

## **Placement Opportunities for Human Factors Engineering and Ergonomics Professionals In Industry and Government/Military Positions**

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During the period from October 1999 through December 2000, the Placement Service of the Human Factors and Ergonomics Society distributed announcements describing 233 new positions available for human factors engineers and ergonomics professionals. This paper describes placement opportunities for HF and ergonomics professionals in industry and government/military (N=220). The attributes of the position descriptions examined include: employment sector, major field of study, degree requirements, required work experience, salary, geographic location, travel, and areas of expertise.

The type of industry seeking most employees was Internet based at 33%. The most frequently specified major field of study was human factors (N=124). Fifty-three percent of the positions describe the master's degree as the minimum requirement. The geographical areas with the most jobs were California (N=48) and the Northwest (N=23). Finally, the area of expertise most frequently requested by employers was usability testing and design (N=99) and Human Computer Interaction (N=42) was the most commonly specified job expertise/function.

During the period from October 1999 through December 2000, the Placement Service of the Human Factors and Ergonomics Society (HFES) posted job listings describing 233 new positions available for human factors and ergonomics (HF&E) professionals. Only job postings that could be accessed during the 2000 calendar year were used for this analysis. Employers completed a "Job Listing" form, provided by the HFES Placement Service, on which they provided information on a variety of factors including: employment sector, major field of study, degree requirements, required work experience, salary, geographic location, and area of expertise required. The analysis of these data is the basis for this article. Please note that only data obtained for new positions in 2000 are analyzed in this article. Thus, positions listed prior to January 2000, which were still listed as new positions available in the period following January 2000, were included. Additionally, this analysis is not a complete listing of all the positions available to HF&E professionals. Related positions are also listed with other placement services. This paper describes placement opportunities for HF&E professionals in industry and government/ military positions (N=220), including internship positions (N=4, a decrease of twenty-four from 1997-98). Excluded from this analysis were academic positions (N=13, a decrease in 3 from 97-98).

## **RESULTS**

### **Placement Opportunities by Sectors**

The 220 positions discussed in this paper were categorized into two employment sectors: industry (92%) and government/military (8%). The industry sector increased 31 percent over last year, while government/military decreased (9%). Previous years had categorized consulting positions separately. In this case, these authors concluded that consulting applied more to the type of industry position, rather than its own sector. The number of positions available in industry was 114 in the 1995-1996 survey, 93 in the 1996-1997 survey, a 125 in 1997-1998, and 201 in this analysis. This increase is most likely due to a reclassification of the consulting positions into the other sectors. The positions were further classified according to industrial sector by type of industry (see Figure 1). Industrial sector was based on the type of industry described in the position announcement. Some classifications were made easily (Microsoft; Computer Software: Yahoo; Internet: GM, Honda; automotive) while others (BC Research – as an example) were more difficult.

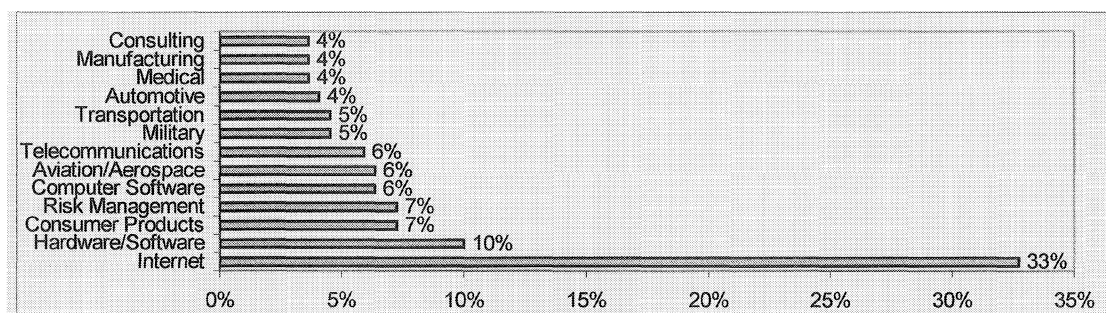


Figure 1: Placement opportunity by type of industry (N=220)

Most (N=72) of the positions were classified as Internet, with computer hardware/software following (N=22) and consumer products and insurance/risk management yielding 16 positions each. Positions in organizations that employ human factors specialists and ergonomists as consultants in a variety of areas (Klein Associates, Humantech) were classified as consulting organizations. On the other hand, positions requested in specific areas (e.g. aviation/aerospace) were classified by that organizations' type of industry.

