

THE ROLE OF USER CENTERED DESIGN PROCESS IN UNDERSTANDING YOUR USERS

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ABSTRACT

This paper describes a standard User Centered Design (UCD) process and the importance of understanding users in order to build better products. It details the steps necessary for implementation of a UCD process of understanding, designing and evaluating. Next the key concepts and deliverables in each phase of the process are outlined. Finally the application of a UCD methodology at Elsevier is explained.

This paper includes highlights from a 2003 field study, which researched the question, “how do scientists in key disciplines create and use information in their daily research practice in today’s information environment?”

The value of good design and its increasing importance to product development will be evaluated. A case study describing how the UCD methodology created a partnership between the librarian, researcher and developer in the creation of Scopus, a large bibliographic search and navigation system will be addressed.

INTRODUCTION

Years ago as technology driven products were created for people who were not technically savvy. The concept of helping people understand how to use technology developed. The quest became how to design products that people will use and buy. ¹

Human Factors Engineers were hired by corporations to make their technology driven products easier to use. User Interface designers were tasked with ensuring that the design of the interface was easy to use. Industry was striving to build products that would “delight customers” and they were driven by “the voice of the customer”.² Over time industry has moved away from simply creating an easier to use product to integrating into the user’s workflow and becoming an indispensable partner.

For the last several years companies have embraced a UCD methodology in developing their products. Companies have hired experts in the area of human computer interaction and information architects to ensure that products are task oriented and focus on the user needs, limitations and preferences rather than solely on the capabilities of the system.

Today, UCD departments can be found in most major corporations. In fact, the current move is beyond a UCD department focused on the user to a company wide culture focused on the user.

USER CENTERED DESIGN EXPLAINED

User Centered design is an approach to designing usefulness and ease of use into products and systems thereby creating a total customer experience. It is a design philosophy in which the emphasis is on the user and the aim is for a high level of usability. The UCD expert is focused on usefulness, ease of use and ease of learning for the user.

Human Computer Interaction (HCI) seeks to understand how humans interact with technology. The discipline of HCI experts is required in order for the user to have a good experience. The HCI expert not only listens to the customer but emphasis is placed on the actions of the user.³

A typical UCD process has three major phases-understand, design and evaluate. The steps in the process and the deliverables in each phase are detailed in this paper.

USER CENTERED DESIGN PROCESS AT ELSEVIER

In 2000 Elsevier created a UCD team, which has grown over the years. The team members are located in six locations, in three countries. The educational background of the team members is multidisciplinary. All team members have a masters or doctorate degree in one of the following disciplines: cognitive psychology, social psychology, library sciences, human factors, anthropology or instructional design (for e-learning projects).

The UCD team is involved in all aspects of user centered design for Elsevier. The members of the UCD team work on a multitude of projects and products. Two of the team members are experts in accessibility and one is a visual design expert. Many of the members of the team are experts in ethnography, contextual inquiry and usability testing.

The mission of the UCD team at Elsevier is to utilize UCD principles to assist in the creation of easy to use electronic products that maximize user satisfaction and meet business needs. The team works closely with product development and engineers to understand, design and evaluate.

Elsevier has several usability labs on site in major cities so that usability testing can be conducted in the Elsevier offices. The advantage to Elsevier is that the labs enable Elsevier employees (product and technology) to directly view the user interacting with the product.

Elsevier publishes several user centered design books and guides. Several of the books are considered “the most have” books on the topic of user centered design. Some of the best-known titles are: Observing the User Experience: A Practitioner’s Guide to User Research⁴, Contextual Design: Defining Customer-Centered Systems⁵, Understanding Your Users: A Practical Guide to User Requirements, Methods, Tools and Techniques⁶, Handbook of Human-Computer Interaction,⁷ Usability Engineering⁸ and GUI Bloopers: Don’ts and Do’s for Software Developers and Web Designers.⁹

The parent company of Elsevier, Reed Elsevier, has a core value of customer focus. Reed Elsevier has four divisions and each division has a UCD team. The UCD teams have a passion for understanding and exceeding our customers’ expectations.

USER CENTERED DESIGN PROCESS STEPS & DELIVERABLES

The three phases of a standard UCD process are understanding the users, designing the product and evaluating the users interaction with the product. Each phase includes specific deliverables and goals.

Understand

The first phase of the UCD approach is to understand the users, their tasks, and how they work (their environment). During this phase questions are asked such as, “What information resources are currently used?” “What is the user’s key job tasks and how do they accomplish them?” “What kind of problems does the user encounter on a day to day basis?” A UCD team will determine the answers to these questions by spending time with the user at the users work site and observing the user’s behaviour in completing daily work processes. Interviews are held with users and in some cases user profiles or modelling will be prepared.

An important component in the understand phase is to observe what the user is actually doing and not simply rely upon what a user reports that they do. We know that what people say and what they do and what they say they do are very different.¹⁰

In many cases, product designers and owners believe that they know and understand the users. Frequently that is not actually the case. In the understand phase, the UCD expert must distinguish between stereotypes and archetypes. Stereotypes reflect biases and assumptions and should be eliminated from consideration in the understand phase. Archetypes reflect facts based upon actual research. Archetypes should be an accurate reflection of the user and be the foundation for the design.

Field Studies represent one of the best tools to enable a solid understanding of the user. A field study includes a series of field investigations at the user’s business site. A valid field study attempts to understand the user and their information activity in their work environment by observing them at work. The field study does not focus on a product but rather on the users day-to-day activity.

