GETTING STARTED IN THE RIGHT DIRECTION: EXPERT ADVICE FOR PREPARING FOR YOUR PROFESSIONAL CAREER

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Welcome to the tenth annual Human Factors and Ergonomics Society Career Panel. The questions answered by this panel address many of the issues that graduate students and recent graduates have about entering the Human Factors field. The goal of this panel is to help individuals interested in becoming Human Factors professionals prepare for their career. This year the panel members each prepared a brief paper to help individuals plan for, prepare for, and commence their careers. During the HFES meeting panel session, the panel will focus on questions from the audience.

MAKING CAREER PREPARATION A PART OF THE GRADUATE SCHOOL EXPERIENCE Anthony D. Andre, Ph. D.

Most students think that preparing for their career is an activity that takes place only at the end of their graduate education, or after they graduate. After all, what else can you do during grad school other than to dedicate yourself to your schoolwork and research? The answer is "a lot!" In reality, there are many ways in which students can actively prepare for their professional career during grad school, and those who take this approach usually get the best jobs. Some of these preparation activities include: creating collateral materials, improving an application skill set, making your portfolio accessible, researching your job options, and developing your own human factors philosophy. Below, I briefly discuss these and other issues that will help you identify what to focus on during, and what to abstract from, graduate school in order to best prepare you for your future career in the field of Human Factors (HF).

Creating Collateral Materials

Hopefully, the courses you take during graduate school naturally produce valuable and tangible examples of your ability, often referred to as collateral materials. However, sometimes you have to be creative and turn a class exercise or informal assignment into something of value. Your goal should be to accumulate as many examples of your HF philosophy, approach, or abilities as possible. To circumvent the fact that these examples reflect a time of learning rather than a state of proficiency, you should consider the following two ideas. First, when possible, make revisions to your assignments based on the feedback provided by your professors, and ask your professor to briefly reassess the quality of your work. This will leave you with a more polished version of the material to share with prospective employers. Second, try to write a onepage summary of the main activities and "lessons learned" for each of your materials. This helps focus readers away from the details or results of your effort (which might not represent your future abilities!) and helps them to understand the process behind the effort.

Improving Your "Application" Skill Set

It's one thing to know about Human Factors in general or to have committed some specific usability guidelines to memory. It's another thing to apply this information towards designing or evaluating products and systems. To apply, and then communicate, your HF knowledge you will need to improve your skills in one or more of the following areas: 1) illustration, 2) prototyping, 3) software/web development, 4) 3D model creation, 5) public speaking, 6) report writing and 7) general business economics. These topics provide the application tools that will enable you to have an influence in the business world.

Making Your Portfolio Accessible

Realize that it is 2003. Make sure your resume and the best work in your portfolio is available on line. And, don't forget to take advantage of the opportunity to showcase your HF skills by creating an attractive and usable web site to accommodate these materials.

Researching Your Options

Business trends emerge over time in terms of months and years, not days. Therefore, you need to study the domains of interest to you while you are in school, not when you graduate. If, for example, you are interested in medical HF you should find out which companies employ HF professionals, what are the hot topics, who are the notable people, and where are the relevant conferences or organizations. You then need to periodically keep track of the changing trends in each of these areas.

Developing Your HF Philosophy

Finally, and perhaps most importantly, you should continually work on developing your personal HF philosophy. After all, what is going to separate you from your fellow students? You share the same courses, the same textbooks, the same professors, the same day-old pizza, etc. – so what makes you stand out? That's the most challenging, yet most rewarding, question you can answer!

PREPARING TO WORK IN HUMAN FACTORS/ERGONOMICS Barry H. Beith, Ph.D.

Career Preparation: An Exercise in Diversity

Preparing for a career in HF/E must be viewed as an exercise in diversity, adaptability, and timesharing. The reason is that students now will be entering an even more rapidly changing technological world in which opinions will become even easier to get and decisions more quickly required. The key to success for the individual and the discipline is to make sure that your opinions carry the weight of objectivity and independent thought.

The Core of Our Discipline

The core of our discipline lies in two areas: knowledge of human behavior, performance, capabilities, and limitations in general and knowledge of the scientific methods necessary to generate valid and reliable data in laboratory and field settings. These two areas of expertise set us apart and make us invaluable to those system and product developers who understand that human error lies at the core of their success. Students must prepare themselves to understand and appreciate that the field of human factors and ergonomics is rooted in the understanding of how to identify and classify human errors, to eliminate or manage those errors, and educate organizations to deal with human errors.