Positions in computer related industries have remained high in all surveys, accounting for 49% of the positions in this survey, up from 24% of the positions in the 1997-98 time frame. However, this pattern does not hold for one type of area within computer related industries, computer hardware. Positions in this area decreased from last years' data, from 10% to 0%. Similarly, aviation/aerospace, which accounted for 15% of the positions in 1996-1997 (Cummings, Barshay, Lesaigle, and Moroney, 1998), and 8% in 1997-1998 (Cummings-Hill, Means, Harrison, and Moroney, 1999) continued to decrease in the current data set to account for only 6% of the positions.

### Major Field of Study

Each employer was asked to list any relevant major fields of study required. Several different major fields of study were listed for each position. As illustrated in Figure 2, the most frequently requested major field of study was human factors (N=124). The second most frequently requested field was "other" (N=88). This could be due to the variety of potential majors that can lead to a career in human factors/ergonomics. Examples of these major fields of study include: ergonomics, the social sciences (i.e. anthropology, IO psychology), industrial design, and electrical engineering. Similarly, many employers indicated a desire for "related disciplines". Other frequently requested major fields of study include: human-computer interaction (N=46) and industrial engineering (N=23). However, other major's, such as safety (N=2) and telecommunications (N=1), were not frequently requested by employers

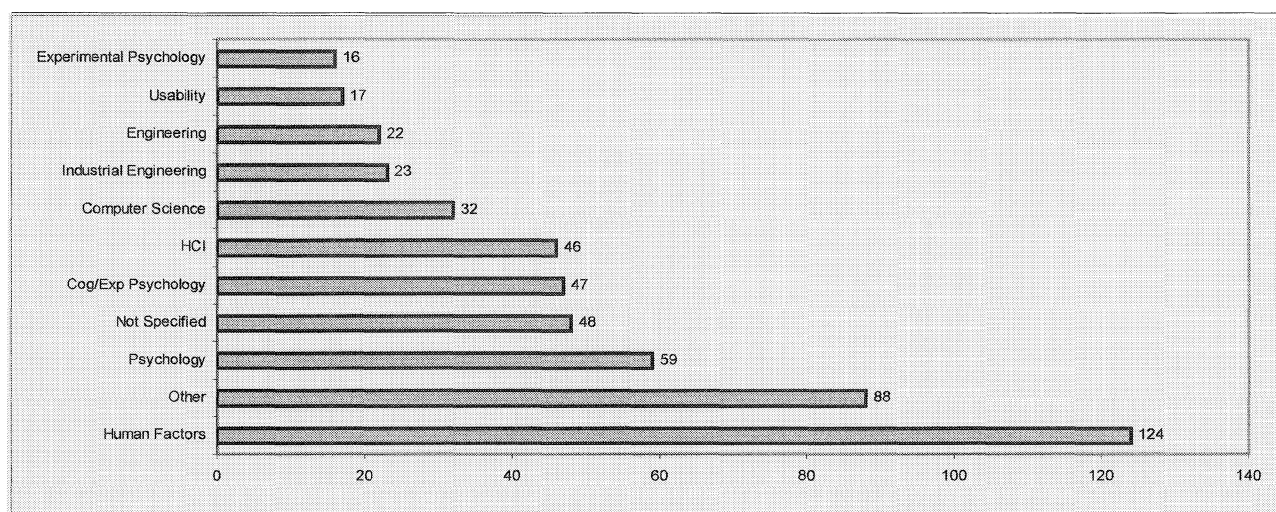


Figure 2: Major field of study requested (N=220).

Note: More than one major field of study was usually specified for each position.

### Minimum Degree and Minimum Years Experience

The minimum degree requirements as requested by the employer resulted in master and bachelor degrees accounting for 83% of the 220 positions (90% in the 1997-98 survey). A master's degree was specified for 53% of the positions (down 7% from 1997-98 data). Table 1 provides a more detailed description, broken into type of degree by employment sector: industry and government/military. The median years of experience in Industry for all types of degrees range from 2 to 5 in industry and from 0 to 3 for government/military.

