

RESEARCH ARTICLE

Development of Multimedia WhatsApp Module for Dairy Farmers in Haridwar District of Uttarakhand

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ABSTRACT

Livestock is a key element of agriculture, with a symbiotic relationship that enhances overall food security. Small and marginal farmers, who own limited land and a few cattle or buffaloes, contribute over 70% of India's milk production. By promoting dairy farming, social and economic transformations can occur, resulting in improved livelihoods and development patterns that can lead to the economic growth of the country. Today, the development of an individual or a society is based on access to information. In India, Information and Communication Technology (ICT) has emerged as a primary source of knowledge and information, with the potential to transform the social and economic development of livestock, agriculture, and rural artisans. They are useful for retrieving the latest knowledge, and quick dissemination of information to livestock holders and dairy farmers. The most preferred information, which is effective in understanding, should be in the local language. The knowledge gap regarding scientific dairy practices and farmers' ignorance towards recent advances like social media and ICTs was questioned seriously. At this juncture, farmers' awareness and knowledge about scientific dairy practices play very crucially in deciding the upcoming course of action. Therefore, the present research was conducted in the Tarai region i.e. Haridwar, district of Uttarakhand with the purpose of developing a Multimedia module and secondly, assessing the effectiveness by testing the knowledge level of farmers before and after disseminating the Multimedia WhatsApp module.

Key words: Multimedia WhatsApp module; Scientific dairy practices; Dairy farmers.

Livestock are essential in attaining the standard socio-economic structure of rural India and overall food security. The livelihood of more than two-thirds of the rural population is supported by livestock that, contributes about 5.21 per cent of the GDP and 28.36 per cent of the agricultural Gross Domestic Product from agriculture, and allied sectors also it provides employment generation opportunities to 8 per cent of the labor force *BAHS (2020)*. Beyond the direct contribution of generating income and food, it acts as a valuable, asset and security for credits, serving as a store of wealth that can be used in times of adversity. Despite its maximum contribution to the agricultural economy and being the top-ranking commodity in India, the productivity of milk is still lagging. According to *Paroda and Kumar 2000*, stated that the demand for milk would rise to 131- 158 million

tonnes by 2020. This increased demand could be met by increasing the productivity of the milking animals through technological and management options, which are currently low. The reasons for low productivity could be indiscriminate breeding, poor quality of feed and fodder, negligence in the health and hygiene of dairy animals, weak resource networks, inadequate extension service, and lack of trained extension professionals (*Garai et al., 2020*). Also, there should be an improvement in the estimation of individual milk constituents to improve the quality of milk *Parmar (2020)*.

Despite the Indian Government's efforts to improve technology in the dairy farming sector in recent years, the socio-economic conditions of farmers have not been uplifted to the expected level. The government's inability to effectively transfer scientific knowledge and technology from institutions

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Despite the Indian Government's efforts to improve technology in the dairy farming sector in recent years, the socio-economic conditions of farmers have not been uplifted to the expected level. The government's inability to effectively transfer scientific knowledge and technology from institutions to the grassroots level may have contributed to the failure to improve the socio-economic conditions of Indian farmers. However, information being a valuable resource in today's era, along with land, labor, and capital, many farmers in India continue to face a lack of information, which remains a critical concern. According to *NSSO (2005)* a survey, only 5.1 per cent of farmer households in India were able to access information related to animal husbandry, whereas 40.4 per cent had access to information related to modern technology for crop farming.

The remarkable change achieved only if farmers possessed sufficient knowledge about improved dairy practices and timely access to information could be incorporated at the farm level, which will gradually lead to the suitable adoption of any new technology

and management practices. So, very few studies have been conducted on this aspect. This development of a multimedia module could favor farmers to get, location-specific, need-based, and local language content in the form of modules easily available on their smartphones. In addition, the Development of standardized knowledge tests for dairy farmers is essential. The study conducted by *Chatterjee (2018)* stated that to assess a significant improvement in the retention of knowledge about the traditional dairy products production a standardized knowledge test is needed for accurate measurement. Similarly, *Belakeri et al., (2017)*, and *Kumari et al., (2020)* also developed and conducted knowledge tests in the dairy sector. Thus, considering the foregoing issues present study aims to develop a Multimedia WhatsApp module and its effectiveness by testing the knowledge level of dairy farmers before and after intervention i.e. Multimedia module for dairy farmers.

