Enhancement of Usability for Farmers: User Interface for Rural Community

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Abstract. This research covers how to empower or improve the role of technology and bridge rural digital divide via ICT solutions in the agriculture sector of rural belt of Pakistan and suggests some new ideas like interconnection of web communities with e-boards and mobile phones for sake of giving access to all latest agricultural updates and news. Farmers will be encouraged towards the use of technology for their betterment, ease and efficient output in simple way while using HCI techniques.

Keywords: Farmers, Rural area, Pakistan, E-board, Mobile Phones, linkage.

1   Introduction

World has become a global village, technology is spreading at great speed in the developing countries too and like other fields of life, its proliferation has also encouraged agriculture sector very efficiently. Importance of food growers cannot be ignore [30][37][38] because according to a survey, roughly agriculture is accounted for between 38-45 % of world's labor force whereas in the developing countries it is about 55% of the labor force in agriculture [12]. 45% of the population of Pakistan works in agriculture field [35]. Pakistan cultivates about 25% of its land and agriculture is the largest income and the employment-generating sector of Pakistan's economy. Being a dominant sector according to recent Pakistan economic survey 2012-13 it exhibited growth of 3.3 percent in agriculture related sub-sectors also contributes 21.4% to the gross domestic product (GDP) employs 45 percent of country's labor force [35] and also contributes in other growth of other domains in economy [10]. A lot of people who are linked with this field but still they rely on face to face communication [37].

In section 2 background of research is discussed to explore, problem statement and research question, than in section 3 research methodology along with proposed model, finely conclusion.

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2   Background

The digital rural divide in both developing and under developing countries that occur due to   many reasons, among which major one is lack of timely and efficient information[6]. Mostly their work is focused on application based or web based job to facilitate the laymen in their rural areas for example some states of Africa and South Asia.   Information today is shared using technology like [14] mobile, telephone [32], radio [36], voice messages [32] and internet etc. to get more and efficient output. All these technologies are increasing their users day by day [33]. In Australia multifunctional agriculture (MFA) is used to maximize the potential of the farms [29].

   HCI: It involves the study, planning and design of interaction between Human and Computers. Cultural factor has lot of impact on the design [31][46][47]. This paper focus on all the principles of HCI and Universal Usability challenges in our system [18][24][43][44].

   Rural community: Pakistani rural community old communication means, the traditional and interpersonal by default due to relevancy in content and the context [25][27]. An interesting research in East African state of Tanzania was done to assess the sources of the agricultural information used by farmers and the results showed that the major source was predominantly the Locals [28][45].

2.1   Internationally Available Solutions

Web based: ICT is helping agriculture market by creating decision support, web based agriculture information management software [9] like e-agriculture [7] Harti-gyan.com, Krishiworld.com etc. have been also launched. Similarly Initiative [1] by SAARC Agrinet is launched, a website named www.saarcagri.net is launched also for this purpose so that efficient conveying of information would be made possible for different stakeholders like farmers, educationist, researchers, Agricultural entrepreneurs, NGO and business institution agencies etc.

   Short Messaging Services (SMS): Kenya Agricultural Commodity Exchange (KACE) [5] has developed a short messaging service as well. Any farmer anywhere in the country can access updated and reliable market information on prices and commodity offers at an affordable rate using their mobile phones. So far, the service is easy to use, reliable, convenient and affordable. Call Centers: Some of the Call centers are also established to facilitate the farmers with facilities of toll free or paid calls, and initiatives like video conferencing [2][10] [15] have been taken for rural uplift. Several smartphone apps have been launched [3][8][19]. The ratio in using technologies like mobiles, computer internet is almost same in both rural and urban areas in India [22][23]. Japanese agriculture industries are actively involved in facilitating an integrated knowledge creation and sharing initiatives within the organizations [39]. In Sri Lanka cellphone are the predominant mode for connecting community [26].

   Many of solutions described above are implementable internationally but nationally these solutions are difficult to implement in Pakistan due to illiteracy in rural areas.

2.2   Pakistan Perspectives

In foreign countries, there are many ways of getting information in the rural areas as they have internet facility, Smart Phones [4] etc. but rural areas of Pakistan are far behind due to illiteracy. They don't have much source of information. Even some of the villages don't have electricity and landlines. It is very difficult for them to get information and the knowledge which are the key component of an improved agricultural development [27]. Field offices are the most approachable place for laymen to get timely information about their domain, it is very clearly evident from the Fig. 1 that how they assess useful information/news.

Fig. 1. Field Issues

So the system we are going to design is especially for the illiterate people. Our main target is to provide information and updates to the illiterate farmers. We will make our messages and updates effective and attractive. If the one hand technology like mobile phone, websites have brought access to information and facilitate communication [6] than on the other hand there is an issue being faced in common in almost every developing country i-e being non-familiar with technology usage due to many reasons, among which illiteracy, poverty and usability are the major one [9]. Many of the farmers don't know much about their usage in agriculture. They remain unfamiliar with the market increasing and decreasing rates and other useful information just because of this rural-digital divide. So, technologies need to be enhanced more and more in their functionalities. Agriculture is a core sector of Pakistan just as any other agricultural state. In Pakistan the issues/problems and proposed solutions are not implementable exactly like other parts of developing and developed world. Pakistan as an agricultural state, the country is facing some other problems like poverty, illiteracy, inflation and even lack of awareness and access to the latest technologies and their usage due to non-user friendly interfaces and high costs as compared to their

income [10]. One who can afford smartphone does not prefer to work in field here so the game need to be is played differently here. No matter how better the mobile based applications are the usability factor affects them badly so we have to encourage the rural belts via designing and developing some already known projects but in much efficient and user friendly way in accordance of usability, efficiency and ease of access to encourage the rural belt of Pakistan towards usage and acceptance of ICT in agriculture.