Employment Sector	Degree Required	Years of Experience Desired	
		Median	Range
Industry (N=202)	Bachelor (N=62)	3	0 to 8
	Master (N=105)	3	0 to 10
	Doctorate (N=12)	5	2 to 10
	Not Specified (N=23)	2	0 to 5
Government/Military (N=18)	Bachelor (N=4)	3	1 to 5
	Master (N=11)	3	0 to 5
	Doctorate (N=2)	0	NA
	Not Specified (N=1)		

Table 1: Years of Experience and degree requirement for each employment section

### Salary

Ninety-six percent of the employers did not specify a salary. Within the 9 positions for which salary was specified, the salaries ranged from a low of \$33,000 to a high of \$95,000 (compared to a range of \$33,000 to \$100,000 in 1997-98, and \$35,000 to \$100,000 in 1996-97). Readers interested in additional details on salary are advised to consult the salary surveys conducted by Sanders (1993) and more recently by

Lovvall (1997). Raw data are also available for analysis through the HFES. Additionally, HFES is planning to conduct a salary analysis during 2001.

### Geographical Location

Compared with last year's survey, this year's data indicate decreases in the number of positions announced in the Northeast (-9), Southwest (-2), Mid-West (-5), Mid-Atlantic (-10), and Southeast (-13). On the contrary, an increase in the number of positions available was noted for California (+14), Northwest (+12), New England (+4), and Mid-Central (+6). Sixteen job postings were listed as Nationwide. In addition, there were no postings for other countries compared to 5 from 1997-98. The greatest concentration of positions available was in California with 48 positions (fourteen more than the 1997-98 survey). The Southeast had the largest drop in positions with 10 (thirteen less than the 1997-98 survey). See Figure 3 for more information.

### Areas of Expertise and Job Expertise/Function

The data used for 'area of expertise' were obtained from a job description of required skills. Employers were allowed to specify as many areas of expertise as necessary, while in previous years up to six areas of expertise could be specified for each position. These areas of expertise were not prioritized; therefore it was impossible to assess the primary needs of the employer. Figure 4 specifies the number of requests for a particular expertise. The 9 areas of expertise requested with less than 5 entries were not reported in Figure 4. These areas include: communication (N=4), industrial ergonomics (N=4), biomechanics (N=4), medical devices (N=3), cognitive systems engineering (N=3), visual performance (N=2), aerospace (N=1), environmental design (N=1), and organizational design (N=1).

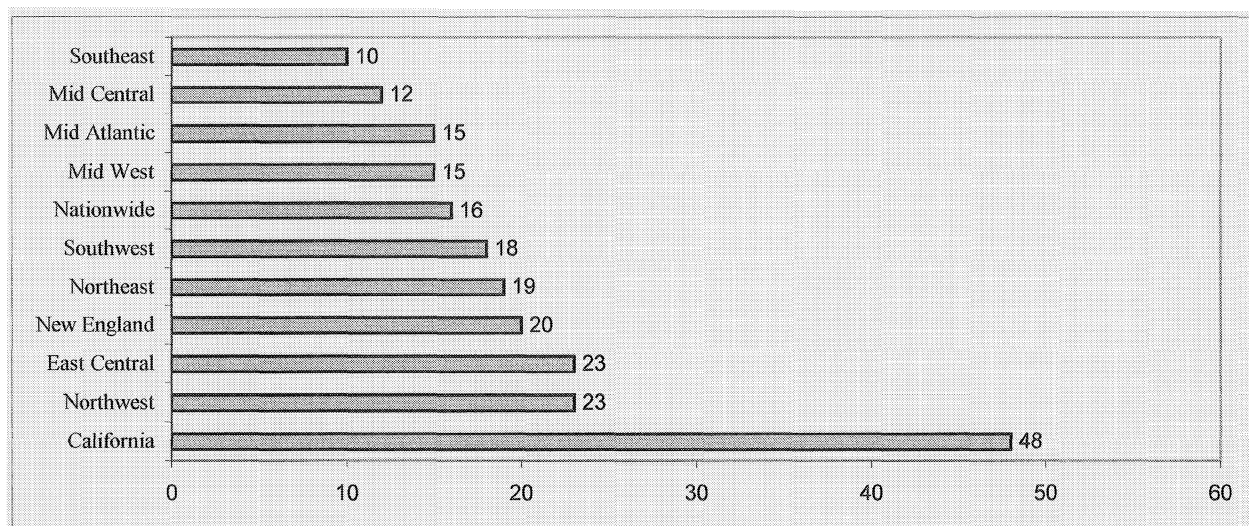


Figure 3: Geographical location of placement opportunity for industry and government/military (N=220)