METHODOLOGY

The development of the Multimedia WhatsApp module is a stepwise procedure. The aim of developing this module was to allow learners to learn and acquire knowledge at their own pace in less time. Thus, the involvement of the respondents was an essential part of the module development for fulfilling the objectives more consistently. The present study follows the steps used by *Huang (2005) & Sharma and Kashyap (2014)* with researchers' modifications. The study showcased the different steps that went into building the Multimedia Module. Initially, the socioeconomic characteristics and information needed was studied through a prepared interview schedule. The next step was to prioritize the top information needs of dairy farmers weighted mean score of each sub-area was calculated for each farmer with the formula

$$\text{Weighted mean} = \frac{\sum wx}{\sum w}$$

Where, Σ , summation; w, weights; x, value

Before giving intervention, the knowledge test was developed for determining the knowledge of the dairy farmers selected sub-areas before and after the intervention. The test was developed for determining the knowledge of the dairy farmers selected sub-areas.

The definition of knowledge provided by *Bloom et al. (1956)* focuses on behaviors and test situations that prioritize the ability to remember ideas, materials, and phenomena through either recognition or recall. For constructing standardized knowledge certain steps

are to be taken under the study.

Item collection and Item selection: The content of the knowledge test was composed of questions called items. The items were collected from different sources, such as the literature of Jena et al., (2019). Pandya et al., (2008), Kumawat et.al. (2012), Chatterjee et al., (2018), and Verma et al., (2020) subject matter specialists of GBPUA&T and the researcher's own experience on scientific dairy farming. The knowledge test included multiple-choice type questions (MCQs), Yes/No type questions, and direct questions. Each area included at least four to five questions. Thus, fifty items were prepared covering all the aspects of the sub-areas.

Relevancy test: To ensure objectivity and impartiality, a relevancy test was conducted by selecting fifty items and converting them into objective form questions, with answers that were fully controlled using Yes/No, multiple choice, and fill-in-the-blank formats. These items were sent to the subject matter expert for relevancy checking. Relevancy scores were calculated on a three-point continuum with the 'most relevant item rated as 3 and the 'irrelevant' item rated as 1 and Out of fifty items forty items were selected.

Item Analysis: The two kinds of information yielded when Gulliford explored item analysis i.e. item difficulty, and item discrimination.

Difficulty Index (Pi): The difficulty index of an item was defined as the proportions of dairy farmers giving correct answers to that item. Its formula:

$$P_i = \frac{n_i}{N_i} \times 100$$

Where, P_i = Difficulty index in the per centage of i th item; n_i = Total Number of Dairy farmers giving the correct answer to the i th item; N_i = Total number of Dairy farmers to whom the i th item was administered.

Discrimination index: The discrimination index measures the ability of an item to distinguish between well-informed and poorly-informed respondents. For this study, the method suggested by Mehta (1958) was employed. The discrimination index of an item was calculated using the formula below, which involved dividing the 60 respondents into six equal groups of ten, arranged in descending order of their knowledge scores. The highest and lowest scoring groups were used to calculate the discrimination index. The discrimination index formula used in this study is as follows:

$$\text{Discrimination index} = \frac{(S_1 + S_2 - S_5 - S_6)}{N}$$

Here, N represents the total number of respondents who answered the items. S_1 and S_2 represent the frequencies of correct answers given by the respondents in the highest and higher score groups, respectively. S_5 and S_6 represent the frequencies of correct answers given by the respondents in the lower and lowest score groups, respectively. The discrimination index ranges from 0 to 1.

