

Enhancement of User Experience by Task Analysis: A Proposal

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Abstract:

This research Investigated how Task Analysis allows user to accomplish their task and obtain the information they require in an efficient and effective manner. In this modern era Usability has become major factor for the use of any product or system can be enhanced through many ways. Usability of websites is the major issue user finds difficulties to find its desired stuff or information the website. Usability can be defined as necessity for web. If a website does not fulfil the needs of the user or it is difficult for a user to use, the user will leave the page. The research deals with the enhancement of user experience by task analysis. It would be helpful to remove the shortcomings or flaws of existing websites. Fig 1 highlight the framework of this research.

This research will use survey method and card sorting technique along task analysis for redesigning. The proposed design would be according to the user's need and easy for user to fulfil its goal.

Keywords: Usability, Task Analysis, User Experience

I. INTRODUCTION

Usability has become a competitive factor for any system or product. The process by which one achieves good usability in a product is known as User-Centered Design (UCD). This is also referred to as usability engineering or human-centered design (1). In this modern era when usability has become major component for the use of any IT related product or any system or web, the need of enhancement of usability for any product, system or web.

Usability of any product or system can be increased through many ways. First thing to do is check the existing or running system, product or web by testing its usability. Usability inspection can be done by using Task Analysis technique (TAT). Through TAT usability issues can be highlighted. To resolve problem for any web or system TAT would be helpful to gain the user's desired system or web with high usability.

Today, the satisfaction with actual usage aspects is still lower compared to the technical and functional aspects of software used in SMEs. However, in parallel we have seen that usability is considered as equally important as technical and functional aspects (2). In this era when the need of website has highly increased it is also important to increase the usability of websites and to facilitate user as per its needs.

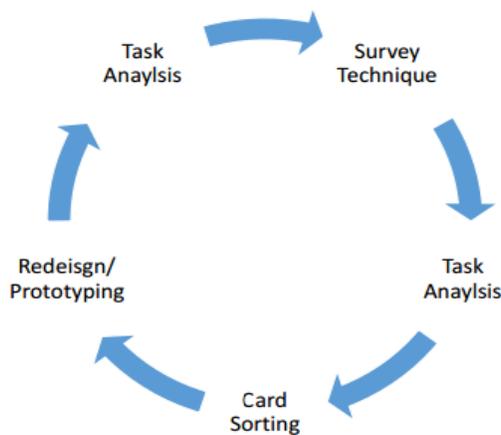


Fig 1: Framework

To enhance the usability of the website in this research different websites would be evaluated through Task analysis. Survey technique would be used for gathering data from user. Usability can be enhanced by using

II. LITERATURE REVIEW/USABILITY

Usability can be defined as: interaction between the user and the product or with the system. Usability is the measurement of a product's potential to accomplish the goals of the user also referred to be as usability. While the ease of use and learnability of a human-made object such as a tool or device also belongs to usability.

The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use (3).

A product can't be usable or unusable by itself, its features or attributes which determine its usability. Any change in the system or product or in environment or task can be the reason of change in the product's or system's usability. Usability can also be defined as following terms:

- **Learnability:** How easy is it for users to accomplish basic tasks the first time they encounter the design?
- **Efficiency:** Once users have learned the design, how quickly can they perform tasks?
- **Memorability:** When users return to the design after a period of not using it, how easily can they re-establish proficiency?
- **Errors:** How many errors do users make, how severe are these errors, and how easily can they recover from the errors?
- **Satisfaction:** How pleasant is it to use the design?

A. Usability and its importance

On the web, usability is the key to survive. Usability can be used as necessity for web. If a website does not fulfil the needs of user or it is difficult for a user to use, the user will leave the page. Same like this if your homepage doesn't deliver the purpose of your website then it would be useless to develop it.

Usability is the most important factor for any web. According to Jakob Nielsen, if the user task or requirement is being fulfilled and the user is spending enough time on website to achieve its goal and getting desired result it would be by providing maximum usability (4).

The result of a research shown that usability is very important in order to develop favorable perception of the

different methods. With the help of usability techniques and user involvement, will enhance the user experience. And also gives the user desired result and ease to achieve its goals.

user. Globally, the researcher has found four usability factors out of five measured to be significantly related to the trustworthiness of the vendor (5). Therefore the researcher has concluded that the usability of a website has an impact on the establishment of trust (6).

