Placement Opportunities for Human Factors Engineering and Ergonomics Professionals:
Part I: Industry, Government/Military and Consulting Positions

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During the period from November 1994 through October 1995, the Placement Service of the Human Factors and Ergonomics Society distributed announcements describing 159 positions available for human factors engineers and ergonomics professionals. These announcements were divided into two groups according to employment sector and position type. This paper describes industry, government and consulting positions (N=129), while its sequel describes academic and internship positions (N=30). The features of the position descriptions examined include: degree requirements, major field of study, areas of expertise, required work experience, salary, geographic location, job description and skills required. The masters degree was specified as the minimum requirement for most positions. The most frequently specified fields of study were human factors, psychology and engineering. The most frequently cited area of expertise was human computer interaction, while the most frequently cited primary responsibility was interface design.

During the period from November 1994 through October 1995, the Placement Service of the Human Factors and Ergonomics Society (HFES) received announcements describing 159 positions available for human factors and ergonomics (HF&E) professionals. This paper describes industry, government and consulting positions, while its sequel (Moroney, Sottile & Blinn, 1996) describes academic and internship positions.

In order to announce a position, employers completed a "Job Listing" form, provided by the HFES Placement Service. The employer provided information on a variety of factors including: degree requirements, major field of study, areas of expertise, required work experience, geographic location, job description, employment sector and skills required. The analysis of these data is the basis of this article. Please note that this analysis is not a complete listing of all the positions available to HF&E professionals. Related positions are also listed with other professional placement services.

Overview of the Positions

The analysis revealed that most of the positions were available in industry, consulting, and government/military (see Figure 1). Positions in industry, consulting, and
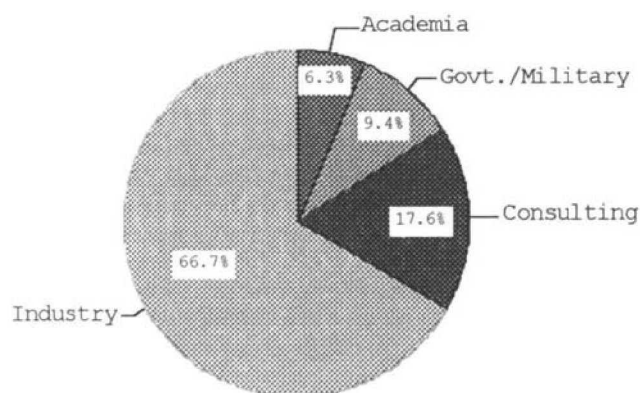

Figure 1: 159 Placement Opportunities Described by Employment Sector.

government/military comprised 93.7% of the 159 positions announced by the HFES Placement Service. Of these positions, 87.4% were full time and 12.6% were internships. The remaining positions were full-time academic positions. No requests for expert witnesses were placed through the Placement Service.

An analysis of the degree requirements revealed that most of the 159 positions specified a masters degree as

the minimum requirement, with a bachelor degree running a close second (see Figure 2). However, eleven of these bachelor positions were internships. Fifty-four of the 159 full-time positions were available for individuals with a bachelors degree.
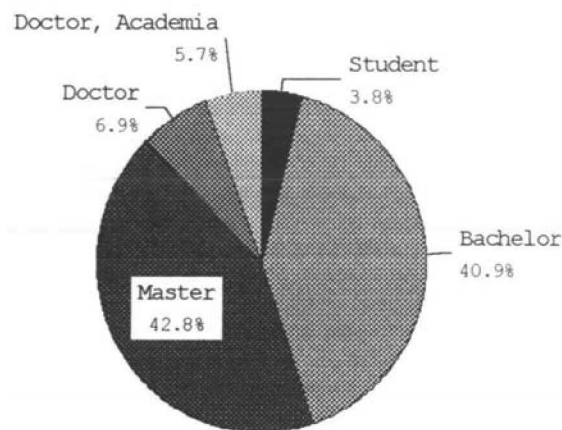

Figure 2: Minimum Degree Requirement for 159 Positions and Internships.