Reliability of test - Reliability is the degree to which measurement tools provide consistent and stable results. The internal consistency reliability was calculated to check the homogeneity of the test. For evaluating, the Spearman-Brown split-half test method was applied. Spearman-Brown split half formula (R) as follow

$$R = \frac{2r}{(1+r)}$$

The effectiveness of Multimedia module was calculated with a statistical tool i.e. Paired t-test method Formula to calculate *paired t-test*:

$$t - \text{cal} = \frac{\bar{D}}{SD/\sqrt{n}}$$

where \bar{D} = Mean of difference between post and pre-knowledge test; This t calculated compared to table value of " t " at $(n-1)$ degree of freedom

RESULTS AND DISCUSSION

Socio-economic characteristics of the dairy farmers : Table 1 revealed that 63.3 per cent of the dairy farmers were middle age males (80%) and (58.33%) were engaged in two occupations for living a better and secured livelihood which were dairying and agriculture. These occupations are the most traditional source of income. Thus, some youth also get involved in it because of family occupation. It was found that if not primary then, dairy has always been a supplementary source of livelihood for almost all the farmers in the studied region to increase their income. Concerning their status of education, data depicts that none of the respondents were illiterate which explains that education is picking up pace among the masses and farmers were trying to achieve a better understanding of their surroundings. The majority (70%) of respondents had medium level of milk production (8.12-27.6litr/day) and herd size (3-6). The results indicates that most the farmers' preferred Indigenous buffalos in the studied area because of low maintenance and good milk production; it favors

Table 1. Socio economic and communication characteristics of the dairy farmers (N=60)

Variable	No.	%
<i>Age</i>		
Young (< 31)	14	23.3
Middle (31 to 50)	38	63.3
Old (>50)	8	13.3
<i>Gender</i>		
Male	48	80
Female	12	20
<i>Education</i>		
Up to High school	33	55.00
Intermediate and above	27	45.00
<i>Family type</i>		
Nuclear	39	65
Joint	21	35
<i>Family size</i>		
Small (less than 4)	6	10
Medium (4 to 9)	46	76.6
large (> 9)	8	13
<i>Occupation</i>		
Dairying+ agriculture	35	58.33
Dairying	13	21.67
Dairying and other	12	20
<i>Landholding</i>		
Landless (<0.2)	6	10
Marginal (<1.00)	7	11.67
Small (1.0 to 2.0)	26	43.33
Semi medium (2.0- 4.0)	11	18.33
Medium (4.0-10.0)	5	8.33
Large (>10.0)	5	8.33
<i>Dairy experience</i>		
Low (<7yrs)	12	20
Medium (7to 18yrs)	34	58.33
High(>18yrs)	13	21.66
<i>Herd size</i>		
Small (< 3)	9	15
Medium (3 to 6)	45	75
Large (> 6)	6	10
<i>Milk production (litres/day)</i>		
Low (< 8.12)	9	15
Medium (8.12to 27.6)	42	70
High (> 27.6)	9	15
<i>Milk consumption (litres/day)</i>		
Low (< 3.1)	10	16.67
Medium (3.1to 6.95)	41	68.33
High (> 6.95)	9	15
<i>Milk sale (litre/day)</i>		
Low (< 4.1)	7	11.66
Medium (4.1 to21.64)	45	75
High (> 21.64)	8	13.33
<i>Dairy income</i>		
Low (< 3000)	3	5
Medium (3000 to19000)	48	80
High (>19000)	9	15
<i>Extension contacts</i>		
Low (<3.32)	12	20
Medium (3.32 to7)	40	66.66
High (>7)	08	13.33
<i>Media ownership</i>		
Radio	36	60
Television	60	100
Newspaper	29	48.33
Smartphone	60	100
Internet	60	100
Computer	15	25
Farm magazine	5	8.33
<i>Social media platform</i>		
Facebook	47	78.33
WhatsApp	60	100
Twitter	4	6.66
Google+	22	36.66
Facebook messenger	10	16.66
YouTube	39	65
Instagram	2	3.33
<i>WhatsApp usage behavior</i>		
<i>Year of using WhatsApp</i>		
Less than a year	7	11.6
Between 1to3 years	20	33.3
More than 3 years	33	55
<i>Mode of access to WhatsApp</i>		
Data pack	60	100
<i>How often recharge data pack</i>		
Monthly	44	73.3
Occasionally	16	26.6
<i>Frequency of WhatsApp use</i>		
More than twice a day	15	25
Once a day	37	61.6
Once in three days	7	11.6
Once a week	1	1.6
<i>Preferred language in WhatsApp</i>		
Hindi	60	100
English	36	60
Both (Hindi & English)	51	85
<i>Preferred format in WhatsApp</i>		
Text	30	50
Video	37	61.66
Audio	31	51.66
Picture	32	53.33
Multimedia	42	70

