

Information Need Differences Regarding User-centered Web Prototype Designed for Kerala Agricultural University

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ABSTRACT

User-centered design of products help to identify with the objectives of end-users ensuring the products' effectiveness. When a user-centered bilingual website prototype was developed for Directorate of Extension, Kerala Agricultural University, the information needs of the primary users, viz., farmers, agricultural scientists and agricultural extension officers were identified and the Information Need Indices (INI) were compared. Analysis of the data showed that the differences in information needs were significant for the main contents of 'Schemes and Projects', 'Crop Information', 'Weather', 'Promising agri-enterprises' and 'Links to social network media'. Altogether, it was observed that farmers were more interested in farming related news like market price, weather, crop information and communication whereas the KAU scientists were more interested in the basic information and technologies from KAU. However, the extension officers have realised the prospects of utilising social media for information dissemination better than the scientists. The findings of this study would be helpful in developing any agriculture related extension websites.

Key words: User-centered design; Web prototype; Information need indices; Agriculture extension websites;

Websites are one of the nerve centres of Information Communication Technologies (ICT). Agricultural extension websites provide an easy access for researchers, extensionists and farmers to agricultural information resources (Chisenga and Brakel, 2005), opening up the communication and thereby narrowing down the information gap existing between the main players with timely and proper feedback (Ballantyne, 2009). Following the recommendations of Alex (2011) that stressed on the need to develop an efficient and interactive cyber extension platform for Kerala Agricultural University, a need based, user centered, bilingual (English and local language, Malayalam) web prototype was designed for the Directorate of Extension (DOE), Kerala Agricultural University (KAU), India.

Rubin *et al.* (2008) had stated that in a user-centered design (UCD), all its "development proceeds with the user as the centre of focus." A user centered web prototype, would act as the basic model for the final extension website. Such an extension website would strengthen the extension activities of KAU matching the deliverables of the agricultural university and the priorities of its main end-users, viz. scientists,

extension officials and farmers. An enquiry based on the preferences of the end users regarding the DoE website content revealed the end-users' information needs. Information need is defined as a state or process started when one perceives that there is a gap between the information and knowledge available to solve a problem and the actual solution of the problem (Miranda and Tarapanoff, 2007). The Information Need Indices (INI) of the three groups of respondents' viz., farmers, agricultural scientists and agricultural extension officers, selected for this study showed significant disparities with respect to certain contents. These variations throw light into the preferences of these primary stakeholders regarding the contents of a general agricultural extension website.

METHODOLOGY

The User-Centered Design (UCD) of the bilingual web prototype for DOE, KAU was based on the guidelines given by ISO 13407 (1999) for UCD project. It had four main steps, viz; requirement specification, requirement gathering, design and evaluation. The web prototype was for the Directorate

of Extension of Kerala Agricultural University to function as an online extension platform. The most important requirement that was to be gathered was the content which was to be based on the information needs of the respondents, viz, 120 scientists of KAU, the 120 officers of the State Department of Agriculture and 30 farmers who are regular internet users. The prototype thus designed based on the user preferences was evaluated by the end-users for their usability and other website attributes.

Each of the identified content was given scores by the respondents according to their preferences, ranging from one to five. Information Need Indices (INI) were calculated from these scores using the below formula:

$$INI = \frac{\text{Total obtained score}}{\text{Maximum possible score}} \times 100$$

INI= Information Need Index

Kruskal Wallis one-way analysis of variance was used to find whether the scientists, extensionists and farmers differed significantly in their information needs regarding the 15 main contents of the website as well their sub-contents. Paired t-test was done between scientists and extensionists to determine whether they differed from each other in a significant way regarding the information needs.

RESULTS AND DISCUSSION

The results of Kruskal-Wallis test showed that the differences in information needs were significant (0.05 level) for ten main contents except 'About DoE, KAU', 'Showcase of technologies', 'Locating your nearest KAU-KVK', 'Agri Market Informant', and 'Contact Us' (Table 1). Hence the null hypothesis, "there exists no significant difference in the information need indices among the three categories of respondents", is rejected and it is concluded that there is significant difference in the information needs among the three groups of respondents with respect to the 15 main items of DoE website. All the respondents had agreed upon the above five information items which are either directly beneficial for all users (like 'Showcase of technologies', 'Agri Market Informant' 'Locating your nearest KAU-KVK',) or mandatory for any organisation's official website (like 'About DoE, KAU' and 'Contact Us').