Additionally, it should be noted that several of the positions indicating a bachelors as a minimum degree requirement actually described an individual with a higher degree. As shown in Figure 2, twenty doctoral positions were announced; 9 in academia and 11 in industry, consulting, and government/military. Twenty internships

were also announced. The category "students" was required to include the six internships for students either currently working towards their bachelor degree or for those who have completed their bachelor degree. The remaining internships were included in Figure 2 according to the appropriate degree level.

Because of the diversity of the data, and the expected interest of the readers, the industry, consulting, and government/military positions (N=129) were examined independently of the twenty internships and ten academic positions (See Moroney, Sottile & Blinn, 1996).

Employment Sector

The 129 positions discussed in the remaining portion of this paper were categorized into three employment sectors; industry (66.6%), government/military (10.8%), or consulting (22.4%). The 86 industry positions were further classified according to type of industries (see Figure 3). Most (28.9%) of the positions were in the software industry. As might be expected, many positions were also available in the telecommunications industry. The descriptions of twelve positions were too ambiguous to classify into a specific industry and thus comprise the category "undetermined". Railroad, defense, oil/gas and ergonomic services each represented less than five percent of the total and were not shown in Figure 3. The nature of work in the consulting and government/military sectors is so amorphous that this type of analysis could not be applied to those data.
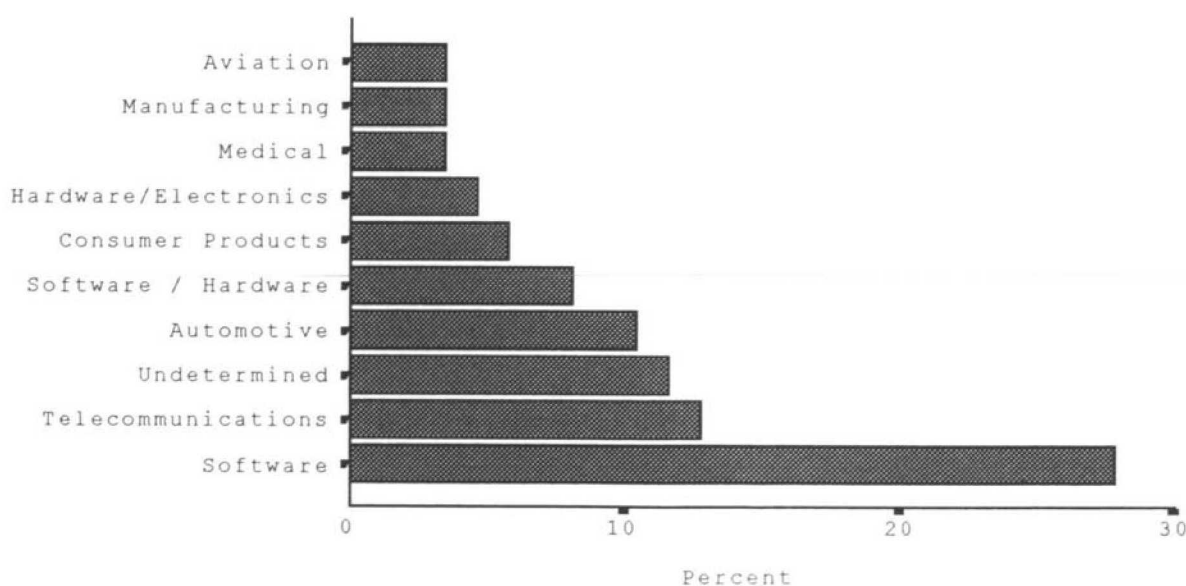

Figure 3: 86 Placement Opportunities in the Industrial Sector By Type of Industry.

Minimum Degree and Minimum Years Experience

With respect to the minimum degree requirements, master and bachelor degrees were requested for 91.5% of these positions, with the master degree being specified for almost half of the 129 positions. Table 1 provides a more detailed description, broken into type of degree by employment sector. The consulting sector, with 29 positions, requires the most experience at the doctoral level (range 3-7 years). Industry had one doctoral position available for an ergonomist, while the four doctoral positions available in the government/military sector were for "fresh-outs" with some experience (range 0-4 years).

Salary & Geographical Location

Ninety percent of the employers described the salary range as negotiable. The salaries specified ranged from $26,000 to $90,000. The median salary range was $43,000 to $55,000. Readers interested in salary are best advised to consult the salary survey conducted by Sanders (1993).