them to earn more with less maintenance cost. The dairy income of 80 per cent of the respondents was at a medium level (between 3000 to 19000) due to a combination of factors, including the rising cost of milk production and low prices offered by the milk cooperative society for each liter of milk produced by the farmers who were members of the society. The total milk production is one of the important factors on which dairy income depends.

Communication Characteristics of the dairy farmers : 66.66 per cent of dairy farmers had a medium level of extension contact and the probable reason could be that private extension staff and government officials had been contacted by farmers more often for accessing information and the rest of the other extension agencies like NGOs were contacted the least. It was observed that Internet and Smartphone owned by all the respondents, they owned it individually or any member of a family had it i.e. either son or daughter whereas Farm magazine was the least owned media by the respondents (8.33%) because the significance of farm magazine yet remains undiscovered among respondents. In the present study, the inclination of respondents toward WhatsApp (100%), Facebook (78.33%) and YouTube (65%), Google+(36.66) was comparatively more than other platforms. The reason might be due to easy access and common use of these social media platforms in respondents' daily life.

The study delineates that the majority (55%) of the farmers were using WhatsApp for more than three years and all the respondents has data pack mode of access because it was cost-effective in comparison to broadband. The format preferred by the dairy farmers for the dissemination was multimedia and the language preferred was Hindi which bridges the gap between different sets of audiences and tried to connect more easily. According to (70%) of dairy farmers multimedia content seems more concise, informative, and attractive. Only reading text will be tiring and monotonous and will not be able to provide all information in the desired way at a minimum period. Therefore, the combination of two or more media had preferred by the dairy farmer for better understanding.

Construction of knowledge test : To calculate a respondent's total score, the score for all questions was added up. Once the scores were calculated for all 60 respondents, they were arranged in descending order according to magnitude. The respondents were then divided into six groups, each consisting of ten

members, and labeled as G1, G2, G3, G4, G5, and G6 mentioned in Table 2.

Table 2. Obtained range scores by the respondents

Group no.	G1	G2	G3	G4	G5	G6
Range of scores	28-22	21-19	18-17	16-15	13-14	12-10
No. of respondents	10	10	10	10	10	10

To conduct item analysis, the middle two groups (G3 and G4) were eliminated, and only the four extreme groups (G1, G2, G5, and G6) with the highest and lowest scores were used. The difficulty index and discrimination index of each item were then analyzed using the formulas mentioned earlier (Equation-1 and Equation-2). The one who had cattle responded for cattle and the one who had buffaloes had responded for buffaloes in the given knowledge test items accordingly.

Reliability of test : The selected non-sampled respondents administered and filled the knowledge test. Later, the test divided into odd and even sets, and scores were calculated. Meanwhile, the correlation between odd and even set found positive. The correlations were denoted with “r” whose value came out to be 0.763.

On quantifying the result $R=0.865$ Thus, the Reliability of the test was 0.865.

Table 3 stated that the final selection of knowledge test items was done based on the items value with difficulty index ranging from 30 to 80 and Discrimination Index ranging from 0.3 to 0.6 were selected for the final test. Thus, total 36 items were included into the final interview schedule out of 40 items. That is, the items, which were neither too difficult nor too easy to reply and could discriminate the well-informed individuals from the less-informed ones.