In 2003 Elsevier conducted several field studies. Included are highlights from one such field study conducted at a center for molecular biology in the United States. The goal of the field study was to understand how scientists in different disciplines seek and use information in the research context. The methodology employed for this field study included open-ended rapid ethnography, contextual design analysis and modelling, activity theory analysis and deep descriptive analysis. The fieldwork included video interviews, observations, walkthroughs and a concept focus group. Thirteen users participated in maintaining a research task diary for a two-week period. The results of the analysis of the information collected from the information flow models, the physical models (maps and photos of work environment) and the activity models identified opportunities for new product development and a better understanding of the user’s behaviour.

Design

In the second phase of the UCD process designs are produced. The designs are based, in part, upon the activities completed during the user understand phase of the process as well as from general knowledge of human computer interaction capabilities and limitations. In this phase the information architecture for the product is created either from a prototype, static wire frames (screen shots) or a detailed specification. The UCD expert insures that best practices in design are followed. Good basic design principles include simple design, consistency in design, task efficiency and accessibility (for a user who may be handicapped). Usually a visual designer assists in creating the graphics and overall aesthetics of the product.

The product benefits of a good design have become increasingly important as evidenced by the large number of major publications with focus on the value of design.¹¹ Recently, the entire issue of Fast Company was devoted to design.¹² The overwhelming success of the Apple iPod and its variations clearly demonstrate how a good product design can embrace user needs and can continue to evolve over time. Many companies are emphasizing design as their competitive advantage. Nike, Google, Proctor & Gamble, Bose and Sony are some of the companies with a strong emphasis on design.

Evaluate

During the third phase of the UCD process the user evaluates the designs. During this phase the UCD experts test the assumptions and behaviour related to specific tasks. The evaluations may include testing with conceptual models or working prototypes. A usability test will evaluate the user’s ability to perform specific

functions with a prototype. Usability testing is the key method of validating the product design with the user. In the evaluate phase the product is tested, not the user. The motto often used in testing is that “there are no bad users only bad user interfaces.”

CASE STUDY-SCOPUS

Researchers require large amounts of data from a variety of sources in order to complete their work assignments. Scientific researchers are often overwhelmed by the huge amount of information available to them. Librarians are challenged to provide access to the universe of information to the end users. Many products that are available to access information are technology driven and therefore not easily accessible to the user. Elsevier was determined to build a new navigation tool, Scopus, to assist users.

Elsevier wanted to develop a system that would provide the researcher with the relevant information in an easy to use product. “Designing such a system requires a reliable and detailed grasp of how researchers approach an information retrieval task. It requires an understanding of a users workflow, information seeking behaviour and evaluation. Understanding research behaviour is not an easy task and cannot be done in isolation. It requires partnering with researchers to build the information system of their dreams.”¹³

Elsevier partnered with 21 institutions with 300 researchers on 4 continents for over 15 rounds of user testing. During the product development cycle all aspects of the UCD process were followed.

UCD experts conducted contextual interviews. The contextual interviews were structured one hour sessions held at the user’s work site. Observations, as well as, interviews were conducted at that time. Identifying the researchers tasks and goals was a key for future work. The same users were contacted repeatedly to review progress. Static pages, wire frames and prototypes were shared with users in order to elicit feedback.

Based on the continuous interaction with users an easy to use product was developed. When the product was released in 2004 it received very favourable reviews on its ease of use by users and industry publications. Scopus marketing has relied heavily on the interaction of Elsevier with the development partners and customers to create an easy to use and very intuitive product. Scopus is “a product designed by scientists for scientists”. Scopus is an excellent example of how the UCD process had a direct impact on the product by creating a better customer focused product.

¹ Beyer, H., and Holtzblatt, K. Contextual Design: Defining Customer-Centered Systems. San Francisco, CA, Morgan Kaufmann, 1997.

² Griffin, A. and Hauser, J., “The Voice of the Customer,” Applied Marketing Science, Winter, 1993.

³ Shneiderman, B. Designing the User Interface: Strategies for Human-Computer Interaction (Third Edition). Reading, MA, Addison-Wesley, 1998.

⁴ Kuniavsky, M. Observing the User Experience: A Practitioner’s Guide to User Research. San Francisco, CA, Morgan Kaufmann, 2003.

⁵ Beyer, H., and Holtzblatt, K. Contextual Design: Defining Customer-Centered Systems. San Francisco, CA, Morgan Kaufmann, 1997.

⁶ Courage, C., and Baxter, K. Understanding Your Users: A Practical Guide to User Requirements, Methods, Tools and Techniques. San Francisco, CA, Morgan Kaufmann, 2005.

⁷ Helander, M. Handbook of Human Computer Interaction. Amsterdam, The Netherlands, North-Holland, 1993.

⁸ Nielson, J., Usability Engineering. San Francisco, CA, Morgan Kaufmann, 1993.

⁹ Johnson, J. GUI Bloopers: Don'ts and Do's for Software Developers and Web Designers. San Francisco, CA, Morgan Kaufmann, 2000.

¹⁰ Margaret Mead.

¹¹ "Bottom Line Design Awards," Business 2.0, April 2005 and "The Power of Design," Business Week, May 17, 2004.

¹² "Masters of Design", Fast Company, a special issue, June 2005.

¹³ De Groot, S.P, and Knapp, A.E., "Applying the User-Centered Design (UCD) Process to the development of a large bibliographic navigation tool: a partnership between librarian, researcher and developer." Elsevier white paper, June 16, 2004.