User-Centered Web Development

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Thank You.

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ABSTRACT

Nowadays, we humans interact with computers at some point or other while trying to fulfil our daily needs. We as users have a two-way relationship with products we use and its services. Sometimes they empower us or frustrate us; some interactions can be simple or complex for our lives, they might bring us together or lead us astray. As we interact with numerous websites every day in search of some product/information we expect excellent services by the products' website.

The web developers are responsible for the dynamics that go in the background of a site just to keep us entertained. Some websites are successful in retaining its users and even bringing new users to itself, others may not.

For this very reason Web Developers study new research in the field of Human Computer Interaction (HCI) and try to incorporate the findings while designing websites.

This results in User-Centered Websites which are visually appealing and cognitively riveting for users.

1. INTRODUCTION

People often interact with websites in numerous ways. The key factors for every user interaction with the worldwide web can be classified as self-motivated and externally motivated. The user proficiency might vary from expert or novice; young or old; expectations and needs; simple or complex. As website developers we need to take such issues into account. E.g., Why do people go to Websites? What they intend or accomplish at website? What topics influence their experience?

From a developer's point of view a website is a set of sequences, mostly iterative, starting with requirements definition, planning and conceptualizations, followed by design, version production, and evaluation/testing, before the commercialization of the site. All requirements are achieved by fully integrating websites with Usability.

Developing a website takes a team of passionate people. Within this team, the role of a usability engineer (UE) is integral to design a web as Usability brings in user-centered perspective.[1]

Designing a user-centered website serves variety of purposes, updating, maintaining, or adding new functionality, creating a new one, introducing new legacy site, refurbishing. Websites are not user centered, inherently but becomes user centered after integrating usability within a site.

Such processes define certain activities and roles, that itself stands upon trivial definitions of tools input, concepts, outputs. From the start, design users' attributes and needs, must share an understanding with web designers. This is often achieved by conducting user end experiments to understand what intrigues users. The data collected is analyzed to draw useful conclusions and then integrated into a site. This understanding underpins the collaboration necessary to incorporate user-centered processes into Web site development.

The key factors responsible in designing a user centered website are:
•Software engineering • Usability engineering • Integrating usability engineering into software engineering lifecycles • Lifecycle activities • User interface   • Usability • Users

Fig 1: Web Development lifecycle
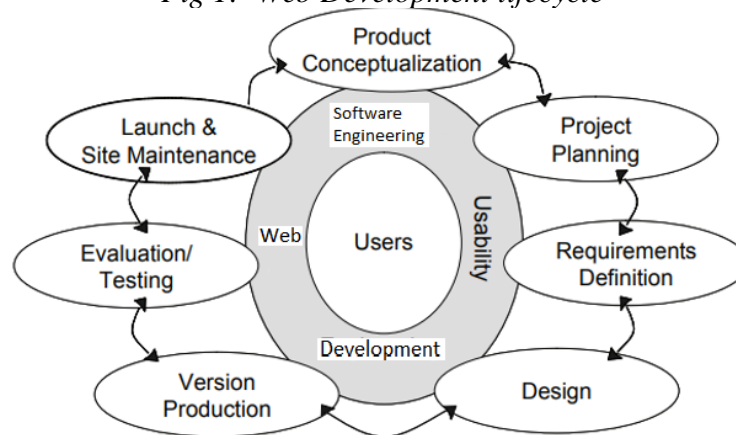
2. PSYCHOLOGY RESEARCH PARTICIPATION SCHEME EXPERIMENTS

I used the SONA platform to volunteer myself to participate in research. As an ANU student from COM6780 I earned course credits for my course. After I participated in an experiment, the researcher granted me credit within 48 hours of the timeslot. I took part in plenty of experiments and earned a credit score 3.25, but this report concerns my two of the most intriguing experiments. (www.anupsych.sona-systems.com)

2.1 EXPERIMENT 1

Titled "The Causes and Consequences of Attentional Re-sizing Flexibility" was a fascinating survey conducted by Dr. Stephanie Goodhew from Research School of Psychology, ANU. It was a way of testing the relationship between flexibility in resizing attentional breadth, and the perceptual benefit one receives from adopting different attentional breadths. Attentional breadth refers to how narrow/wide anyone's attention is allocated.

The general methodology entails the presentation of visual stimuli (e.g., in this experiment, different English letters were built using an arbitrary alphabet) on the screen, as a user (18 years or older) I was asked to make rapid responses about the alphabet which made the correct letter. I was given the task to identify 'T' or 'H' and type the respective key on my keyboard as soon as possible when any letter comprising of only 'T's or 'H's appear (a big 'H' made up of tiny 'T's). I was also asked some demographic questions (e.g., your age, gender, and country of birth). I was given the flexibility to decline answering any questions that I do not wish to share. Participation was fully online and lasted for approximately 45 minutes. It was conducted and administered via Testable (www.testable.org).
The platform and the experiment itself were extremely invigorating, it was more like an online puzzle game for me, and I enjoyed every minute of it.