Information needs of dairy farmers : From the Table 4, it was stated that ‘Breeds’ were categorized under two sub-areas namely ‘Type of breeds’ and ‘selection of breeds’. Out of these two ‘Selection of breeds’ were given more priority with a WMS of 2.16 in terms of information needs. This indicates dairy farmers want to know more about the selection of the breeds because ultimately good selection will eventually lead to high yield. Thus, leads to high-income generation. Out of the four sub-areas in ‘Breeding’ ‘Artificial insemination’ had the highest weighted mean score of 1.95 and was the top most needed priority of dairy farmers followed by pregnancy diagnosis (WMS 1.91), time of insemination (WMS 1.45) and identification of heat symptoms (WMS 1.13). This states that many families in the studied

Table 3. Difficulty index, discrimination index value of selected set of knowledge items

Items	Difficulty index	Discrimination index	Accepted/ removed
Which Indian breed of cattle/ buffalo ideal for production?	78.3	0.3	
What are the characteristics of good dairy animal.	85	0.1	Removed
Which breed of cattle has high milk yielding capacity?	61.6	0.35	
Lactation period of cattle/ buffalo on an average	45.7	0.3	
Which dairy animal breed is more disease resistant?	88.3	0.45	
What is the first breeding age of Indigeneous animal?	35	0.5	
What is the first breeding age of exotic breed animal?	46.6	0.37	
How many days after parturition cross breed cows should inseminate?	46.8	0.3	
Average gestation period of cattle/ Buffalo	53.3	0.45	
Heat cycle of cattle/buffalo is of how many days?	63.3	0.35	
AI time is	46.67	0.35	
What is the time of feeding first colostrum to the new born calf	93.3	0.1	Removed
How much feed given to cattle for 3 litre of milk	43.67	0.45	
How concentrate feeding to animal should be practiced?	48.33	.4	
How much dry matter should be offered daily to the dairy animals.	34.5	0.55	
What is the Percentage of total feed included in mineral mixture?	36.1	0.3	
At what time fodder to be harvested	63.3	.3	
Which crops are used for fodder in your area ?	66.66	.3	
Chopping of fodder is required ?	68.67	.35	
IF YES - Advantage of chopped fodders	38.33	.25	
Hay is preserved form of feed - Yes/No	53.8	.25	
Which crop is perfect for Silage preparation	40.6	0.3	
Crop for silage should contain moisture? Yes / no	33.67	0.3	
For small farmers which are more economic	41.7	0.5	
Milk fever occur due to Deficiency of	42.8	.3	
In which disease proper disposal of animal carcass is very much important?	67.6	0.6	
Symptoms of mastitis	37.8	0.5	
Why colostrums should be provided to new born calf after birth?	55	0.4	
Dehorning in cattle calf should be practiced in/after _____	36.6	0.3	
FMD vaccination in every _____ months	35.2	0.5	
Hemorrhagic septicemia(HS) _____ year	34	0.37	
Blackquarter(BQ) _____ year	47.8	0.3	
RFID stands for	61.8	0.1	Removed
What is BAIF	23.33	0.25	Removed
Name some subsidies and schemes provided to dairy farmers __	41.6	0.5	
Name the scheme in which to make society/union women empowered one hybrid cow is given _____	43.3	0.35	
Which scheme provide limit of 3 lakh to farmers with very minimal interest if your milk is sell to any milk union and society _____	31.67	0.6	
Under which scheme chances of cow delivering female calf is high as 90% to improve milk production	39.7	.45	
Have you done tagging to your animal Yes/No	61.8	0.45	
If Yes what are its benefit	38.3	0.4	

area were dairying for ages so they had some prior information from their earlier days, which was passed from generation to generation. Thus, they do not find it most needed. Another probable reason could be that the veterinarian and cooperative societies in the locality play a major role in providing basic knowledge regarding breeding practices.

The results revealed that 'feeding of mineral mixture' with WMS 2.03 was prioritized over 'preparation of balanced ration (WMS 1.86)' under a broad area of 'feeding'. Among the four sub-areas of 'fodder production', 'silage preparation' had the highest WMS of 2.33 followed by 'improved variety of fodder seed and plant (WMS of 2.08)' and 'time of sowing and time of harvesting (WMS 1.68)' were highly prioritized because fodder consumption directly affects the milk production of animals. Thus, the farmers were more interested in gathering information about a

good variety of fodder and had very little knowledge about how to make them available in non-season. The results also revealed that none of the farmers needed information about the storage of fodder crops i.e. Hay.

