	Product Design Technical Group Newsletter	**Human Factors and Ergonomics Society Product Design Technical Group**
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Think Total User Experience

By Stan Caplan

Stan Caplan is Stan is President/Principal at Usability Associates where he serves clients with usability research, design, and evaluation of products as well as organizational benchmarking studies, and Human Factors staff recruiting. He also coordinates meetings for an ongoing consortium of design and usability managers from Fortune 200 companies and conducts special research projects for them.

People buy products to accomplish a personal objective. They purchase a razor to look better, a car to transport them on demand, or a hand held computer to track daily activities. The companies that develop successful razors, cars, and PDAs help people accomplish their objectives in a compelling and easy way. But those companies must do more to be truly successful in the long run. They must address the big picture. The big picture is the perspective that makes the customer glad they bought the product and compels them to be a repeat customer and an ambassador for the product. The big picture is a challenge to create.

The real challenge for product developers is to consider the TOTAL USER EXPERIENCE (TUE) when developing a product. The total user experience encompasses all encounters the customer will have with the product.

Some companies approach the challenge by loading their product with features….at least one more than on their competitor's product. This will attract customers to the product and that's the necessary first step to a sale. A recent study (Rust et al, 2006) has shown that, in fact, peoples' buy decisions are highly influenced by product features. Based on the results of an experiment simulating an in-store experience, the authors concluded, "Consumers know that products with more features are harder to use, but before they purchase a product they value its capability more than its usability". The results of a related study in which participants performed typical tasks using working models of two products led them to conclude, "Once consumers have used a product, their preferences change. Suddenly, usability matters very much". The authors offer several ways for developers to address the contradiction between more features and usability. All of them are aimed at finding a happy medium between the two.

Think Total User Experience, continued

While this was a useful study that confirmed what many already know anecdotally, I contend there is much more to the big picture. Feature bloat that influences purchase behavior must be balanced with the whole experience of ownership after purchase. Performing typical tasks is only one piece of that entire experience.

The real challenge for product developers is to consider the TOTAL USER EXPERIENCE (TUE) when developing a product. The total user experience encompasses all encounters the customer will have with the product. For consumer and business products which are comprised of hardware and/or software, my model of total user experience has six components.

1. **Acquire** (all customer touch points prior to and including acquisition that affect customer perceptions)
   Examples: demo, trial, product literature, payment, advertisement, order, wait, subscribe, negotiate

2. **Prepare to use** (all out-of-box activities prior to the start of learning to perform intended tasks)
   Examples: open package, remove, read instructions, assemble, set up, download, install, get situated, store

3. **Use** (ease of learning and use, pride of ownership)
   Examples: appearance, affordances, instructions, productivity aids, navigation, terminology, carry, transport, clean, replenishment/replacement

4. *Maintain (performing unplanned activities to keep product working properly)*
   Examples: troubleshoot, repair, update, clean

5. **Get Support** (acquiring knowledge needed to maintain product)
   Examples: help line, training, web site, service

6. **Terminate** (properly ending ownership when no longer intending to use product)
   Examples: disposal, uninstall, store

Unfortunately, most companies have a fragmented approach to dealing with user experience. Different components are handled by different areas of the company and are not coordinated into a big picture approach to the total user experience. Recently, I conducted a benchmarking study of Human Factors organizations in six Fortune 500 companies. As part of the study, each interviewee, a manager responsible for the company's Human Factors function, gave self-ratings of their function's contribution to each TUE component (see Table 1). I found their contribution to development of the user experience for the companies' primary products was strong for the Use component as expected for a usability function. Unexpected was their weaker contribution to the other components. Only Company 4 Human Factors has a high or medium contribution for all components. In contrast, Company 2 Human Factors makes no contribution at all to four of the components.

