



Development of mobile based technology transfer application system to empower the small ruminant farmers

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Now-a-days wide range of ICT platforms are being used to access and share agriculture, veterinary and animal husbandry information and knowledge in the form of web pages that includes audio, video and text messaging. Among various ICT tools, mobile phone has emerged as one of the widely accepted and adopted instruments in most parts of the world to ease the information communication process among farming communities (Hayrol *et al.* 2009). Mittal and Tripathi (2009) reported the key role played by mobiles in lowering transaction costs and raising the income levels of farmers, by efficiently addressing agricultural information requirements, while Inigo *et al.* (2014) and Mittal *et al.* (2010) reported that mobile phones contribute greatly to agricultural and animal husbandry information. Now-a-days, the popularity of an Android smartphone is increasing very fast. Smart phone has become the basic need of mostly every one. An Android is one of the smart phone operating system, which is available freely on Android Market. An Android user easily and freely downloads android application (Senthilkumar *et al.* 2018).

To overcome the problem of difficulty in accessing crucial information in order to make timely decisions in rural areas, development of Mobile Application System using the available resources and technology would serve as a decision support system for the small ruminant farmers at an affordable cost. With these background, NABARD Project on 'Development of mobile based technology transfer application system to empower the small ruminant farmers in Tirunelveli District' was implemented at Veterinary College and Research Institute, Tirunelveli, Tamil Nadu, India during 2017–2019 to develop a mobile app for sheep and goat farming. The present study has assessed and prioritized the information needs of small ruminant farmers of Tirunelveli District of Tamil Nadu in India and captured the perception on usefulness of developed mobile app among the small ruminant farmers and extension personnel.

An ex-post facto research design was used in this study. Tirunelveli district was selected as study area since the Project was operated in Tirunelveli District which has sheep and goat population of about 3,03,105 and 3,30,230 respectively (Anonymous 2012). The level of information needed by the farmers as perceived by the researcher, extension personnel and small ruminant farmers was assessed on various small ruminant farming activities.

The primary data were collected during 2017 to 2018 from the selected respondents by using well structured pre-tested interview schedule. A schedule of information needs contained 48 items on various aspects of small ruminant farming like breed and breeding, feeding, management, disease control and marketing. The different need items were identified in consultation with the subject matter specialists and secondary data on small ruminant rearing. The responses for each of the 48 items were measured on a five point continuum, i.e. most needed, more needed, needed, less needed and least needed. The scores of 5, 4, 3, 2 and 1 were given respectively for researchers, 10, 9, 8, 7 and 6 for extension personnel and 15, 14, 13, 12 and 11 for farmers as followed by Vetrivelvan (2000) and Nisha (2008). The mean was calculated and the item above the mean was considered as the identified needs for the development of mobile application.

Suitable contents with relevant photographs and videos on breeds and breeding, feeding, management, disease control and marketing were developed in consultation with subject matter specialists of Veterinary College and Research Institute, Tirunelveli. The contents pertinent to the information needs were incorporated as an Android based Mobile Application System in English and Tamil languages with suitable text, video and audio etc. Perception on the usefulness of developed Android based mobile app on sheep and goat farming was studied among randomly selected 120 respondents comprising 60 small ruminant farmers and 60 extension personnel who had android based mobile phone.

The schedule on the usefulness of the need based mobile app contained 33 items on utility, technical component, information component and user attributes. The responses

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were recorded on a three point continuum, i.e. most satisfied, satisfied and least satisfied with the score of 3, 2 and 1 respectively as followed by Nisha (2008). The item wise perception score was calculated based on the mean and was presented for interpretation.