B. GOMS Model

It is useful to analyze the knowledge of how to do a task in terms of goals, operators, methods, and selection rules (7). An approach to describe the knowledge of procedures that a user must have in order to operate a system. This method was proposed by Card, Moran, & Newell (8).

Goals - what goals can be accomplished with the system? (9)

Operators - what basic actions can be performed? (10)

Methods - what sequences of operators can be used to accomplish each goal. (11)

Selection Rules - which method should be used to accomplish a goal.(12)

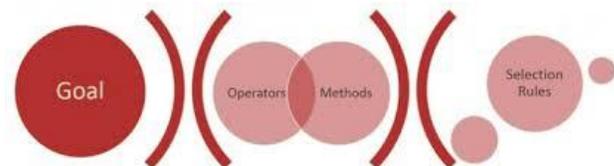


Fig no 1

C. GOMS and Task Analysis

Hierarchal Task Analysis (HTA) differs from GOMS. In HTA it considers only physical activity (not cognitive tasks), and focuses on plans (rather than selection rules). Conversely, large-scale tasks can be described using HTA whereas only a dedicated person with too much times on their hands would complete a GOMS analysis for such large tasks (it would take weeks of effort to do it thoroughly). If using HTA as a guide for implementation or for detailed documentation, a fairly fine grain of detail (down to the individual action level) may be necessary. Where it is being used to help get an understanding of the domain tasks, less detail may be appropriate (13).

D. Task Analysis

Task analysis means learning about users' goals and users' ways of working. Figuring out what more specific tasks

users must do to meet those goals and what steps they must take to accomplish those tasks also meant to Task Analysis. Along with user and task analysis, a third analysis is often used: understanding users' environments (physical, social, cultural, and technological environments). TA methods can be used to eliminate the preconditions that give rise to errors before they occur.

They can be used as an aid in the design stage of a new system, or the modification of an existing system. They can also be used as part of an audit of an existing system. (1 4) .

The technique should be used during the analysis phase of design to ensure proper description of user activities. It can be used to analyses interactions with an existing system or as a means to structure discussions about a hypothetical product. (15).

1) Purpose of Task Analysis

Performing a task analysis helps you understand:

- What your users' goals are; what they are trying to achieve
- What users actually do to achieve those goals
- What experiences (personal, social, and cultural) users bring to the tasks
- How users are influenced by their physical environment
- How users' previous knowledge and experience influence:
 - o How they think about their work
 - o The workflow they follow to perform their tasks

2) Types of Task Analysis

There are several types of task analysis but among the most common techniques used these are:

- a) Cognitive Task Analysis is focused on understanding tasks that require decision-making, problem-solving, memory, attention and judgment. The task analysis techniques described in the previous section are mainly oriented towards observable actions.
- b) Hierarchical Task Analysis is focused on decomposing a high-level task subtasks.
 - Involves breaking a task down into subtasks, then sub-tasks and so on. These are grouped as plans which specify how the tasks might be performed in practice

- HTA focuses on physical and observable actions, and includes looking at actions not related to software or an interaction device.
- Start with a user goal which is examined and the main tasks for achieving it are identified.

3) Task Analysis and Benefits

- Through a task analysis you can attain a clear definition of what resources, and results are related to current tasks that are (or will be) related to your program or project (16).
- By using a task analysis to systematically review the completion of current tasks and their results your needs assessment will be better prepared to make recommendations regarding changes to current procedures and/or new tasks (17).
- A task analysis will help you identify both what is working well and what is not working as well within the current system or organization (18).
- HTA is an economical method of gathering and organizing information since the hierarchical description needs only to be developed up to the point where it is needed for the purposes of the analysis (19).
- The hierarchical structure of HTA enables the analyst to focus on crucial aspects of the task which can have an impact on plant safety (20).
- When used as an input to design, HTA allows functional objectives to be specified at the higher levels of the analysis prior to final decisions being made about the hardware. This is important when allocating functions between personnel and automatic systems (21).
- HTA is best developed as collaboration between the task analyst and people involved in operations. Thus, the analyst develops the description of the task in accordance with the perceptions of line personnel who are responsible for effective operation of the system (22).
- HTA can be used as a starting point for using various error analysis methods to examine the error potential in the performance of the required operations (23).

4) Task Analysis and Websites

By using testing technique “Task Analysis” any system or website can be evaluated. Task Analysis can help to check following things:

- Goal: Things they wants to do.
- Task: What things they use.
- Action: What they must know.