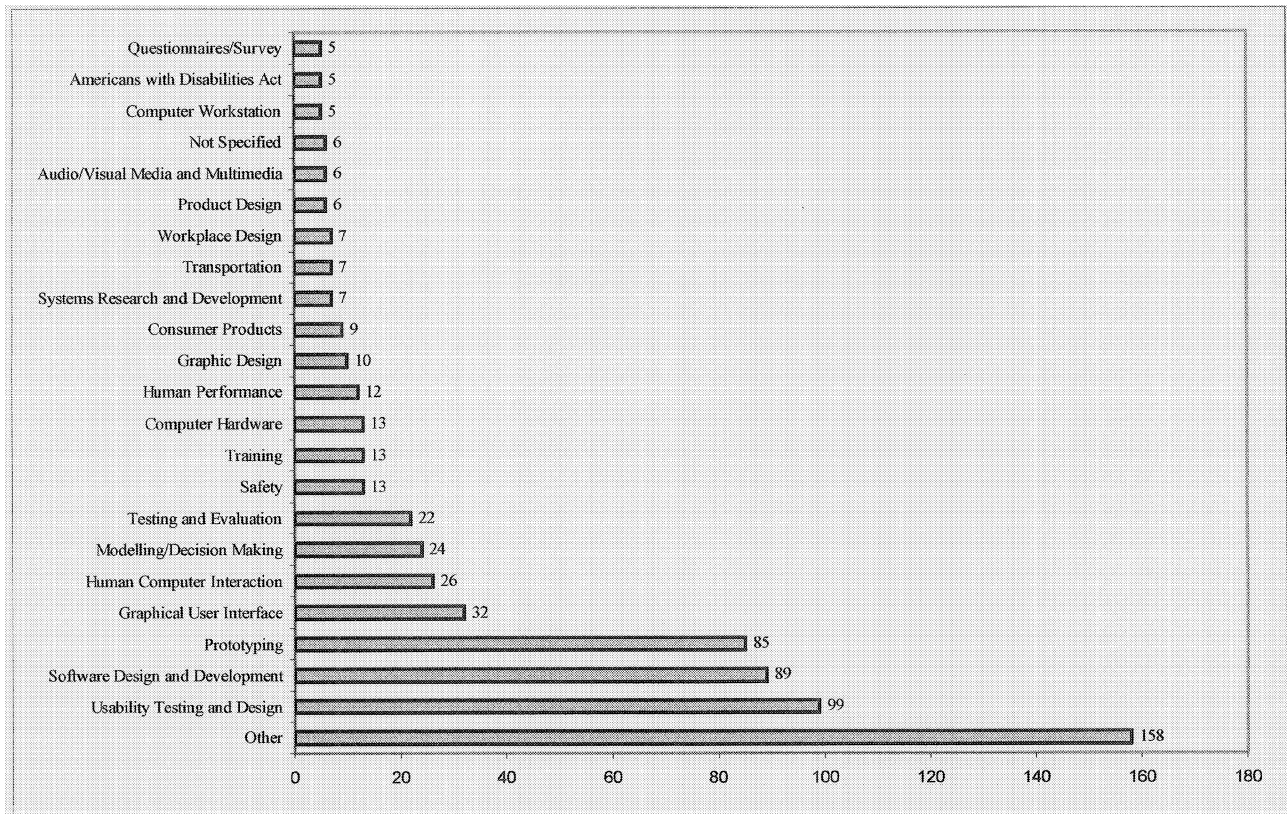


Figure 4: Areas of expertise requested for position in industry and government/military (N=220)

Note: More than one area of expertise was usually specified for each position.

