to go into human factors/ergonomics as a career field? This question is of particular interest to the Human Factors and Ergonomics Society (HFES). The society obviously wishes to attract the most talented people possible into the field and to ensure that those who might be interested in the field have an early enough exposure to make appropriate career decisions. One way to answer the question posed is to ask people currently working or preparing to work in this field how they decided on their career. We did just that by means of a questionnaire to the members of HFES. In addition to asking about demographic information, we asked how they first learned about the field and what or who was the major influence in their career selection. In addition, we also asked how they would go about creating interest in a person unfamiliar with the field; what they would tell this person about specific application areas or research in the field.

The *Human Factors and Ergonomic Society Directory and Yearbook* lists information about fellows, members, associate members, and student and nonstudent affiliates. For purposes of our survey we were interested in sampling people who have made a commitment to Human Factors/ Ergonomics (HF/E) as their primary occupation. Therefore, we did not include associate members or nonstudent affiliates. In addition we wanted to include a sample who recently made a career decision to enter the field. Thus we chose to include student affiliates as half of the sample. In addition, because the directory lists not only mailing addresses but also FAX numbers and e-mail addresses for most entries, it offers an interesting option to compare response rates for these various modes of questionnaire administration. This comparison was made and is reported elsewhere in these proceedings (Wogalter, Yarbrough, & Martin, 2000).

METHOD

Participants

Surveys were sent to 300 people listed in the *Directory*. All were U.S. residents. Half were chosen from the listings for Members or Fellows and half from the Student Affiliate listings.

The Survey

The one-page survey included a cover letter explaining its purpose and instructions about options for its return. The survey form included a demographic section asking about: sex; age; occupational status; for students, years enrolled, highest degree sought, and field; for nonstudents, years since degree, type of degree, and field, and years as a member of HFES. The three critical questions asked were:

(1) How did you first learn about the area of HF/E?

(2) What or who was the major influence in your choosing the field of HF/E as a career?

(3) If you were talking to a person unfamiliar with HF/E, and you wanted to excite or interest them in the field, what specific applications area and/or research would you tell them about?

RESULTS

Response Rates

Of the 300 surveys distributed, 109 were returned by the deadline for an overall response rate of 36.3%. Of the respondents returning questionnaires, 35 indicated they were students. Because 150 surveys were

sent to student affiliates the apparent response rate was 23%. Seventy-two questionnaires listed an occupation for an apparent response rate of 48%. However, it should be noted that when surveys are sent or returned electronically it is not possible to code them in the usual way. We used different orders of three questions so that we could determine the original mode of delivery. But, we have no way of verifying how many of the questionnaires originally sent to student affiliates were returned indicating an occupation. Eight questionnaires listing an occupation indicated one year or less since receipt of degree. At least some of these were likely originally sent to student affiliates. Thus, the response rate of 23% for students is probably artificially low because some students had become employed since their listing. It is also possible that the response rate was lower for student affiliates because the contact information listed in the *Directory* is less reliable for students so some may have failed to receive the survey.

Demographic Data

Of the 109 questionnaires returned, 65 indicated the respondent was male and 44 female. The percentage of women is higher than the percentage in the Society but the disparity may reflect the fact that half of the sample was students and a larger proportion of students are women. Age of respondent ranged from 21 to 78 with a mean of 42.9 and a median of 41. Again this figure is probably lower than the average for the society due to the larger number of students; 26 respondents were under 29. The mean years since joining the society was 11.3 with a median of 9. Most of the 29 respondents who had been in the society three or few years were probably students.

Of the student respondents 1 was an undergraduate and 34 were graduate students. The graduate students had been in their programs for a mean of 4.4 years. It is notable that 15 had been students for 5 or more years.Students in human factors/ergonomics apparently take longer than the historically expected 4 years to complete their degrees. Internships, part-time work, and applied research experience probably accounts for some of this extended time.

The frequencies of occupations identified by the respondents are shown in Table 1. It is notable given the early history of human factors in the government that only 11% of the current respondents are employed there. It is also striking that many of those listing their occupation as consultant were relatively early in their careers. Perhaps the old model of people working in industry or government for several decades before striking out on their own is less true today.

Of respondents indicating a degree held or sought, 65% indicated a doctoral degree, 28% a masters, and 7% a baccalaureate. The degree was in psychology for 59% of the respondents, in engineering for 28%, and in some other field for 13%. This latter category contained both people whose training was in a non-HF/E area (e.g. MBA, education) but who had retrained in HF/E and those in a specialty of the HF/E field (e.g. design, computer science). For those indicating an occupation, the mean years since degree was 18; the median was 17.

How They Learned About the Field

We asked two questions relevant to choosing human factors/ergonomics as a career: "How did you first learn about the area of HF/E?" and "What or who was the major influence in your choosing the field of HF/E as a career?" There was considerable redundancy in the answers to these two questions. In many cases respondents answered the second question by referring to their answer to the first. For this reason the answers were combined and classified as if they were a single answer. The answers were put into four general categories with sub-categories under some of these. The four categories were: as an undergraduate student, as a graduate student, on the job, and other. Of the 108 usable responses, 50 respondents or 46% said they had learned about the field in some way during undergraduate school. In 37 cases they learned about it during a course or from a professor. The courses mentioned included introductory psychology, experimental psychology, industrial psychology, cognitive psychology, industrial engineering, and human factors. Many of the descriptions read as if the respondent had experienced an epiphany; they knew immediately that human factors/ergonomics was for them. In some cases the encouragement came from a professor and in some cases just the exposure to a book chapter or a description of research was enough for this conversion to take place.

