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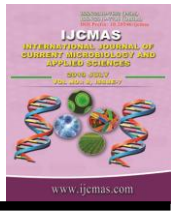

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Protocol for User-Centered Website Development for the Directorate of Extension, Kerala Agricultural University - A Model Work

N. Mridula*, P. Ahamed and S. Helen

Central Training Institute, Kerala Agricultural University, Mannuthy, Kerala-680651, India

**Corresponding author*

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A B S T R A C T

Any information system that is developed without considering the needs of the user fail to achieve the goals for it stands. Considering that view, the design of a User-centered bilingual website was done as per ISO 13407 guidelines for strengthening the cyber extension activities of the Directorate of Extension (DoE), Kerala Agricultural University (KAU). A user-centered design (UCD) of the website optimizes it around how the end-users want, or need to use it, rather than forcing them to accept it. The website thus developed after prototyping can be a better tool for agriculture extension. This study came up with an eight step protocol (sequential steps and procedures) for the development of a user-centered website, which can be adopted for the future works in the same line.

Introduction

In the present digital era, websites serve as one of the most important sources of information as they are the primary points of interface between the end-users and the organisation. However, it is a truth that most of the websites are created without the user in mind and this makes the use of such websites a chore to the end-users. A User-Centered Design (UCD) of the website would be a workable solution to this problem. A UCD can take care of the strategic objectives of the organisation as well as the needs of the end-users. Information systems like websites are to be developed around the needs of the user (Norman and Draper, 1986) without which they would be unable to achieve their goals (Preece *et al.*, 1986). An ideal website should maintain a good balance between sophisticated technology and cohesive, consistent user experience to support it (Garrett, 2003).

In order to strengthen the cyber extension activities of the Directorate of Extension (DoE), Kerala Agricultural University (KAU), a need-based, demand driven web interface was essential. The objective of the study was to make that idea a reality, by designing a user-centered bilingual website as per ISO 13407 guidelines. The web prototype which

was developed as a part of this project gave insights about the needs and preferences of the primary stakeholders of an agricultural extension website, viz. scientists, extensionists, and farmers. Above all, the study came up with an eight step protocol for the user-centered web development which could be useful to the future researchers in the same domain.

Materials and Methods

This study was an action research based on the guidelines for UCD project as per ISO 13407 (1999). The ISO 13407 guidelines for UCD project included four main processes such as: (i) Requirement specification (ii) Requirement gathering (iii) Design, and, (iv) Evaluation. Requirement specification described the purpose and defined the users of the product. Requirement gathering enquired the type of content and design suitable for the website as per the information needs of the targeted population. Then, a web prototype was physically designed as per the requirements of the end users. Finally, it was evaluated for its performance and tested for its usability. Based on the results of evaluation and testing, the web prototype was modified. It was then used as a base for developing the final UCD website for DoE, KAU.

All the procedures involved in this process were shaped into a protocol that would give directions to similar projects in the future. This eight step protocol was based on web prototyping. A web prototype is a rudimentary working model of a website, usually built for demonstration purposes or as part of the development process. The prototype is considered as the "basic version that is built, tested, and then reworked as necessary until an acceptable prototype is finally achieved from which the complete system can be developed" (Rose, 2005). A prototype model is usually built to test a concept or to act as an early platform to validate that a design meets the target users' requirements. The prototype will typically include as many, if not all, priority aspects of the design including the hardware/software operation, mechanical and external interfaces (Bailey, 2011).

Results and Discussion

Protocol for the development of a user-centered website

The processes followed for the design and development of the user-centered bilingual extension website for the DoE, KAU is shown in the Figure 1. This easy to follow sequential steps and procedures (protocol), will be helpful to the future researchers in the same line.

The first step was to specify the purpose of the web prototype which was to act as the foundation for the prospective final website. The purpose of a scientific organisation's website can vary from data management to administration, from an academic platform to an extension interface. This defines the overall goals for the website. Here, the prototype was for the Directorate of Extension, Kerala Agricultural University (KAU) to act as an interactive online agricultural extension platform providing latest technologies, information and online consultancy services of KAU.