Think Total User Experience, continued

Table 1: Contribution to Total User Experience

TOTAL USER *EXPERIENCE COMPONENT*	RATING OF HUMAN FACTORS CONTRIBUTION			
	High	**Med**	**Low**	**None**
1. Acquire	4,5	1	6	2,3
2. Prepare to Use	4	1,2,3,6	5	
3. Use	1,2,3,4,5,6			
4. Maintain	3,4	1	5,6	2
5. Get support		4,5	1	2,3,6
6. Terminate		4		1,2,3,5,6

In the best scenario, other company organizations fill the voids by paying attention to the user experience components not addressed by the Human Factors function. For instance, Marketing is accountable for Acquire, Customer Service is accountable for Get Support, etc. However, since usability is not their primary concern, they may not develop their components with the same foresight and passion for creating a positive user experience as the Human Factors people would do. Secondly, although the components are interdependent, their individual development may not receive adequate coordination.

Enter the User Experience Czar. S/he is accountable for ensuring the company's products will give customers a superior total user experience. At this point in time for most companies, the Czar is a fictional character. Companies I have talked to think such a role would be effective, but proclaim it would be hard to implement. It would require a significant change in company organization and way of thinking.

Change is a way of corporate life now. Is your company ready for a User Experience Czar?

REFERENCES

Rust, Roland T., Thompson, Debora Viana, and Hamilton, Rebecca W., Defeating Feature Fatigue, *Harvard Business Review*, February, 2006.

For More Information about Experience Design

Would you like to learn more about Experience Design? Consider the resources below.

Websites   *Good Experience.* www.goodexperience.com . Be sure to sign up for the e-newsletter and check out the blog. The website "This is Broken" is now part of this blog.

                  Uxnet — The User Experience Network. www.uxnet.org

Books   *Experience Design* by Nathan Shedroff

                  Customer Experience Management by Bernd H. Schmitt

                  Priceless: Turning Ordinary Products into Extraordinary Experiences by Diana Lasalle and Terry A. Britton

Magazines   *UX — User Experience.* A publication by the Usability Professionals Association. See www.upassoc.org/upa_publications/user_experience/

Introducing the PDTG Executive Council

In the last newsletter, the activities and benefits of the PDTG were described. As mentioned, the PDTG Executive council is a group of volunteers that work together to make this happen. The Council members have a wide variety of backgrounds — from academia, industry and consulting. Below we have provided short biographies of each Council member. We all hope to see you at HFES in October. Please do not hesitate to approach us and talk!

Patrick Patterson, Ph.D. – Chair
Pat has recently become chair of the Department of Industrial Engineering at Texas Tech University after serving for six years in a similar capacity at Iowa State University. His research and teaching interests include interaction design, cognitive ergonomics, user-centered product design, and situation awareness in complex systems. He also has extensive experience in the development of devices and device adaptations for individuals with disabilities. Current work includes the development of adaptive displays, the effects of product design on human error, the evaluation of display sophistication on teleoperations and on information value, and the design of products for the aging population. He has developed courses and training packages that utilize distance learning, streaming video, and interactive distance team collaboration.

Steven M. Belz, Ph.D. – Program Chair
Steven is a Principal Member of Technical Staff with AT&T Labs in Austin, TX. Steven holds a Ph.D. from the Grado Department of Industrial and Systems Engineering at Virginia Tech and was awarded the 2004-05 Outstanding Alumnus Award by Virginia Tech. Steven has also worked for Kodak and Lucent Technologies and served as an Adjunct Faculty member within the Department of Industrial Engineering at the Rochester Institute of Technology. While at Kodak, Steven won the PDTG's 2005 User-Centered Product Design Award for the development of the Kodak EasyShare-One digital camera.

Stan Caplan, M.S.E., CHFP – Secretary/Treasurer and Award Co-Coordinator
Stan is President/Principal at Usability Associates where he serves clients with usability research, design, and evaluation of products as well as organizational benchmarking studies, and Human Factors staff recruiting. He also coordinates meetings for an ongoing consortium of design and usability managers from Fortune 200 companies and conducts special research projects for them. Previously, Stan worked at Eastman Kodak Company performing a variety of usability projects involving both product concept ideation and product commercialization. Products included copiers, cameras, camcorders, scanners, blood analyzers, x-ray machines and document processing systems. He also supervised the Human Factors group who supported such products. Stan is a contributing author of Kodak's Ergonomic Design for People at Work, Volume 1. He is a long-time member of HFES and has been active in PDTG for much of that time.