Significant difference was observed for INI of 'Schemes and Projects' (10.18), 'Crop Information' (6.26), 'Weather' (11.68), 'Promising agri-enterprises'

Table 1. Differences in the INI among the respondents for the main information items

Contents	Information Need Indices			H-value
	Scientists (n ₁ =120)	Extensionists (n ₂ =120)	Farmers (n ₃ =30)	
About DoE, KAU	93.33	91.38	92.22	1.86
Schemes & Projects	91.94	91.80	85.55	10.18**
Showcase of tech.	94.58	94.86	96.66	0.42
Locating your KAU, KVK	92.91	91.25	90	1.400
Crop Information	94.16	92.08	96.11	6.26**
Agri. Market Informant	91.66	93.05	94.44	4.00
Weather	91.25	88.47	92.77	11.68**
Promising agri-enterprises	94.02	86.11	94.44	37.06**
Forthcoming events	91.66	87.5	89.44	15.03**
News & Information	92.91	88.33	90	17.82**
KAU Publications	93.33	90	90.55	10.18**
Media Gallery	93.88	90.55	92.22	8.25**
Important links	92.22	90.13	90.55	10.90**
Links to social network media	70.97	86.66	88.33	28.37**
Contact Us	97.36	95.97	98.33	4.44

** Significant at 5% level

(37.06), and 'Links to social network media' (28.37). When all the scientists and extensionists wanted to have information on 'Schemes and Projects', farmers did not find it as important for them. It is well comprehensible that farmers, who are usually the beneficiaries of the projects, are not generally interested in the details of schemes/projects which are neither initiated nor managed by them, whereas, the former groups are ought to deal with such programmes on a daily basis. But it was found that the farmers needed more information than the scientists and extensionists on 'Crop Information', 'Weather', 'Promising agri-enterprises', 'Links to social network media' and 'Contact Us'. These are important information which has a direct bearing on farmers' day- to-day activities upon which all their important decisions are based upon. Hence, they are more appropriate for the stakeholders like farmers than scientists or extension workers.

The high INI for 'Links to social network media' and 'Contact Us' show that farmers consider them essential to contact each other as well as Kerala Agricultural University for sharing their information,

Table 2. Differences in the INI for the sub-contents

Contents	Information Need Indices			H-value
	Scie-ntists (n ₁ =120)	Exten-sionists (n ₂ =120)	Farm-ers (n ₃ =30)	
<i>About DoE, KAU</i>				
History & mandate	93.88	89.72	83.88	23.27**
Vision & mission	97.36	95.13	88.33	11.27**
Services & activities	98.47	91.52	92.22	27.71**
Organizational setup	93.75	85.13	80	28.59**
Staff profile	90	87.08	85.55	14.80**
Constituent units of DoE, KAU	95.13	86.66	90.55	38.95**
Achievements	92.22	84.44	91.11	21.96**
Honours and awards	90.13	81.66	85.55	25.27**
Success stories	90.83	89.02	88.88	0.51
Contingency planning	80.69	74.72	77.77	10.12**
<i>'techno. showcase</i>				
Techno. developed	98.33	94.72	93.88	12.77**
Tech. commercialized	95.83	94.86	94.44	1.78
Farmers' innovations	63.75	75.56	91.12	31.79**
Video clips	92.5	90.69	92.22	2.95
<i>'Agri mkt. informant'</i>				
Daily mkt. price info.	90.97	94.86	94.44	17.71**
Major mkt. in Kerala	85.97	84.86	90	6.23**
Seasonal mkt. in Kerala	81.25	83.88	89.44	7.71**
NGOs in Kerala doing agril. marketing service	81.11	82.22	88.88	8.62**
<i>'Agri-enterprises'</i>				
Mushroom cultivation	87.63	86.66	88.33	0.91
Honeybee rearing	85.41	85.41	87.77	1.59
Proc. & value addition	86.80	85.27	87.77	1.28
Production of bio-ferti.	82.5	81.66	86.11	03.60
Produ. of composts	85.13	87.08	91.11	7.32**
Produ. of bio control	85.41	85.13	85.55	0.03
Plant propagation	84.16	84.58	90	6.66**
Flower arrangement	84.58	81.66	78.88	14.55**
Landscaping	84.72	81.25	79.44	07.49**
Hi-tech farmig				
Plant propagation	82.5	81.52	88.88	10.21**
<i>'News and info.'</i>				
New releases	92.91	87.36	87.77	22.989**
Ready for sale	93.05	89.30	90.55	21.856**
Downloads	89.72	86.80	80.55	11.876**
Letters and circulars	86.94	81.52	80.55	11.988**
Geographical indications	87.91	81.66	82.77	19.448**
Patents from KAU	89.30	84.86	86.66	25.474**
<i>'Publications'</i>				
List of publications	90.41	82.36	90	30.333**
KAU vision 2030	86.52	81.52	78.88	11.357**
Publ. in pipeline	83.75	80.13	82.77	3.482
<i>'Important links'</i>				
Public agril ext. dept.	82.36	86.80	87.77	11.785**
Commodity boards	81.11	83.88	82.77	4.561
Market federations	82.22	82.22	81.11	0.240
ICAR institutes	80	80.69	81.11	0.618

**Significant at 0.05 level

clearing their doubts, getting remedies, advices or services. The encouraging result of the social media influence on the farmers is a proof for the ever growing, immense role of online social media in information dissemination in agriculture.