To check usability of website Task Analysis technique applied on different websites following are the few examples of Task Analysis and usability issues:
Example: Master Sanitary Fittings Website

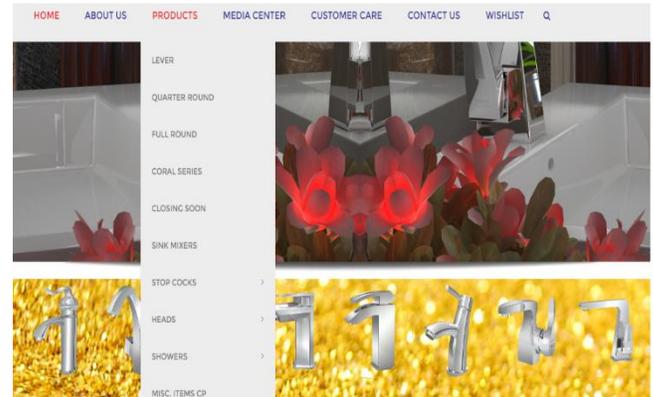


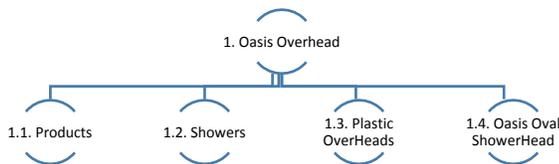
Fig no 2

On the website user need to search for a specific product of a sanitary. It would go for products list on the homepage and will go for the sub-tab of products which is of shower.



Master Sanitary Home Page

Now the task is to search to search oasis overhead (product of Master Sanitary), following is the hierarchy how a task is divided in to sub-tasks:



Product Search

Now above mentioned Fig is the simple Task performed on SME’s website. In above mentioned hierarchy the goal of a user is to search Oasis overhead, next is the task user performed to achieve its goal and the actions user know before performing the task. Now following are the screenshots of website on which a task is performed:



Fig no 3

In figure 2 users has find its desire product is the sub- tab of products, which is shower. This is an example of a task performed on the website.

E. Card Sorting

The term card Sorting applies to a wide variety of activities involving the grouping and/or naming of objects or concepts. These may be represented on physical cards; virtual cards on computer screens; or photos in either physical or computer form (24).

Following are the methods of card sorting:

Open Card Sorting: Participants are given cards with no pre-established groupings. They are asked to sort cards

into groups that they feel are appropriate and then describe each group.

Closed Card Sorting: Participants are given cards showing site content with an established initial set of primary groups. Participants are asked to place cards into these pre-established primary groups. Closed card sorting is useful when adding new content to an existing structure, or for gaining additional feedback after an open card sort

There are few advantages of card sorting which are above mentioned:

Simple – Card sorts are very easy to implement by organizers and participants as well.

Cheap – Cost of a stack of 3×5 index cards, sticky notes, a pen or printing labels, and your time.

Quick to execute – Can perform several sorts in short time that gives significant amount of data.

Established – The technique has been used for over 10 years, by many designers.

Involves users – Information structure suggested by a card sort involves real users and hence it should be easier to use.

III. PROBLEM STATEMENT

With the needs of any common searcher or a user of website, a website also fulfils the needs of its organization. In this era where the users are being facilitate by electronic information, users are also facing many problems. The major issue of interfaces or of websites is “Usability”. Users are encountering usability issues on the many interfaces and websites, also unable to find their desired information on the websites. This is the major problem of having worst “User Experience”.

IV. RESEARCH QUESTION

This research investigated how task analysis allows user to accomplish their task and obtain the information they require in an efficient and effective manner. Therefore, the research question is as follow:

- How can Task analysis enhance the user experience?
- The main research question has been split into the following sub-questions: How does Task Analysis influence user?

- How can Task Analysis identity areas for design improvements?
- How can these areas be used to design?
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V. AMIS AND OBJECTIVES

In order to investigate the abovementioned research question, the study aimed to achieve the following specific aims and objectives.

