



Effectiveness of Interactive Video Conferencing through Village Resource Centres of Karnataka, India: Farmers' Feedback

A. Shamna^{1*}, K. Narayana Gowda² and N. S. Shivalinge Gowda²

¹ICAR-Central Research Institute for Jute and Allied Fibres, Kolkata, India.

²University of Agricultural Sciences, Bangalore, India.

Authors' contributions

This work was carried out in collaboration between all authors. Author AS designed the study, performed the primary data collection, statistical analysis and wrote the first draft of the manuscript. Authors KNG and NSSG guided and assisted in formulating the research study, data collection tools and final analysis. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/BJAST/2017/30337

Editor(s):

(1) Chien-Jen Wang, Department of Electrical Engineering, National University of Tainan, Tainan, Taiwan.

Reviewers:

(1) Zahidul Haque, Center for Environmental and Geographic Information Services (CEGIS), Gulshan, Dhaka, Bangladesh.

(2) Bambang Ali Nugroho, Brawijaya University, Malang, Indonesia.

Complete Peer review History: <http://www.sciencedomain.org/review-history/18101>

Received 3rd November 2016

Accepted 1st March 2017

Published 9th March 2017

Original Research Article

ABSTRACT

Interactive video conferencing through satellite is an effective means of transferring the latest technologies to farmers. A study on the effectiveness of interactive video conferencing with farmers through VRCs for agriculture information dissemination is very much important to decide a massive replication of this model of communication. The study was conducted at Karnataka state of India. Twenty farmers who frequently visited the VRCs were selected randomly from each VRC, thus constituting a sample size of 200. Personal Interview and case study method was used for data collection. From the personal variables, it is evident that VRC programmes attracted more of young (33.3%) and middle age groups (38%). Among the participants 63% were male. Irrespective of the educational qualification, all of them had participated in VRC programmes. It was observed that social participation was low for more than half of the respondents (54%) and 40 per cent of them had low cosmopolitanism. The case studies had revealed that farmers felt greater satisfaction as they could interact with the experts directly and could solve their problems, could save money and time, could find new enterprises that are profitable to them. Among the constraints the highly

*Corresponding author: E-mail: shamnaext@yahoo.co.in, sham nababun@gmail.com;

scored one was regarding the timing and duration of the programmes (69.5%). The prominent suggestions included regarding inculcation of experiences of progressive farmers and more success stories (89%). The study was ended with the conclusion that the technology transfer to farmers through this modern method of communication can empower the rural farmers in developing countries, enhance ecological and livelihood security and accelerate human development and quality of life.

Keywords: Interactive video conference; village resource centres; information; communication; knowledge.

1. INTRODUCTION

Interactive videoconferencing is a two way audio video based interaction between two or more participants. The Village Resource Center (VRC) connects village level communities to the Expert Centers located in strategic places through interactive video conferencing. This is one of the space enabled technologies of Indian Space Research Organisation initiated to leverage technologies to the rural communities. The entire system has teacher ends and student ends. The teacher end is called expert centre and student end is the Village Resource Centre. The expert centre is generally located at universities, Krishi Vigyan Kendras, hospitals or Research Centres. The student end or VRCs are located at remote villages.

With the intention of directly interacting with people in rural areas around 500 VRCs are established all over India by ISRO in association with various universities, non-governmental organizations, trusts, state and central agencies. In karnataka state alone, 57 VRCs are established by ISRO in collaboration with various organizations. The agriculture related programmes were initiated in 2007 through the expert centre from University of Agriculture Sciences, Bangalore. The centre had conducted expert programmes covering improved technology on field crops, fruit crops, vegetables, flower crops, organic farming, integrated nutrient management, integrated pest management, fishery, poultry, harvest and postharvest technology, value addition, biofertilisers, sericulture and weather forecast which was found very useful to farmers at the receiving end. The expert centre programme popularly called as teleconferencing programme from the University has lecture session followed by interaction. Farmers can also bring disease specimens, pests etc. to the VRCs to show the experts and get clear solutions for plant protection and other problems.