Based on the individual score, the perception index was calculated as given below to get perception index for each respondent.

$$\text{Perception index} = \frac{\text{Individual respondent score}}{\text{Total score}} \times 100$$

Information needs of small ruminant farmers: The small ruminant rearing activity was classified under five major heads, i.e breed and breeding, feeding, management, disease control and marketing. In breeding component, out of the nine topics, 14 topics, viz. Indian breeds, native breeds of Tamil Nadu and local breeds of Tirunelveli region formed the information needs of small ruminant farmers as they had score a value of above mean. In feeding aspect, out of 11 topics, balanced feeding, formulation of ration, unconventional feed and fodder, fodder cultivation and need for feeding mineral mixture were identified as the major needs of small ruminant farmers. The researchers and farmers identified balanced feeding as most essential topic. All these factors contribute to the production and productivity of the small ruminants, which could eventually enhance the farmer's income. Hence, it was natural to be identified as their important needs.

In management part, out of 11 topics identified, five items formed the needs of small ruminant farmers, viz. source of animal purchase, system of rearing small ruminants, summer management, management of pregnant animals and transportation of animal which score more than mean.

The researchers, extension personnel and farmers had given highest score for all seven topics considered under disease control section. This might be due to fact that the farmers are aware that regular deworming and vaccination could improve the health status of the animal which would eventually lead towards better production, while solving the problems related to breeding was essential to maintain regular and higher level of productivity.

The respondents of this study selected all topics as most essential topics under marketing components. This might be due to the fact that the farmers had livestock local markets called as *shandies* in the study area like Reddiarpatti, Melapalayam, Vallivoor and Pampukovil which are very popular in trading of sheep and goats and felt need to insure their animals only during crisis.

Thus, a total of 24 items were considered as the identified needs that include topics on breed and breeding (three), feeding (five), management (five), disease control (six) and marketing (five). Based on the needs identified and prioritized, the content was organised; script was prepared both in Tamil and English languages; video clipping and photos were collected and mobile based application software was developed in android platform.

Development of mobile app for sheep and goat farming: App contents were organised into main and sub-menu. Main menu has breeding, feeding, management, disease control, marketing and others sections. Under breed sub-menu, contents were organised into breeds and breeding management. Breeds section has exotic, Indian and Tamil Nadu types of breeds. Breeding management section has details on traits of breeding and types of breeding. Feeding sub-menu has green fodder, dry fodder, concentrate feed, feeding management and grazing management sections. Under concentrate feeding, preparations of concentrate feed, quantities of concentrate feed, were included. Under management sub-menu, floor space requirement, dentition, method of rearing, culling of animal, transport of goat/sheep, farm appliances were provided. Disease control sub-menu has bacterial diseases, viral diseases, parasitic diseases, deworming and vaccination schedule, ethno-veterinary medicine and first aid-medicine.

Marketing sub-menu comprises marketing channel, slaughtering goat, value added meat products, bankable project, livestock local market (*shandy*). Other sub-menu has contact details of TANUVAS units and Animal Husbandry Department.

This app has separate icons for special options like Push notification, WhatsApp, Frequently Asked Questions, Google MAP FAQ, MAP and Search. We can send important notification like forecasting, deworming and vaccination schedule to all end-users in a single stroke by using push notification option. By using WhatsApp option, many innovative ideas and experiences in sheep and goat farming can be shared. FAQ options are obviously helpful to new entrepreneurs. Users can locate the veterinary hospital, dispensary, college etc. by using MAP option. By using search option, one can find exact content as required which saves time too.

Perception on the usefulness of developed Android based mobile app: The details of the mean perception of extension personnel and farmers were categorized item-wise under four topics namely utility, technical component, message component and user attributes. The results obtained are presented in Table 1.

The farmers and extension personnel were most satisfied with the utility of the mobile app. The farmers had most satisfaction than the extension personnel in the areas namely receiving information in shorter time, most suited to get the required information and better retention of the message. The farmers felt that the mobile app module had more advantage than other teaching aids. As the module was developed based on the needs of the farmers, the farmers felt that it was most useful (Ponnusamy *et al.* 2009, Ponnusamy *et al.* 2016).