Among the five sub-areas of the 'Health care practice', 'common disease of animal (WMS 2.33)' and 'vaccination schedule (WMS 2.1)' was given more priority over other areas. This indicates that dairy farmers were not aware of these sub-areas as compared to 'deficiency disease (1.83)', 'first aid treatment (WMS 1.73)' and 'de-worming (WMS1.65)'. Concerning, 'Management practices' it was observed that a maximum of the dairy farmers does not need information regarding housing management calving management, clean milk production, and milk testing technique. The reason behind this could be that government is taking a step ahead and providing free milk testing training and clean milk production

Table 4. Information needs related to dairy farming practices

Area	Most needed	Needed	Not needed	WMS
<i>Breed</i>				
Types of breeds	3 (5%)	45(75)	12(20%)	1.85
Selection of breed	13(21.66%)	44(73.3%)	3 (5%)	2.16
<i>Breeding</i>				
Artificial insemination	15(25%)	27(45%)	18(30%)	1.95
Time of insemination	0	27 (45%)	33(55%)	1.45
Identification of heat symptoms	0	8(13.33%)	52(86.67%)	1.13
Pregnancy diagnoses	1(1.667%)	52 (86.66)	8(13.33%)	1.91
<i>Feeding</i>				
Preparation of balanced ration	9 (15%)	34(56.6%)	17 (28.33%)	1.86
Feeding of mineral mixture	10(16.67%)	42 (70%)	8(13.33%)	2.03
<i>Fodder production</i>				
Information of improved variety of fodder seeds and fodder plants	8(13.33%)	49(81.6%)	3(5%)	2.08
Time of sowing and harvesting of fodder	2(3.33%)	37(61.6%)	21(35%)	1.68
Storage of fodder crop i.e. Hay	0	0	60(100%)	1
Silage preparation	23(38.33%)	34(56.6%)	3(5%)	2.33
<i>Health care practice</i>				
Common disease of animals	16(26.66%)	42(70%)	2(3.33%)	2.33
De-worming	3(5%)	33(55%)	24(40%)	1.65
Schedule for vaccination	13(21.67%)	40(66.6)	7(11.67%)	2.1
First aid treatment	0	44(73.3%)	16(26.66%)	1.73
Deficiency disease and their symptoms	4(6.67%)	42(70%)	14 (23.33%)	1.83
<i>Management practice</i>				
Housing system	0	7(11.67%)	53(88.3%)	1.16
Calving management	0	16(26.6%)	44(73.3%)	1.26
Clean milk production	0	11(18.3%)	49(81.6%)	1.18
Milk testing technique	0	14(23.3%)	46(76.6%)	1.23
<i>Others</i>				
Information about government schemes and subsidies	40(66.6%)	14(23.3%)	6(10%)	2.56
Preparation of milk production and value addition to them	4(6.6%)	38(63.33%)	18(30%)	1.76

workshop in the nearby cooperative societies and KVKs. In addition, many of the farmers were doing dairying for ages. Thus, had indigenous knowledge and basic knowledge about all these.

‘Information about subsidy and scheme (WMS 2.56)’ is the top most prioritized need of dairy farmers contrary to all sub-areas. Most of the farmers were unaware of government schemes and subsidies that are been provided to enhance their livelihood and to encourage their entrepreneurial skills. The top eight WMS of the sub-areas in which respondents needed the utmost information were selected.

Effectiveness of multimedia WhatsApp module in terms of gain in knowledge : The effectiveness of the Multimedia WhatsApp Module was measured in terms of gain in knowledge of the respondents. Initially, a pre-knowledge test was calculated through standardized knowledge test and given to the dairy farmers before the intervention of the multimedia WhatsApp Module (Figure 1). Later the post-knowledge test was analyzed after the intervention was disseminated among the audiences through WhatsApp. Both Pre-test and Post-test were conducted in field conditions.

Table 5 revealed that ‘t’ calculated value is higher than ‘t’ tabulated. It shows that, there was acceptance of alternate hypothesis and null hypothesis was rejected. It is observed that intervention of multimedia WhatsApp module had favored many respondents in term of getting needed information in limited period and upgrading their knowledge level in terms of gain in knowledge. Hence, exposure of multimedia module through WhatsApp can be used as an effective medium to upgrade the level of knowledge of respondents.