Significant variation was noted in the INI among the three respondent groups on 'Forthcoming events' (15.03), 'News and information' (17.82), 'Publications from KAU' (10.18), 'Media Gallery' (8.25), and 'Important links' (10.90). In general, KAU scientists showed comparatively more interest in the information that is directly related to KAU. It is noted that KAU being the main hub of agricultural knowledge and information in the State of Kerala, the farmer population is always eager to utilise the technology dissemination opportunities, and information facilities provided by KAU in the form of trainings, workshops, seminars, technology weeks, farmer-scientists interactions, latest news, new releases, different publications and audio-visual media on agriculture and links to other important organisations.

Differences in the INI among the respondents for the sub-contents of main information items : Kruskal Wallis test showed significant differences in the INI (0.05 level) for the sub contents of 'About DoE, KAU', 'Showcase of technologies', 'Agri Market Informant', 'Promising agri-enterprises', 'News and information', 'Publications from KAU', and 'Important links'. The results are presented in Tables 2.

"About Us" section is one of the most important elements on an organisation's website, where the world clicks to learn about any organisation, its goals, services offered, activities taken up, set up and successes which can contribute more credibility to the organisation. It projects the professional image of the organization at a glance. Under this, significant difference among the INI was observed for all the items except 'Success stories (DoE)'. The high INI of the scientists emphasises that the loyal employees of any organisation would try to highlight their organisation's services and other information useful for the public, than the other stakeholders. However, it was observed that the farmers showed a higher needs index for 'Contingency planning & planning for adverse situations' (77.77) than the extension officers (74.72). This shows that the farmers give due importance for the timely recommendations from organisations like KAU in the matters of disasters i.e. pest and disease outbreaks, flood, torrential rains etc..

Showcase of technologies : Showcase of technologies features the different technologies developed, standardised and commercialised from KAU, along with farmers' innovations.

Information need indices for 'Technologies developed (by KAU)' and 'Farmers' Innovations' throw light to the significant disparity in the respective respondents' interests. Farmers' index was the highest for 'Farmers' Innovations' (91.11) for which, as a paradox, the scientists showed an index as low as 63.75. This shows that when scientists encourage KAU technologies, they did not find farmers' innovations as an important content to be added in the DoE website. Following the global trend of appreciating and accepting useful and rational innovations irrespective of the 'class' of innovators, scientists should embrace a broader outlook about the farmers' innovations.

Agri market informant : The basic idea of adding 'Agri Market Informant' in the DoE website is to harness the power of ICT to add value to the farm sector and empower the rural farmer by giving him access to the vital market information in a timely manner, in order to help him enhance his livelihood and quality of life. It may be noted that the information need indices differed significantly for all the sub items and the indices of the farmers were the highest for all items. The high indices of farmers show that market information, its dissemination and sharing directly impacted them than any other respondents. In fact, it is crucial for their decision-making process.

Promising agri-enterprises: Agri-enterprises are avenues for self-employment as well as for generating employment opportunities for others. The hope that the knowledge about these potential agri-enterprises would help the stakeholders to take up such activities, prompted the respondents to find it as an important content in the Directorate of Extension website.

The need indices for 'Production of composts', 'Plant propagation by tissue culture', 'Flower arrangement & dry flower products', 'Landscaping', 'Hi-tech/Precision farming' and 'Plant propagation and nursery management techniques' among scientists, extension officers and farmers showed significant difference. Naturally farmers are highly interested in the information regarding agri-enterprises than the other two groups. They indicated highest need index for all the above sub contents except 'Flower arrangement

and dry flower products' and 'Landscaping'. Extension officers' indices were the highest for the enterprises like 'Production of Composts', 'Plant propagation by Tissue culture' and 'Hi-tech/Precision farming'. This is because extensionists know the pulse of farmers, and they favour their choices

In the case of 'Mushroom cultivation', 'Processing and value addition of fruits and vegetables', 'Production of bio-fertilizers', 'Production of bio control agents', 'Plant propagation & Nursery management techniques', and 'Medicinal plant cultivation', scientists registered the higher indices than extension officials. This is mainly because they have been working in these areas and giving training to a huge number of stakeholders in different parts of the country. Honeybee rearing is an enterprise for which both scientists and extension officers recorded the same need index of 85.41.

News and information : News and information gives an idea about the new releases *i.e.*, latest products released from KAU along with their prices, information on intellectual property rights in agriculture products like that of geographical indications, patents, important letters and circulars, and materials for download. Significant difference in the information needs was indicated for all the items. The indices of scientists were the highest for all sub items which shows the eagerness and interest of the KAU scientists in disseminating the news and information related to KAU.