In eight cases the respondent learned about the field during undergraduate school from an acquaintance, a

Table 1. Frequencies of occupation categories reported by respondents

Occupations	*f*
Industry	20
Consultant/Contractor	18
Faculty	15
Government	8
Non-profit & Non-faculty university employee	5
Retired	5
Home Maker	1

family member, fellow student, friend, in-law, roommate, or wife. In five cases the respondent had an internship or research experience that was influential.

A total of 35 respondents or 32% said they learned about the field during graduate school. Again in the majority of cases, 28, their exposure was during a course or from a professor. In seven cases they learned about the field during an internship or research experience. Many of the respondents reporting that they learned about the field during graduate school also indicated that one or two professors had had a profound influence on their choosing to enter the field. In many of these cases the professor apparently provided a professional model for the student.

Seventeen respondents or 16% said they learned about the field while on the job. These cases seemed to be split between those who had been trained in some other academic field and then learned about the field through their work and those whose formal education preceded the establishment of human factors/ergonomics as a field. Several of those in the former situation are members of the society but do not identify themselves as being primarily human factors/ergonomics specialists. Among those in the latter situation are pioneers in the field who helped establish the terms human factors and ergonomics and founded the society.

In 6 cases respondents discovered the field in some other way. Two said they personally did some research and discovered it. One discovered it through career counseling and an interest inventory. One discovered it while reading a *Proceedings*, one through an ANSI standard, and a faculty member discovered it by teaching the subject in a course.

Table 2. Frequencies of application/research area categories reported by respondents

f	*Application/Research Area*
25	Human-Comp. Interaction/Web
17	Aviation and Space
12	Auto, Driving, and Highways
10	Workplace and Industrial
8	Consumer Product Design
6	Aging
6	Biomechanics
5	Medical
3	Virtual Reality
2	Safety
1	Workload
1	Fly in the Urinal

Conveying the Excitement of the Field

The final question on the survey was, "If you were talking to a person unfamiliar with HF/E, and you wanted to excite or interest them in the field, what specific application area and/or research would you tell them about? Be brief (but as specific as possible) in your description." The answers were wide ranging, but we attempted to put them into categories. Three respondents gave no answer leaving 106 surveys with an answer of some sort. Even though they were asked for a specific application, 19 respondents instead gave a general description of human factors/ergonomics. Many of these said that they would emphasize the breadth of the field. Six respondents did not cite a specific example but indicated that they would tailor their presentation to the interests of the individual they were talking to. Nine respondents cited so many examples it would have distorted the data to include them all.

For respondents who cited one or two specific applications/research or at least an area of application we classified responses by area as shown in Table 2 in decreasing order of frequency:

Perhaps not surprising given the number of members or student affiliates employed or training to be employed in the computer industry, the largest number of respondents cited an example or at least the general problems involved in computer applications including both hardware and software. In many cases the problems associated with the Internet were mentioned. One of the more detailed and interesting responses was the following:

> "Mankind is on the verge of a quantum evolutionary leap. The current limitations of human beings (e.g., memory, vigilance) is being supported in a complementary fashion by computers aud networking. As computers become wearable and networking becomes instantaneous with high bandwidth, each human being may literally know all that is known. But the interface between these complementary computers and creative and sometimes unpredictable human beings presents incredibly challenging issues. It is an undiscovered country and research and advances in this area could greatly accelerate or decelerate the process. Be part of the next evolutionary revolution."

Human-computer interaction was also probably mentioned frequently because respondents realize that most people now have some familiarity with computers and the Internet and would likely understand the problems involved in this environment.

The area of aviation/space is, of course, one of the historically most important application areas of human factors. It is an area that comes readily to mind for those who are familiar with the history of the field. It is also a high visibility area in that aircraft accidents receive such wide media coverage. Examples from the

third most frequently cited category, ground transportation, have an advantage in that every person has some experience with vehicles and highways and should be able to relate to the problems involved. In addition, with recent advancements such as global positioning it is possible to put a technological spin on this topic.

The most unusual and humorous example cited by a respondent was, "Lately I've been telling lawyers about Martin Helander's experiment in Sweden where a fly was painted on the middle of a urinal and this reduced the amount of splatter on the floor by about 65%."

RECOMMENDATIONS

Based on responses to the survey the authors offer several recommendations to members of HFES:

(1) Given that most members initially found out about the field in undergraduate school, efforts should be made to provide information and materials to professors and students. As we have previously suggested (Martin & Wogalter, 1997), information could be provided to textbook authors to encourage the inclusion of HF/E in their textbooks. Web sites could also be used to provide information and even course instruction to undergraduate students

(2) Universities and industries could be encouraged to provide a wider variety of research and internship experiences for undergraduate students. Survey results suggest that such experiences were influential in the choice of career field.

(3) HFES could collect and distribute short vignettes containing examples that would interest undergraduate students. These could be shortened versions of success stories such as those collected by Hal Hendrick (1996) and disasters such as those detailed in Steve Casey's book *Set Phasers on Stun*.

(4) Finally, armed with various examples members would be well advised to heed the advice of one respondent and tailor the example to the person and the environment. People like to hear about things they are already interested in. Even if we are unsuccessful in making a career convert, we might at least be successful at promoting the field.

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