The highest concentration of positions were available in the Northeast (N=21). Thirty-two of the positions were evenly divided between California and the East Central region. Only three positions were located in New England and four in the Midwest. Of the international positions, five were in Canada, one was in Venezuela, and one was in the Netherlands. The remaining positions were evenly distributed throughout other regions in the United States .

Table 1. Minimum years experience needed for employment sector and degree.

SECTOR	DEGREE REQUESTED Number of Positions	MINIMUM YRS. OF EXPERIENCE Median
Industry N=86	Bachelor (38) Master (47) Doctor (1)	2.0 2.0 0.0
Consulting N=29	Bachelor (12) Master (11) Doctor (6)	1.0 1.0 4.0
Govt./Mil. N=14	Bachelor (4) Master (6) Doctor (4)	3.0 3.5 1.0

Areas of Expertise & Responsibility

Employers were allowed to specify up to six areas of expertise needed for the position. Because these areas of expertise were not prioritize, it was impossible to assess the primary needs of the employer. Figure 4 specifies the number of positions requesting a particular expertise. For example "Aerospace" was requested in 13 of the 129 positions. Areas of expertise with less than 6 entries were not reported. These included aging/disabled, individual differences, environmental design and MANPRINT.
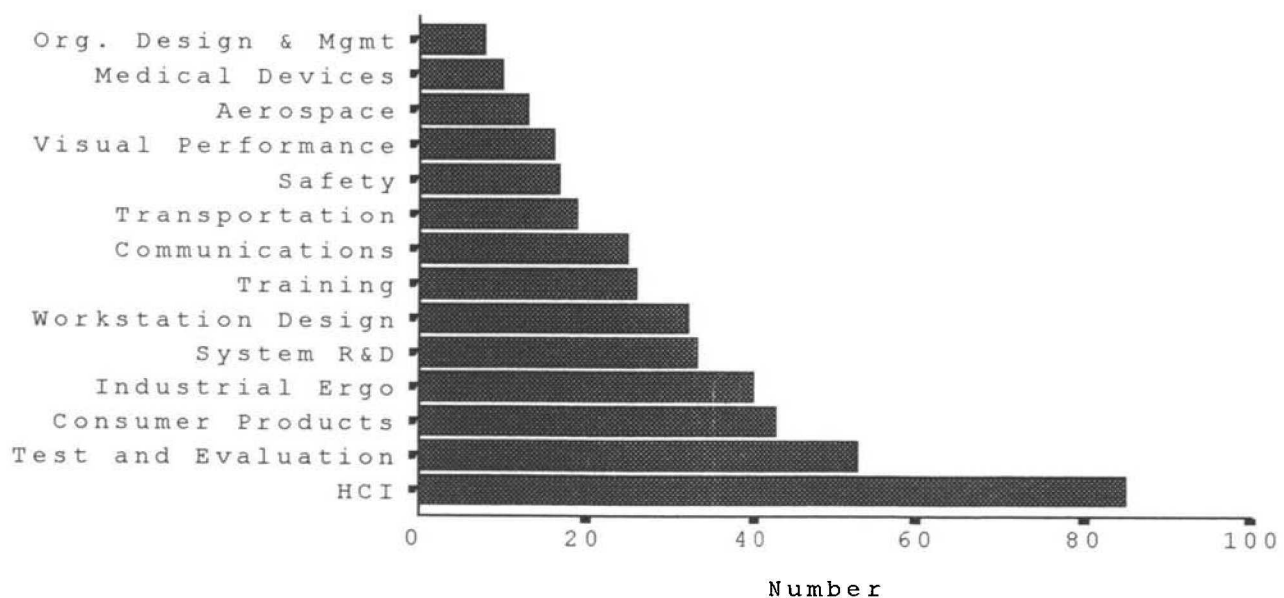