A. Aims

The research addressed the above research questions by investigating:

- How to understand User-Centered design techniques
- How these techniques can be leveraged for user interface design
- What impact these techniques have on usability adoption

B. Objectives:

The objectives of the research are:

- To understand how Task Analysis can increase the effectiveness and efficiency of user interface design.
- To develop a process model of user interface design
- To develop and evaluate experimental user interface design

VI. METHODOLOGY

A. Participants:

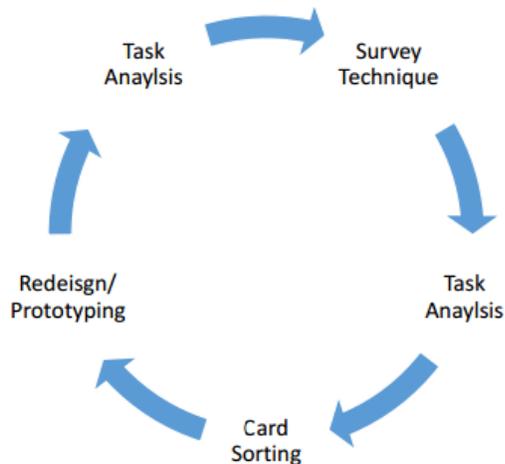
In order to gather the information from different users and people from different groups related to different domains the survey method would be used through the method of questioner, the information would be gather from different people. Data would be also collected from specific group of people who are directly involved in those domains.

B. Methodolgy:

Task Analysis technique would be used to check the usability of existing websites. Through the Task Analysis the websites would be evaluated. The comparison of different websites in Pakistan would be done.

In next phase card sorting technique, would be used to have a view of user that which kind of website or platform a user needs to have.

In the last phase, the modification in the website would be done according to the need of user and demand of the era. Through task analysis the redesigned website would be evaluated.



VII. EXPECTED RESULT

By evaluating existing website through Task Analysis it would be helpful to overcome the shortcomings or flaws of existing websites. By using survey method, will gather information what are the need of user and it would be helpful for redesigning the website and with the help of Task analysis redesigned website would be reevaluate to enhance the usability of the website.

VIII. SIGNIFICANCE

With the deployment of proposed method a new design would be developed to facilitate user and to enhance the usability. The proposed design would be according to the need of user so it can be easy for user to fulfil its goal by performing same tasks which was not fulfilling the need of user in existing website.

REFERENCES

- [1] Speicher, Maximilian. "What is Usability? A Characterization based on ISO 9241-11 and ISO/IEC 25010." arXiv preprint arXiv:1502.06792 (2015).
- [2] Nielsen, Jakob. "Usability 101: Introduction to usability." (2003).
- [3] Lapin, Kristina. "Task analysis."
- [4] Embrey, David. "Task analysis techniques." Human Reliability Associates Ltd 1 (2000).
- [5] Scheiber, Florian, et al. "Software Usability in Small and Medium Sized Enterprises in Germany: An Empirical Study." Software for people. Springer Berlin Heidelberg, 2012. 39-52.
- [6] O'Connor, Rory V. "Exploring the role of usability in the software process: A study of irish software smes." European Conference on Software Process Improvement. Springer Berlin Heidelberg, 2009.
- [7] Smith, Stephen M., et al. "Advances in functional and structural MR image analysis and implementation as FSL." Neuroimage 23 (2004): S208-S219.
- [8] Aubert, Benoit A. "The impact of interface quality on trust in web retailers." Cahier du GRESI no 1 (2001): 05.
- [9] Embrey, David. "Task analysis techniques." Human Reliability Associates Ltd 1 (2000).
- [10] David E. Kieras. "GOMS Models- Simplified Cognitive Architectures" (2016)
- [11] John. Bonnie E., and David E. Kieras. "Using GOMS for user interface design and evaluation: Which technique?" ACM Transactions on Computer-Human Interaction (TOCHI) 3.4 (1996): 287-319.
- [12] Brooke, John. "Usability, change, adaptable systems and community computing." Proceedings Fourth International Conference on Human-Computer Interaction. Vol. 2. 1991.
- [13] Rocha, Álvaro. "Framework for a global quality evaluation of a website." Online Information Review 36.3 (2012): 374-382.
- [14] Lew, Philip, Luis Olsina, and Li Zhang. "Quality, quality in use, actual usability and user experience as key drivers for web application evaluation." International Conference on Web Engineering. Springer Berlin Heidelberg, 2010.
- [15] Speicher, Maximilian, Andreas Roth, and Martin Gaedke. "Inuit: The Interface Usability Instrument." International Conference of Design, User Experience, and Usability. Springer International Publishing, 2015.
- [16] Hudson, William. "Card sorting." The Encyclopedia of Human-Computer Interaction, 2nd Ed. (2013).