Stakeholder Participatory Design and Development of an Agri-Infotech Portal

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Abstract

The Agri-Infotech Portal (www.celkau.in), developed by Centre for e-learning of Kerala Agricultural University (KAU) is an ICT enabled bi-lingual platform for demand-driven technology information and advisory services in the agri-front, covering agriculture, animal husbandry, fisheries and allied aspects. It also acts as a platform for online course management in agriculture. As on August 2016, the portal had nearly 16 lakh hits within four years, which show a geometric progression. Besides, the portal won two international awards, one national award and the Kerala Government's e-governance award. This paper analyses the methodology followed for designing and developing this high-end utility web portal. To accomplish this, a basic research mode work on user-centred design, testing, refining and launching of the portal was adopted, as it would match the priorities of its end-users. The utility was ensured by testing and fine-tuning from its designing stage itself. Creating a working model (prototype) before developing the actual portal was the first stage. To generate content, the information needs of the users were identified and prioritized through questionnaires, brainstorming sessions, and focus group discussions. Interpretations based on the priorities, suggestions from the users, and desktop analyses of various similar portals across the world, led to designing of the first prototype. This prototype was subjected to a process of criteria/trait based evaluation by the end-users for further refinement leading to the second prototype. This second prototype was demonstrated before various categories of end-users and stake holders for final fine-tuning.

Keywords: Agro-tech portal, portal development, website, user centred design

Introduction

In India, due to the wide ratio of farmer to extension worker availability, timely access to relevant information has always been a setback. The availability of information and authentic farm advisory services lacked in several aspects. It has been a long felt need of Kerala's Agricultural Extension System in general, and

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that of the four decades old Kerala Agricultural University (KAU) in particular that an interactive website be launched as part of strengthening its extension activities. The KAU Agri-Infotech Portal (www.celkau.in), developed by the Centre for e-learning of KAU is an Information and Communication Technology (ICT) enabled platform for demand-driven technology information and advisory service for farmers, field extension workers, researchers, students and all other stakeholders of the agri-front. This makes agricultural knowledge, technology and best practices available at the fingertips of users on a 24X7 basis through an indigenously designed and easy to use bi-lingual (English and local language, Malayalam) platform. It aims at knowledge empowerment and skill upgradation of people who want to come to the farm front as practicing farmers and agripreneurs in frontier areas of agricultural technology.

Need for an Agri-Infotech Portal

The prime goal of the extension wing of an agricultural university is technology pooling, assessment, diffusion and handling the "feed-forward and feedback" mechanisms. In the scenario of an unwieldy number of farmers per extension worker, it is practically impossible for the extension system to cover all the needy farmers. At the same time, the research system has a treasure of information and innovations which need to be transferred to farmers and extension workers as well. This made it an urgent need to develop a demand-driven agricultural information technology portal.

User-centred design of Portal

To accomplish a high-end utility web portal, the philosophy of User-Centred Design (UCD) was adopted as it would match the priorities of its end-users. The only way to ensure such utility is to test the web portal and fine-tune from its designing stage itself (Krug, 2005). Creating a working model before developing the actual site would allow saving time and money by perfecting the features before major changes are found difficult to be implemented. Thus, our first attempt was for a prototype built to test a concept or process to be replicated or learned from. It was with this grounding that the baseline work was initiated.

In the present project, the problem was identified as the absence of a proper multipurpose, multimodal tech portal, especially in the Kerala context. The available websites on agriculture did not provide much space for adequate and timely information on agricultural technologies and extension activities. This lack,

together with the long felt need of Kerala state to have an interactive tech portal, led to the basic research mode work on user-centred design, testing, refining and launching of the tech portal. The concept of UCD was earlier adopted by ISO 13407(1999) and followed by Mridula (2014). In this project, a UCD methodology, which is much more extensive and elaborate was adopted for portal development.

Collection of data was an important step in deciding what actions are to be taken. To generate content for the portal, the information needs of the users were identified and prioritized through questionnaires, brainstorming sessions, and focus group discussions. Interpretations based on the priorities, suggestions from the users, and desktop analyses of various similar portals across the world, led to designing of the first prototype.

This prototype was subjected to a process of criteria/trait based evaluation by the end-users for further refinement. Criteria/traits adopted by Koshy (2013) were used with modifications. Scores were given to web/portal assessment traits, the major areas being: design and layout, content coverage and accuracy, interactivity and navigation, links, site organisation, readability and contrast, user-friendliness, and information retrievability. Based on the scores, suggestions and constraints reported by the users, the prototype was refined leading to the second prototype of the portal. This second prototype was demonstrated to various categories of end-users and stake holders including academicians, researchers, extension workers, administrators and farmers for the final fine-tuning.