The extension personnel were more satisfied, whereas the farmers were less satisfied. Easiness to learn, operate and navigate, the extension personnel perceived it as more satisfactory and farmers perceived it as less satisfaction. This was due to the fact that extension personnel know how to use a Mobile and the farmers were illiterate in term of

Table 1. Perception on the usefulness of mobile app

Characteristics	Mean perception score	
	Extension personnel (n = 60)	Farmers (n = 60)
<i>Utility</i>		
Usefulness	4.2	4.2
Saves time	4.3	4.5
Saves money	4.0	4.0
Suitable to get the required information	4.0	4.2
Retention of the message	3.9	4.4
Advantage over other teaching aid	3.4	4.1
Simple to operate	4.2	1.7
Easy to navigate	4.0	2.1
Easy to learn	4.3	2.1
Sub-total	4.0	4.0
<i>Technical component</i>		
Layout	3.7	3.6
Order of the content	4.0	4.2
Readability	4.0	4.0
Illustration	4.0	4.0
Voice	3.9	3.9
Text	4.0	4.2
Colour combination	3.8	3.8
Video clippings	3.9	4.3
Less errors	3.9	4.3
Visual impact	3.9	4.2
Sub-total	3.9	4.1
<i>Information component</i>		
Relevancy of the message	3.9	4.3
Completeness of the information	3.9	4.6
Credibility of the message	3.8	4.2
Clarity of the message	4.1	4.5
Accuracy of the message	3.9	4.3
Simple language	4.2	4.1
Use of clippings	4.4	3.8
Appropriateness of the message	3.8	4.4
Sub-total	4.0	4.3
<i>User attributes</i>		
Improves self confidence	3.9	3.5
Creates interest	3.8	3.9
Favourable attitude towards computer	3.8	3.7
Helps in decision making	3.8	3.6
Motivate in improving the farm	3.9	4.1
Motivate to learn mobile	4.0	4.2
Sub-total	3.9	3.8
Overall perception score	4.1	4.0

computer knowledge and lacked skill in operating it.

The overall perception of the extension personnel (4.1) and farmers (4.0) on the mobile app ranged from most satisfactory to satisfactory. These findings also in agreement with results of Nisha (2008) and Ponnusamy *et al.* (2016) who reported an improvement in the overall perception of farmers using dairy advisory system and expert system on cattle and buffalo respectively. Similar results were also reported by Pavan Belakeri *et al.* (2016).

The overall perception of the sheep and goat farmers

and the extension personnel on the mobile app. ranged from satisfactory to more satisfactory. The technical and message component were more satisfactory for the farmers than the extension personnel, whereas user attributes of the mobile app was more satisfactory for the extension personnel than the farmers. It can be used by end users any time and from anywhere which will ultimately save money, time and effort in reaching a larger population. This software will help to impart the scientific knowledge on sheep and goat farming to the end-users in local languages and at the farmer's level of understanding to reduce economic losses due to diseases. This application is built to break the literacy barrier and deliver the information. Android app which works offline can be effectively used as intervention tool for overcoming information asymmetry existing among the group of farmers by leveraging the smartphone penetration in rural areas.

SUMMARY

Mobile app is one of the means to strengthen the bridge between research system and farming system. Hence, the present study has focused to identify and prioritize the information needs of small ruminant farmers to develop mobile based application software. Data were collected from 40 researchers of Tamil Nadu Veterinary and Animal Sciences University, 60 extension personnel of the State Animal Husbandry Department and 100 small ruminant farmers of Tirunelveli district by questionnaire method. The responses for each item were measured on a five point continuum, i.e. most needed, more needed, needed, less needed and least needed. The mean was calculated and the item above the mean, i.e 24 items were considered as the identified needs that include topics on breed and breeding (three), feeding (five), management (five), disease control (six) and marketing (five). Based on the identified and prioritized needs, the contents were framed in Tamil and English languages which includes, video clipping and photos collection. Accordingly, a mobile based application software was developed in android platform in order to impart the scientific knowledge of small ruminant farming system in local language to the end users. Perception on the usefulness of developed android based mobile app was captured among 60 randomly selected small ruminant farmers and 60 extension personnel who had android mobile phone that constituted a sample size of 120. The overall perception of the extension personnel (4.1) and farmers (4.0) on the mobile app ranged from most satisfactory to satisfactory.

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