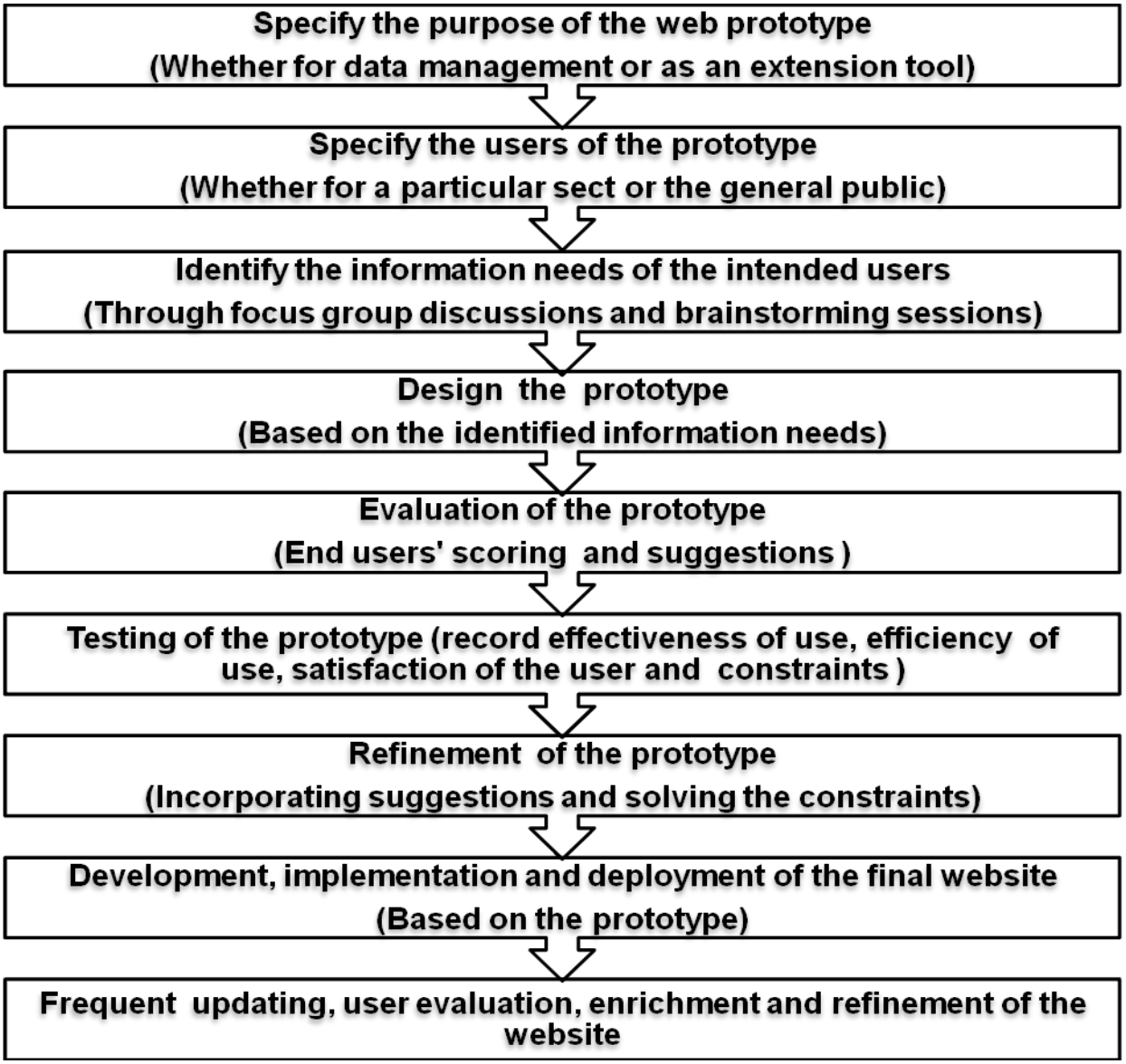
Next, the population of target users of the prospective website was to be defined. The target population can be a specific group, like children as for the cartoon websites, or the general public as in the case of public organizations or news agencies. The web prototype here being an agricultural extension website for an agricultural university, the predominant users were defined as the agricultural scientists, agricultural officers and farmers who were regular internet users. The

other potential clients were identified as agripreneurs, researchers, school /college students, self-help groups, non-government organizations, banks, policy makers, other line departments, and private sector organizations.

The third step was to analyse the information needs of the target groups. Information need is a factual situation in which there exists an inseparable interconnection with information and need. It contributes to the achievement of a genuine purpose (Prasad, 2012). In this study, information needs were collected using structured questionnaires, focus group discussions and brainstorming sessions.

Information need indices (INI) were calculated and the contents were selected for the web prototype based on these indices. The respondents were free to give their preferences and suggestions about the contents and design of the DoE website.

Fig.1 Suggested protocol for the development of a user-centered website



The prototype was then physically designed based on the information needs of the selected

stakeholders. This included technical developments like navigation design, page design, content design and the like, which were done manually and by using suitable web applications. Resultantly, a high fidelity website prototype (primary) was developed as a sub-domain after incorporating the needs and suggestions of respondents. It was temporarily hosted online. The programming languages used included HTML (Hyper Text Mark-up Language) and CSS (Cascading Style Sheets).

In the next stage, the prototype was subjected to evaluation. As user-centered approach was used, evaluation of the prototype was done by the end-users who assigned scores to the website quality attributes as suggested by Moustakis *et al.*, (2004). The website features for evaluation included (1) content, (2) structure and navigation, (3) visual design, (4) functionality, (5) interactivity, and (6) overall impression. Questionnaires with scoring procedures were used for this process. The mean scores were worked out and this gave an idea about those features that needed improvement. The suggestions of the respondents were promptly recorded.

Prototype testing is a process in which users perform certain tasks with an early version of a product and observe if they are encountering any difficulties. User testing of the website focussed on key research questions and encouraged the users to behave as naturally as possible to yield better results. Testing process is essential to increase the usability of any website (Rees, 2013). ISO 9241-11 (1998) defined usability as 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." In this project, self-reported validation was used to determine the usability of the web prototype though the constructs of performance. This was done by identifying a specific task and giving it to all the respondents. Their performances were evaluated. Task success rates were registered through usability constraints viz., effectiveness, and efficiency of use and satisfaction of the users.

The next step was the refinement of the prototype which included incorporation of the suggestions and solving the constraints. Contents were re-organised to enable easy access. The additional contents as requested by the users were included. The colour schemes and multimedia were modified. After the refinements, the secondary prototype was ready.

Based on the refined prototype (secondary), the final website was developed by DoE, KAU. The error free final website thus developed, enabling full functionality, should be maintained by frequently updating the contents, enriching the quantity and quality of content, regularly performing end-users evaluations and refining it accordingly. This process is essential for keeping up with the user needs and preferences which may change with time.

A user-centred approach to the web site designing process increases the usability of the website. Web prototyping creates a working model of the website before developing the actual website. It allows perfecting the features before major changes are difficult to implement. The user-centered web prototype designed and developed for DoE, KAU acted as an early sample of website to test and to give profound insights on the final website. The eight step protocol suggested as part of this study will help to design a user centered website based on a web prototype. This will be of immense use to all those who work on user-centered web design and development, especially for agricultural extension activities focussed on cyber extension.

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