Information Authenticity

The contents published in the portal are based on the recommendations of Kerala Agricultural University's Package of Practices and of institutes under Indian Council of Agricultural Research. The contents were fine-tuned through stepwise content generation process involving user need identification, content development by graduates in agriculture, content editing by agricultural experts, content purification by teachers of KAU, end user evaluation of different stakeholders, and the final fine tuning by the KAU scientists and researchers. To achieve this, a series of participatory workshops separately for agricultural experts, scientists, extension workers, farm graduates, farmers, agriprenuers and IT experts were organized. The services of the scientists and the researchers of Kerala Agricultural University were also used for refinement ensuring content accuracy. Thus the information in the portal is highly authentic.

Launching of the portal

The portal was ceremoniously launched in a state level function on 1st November, 2012. Wide propaganda was given globally. The print, radio, TV, and Social media gave publicity to the KAU Agri-infotech Portal.

Features and Uniqueness of the Portal

The web URL of the portal designed and developed through stake holder need analysis, participation and use of user centred design is www.celkau.in. This is a highly authentic bilingual information source on technologies and scientific practices comprising farming practices, agri enterprise management, plant protection, weather information, mechanization, processing and value addition, and marketing in an easy to use manner. It also has an on line course management platform (*e-krishipatashala*) of Kerala Agricultural University.

The portal contains category wise information on agriculture, animal husbandry and fisheries. The 'crops section' of the portal covers more than 140 crops with different sections in crop production and management, crop protection, harvest and post-harvest. For each crop, links for climate, soil, cropping pattern, varieties, seed production, field operations, manuring, irrigation, plant protection, weed management, integrated pest and disease management, harvesting and processing/ post-harvest management have been given. Regarding animal husbandry, the portal contains information and technologies on major animals, and birds -their breeds, characters, special features, housing, feeding, upkeep, and disease management with practical tips and illustrations. The fisheries link comprises of fresh water, back water and marine fishes; capturing and culturing of fishes, aquarium fishes, aquarium plants, fish breeds and characteristics, fish rearing, feeding, management and disease prevention and protection.

The portal acts as a platform for operating some Agri-software (Decision Support Systems/Agri-e-Experts). The KAU Fertulator, a fertilizer calculator for crops based on the farming area/ number of plants is a software that easily calculates the fertilizer dosage recommendations with just two user inputs. The farmer can choose the recommended N:P:K fertilizer available in the market. The software is highly useful to the Agriculture Extension workers also, to recommend the fertilizer. The KAU E-Crop Doctor is a software that prescribes remedies against pests, diseases and weeds. The Crop Health Diagnoser, a flash based software for the farming community helps the user to identify the disease or pest that affected their crop with the help of user inputs, and to get solutions.

Further, highly interactive and illustrated e-resources have been embedded in the portal, which include *e-Kaarshikajaalakam*, a built-in Interactive Digital Information Guide in Malayalam with simple Decision Supporting System (DSS) software; *Haritha Keralam*, an interactive sub portal with illustrated multimedia based agricultural information; Interactive multimodal Digital Guide for Vegetable Cultivation; Digital Library on Farm Mechanization, an interactive digital guide on farm mechanization that includes specifications, price, use, working and details of manufacturers, mode of operation, work efficiency, operational cost and brands; Agri almanac, a dynamic and interactive digital crop calendar of farm activities; Agri-Inputs Availability, an interactive database for location based Agri Inputs availability in Kerala; Agri Directory, a detailed directory of agricultural input dealers, suppliers and stakeholders; Agri –Videos, (a collection of over 200 videos on agriculture and enterprises). The portal also acts as a platform for running online courses in agriculture.

Facilities for open discussion on agriculture and related matters, a repository of agricultural technology problems and FAQs, Success stories of farmers and contemporary farmer-led innovations, advanced materials and guidelines for agricultural researchers, a categorized collection and set of dynamic direct links to hundreds of websites related to agriculture and general areas, dynamic links to major media (newspapers, television, radio, forums, blogs and other publications) on agriculture are also available on the portal.

The entire website is also made available in the vernacular language (Malayalam) using Unicode fonts. (See http://celkau.in/Default2.aspx)

Technology Platform

The technology used to develop the platform is Microsoft products. The choice of Microsoft technologies was based on easiness of the product and the availability of technology among the common people. The web platform is built in ASP.Net and uses MS SQL Server for data storage. The major software like e-Crop Doctor and KAU Fertulator were created using MS-Excel, which can be downloaded and can work offline. The multimedia software was developed using Adobe flash. Some software are embedded in the web portal which are easily downloadable for keeping in their system to work offline. The entire portal was fully indigenously built. No part of the portal and e-Learning platform were outsourced.

Accessibility and User - friendliness of the Portal

In designing the portal, effort has been to follow the Principles of Accessibility guidelines which lay the foundation necessary for anyone to access and use the content.

1. **Perceivable** - Information and user interface components are presented to users in ways they can easily perceive.
2. **Operable** - User interface components and navigation are operable. The interface does not require interaction that the user cannot perform.
3. **Understandable** - Information and the operation of user interface is easily understandable. The content and operation are not beyond their understanding.
4. **Robust** - The contents are reasonably robust enough that it can be interpreted reliably by a wide variety of end-users.