Integrating Science and Practice

Students must prepare methodologically to respond to research, design, and evaluation requirements by employing a diverse and effective set of methods and techniques that will generate data on which to base decisions. We cannot allow the pace of technology to drive down the science of HF/E. If we do, we will become nothing more than "hired guns" whose "shoot from the hip" opinions will be lost in the noise of other unsupported and invalid opinions. To prepare for careers in HF/E, prepare to drive the science of HF/E into the practice of HF/E for all you are worth.

Develop a Broad Background While In School

While it runs counter to the "specializationdriven" thinking of today, HF/E students must ensure that they are prepared for a very broad range of domains. They need to structure their courses and experiences such that whether they are entering the profession from an engineering, behavioral science, or other base discipline, they have the root knowledge to work in any domain from transportation and industrial settings to medical product design. Do not matriculate yourself into a corner. Become a "jack of all trades and a master of some," but remember that mastery comes from experience over years while your development of broad and adaptive abilities starts in school.

Learn To Communicate

Finally, a successful professional must have the ability to communicate in both written and spoken forms and the ability to communicate to individuals and to groups. This ability is not natural to most people and must be practiced and developed. Learning to write concisely and well is important for getting the details across. Learning to speak well, to speak with confidence, to speak to people, as well as with people, is absolutely critical to your future. Those who work at it and learn to communicate well will have a critical edge in selling themselves, selling their ideas, and selling human factors and ergonomics.

OPTIMIZING YOUR GRADUATE SCHOOL EXPERIENCE Eileen B. Entin, Ph. D.

Balance Theory and Application

During your graduate years, strive for a balance between theory and applications in your coursework and your research. Be sure you are well grounded in human factors theory and principles. Take applicable courses in related fields such as psychology, cognitive science, mechanical engineering, or graphical design. Take courses in statistics and experimental design. Learn how to design effective data collection instruments, develop requirements, build interface prototypes, and conduct effective usability tests. At the same time, seek research or other opportunities that will allow you to apply the theoretical concepts and skills you are acquiring and help you learn how to conduct research and build applications in situations that require you to deal with real-world constraints. The skills you learn can be shaped for any domain in which you will work, but you need to become competent in and comfortable with these skills.

Hone Your Communications Skills

Communication is an important aspect of any job. Document projects you are working on, prepare presentations, and write technical papers. Learn as much as you can about effective written and oral communication. Take advantage of the mentorship that the faculty provides to students. When you leave school, you will not always have someone who is responsible for reading and constructively critiquing your work.

Seek Diverse and Involving Internships

When you consider internships, look for ones that will give you an opportunity to apply the knowledge and skills that you have been learning under the mentorship of experienced professionals, where the people you will be working with have a vested interest in your being there, and who are, therefore, willing to mentor you and share their knowledge. Avoid situations where you are only doing routine tasks that you could have done before you entered graduate school. Internships can also give you the opportunity to work in small groups, to benefit from the background and ideas that others bring to a task, and to see how the complementary skills that the team members bring to a project result in a better product. Working in a group will also give you opportunities to express what you know and to articulate and defend your ideas on how to solve problems that arise. It will also give you an opportunity to become involved in decisionmaking processes in which alternatives have to be weighed and compromises made.

Seek Your First Professional Position Carefully

When you are looking for a permanent position, try, as much as possible, to be clear about the kind of situation you are looking for and the competencies that you bring. Look for a position in which you can continue to learn from more senior colleagues and one that will give you broad experiences that provide opportunities to develop your interests rather than one that will pigeonhole you into a narrow field. Tell everyone that you are looking. You can never tell where opportunities will arise. Think twice about leaving school before completing your thesis or dissertation. Many folks who have done that can tell you about the daunting challenges of completing a dissertation while at the same time maintaining a full-time position.

PREPARING FOR A CAREER AS A CONSULTANT Brian M. Legan, CIE

A consulting career offers unique challenges for the human factors professional. Typical assignments involve time-critical problem solving, real-world engineering, budgetary constraints, and multiple stakeholders who have different, and often competing, objectives. Students interested in this career path should strive to develop both functional HF/E expertise and general problem-solving and analytical skills, since impact in the consulting profession is driven by one's ability to apply scientific HF/E research and principles in new and creative ways.