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not
available

Andrew Morton, MASc – Webmaster
Andrew is a Human Factors Consultant with Human*systems*® Incorporated where he provides human factors and ergonomics expertise to a broad range of industry and government clients. Prior to joining Human*systems*® Incorporated, Andrew has worked for Human Factors North, Defence Research & Development Canada, Nortel Networks, and Hewlett Packard. Andrew earned a BSc in Kinesiology (Ergonomics specialization) from the University of Waterloo and a MASc in Mechanical and Industrial Engineering (Human Factors Engineering specialization) from the University of Toronto.

Jean Schiller, M.S.E., CPE, C.P.S.M. – Newsletter Editor
Jean is the owner and principal consultant at Tenor Design LLC. At Tenor Design, she provides consulting services in human factors and user research, specializing in product design in a wide variety of industries. Prior to starting her own firm, she worked at Applied Safety & Ergonomics, Inc., Ford Motor Company, and Toyota Technical Center, U.S.A. Jean has served on ANSI standards committees and has held several officer positions in various HFES Technical Groups. She is a Certified Professional Ergonomist (CPE) and a Certified Product Safety Manager (C.P.S.M.). She holds a B.S.E. and an M.S.E. from the University of Michigan in Industrial Engineering (human factors focus).

Introducing the PDTG Executive Council
continued

Dianne L. McMullin, Ph.D. – Executive Council and Co-Chair of PDTG User-Centered Design Award Dianne is a human factors engineer at Boeing Commercial Airplanes supporting cabin environment. Her projects primarily focus on passenger and crew comfort and health for the new 787 Dreamliner and for future airplanes. Prior to moving to The Boeing Company, she was an assistant professor of Industrial and Management Systems Engineering at West Virginia University and director of the Occupational Health and Occupational Safety masters program. Dianne holds a doctorate from the University of Nebraska-Lincoln and a masters from Virginia Tech.

Edie Adams, M.E.Des., CPE – Executive Council Member, At Large
Edie is the Manager of User Experience in the Mobile and Tailored Platforms Division, Windows, Microsoft, where she leads a User Research team of psychologists and ethnographers in the development of mobile, tablet and place - specific PCs. Previously, she directed the user research for hardware innovation programs for Windows Vista and prior to that, she lead a team in the research of physical, cognitive and emotional interactions of people and products and its application to all Microsoft Hardware and Strategic Business products. She joined Microsoft in 1994. Edie is trained in occupational ergonomics, product design and design research. She is a CPE (Certified Professional Ergonomist), and holds an M.E.Des. in industrial design and a B.Sc. in psychology from the University of Calgary.

Jay Pollack, Ph.D. – Executive Council Member, At Large
Jay is senior Human Factors Engineer at Crown Equipment Corporation in New Bremen, Ohio. He has held several past positions within the PDTG including Chair and Program Chair and is an associate editor for EID. Prior to joining Crown, he was owner of Joshua Technology Group, a consulting firm that provided forensic HF analysis and product design services. His technical expertise covers a wide range of application sectors that include aviation, commercial and industrial vehicles, software development, simulation and training, manufacturing and litigation.

M. Susan Hallbeck, Ph.D., CPE – Executive Council Member, At Large
Sue is a Professor of Industrial and Management Systems Engineering at the University of Nebraska - Lincoln. She also holds a courtesy appointment in Surgery at the University of Nebraska Medical Center. She earned her Ph.D. from Virginia Tech, her M.S. from Texas Tech and her B.S. from Iowa State University all in Industrial Engineering. She is currently the director of the Innovative Design and Ergonomic Analysis Lab (IDEA Lab) and the coordinator of the award-winning FINDER group – a collaboration among physicists, chemists, electrical, materials and industrial engineers for detection of neutrons for homeland security. Her IntuiTool won the PDTG Product Design Award Honorable Mention in 2004. She has been active in HFES as the Chair of the IETG, the program chair for both PDTG and IETG and a newsletter editor for the IETG. Sue is a Professional Engineer and Certified Professional Ergonomist.

Job Opportunities

Human Factors Design Engineer

Company: St. Jude Medical, Inc.