Developing multimedia WhatsApp module :

Step 1-Determining target audiences: Under this step, the researcher consulted several secondary sources then selected the interest area and came out with a conclusion of researching the dairy farmers of the specific area. The list of dairy farmers was collected with specific criteria of having herd size of two or more than two, availability of Smartphone and WhatsApp installed in it. The list was collected through Pradhan and the Additional Director (Dairy) of districts (Figure 2).

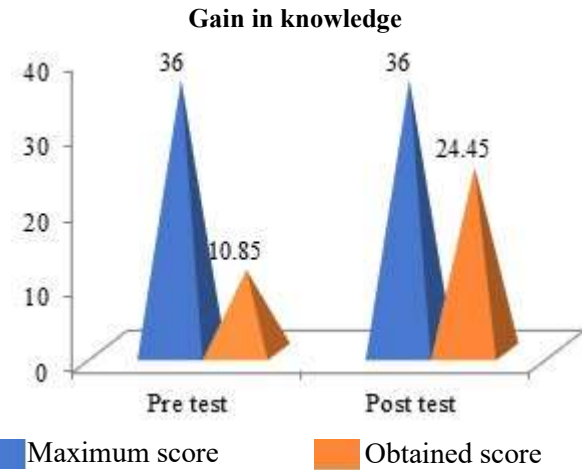


Fig. 1. Mean score of the respondents before and after exposure of multimedia WhatsApp module.

Step 2- Rapport building: The major problem faced while developing any need-based module was that the respondents find the researcher as an outsider, this leads to difficulty in working together. It took two to three days in each village to encompasses a bond amongst the audience and researcher for which door-to-door visit, informal talks with Gram Pradhan, progressive dairy farmers, and respondents of villages was arranged to build a rapport and develop empathy.

Step 3 Analyzing the profile characteristics of target audience: The step includes acquiring information about the socio-economic, and communication characteristics of the dairy farmers through an interview schedule in the routine workplace of dairy farmers. As mentioned in Table 1.

Step 4-Need assessment and its prioritization: The top most sought information needs of the dairy farmers were measure through Weighted mean score and shown in Table 4. Accordingly, the eight top preferred subareas having weighted mean score of above 1.94 were selected.

Step 5- Analyzing knowledge gap (pre-test) : This step includes a pre-test of the respondent with the help of standardized knowledge test to identify the existing knowledge level of the respondents prior to the intervention. The score out there was 10.85 out of 36. The pre-test was conducted offline mode by interacting with farmers so that they face fewer problems while

Table 5. Paired t test for Effectiveness of Multimedia WhatsApp module (n=60)

\bar{X}_1	\bar{X}_2	\bar{d}	S_d	't' calc	't' tab (n-1), alpha	Significant relationship
10.85	24.45	13.6	2.65	42.22	-2.3912	Null hypothesis Rejected