Education: Another big factor is education. It has the key role of development of any country. Pakistan has low literacy rate and there is a gap between rural and urban education system [21][25] [20].

2.3   Problem Statement

Pakistani Rural belt is facing many challenges among which most important one is the lack of updated/current information which like other domains/fields affects agriculture too. There are little or no proper channels of conveying message/sending information to the farmers about weather, diseases, seeds, soil and fertilizers etc. They are facing many problem of long journey for laboratory tests or to get information or some other purposes. They are illiterate and poverty people. They don't know about the market increasing and decreasing rates. No efficient bridging between farmers and latest updates/information.

2.4   Research Question

What are the effective and innovative approaches to bridge the gap between global knowledge and local knowledge?

3   Research Methodology

We will conduct/take interviews of different stakeholders, like farmers, agriculturist, field officers and other officers and staff members of agriculture offices at Tehsil and district level. We can also analyze via questionnaires and in the end we will do statistical analysis to generate our problem and its solution in an efficient way. Tool that we will use for statistical analysis is Excel.

3.1   Proposed Model

A community based website will be designed where daily based updates will be shared. These automatic updates will be sent to the e-boards at field office in the form of pictography and local language in the union council in the form of images/pictures and in form of text message on their cell phones to stay updated with current updates (Fig. 2 Proposed Model).
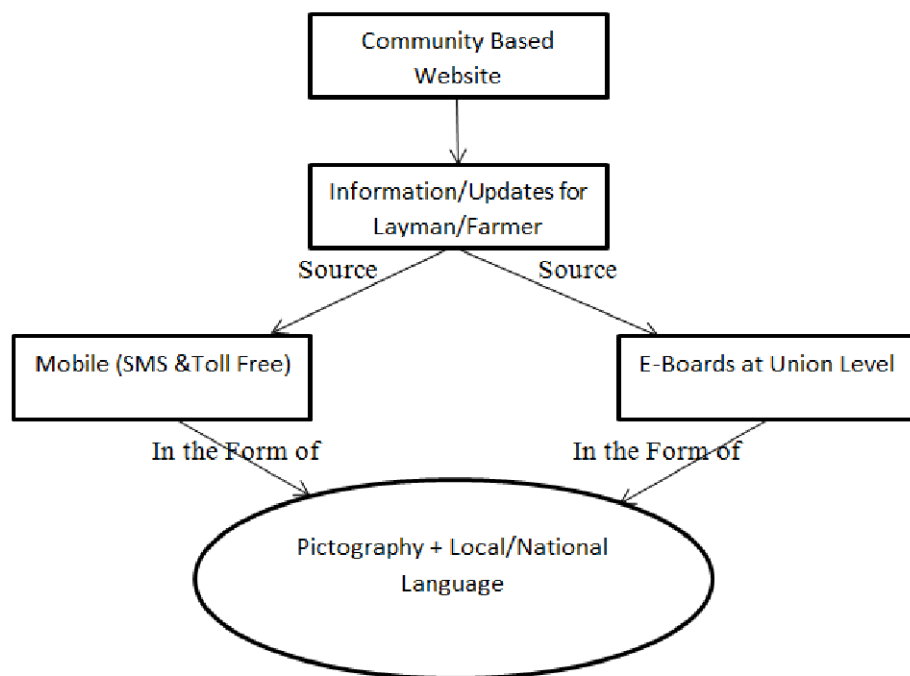
Fig. 2. Proposed Model

4   Expected Results

By implementing such a setup in a user friendly environment even an illiterate user can use/entertain technological services in the field of agriculture simply by signing in (himself or by assistance of officials) an online web community which will be up-dated with all useful data/information and that will be interconnected with the e-boards at union-council/field office and also by getting the information via cell phones in the form of picture messages and national/local/international languages (Fig. 3 Implementation).

This work (Fig. 3 Implementation) if done will be very innovative step in the rural sector and will not only solve the issues of ICT digital divide in the agriculture field but also this will motivate a layman towards the use of technology due to its ease or usability.
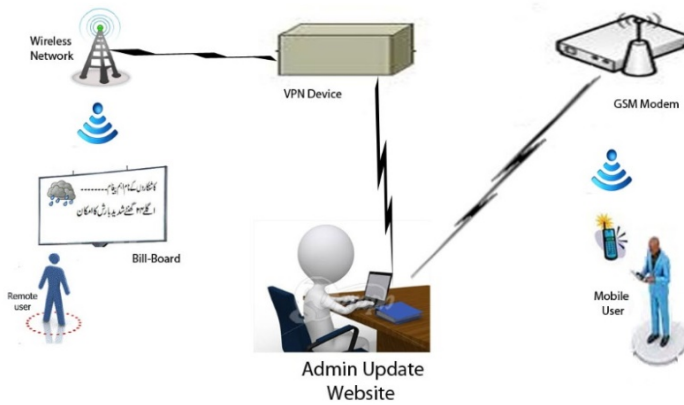
Fig. 3. Implementation

5   Conclusion

This research focuses on user perceive information to present in easy and understandable way [31][34] [41].We are going to provide information system to the Pakistani illustrate farmers. Information plays vital role in agriculture development and production and their effective communication will help in facilitating farmers and mutual understanding among them [40]. By providing updates/information with more usability and effectiveness to the farmers, we are going to increase the productivity of crops and bring rural community to the (standards of) international level.

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