Communication and Dissemination Strategy and Approach

The KAU Agri-Infotech Portal is basically for the farming society and learners across the world who want to understand and practice scientific agriculture and enterprises. To promote the tech portal, publicity was given through local media and a number of workshops, trainings, and demo sessions conducted across the state. Social media like face book, you tube, and google plus is also being used for promotion. The portal is actively linked to sites of other line departments and farm websites like Farm Information Bureau, Association of Agricultural Officers of Kerala, Kerala Agricultural University, Indian Agricultural Statistics Research Institute, Bioinformatics Centre of KAU and the like. More uniquely, the online course platform available in the portal is a promotional medium.

Extent of Reach of the Portal

The end-users span the world. People, farmers, farm enterprises, agricultural institutions and extensionists - can use the portal for one purpose or the other. Within just four years of its launching, the tech portal has been used nearly 16 lakh times.

The possible delivery centres of the portal include Kissan Call Centres of various states of India, Krishi Vigyan Kendras (KVKs) in all the districts of India, nearly 1,050 local level Agricultural Development Units and 152 Block level agricultural units of Kerala, Other state line Departments of Animal husbandry, Dairy and Fisheries, Commodity Boards of the country like Coconut Development Board,

Spices Board, Coffee Board, and Rubber Board, agricultural research stations in the country, NGOs and other organizations of the nation and abroad, State and Central Agricultural Universities, Colleges of Agriculture, Horticulture and Agricultural Engineering, Agri business management, and staff training colleges of many banks across the country, 260 NABARD Farmers Clubs, SHGs (comprising 1.71 lakh commercial fruit and vegetable cultivators) under the Vegetables and Fruits Promotion Council Keralam (VFPCK), the Federation of about 250 *Swasraya Karshaka Samithis* (SKS) spanned across all the 14 districts of Kerala, 201 Akshaya E-Centres (Rural IT Centres in Kerala), agri-kiosks, libraries, Extension Training Centres and Farmers Training Centres, the 375 Vocational Higher secondary schools spread across the 14 districts of Kerala state and all the schools in India which promote IT@ school.

Other categories of users comprise agricultural entrepreneurs, Kudumbashree (an SHG based rural development programme for women empowerment in Kerala) units of 152 Blocks and 978 grama panchayats (village panchayats) of Kerala, agricultural input dealers, farm journalists and media, local self-government agencies, NABARD and banking institutions, agricultural insurance companies, Farm Information Bureaus of various states, agricultural exporters, importers and members of agriculture self-help groups. Thousands of farmers, farm youth, agricultural extension workers, students and agri entrepreneurs are regular users of the portal.

Different categories of users uses this portal for different purposes. Some use this as a learning platform. Some use it for teaching, imparting lessons and practicals and demo. Some use this for advisory services and decision support. The platform is also referred as a unique and evolutionary way of communicating with the farmers in the process of technology transfer and solution of location specific problems instantly.

Proof of value and accomplishments of USD

The portal is highly relevant, useful and user friendly, mainly because of the adoption of user centred design. Hence it received wide media coverage. Since the ceremonial launching on 1st November 2012, within 4 years, the hit statistics show a geometric progression, reaching nearly 16 lakh hits. Besides, positive feedback and appreciation were received through different media like website forum, interactive forum of online courses, letters, official and personal mails, phone calls, visits, and during interfaces of online course participants (sample feedback statements

are available in the respective forum). This indigenously developed portal (KAU Agri infotech Portal) won the World Education Award-2014, thc South West India Manthan Award 2014, and the Kerala State e-Governance Award 2011-13 under e-learning category. The *e-Krishi Patashala* (Online Courses in Agriculture) of the Centre for e-Learning was honoured with the DEF International Juror's Encouragement Award jointly organised by the Digital Empowerment Foundation and World Summit Award, for South Asia and Asia Pacific countries for the best digital innovations in Agriculture in 2013. Thus the portal showed value and effect of a user centred design. To suit the needs of the users, the portal is regularly refined and upgraded.

Suggestions

1. Content generation and ensuring correctness and accuracy of all the information is a herculean task. Utmost care has to be taken while including information.
2. A very important aspect is that no part of the design and development of the portal was outsourced. Designing and developing 100 per cent indigenously, makes it easy for maintenance and updating.
3. Wherever possible, this has to be developed in local language too, to be more useful to the end users, especially in the case of agri info-tech portal.
4. Team work is essential for the success of such ventures. A committed team with a highly motivating team leader should be entrusted with this.
5. Hectic and rigorous propaganda and publicity efforts would be needed during the initial period of launching the portal so as to bring in awareness among different stakeholders.
6. Series of demonstrations and training programmes have to be organized to appraise the end users about the advantage of using the portal and software.

Conclusion

Whenever portals and websites are developed, they should be based on the needs of the intended users and stakeholders. Such a website/portal would be in-depth, highly user-friendly and interactive, and would cater to the requirement of the users, which in turn would help and support the users thereby providing value to the website/portal, creating a high organisational image. Info-tech portals for the purpose of extension and outreach should compulsorily be based on the demands of the clientele. This is more important and relevant in the case of agricultural sector, which is always dynamic.

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