Publications from KAU : Publications showcase all types of print and online publications from KAU. Significant difference was found for 'List of publications' and 'KAU Vision 2030'. The high indices of scientists indicate that they wanted to include these for the benefit of the farming community.

Important links : Important links include the links to relevant websites that are to be provided in the DoE website. Significant difference in INI was found only for 'Public Agricultural Extension departments'. The high index of farmers shows that they find all the sources of information related to agriculture, like animal husbandry, fisheries and forestry with the same importance.

The analysis revealed that there were no significant differences in the need indices for the sub contents of 'Schemes and projects', 'Crop Information', 'Forthcoming events', and 'Contact Us'. To briefly explain, when 'schemes and projects' throw light on the various

schemes, their mission and guidelines, 'Crop information' gives knowledge about different crop production techniques. While 'Forthcoming events' announces the important programmes scheduled in KAU including trainings, seminars and workshops, 'Contact Us' gives addresses of DoE, provision for feedback and discussion. *Differences in the information need indices between scientists and extensionists* : The 't' values obtained from the paired t-test indicated that the scientists and extensionists differed significantly in all the information items except two, viz; 'Schemes & Projects' and 'Showcase of technologies' (Table 3). Extensionists and scientists are dealing with schemes and projects as part of the routine works. Both groups are working with agricultural technologies for the development of agricultural sector. These factors might have influenced them to feel that these two contents are quite important to be included in the DoE website.

In general, it was found that scientists' information need indices were higher for all the information items. Here it is to be noted that most of the items preferred by the scientists were those connected to Kerala Agricultural University (KAU) ('About DoE, KAU', 'Locating your nearest KAU KVK', 'Forthcoming events', 'News and information', 'Publications from KAU', 'Contact Us'). This might be because the scientists are working in KAU and they wanted to disseminate the useful information from the institution to the public. It is naturally expected that scientists will try to highlight their organisation's achievements and useful information. On the other hand, the extensionists were keener about information directly required by farmers like 'Agri Market Informant', which is crucial for them to make crucial economic decisions.

Another interesting point is that extensionists find 'Links to social network media' (86.67) as important, when scientists gave a very low INI for that as low 70.97. This indicates that extensionists have understood the prospects of using social media for information dissemination when the scientists think they are only for personal purposes. Many Krishi Bhavans (Agricultural Office), in Kerala are already active in social media like Facebook. Lot of farmers are actively involved in social media. In this context, it is noteworthy to mention that Vattamkulam Krishi Bhavan in Malappuram district of Kerala which had started its

Table 3. Differences in the INI between scientists (N=120) and extensionists (N=120)

Contents	Scientists' Index	Extensionists' Index	't' values
About DoE, KAU	93.33	91.38	3.96**
Schemes & projects	91.94	91.80	0.42
Showcase of techn.	94.58	94.86	1.42
Locating your nearest KAU KVK	92.91	91.25	3.63**
Crop information	94.16	92.08	4.12**
Agri market informant	91.66	93.05	3.28**
Weather	91.25	88.47	7.00**
Promising agri-enterprises	94.02	86.11	9.74**
Forthcoming events	91.66	87.5	5.08**
News & information	92.91	88.33	5.81**
KAU publications	93.33	90	4.76**
Media gallery	93.88	90.55	5.19**
Important links	92.22	90.13	1.97**
Links to social network media	70.97	86.66	9.77**
Contact us	97.36	95.97	3.28**

**Significant at 0.05 level

Facebook page in 2013 and attracted a lot of farmers, youngsters and entrepreneurs to share and seek information. Farmers take social media in a big way and they want to "keep tabs on what they are doing" (Raj, 2014). The role of many social media groups like 'Adukkalathottam' (Kitchen garden), 'Agriculture'. 'Karshakan' (Farmer) and the like which promote home/kitchen gardens by giving online advice as well as sending free seeds to the users are also important in this regard (Joshy, 2014). This suggests that scientists should start considering technology and information dissemination utilising the immense opportunity available through social media.

CONCLUSION

A thorough analysis of the information needs of the agricultural scientists, agricultural extension officers and farmers show that their information needs with regard to an agricultural extension website vary considerably. As a user-centered website was intended for the DoE, Kerala Agricultural University, none of the suggested contents for the DoE website were excluded. It is observed that the farmers were more interested in information regarding market price, farming activities and communication, where as the scientists

of KAU were more interested in disseminating the basic information and technologies from KAU. The extension officers' indices were in between those of scientists and farmers for most of the contents, anyhow they have realised the prospects of utilising social media for

information dissemination better than the scientists. The findings from this study would give insights for developing any other agricultural information and extension website.

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