The experiment suggests that a narrow Attention-Breadth means better spatial resolution and faster responses, whereas a broad one means better integration of complex stimuli like faces. So, in real-life, we need to dynamically resize attentional breadth to meet different tasks. Some previous work of the researcher suggests that there are large individual differences in this process, with some people doing it almost instantaneously, and others taking ~500ms. It raised some concerns whether people really are doing super-fast resizing, or perhaps they're not really optimising their breadth for the task at hand. So, this experiment can successfully measure individuals' attentional resizing time, and then their perceptual benefit in identifying a single letter when most trials in the block broadened their attention (the global stimuli) versus narrowed them (the local stimuli). If people really are resizing, there shouldn't be a correlation between these. If people sacrifice optimising for flexibility, then there should be.[2]

The major strengths of this experiment in my opinion are that it could improve our theoretical understanding of the mechanisms of attentional re-sizing and provide practical insight into how resizing efficiency might be enhanced (e.g., training sessions) in young healthy adult humans. The only drawback I experienced was the non-stop evaluation of the experiment. For entire 45 minutes I was not given any break, I could feel myself losing interest due to exhaustion and fatigue that eventually resulted in a poor performance during last 15 minutes. I suggest, I could contribute better, if I was given the choice to pause/resume in between.

2.2 EXPERIMENT 2

Titled "Beliefs about Expressing Emotions Study" was a heartwarming survey conducted by Ms. Paige Mewton, PhD candidate from College of Health and Medicine, ANU.
It was a study aimed to understand students' beliefs about how they should express emotions, and how these beliefs relate to their emotional wellbeing. I asked about my beliefs about expressing my emotions in front of different people, and about your emotional wellbeing and empathy. I also answered a demographic questionnaire (e.g., age, gender identification, ethnicity, country of birth, English language fluency) and some questions about social status. It was promised that all data was collected anonymously, with no record of your name or date of birth. Qualtrics (www.anu.au1.qualtrics.com) was the platform used for the survey.

The experiment was a collection of emotional states and statements about my everyday experience for the past few months. It used a scale from 1-6, all the six scales showed some kind of options to choose from such as, (not at all/a little/moderately/quite a bit/extremely), (never/very/ seldom/seldom/sometimes/frequently/almost always/always), (didn't apply to me/applied to some degree/applied to a considerable degree/applied to me very much).
The questionnaire started with some simple questions about the emotions I had been feeling lately. For example, was I feeling interested/upset/excited/guilty/hostile/proud/ashamed/alert etc. I needed to choose the amount of degree I felt on the scale provided. The questions exponentially raised my interest, as I had not given thoughts to these feelings for a while. Later on, as the questions got deeper, I started recollecting more and more memories much more frequently in respect to the questions. For example, did something unpleasant /painful/disturbing/regretful/unforgettable happen recently. To be honest, the survey got me in a turmoil of my own memories. Lastly, the questions got a bit depressing for me, such as feeling downhearted/less enthusiastic/meaningless/blue/broken etc. I was myself surprised to find that I experienced so much negative feelings in a very short time. The experiment was riveting down to every question, and the platform was very adaptive, but little personal.[3]

I voluntarily participated in this excellent survey as I believe this could help researchers to understand better how people's beliefs about how they should express emotions differ across cultures when they study data collected from approximately 600 ANU students from all ethnic and national backgrounds. Some are, Caucasians (Britain) born in Australia or Western Countries, East or Southeast Asians (e.g., Chinese, Indian, Japanese, Malay, Singaporean etc.). This also helped me learn about research process.

The major strengths of this experiment in my opinion are that it could improve our theoretical scientific understanding of emotions in males and females across different countries and various cultures. The only drawback I experienced was some extremely sad questions, though a list of ANU helping committee was provided, I think a joyous video could be added at thee end to lighten the mood. Otherwise, the 30 minutes I spent with my brain recollecting memories was soul touching.

3. HUMAN COMPUTER INTERACTION (HCI)

Human Computer Interaction (HCI) is the discipline in Computer Science that deals with the designing, evaluating, and implementing interactive computing programs for human ease and with the study of the major phenomena surrounding them.

While designing the developer must keep in mind:

- Content or Context
- User's Cognitive Abilities
- User's Memory

A computer is fed data by translating the user's senses (see, hear and touch) into digital form, that enables users to understand what is happening around them. Designing good Websites requires knowledge about how users perceive the experience, the easiest way to study the concept of "user-centred designing" is by performing user end experiments. Context is the strongest pillar that holds a website, what a user sees, has a major effect on the usability of a website.[1]

Memory, humans, tend to have a limited memory. Designers don't exceed this number, as a result content can be retained by users with faster recall.