"Performance-based organizations," "performance metrics," "collaborative decisionmaking," and "information on demand" are just a few buzz words that accompany the quest of companies, organizations, and teams to improve productivity, effectiveness, and profitability. The common thread in this quest is the drive to enhance human performance - whether it be the performance of pilots and air-traffic controllers through the use of advanced air-traffic management technologies, the performance of Chief Financial Officers through the implementation of new management information systems, or the performance of security officials through the integration of data from disparate sources. Making the right investments is crucial, especially in today's tough economy, and the human factors consultant

plays an important role in helping organizations implement the right combination of technologies and processes to achieve human performance benefits that ultimately affect their bottom line. Students interested in the consulting field should focus on the areas that follow to increase their marketability and success.

Learn How to Learn

While each of us approaches our studies and tasks in different ways, the ability to quickly assimilate relevant knowledge and create new intellectual capital to bring to bear on assignments is critical. Students should always maintain their intellectual curiosity, ask questions and challenge conventional wisdom, read and stay abreast of emerging research, seek out constructive criticism and alternative points of view, and contribute original ideas and approaches through authoritative articles and presentations. This approach will help make the student's viewpoints well rounded and compelling.

Learn How to be a Chameleon

Understanding and communicating with people is one of the most important qualities a student can develop. Success in the consulting profession is as dependent upon the ability to communicate information as it is upon the quality of the information itself. Whether you are writing a report, giving a presentation, or simply interacting with clients, the most effective way to communicate is to show that you understand a client's industry, organization, and domain and to speak the client's language. Academic or scientific "human factors speak" will quickly alienate clients. Recognize that most of your clients will not be human factors professionals and many will not understand the relevance of our profession to their mission. Students can hone their communication skills through internship opportunities, particularly internships that allow a student to apply his/her human factors skills within a broader context and afford opportunities to examine the feasibility, risks, and tradeoffs of alternative HF/E recommendations. Complementary coursework in systems engineering, computer science, operations research,

and business management will also help students diversify and extend their versatility.

Contribute to Your Profession

Human factors students have an abundance of opportunities to contribute to the advancement of their professional field while improving themselves. Students should not just attend and participate in human factors conferences, but also give relevant and thought-provoking presentations at non-human factors conferences. These experiences will stretch a students' comfort zone, build self-confidence, and force a student to relate to an audience who may not understand or appreciate the importance of human factors. Involvement in diverse conference venues will also increase a student's visibility and that of our profession, and potentially *create* opportunities for human factors professionals other than those that are already recognized and advertised.

Look Beyond "Human Factors"

Some of the most interesting work being done by human factors professionals is not referred to or advertised as "human factors" work. This is partly due to our profession's continuous struggle to define its identity and partly due to the narrow view of human factors within some industries and organizations. The stereotypical view of a human factors engineer/scientist may constrain a student's search for employment or limit opportunities to contribute when employed. To overcome this potential roadblock, students should seek both traditional and non-traditional avenues for applying their core human factors skills. Students can maximize their impact by developing a network of contacts within and outside of the human factors profession and conveying how their skills can contribute to an organization's overall mission which usually involves improving human performance.

DEVELOPING AN ACTION PLAN Ronald G. Shapiro, Ph. D.

Our panelists have provided consistent, high quality expert recommendations for your career preparation. In summary, they suggested:

- Start career planning early.
- Learn facts and methodology of HF.
- Learn how to learn.
- Secure an outstanding internship and maintain balance between schoolwork and internship.
- Prepare a portfolio, and perhaps a website, to demonstrate your strengths and accomplishments.
- Develop and demonstrate the ability to communicate effectively.

Now, you need to develop a career plan.

Developing a Career Preparation Plan

First, determine what your ideal position would be. Gather information by talking and working with established professionals (Networking). The Human Factors and Ergonomics Society Annual Meeting provides an ideal forum to do this, especially if you attend the receptions and the business meetings and volunteer to help a technical group by becoming their editor, webmaster, assistant editor, or assistant webmaster. You might also volunteer to help explain the profession to school and community groups during National Ergonomics Month. By taking a broad look at the profession, which is required to do this type of a presentation, you might discover a potential career.

Second, prepare a very detailed resume which depicts you as the ideal candidate for the job you would most like to have. Do not worry about being factual or accurate. Just portray yourself as the ideal candidate. If there are several "ideal jobs" then prepare several of these resumes.

Third, highlight those items on the resume(s) which do not exist today, such as a publication that is not yet written, an internship that you have not done, or a skill that you do not yet have.

Fourth, make a checklist of those items which are highlighted. You now have a detailed plan to get you to the "ideal job." Implement it.

ACKNOWLEDGEMENTS

The views expressed in this paper are those of the individual participants only and do not necessarily reflect the views of their employers.

The panel wishes to thank Dr. Karen R. Young (University of Alabama in Huntsville) for a thorough review of this paper.