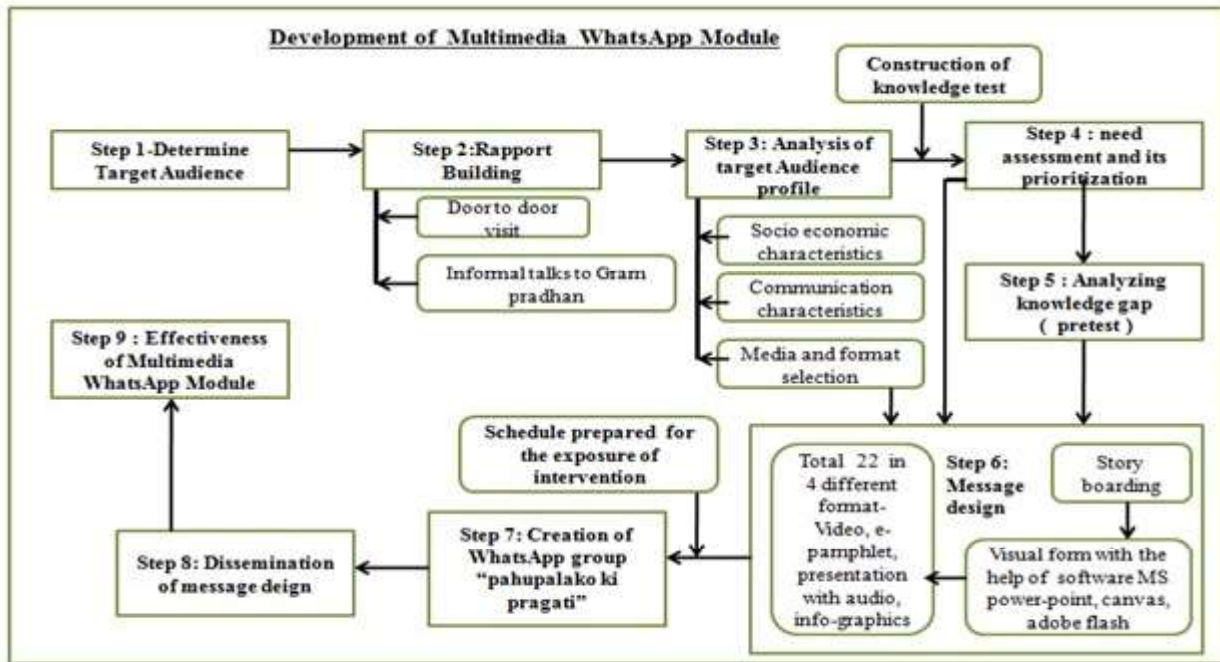


Fig. 2. Schematic representation of development of multimedia WhatsApp module

answering the questions of the knowledge test.

Step 6-Message designing: The open discussion and meetings with the veterinary doctors were organized then the storyboarding of ideas which later converted into visual form with the help of software and applications like Canava for e-pamphlets, Adobe flash, video editor for editing video and adding voice to it, Kine-master, in-shot, power-point for slideshow.

Step 7-Creation of WhatsApp group: One or two selective content was shared daily to the group from the selected sub-areas so that there can be a discussion on the queries of the farmers regarding the content that has been delivered. Hence, a schedule was prepared accordingly for dissemination. All the preferred sub-areas were covered under 16 days and 2 days were given to each of the sub-areas so that, information through each content could leave a remarkable impression on the respondents.

Step 8-Dissemination of message in WhatsApp group: After designing the message, the consent of the target audience was taken for the creation of a WhatsApp group in which all the 60 respondents were taken as active members. The group was named “Pashupalako ki Pragati” and maximum of the content in the group were shared in the Hindi language so that the respondents do not find any hindrance while understanding and communicating.

Step 9-Effectiveness of multimedia WhatsApp module : The step calculated the difference between pre-posts

knowledge test to assess the effectiveness of Multimedia WhatsApp module in terms of gain in knowledge.

Policy Implication : The findings of the present study have some potential implication. The findings in the study are useful for other researchers who want to adopt the same knowledge test in different regions on different respondents as the study developed a knowledge test on dairy farming practices. Also, the findings can be useful in the training program organized by KVKs or other institutions of the studied area as it gave brief review about socio-economic communication and information needs aspects of the dairy farmers of Hardiwar districts. The policy implication may include development of guideline for the use of multimedia in filling knowledge gap through appropriate use of digital media. The training should be conducted for the extension workers to integrate multimedia into information delivery system.

CONCLUSION

The paper gives incontrovertible evidence that there was a lack of awareness and a significant knowledge gap exists among dairy farmers regarding dairy farming practices. So, there is a vast scope of enhancing knowledge and awareness level of farmers with the advancement or intervention of well-planned and strategize media as done in the present study. Now a days, platforms like WhatsApp grasps the attention of every individual irrespective of age because of

their user-friendliness and easy know-how. Hence, in the present paper, it is used as an effective medium to disseminate information. It focuses on the need assessment of the respondents before the development of the “Multimedia WhatsApp Module” to make it need-based, as need assessment is the foremost step for the development of any media. Along with the decision of format, duration, language, and social media preferred, the information need should be analyzed to make a module more impactful and attractive to the respondents for a short span of 16 days. As a result, it was been observed that there was a significant gain in knowledge which emphasizes a crucial role of WhatsApp module in disseminating needs-based Dairy information along with the participation of target audience.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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