Location: Sylmar, CA (25 miles north of Los Angeles)

Duration: Full-time

Job description: Here is an opportunity for the motivated and creative thinker to research and design novel user interaction concepts for a suite of sophisticated and lifesaving medical products. You will be asked to research, design and test solutions that utilize advanced technologies across multiple platforms, such as wireless handhelds, touch-screen tablets, web applications and IVR systems. You will also participate in early-stage product research, and will have the opportunity to work in clinical environments and interact with leading surgeons, nurses and scientists.

Note: Depending on candidate experience and education, the responsibilities and salary for this position will scale accordingly.

Summary of responsibilities:

- Work collaboratively with peers to research and develop innovative medical products
- Plan, design and conduct usability studies for different stages of the product development lifecycle, e.g. early-stage generative product research, concept testing, post-market release evaluations
- Analyze and interpret data, compile professional reports and present research results to cross functional teams
- Create interaction design solutions, develop user models, interaction architectures, frameworks, and high-level prototypes that communicate product functionality
- Document, communicate and advocate for design solutions through dialogue with internal staff, written and verbal presentations, and GUI specifications
- Produce comprehensive use scenarios, concept storyboards and design specifications
- Design hardware control panels, screen layouts, icons, and interface elements
- Conduct usability tests and apply customer feedback toward improved product concepts
- Participate in multiple projects simultaneously across extensive product lifecycles

Qualifications:

- A self-starter with a minimum of 3 to 8 years work experience conducting usability research and designing complex software tools for medical, business or consumer products
- BS, MS/MA, Ph.D. or equivalent number of years of experience in Human-Computer Interaction, Human Factors, Usability Engineering, Interaction Design, Information Design or related field

- Superb oral, written and presentation communication skills with ability to communicate product functionality to peers and management
- Excellent conceptual design and detailed design skills for a variety of mediums e.g. touch-screen, handhelds, web applications, interactive voice recognition systems, etc.
- Ability to effectively persuade, explain, negotiate and monitor design solutions
- Ability to develop creative approaches to researching complex user experience problems
- Excellent analytical ability, especially with regard to observation of user behavior
- In-depth knowledge of Human Factors principles including an understanding of human performance and limitations (perceptual, cognitive etc.)
- Ability to work across disciplines with clinical, systems and software engineers
- Ability to effectively apply change control methods and prepare product specification documentation
- Possess proficiency with prototyping & design tools, such as Adobe Photoshop and Illustrator, InDesign, and Flash, PowerPoint, Visio, and Director
- (Required) A design portfolio that demonstrates the following:
  - ◊ creative problem solving skills
  - ◊ the ability to generate solid design and user interface solutions
  - ◊ an illustration of design and creative processes

Knowledge of or experience with any of the following is a plus:
- Experience working with software development teams in an FDA regulated environment
- Experience with video capture and editing applications and running a research lab

About the company:

Dynamic. Innovative. Devoted to uncompromising quality and customer satisfaction. These are the characteristics that make St. Jude Medical an international leader in devices to treat cardiac arrhythmias and the reasons why our company is the place to be if you want a career in this exciting sector of the medical device industry. Our technologies include defibrillators, pacemakers, and sensors, as well as all of the software systems and hardware platforms that are used by physicians and clinicians to interface with implantable devices. St. Jude Medical is a Fortune 500 company, and for two years running has been featured in the BusinessWeek 50 list of top-performing companies.

How to apply:

For immediate consideration email your resume to Marshall Van Wormer at mvanwormer@sjm.com. Please include "Human Factors" and your name in the subject line.

Job Opportunities, continued

Design Continuum seeks a Human Factors Practitioner

You must have a proven track record in the cognitive, behavioral, and ergonomic aspects of human factors including research, analysis, and usability test design and execution. Familiarity with FDA guidelines and other relevant experience in medical product design highly desirable.

You have demonstrable experience in user research and interaction/interface testing, have the flexibility and ability to adapt to changing constraints, and have the self motivation and ability to work alone or in interdisciplinary teams.

The ideal candidate will have a minimum of 3-5 years of professional practice, excellent verbal and communication skills, and a good understanding of design and technology. Advanced Degree in Applied Psychology or equivalent with specialization in Human Factors Engineering and Cognitive Psychology preferred.

Please email resume/cover to work@dcontinuum.com.