Figure 4: Areas of Expertise Requested for 129 Positions in Industry, Govt./Mil.and Consulting
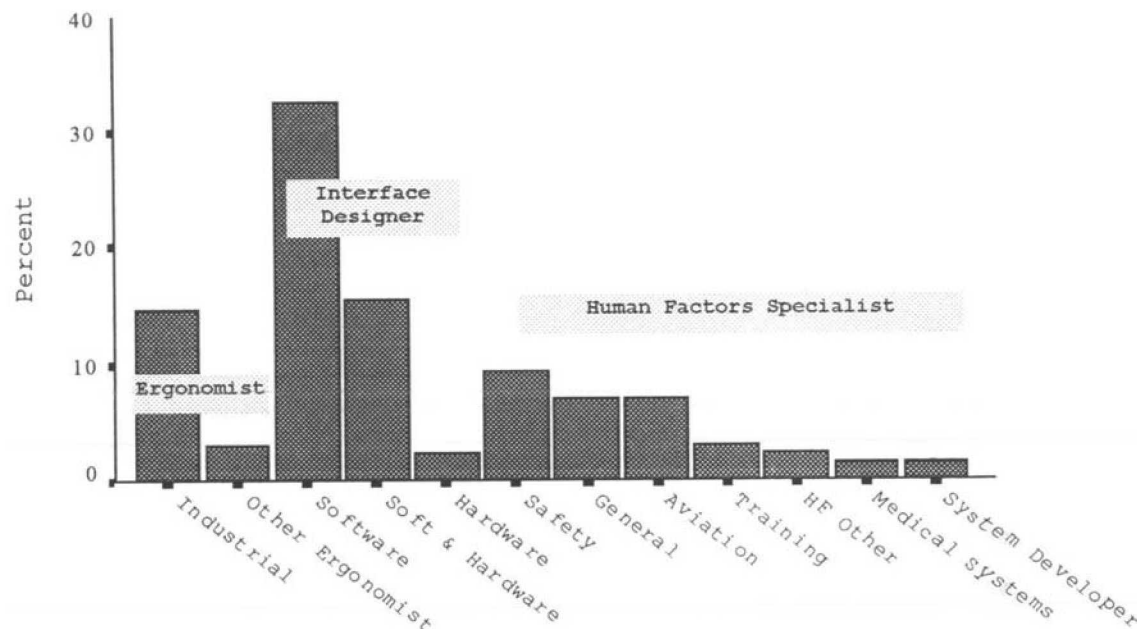
Figure 5: Primary Area of Responsibility for 129 Positions in Industry, Govt./Mil. and Consulting.

In many cases, the position title was not specified, or general terms such as HFE, ergonomist or manager were used. In addition, terms as different as usability designer, usability specialist, user interface designer, and application architect were used to describe positions which required an individual who could develop graphical user interfaces (GUIs). The authors reviewed the announcements, particularly the narratives, and classified each position into a category which they felt reflected the primary area of responsibility for that position (see Figure 5). The greatest demand was for interface designers of which there are three categories: interface designers with GUI, HCI, or graphics expertise (N=42), interface designers for both software and hardware (N=20) and hardware interface designers (N=3). The authors used the term "hardware" to reflect electronics, computer hardware and other consumer products. The classification "Other Ergonomist" includes: two positions in fabrication ergonomics, a position as a rehabilitation ergonomist and a position in the area of accident prevention. The classification " HF Other" includes single positions for human factors specialists in the areas of aging/disabled, communications, and decision support.

Other Skill Requirements

Many basic "tools" are expected to be in the HF&E professional's toolbox. The tools most often cited in these announcements include: a working knowledge of usability techniques for that domain, proficiency with rapid prototyping tools, the ability to conduct user need assessments, basic research skills, and a working knowledge of testing and evaluation techniques. Within the software industry, many employers required computer programming skills. Several skills which transcend particular task domains were frequently cited in the position announcements and include: computer literacy, professional skills such oral and written communication and the ability to work with others in a team setting. Work experience in the employer's domain was also desired. These expectancies can be met, at least in part, through an internship, a cooperative position or some other form of practical experience while in school. Industry's demand for these skills and the themes of effective team work, flexibility, interdisciplinary skills, and practical experience are strongly reinforced in the works of Shapiro, et al. (1995) and Shapiro (1995, 1994).

Additional skill requirements were identified and are discussed in Moroney, Green and Konz (1996). They also describe strategies for incorporating a team experience into the curriculum.

CONCLUSION

The authors hope that they have provided a useful analysis of the placement opportunities available to HF&E professionals seeking positions in industry,

government/military and consulting. A similar analysis performed annually should be of use to both HFES members and educators.

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