There were 158 "other" classifications that are probably indicative of the fact that given the variety of skills required by the human factors professional, and it is difficult to account for all potential skills area. The "other" classification included, but was not limited to, individual areas as diverse as task analysis, information architecture, biostatistics, contextual inquiries, and voice/telephony interfaces. Usability testing and design (N=99), software design and development (N=89), and prototyping (N=85) accounted for the majority of the skills analyzed by these authors. In 1997-98, the majority of requested skills were in HCI (N=139) compared to only 26 this year. This discrepancy may be attributed to the further separation of the HCI skills into prototyping and usability testing and design by the authors of this article. These skills, which previously would have been recorded as HCI, are now being classified as usability, prototyping, etc.

As reported in 1997-98, the transportation area appears

to be cyclical, with 23 positions in 1994-95, 13 in 1996-97, 26 in 1997-98, and 7 this year. Visual performance showed a similar pattern: 22 positions in 1994-95, 14 in 1996-97, 24 in 1997-98, and 2 this year. During these same periods the number of safety positions cycled from 32 to 26 to 40 to 13.

The data used to describe job expertise/function were obtained from a drop-down menu on the job entry form. Employers chose one of these job expertise/functions from several categories composed of the HFES technical groups and subcategories within them. These data, summarized in Figure 5, further support the previously reported 'area of expertise' finding that employers requested HCI (N=42) and usability (N=28) categories most often. Other common expertise/functions requested by employers included more general categories such as human factors (N=35) and human factors/ergonomics (N=29).

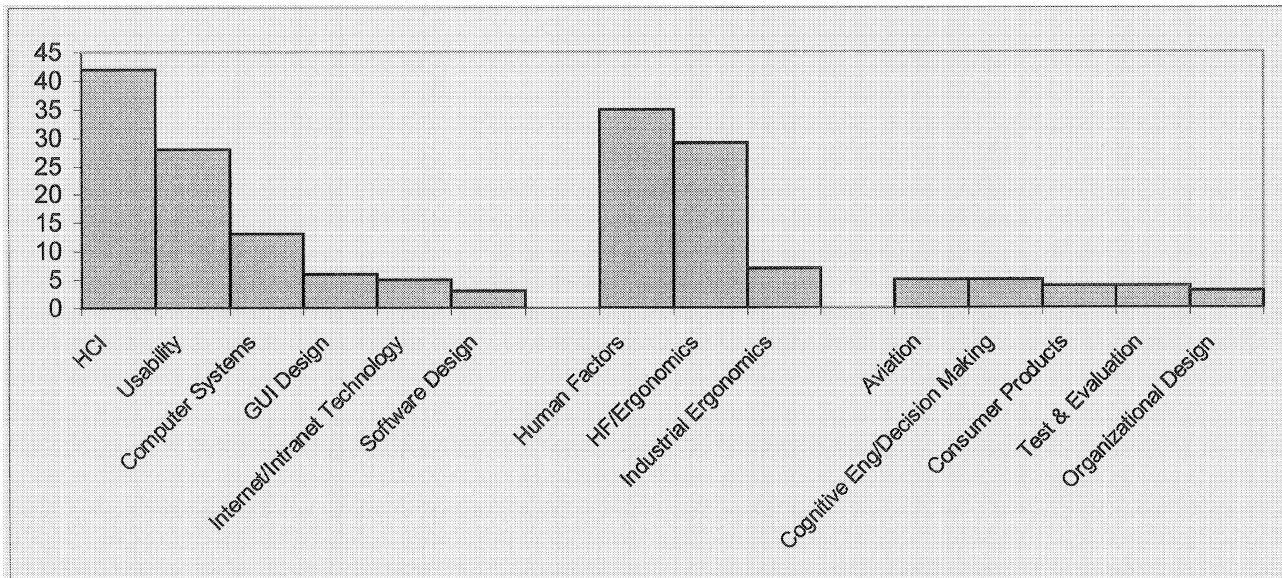


Figure 5: Total number of positions requested by area of job expertise/function.

Note: Areas of job expertise with less than two requests were not included.

### CONCLUSION

The authors hope that they have provided a useful analysis of the placement opportunities available to human factors and ergonomics professionals seeking positions in industry and government/military. It is also hoped that these data will influence the educational opportunities provided to HF&E students.

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