> ### *Hiring Managers!*
>
> Be sure to list job opportunities here. Email your job posting to jeanschiller@gmail.com, and we will post it in the next newsletter.

Job Search Resources

Are you in the market for a new job? Listed below are some helpful resources.

Job Search Sites

- Career Builder.   www.careerbuilder.com
- Monster. www.monster.com
- Hfcareers.com
- The HFES Career Center.   www.hfes.org/web/CareerCenter/Career.aspx
- Industrial Designers Society of America. www.idsa.org
- Usability Professional's Association.   www.upassoc.org
- Good Experience. www.goodexperience.com

Information Resources

The HFES website has well over a dozen articles on career issues and job searching, including the 2005 Salary and Compensation Survey. See http://www.hfes.org/Publications/

Don't Forget!

One of the best ways to hear about jobs and score an interview is through people you know. ***Networking*** is a key element in the job search. Take time to meet new people in the field, and sign up for networking sites like Linked In (www.linkedin.com).   Remember, the annual meeting is the key event for networking.

HFES 51st Annual Meeting — Join Us!

This year's annual meeting schedule is packed with activities related to product design.   Here is the planned schedule:

MONDAY, October 1st

    8:30 am – 4:30 pm   Design Chautauqua--Design Ethnography

TUESDAY, October 2nd

    3:00 pm – 5:00 pm   Sixth Annual User Centered Design Award

    5:30 pm – 7:00 pm   PDTG Annual Business Meeting

THURSDAY, October 4th

    8:30 am-10:00 am   Product Potpourri (includes topics related to office chairs, vibrating mice, a laparoscopic surgery tool, a hand-held neutron detector, a wearable vital sign detection system, and self-checkout systems.)

    10:30 am – 12:00 pm   Panel: Pointing Devices--Biomechanics, Designs, and Alternatives: An Update for 2007

FRIDAY, October 5th

    8:30 am – 10:00 am   Information and Instructions in Product Design

    10:30 am – 12:00 pm   Miscellanea: Methods, Tools, Aesthetics, and Evaluations

Don't miss our booth in the Exhibit Hall. The PDTG will be displaying products that have won the PDTG User-Centered Design Award in the past. It is a great opportunity to get an up close view of these amazing products!

Member Updates

Rob Tannen, Ph.D. has joined Bresslergroup as Director of Research. Headquartered in Philadelphia, the Bresslergroup has developed products for clients including Black and Decker, Becton Dickinson, Air Products, Motorola and others. Rob was previously Director of Human factors at Electronic Ink. He can now be reached at rtannen@bresslergroup.com .

Coming Events

HFES 51st Annual Meeting, October 1–5, 2007, Baltimore, MD.
  http://www.hfes.org/web/HFESMeetings/07annualmeetings.html

Industrial Designers Society of America Annual Meeting: ICSID/IDSA Connecting: 07, October 17--20, 2007. San Francisco, CA. www.idsa.org/ICSID-IDSA07/connecting.html

HFES Europe Chapter Annual Meeting, October 24–26, 2007. Braunschweig, Germany.
  http://conference.hfes-europe.org.

User Experience 2007, November 4-9, 2007. Barcelona, Spain. http://www.nngroup.com/events/

DUX 2007 – Conference on Designing for User Experience, November 5–7, 2007. Chicago, IL. http://www. dux2007.org

2007 New Zealand Ergonomics Society Conference, "Ergonomics Perspectives," November 7–9, 2007. Waiheke Island, New Zealand. New Zealand Ergonomics Society. http://www.ergonomics.org.nz

World Usability Day, November 8, 2007. www.usabilityprofessionals.org/worldusabilityday/

USAB 2007—Usability and Human-Computer Interaction for Medicine and Health Care, November 22, 2007. Graz, Austria. http://www.meduni-graz.at/imi/usab-symposium.

User Friendly 2007, November 23—25, 2007. Beijing, China. http://www.upachina.org/userfriendly2007/

User Experience 2007, November 4-9, 2007. Las Vegas, NV. http://www.nngroup.com/events/

3rd ACM/IEEE International Conference on Human-Robot Interaction, March 12–15, 2008. Amsterdam, Netherlands. http://www.hri2008.org

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