Affordance, the services played by an interface. For example, a Hyperlink. Designers make sure users' perceived affordances are both visible and obvious in nature.

Feedback, users get frustrated easily when they perform an action on a site when the action doesn't translate into anything meaningful, designers always ensure that there is feedback for every action.

Designers' priority is to provide consistency and navigation capability to users.

4. ELEMENTS OF USER-CENTERED MODEL

A user-centered web development is a subdomain of Human Computer Interaction (HCI), that incorporates the findings from user-evaluation experiments to web designing.

4.1 USABILITY

People often misunderstand usability (user-centered designing) as obvious (able to derive from common sense), but vague and unstructured. Whereas the field has its own established processes and definitions. For Web Developers, a strict definition focuses on users' needs and a goal of meeting those needs through usability engineering processes. Users' needs in the context of human-computer interaction (HCI), specifically as users interact with Web sites.

The International Organization for Standardization (ISO) states usability as the user interaction attributes with software products in specific contexts per usage: efficiency, effectiveness, and user satisfaction [1]. We muster these attributes to two outcomes: (1) user success and (2) user satisfaction. Throughout user centered designing, we draw inferences from a specialized branch of usability called accessibility. Accessibility enables people with disabilities to experience success and satisfaction with websites comparable to that enjoyed by people without disabilities.

4.2 USERS

Users are people who interact with Websites. Whereas technically speaking, users are (also known as end users), the people who visit Web sites and interact with their content of their interest.[1] The term user excludes people employed in a Web site project, for example, the Designers. It excludes the site's providers and stakeholders in the Web site. People close to the project run a high risk of unintentionally clouding their view of users' needs with their own commitment to achieving the project's goals. Many variables are inherent to users, for example, age, gender, presence of physical or cognitive disabilities are intrinsic in nature but variables, such as working environment are extrinsic, both affect the user experience.

Many user attributes might decline with age, for example, recalling memories. A user is unique and brings a set of varying capabilities and limitations when interacting with a website. Staying on a site for prolong period can further limit user actions by inducing, noise, fatigue, exhaustion, and other stress.
Correctly applying such research findings to website design is the designer's responsibility. By offering such arrangements, the site accommodates more users. Designers must know the details about the site's targeted audience to gain better user satisfaction with future needs in mind.

4.3 USER PARTICIPATION

It is imperative to engage users while designing a website because user action are independent, not influenced by developers. User behavior cannot be anticipated every time. Frequent experiments are conducted in order to help developers estimate user behavior as users always do what seems logical to them. Such experiments also align with stakeholders' goals. Experiments can be conducted with focus groups and interviews or surveys. Observations are made with the help of experiment data and analyzed to develop various interactions. It is a key role of designers and developers to incorporate user needs into interactive design interfaces that promote users' satisfaction and success.

4.4 USER.INTERFACE

A user interface (UI) is software that people use to interact with technology. For UEs it is a matter of layers. It is the look-and feel layer. It refers to what users see and hear. Every UI includes user's actual and expected mode of interaction. UI is the ultimate virtual place where the designers' system model meets the user's mental model.

4.5   USABILITY DESIGNERS (UD)

The UD comprehend the complexities involved in any user group and apply this comprehension to achieve users' success and satisfaction. Web site usability is defined by UD because as technology progresses so does people's styles of using them. The UD communicate with users, stakeholders, and other members of the Web site development team. Usability influences users' impressions of the site providers' trustworthiness and integrity. Usability has interdisciplinary team, cognitive psychology, biology, linguistics, software engineering, technology, and graphic design. Research and experience-based activities promote usability. UD takes care about users always feeling in control. While promoting users' success and satisfaction, remember to promote stakeholders' aims.

4.6   WEB ENGINEERING

Web engineering is the application of a quantifiably systematic approach to the development, maintenance of a website. An engineer often has two roles, project manager and computer scientist. On a huge Web project, engineers look into both the technical and management aspects of development. They accomplish this by following predefined lifecycles. (See fig.1)

5.   CONCLUSION

In conclusion, user performed experiments are the most reliable methods for data collection in order to analyze and scrutinize user needs when customizing a website and imbedding stakeholder's perspective without compromising with user demands bring satisfaction and success to anyone who interacts with it. As technology changes, so does user perspective. Hence, it is the duty of a web developer to keep the website relevant with respect to time.

6.   REFERENCES

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[2]   Information Sheet (The Causes and Consequences of Attentional Re-sizing Flexibility) by Dr Stephanie Goodhew in the Research School of Psychology, College of Health and Medicine, at the Australian National University (stephanie.goodhew@anu.edu.au)

[3]   Information Sheet (Beliefs about Expressing Emotions Study) by Dr Paige Mewton and Dr Amy Dawel, at the Research School of Psychology, CHM, The Australian National University (Paige.Mewton@anu.edu.au)