Satellite Communication (SATCOM) has helped messages reaching directly from the Expert

Center to the grass root people through its VRC's two way audio video networks at quickest possible time with an opportunity to directly interact with the source by the receivers. This will help the participants to have a real feeling of face to face communication. Adoption of this interactive communication method will be a path breaking step in agriculture information dissemination. The message can be send to the end user without any distortion; further the participants can also clarify any doubts regarding the technology.

VRC programme is a unique societal application conceived by Department of Space, wherein the capabilities of satellite communication and earth observation are integrated, to reach the variety of services emanating from the space systems and other IT tools directly to the rural communities [1]. Communication through interactive video conferencing helped to reach the message directly to the grass root level extension personnel, local leaders and farmers through VRC which is a unique two way audio video network [2]. Most of the ICT initiatives information flow one-way [3]. There was a limited scope for interaction. Projects such as Farmers Call Centre, Village Resource Centre, e-Arik, e-Sagu and digital green provide opportunities for interaction among farmers and experts. It is expected that integration of ICTs in agricultural extension will provide needed impetus to agricultural sector and ICTs can complement the traditional extension system for Knowledge Resource delivery to the millions of the farmers [4].

A study on the effectiveness of interactive video conferencing with farmers through VRCs for agriculture information dissemination is very much important to decide a massive replication of this model of communication. It is important to know how the farmers are satisfied with the programmes given by VRCs on farming activities. If the system is found to be effective, the farmers especially in rural areas need not run from pillar to post for information regarding new

technologies. In this context, the present study is designed with the following objectives.

1.1 Objectives

1. To analyse the profile of participants of VRC's farm related programmes
2. To study the effectiveness of interactive video conference of VRCs in dissemination of agricultural technologies
3. To document the constraints and suggestions from the participants of VRC programmes.

2. LOCALE AND METHODOLOGY OF THE STUDY

Karnataka state in India where 51 VRCs were established was the study area where VRCs were used intensively to disseminate technologies to farmers in remote and rural areas and interact with them directly. The expert centre at University of Agricultural Sciences, Bangalore was actively involved in the information dissemination process through interactive video conferencing. The centre had covered various programmes on improved technology in agriculture, fishery, poultry, sericulture, weather forecasting information etc.

Ten VRCs which were regularly connecting to the expert centre of University were selected for the study. Twenty farmers who frequently visited the VRCs were selected randomly from each VRC, thus constituting a sample size of 200. Personal interview and case study method was used for data collection. The constraints and suggestions for the functioning of the VRCs were also documented through survey method.

3. RESULTS AND DISCUSSION

The data collected from two hundred farmers who attended the programmes was analysed and the results are presented under different heads.

3.1 Profile of Participants of VRC Programmes on Farming Activities

The profile of the participants of the farming related programmes of VRC was studied in terms of their personal, economic, social and psychological variables and are presented in Table 1. From the personal variables, it is evident that VRC programmes attracted more of young and middle age groups. Majority of the participants were male. This result is in line with

the findings of Samansiri and Wanigasundera [5] that the intensity of use of Modern communication technologies is influenced by gender, participation in agricultural projects and the region variations. The table also reveal that irrespective of the level of education and experience in farming, farmers participated in the VRC programmes.

The economic variables revealed that majority of the participants belonged to medium and high income groups. Marginal and small farmers participation in VRC programmes was more when compared to medium and big farmers. They had found VRCs as a source of obtaining farm related information in a bigger way.

Most of the participants had a low score on social variables studied. It was observed that social participation was low for more than half of the respondents, 40 per cent of them had low cosmopolitanness. The low to medium level of cosmopolitanness of farmers may be due to their complete involvement in farming activities especially in field works which is a reflection of lack of sufficient labourers and high labour charges. They manage their field works and other related works in such a manner that they don't miss the VRC programme on farming activities which is of great use to them. They find very less time to go to nearby towns or cities due to this and hence they have very less outside exposure. The findings were similar to the findings of Dhananjaya [6], Soumya Shree [7] and Babu [8]. Nearly 50 per cent of VRC participants had low leadership ability. Majority of the participants of the VRC programmes do not find time to involve in discussion or take lead in his village regarding new farming practices. More over most of them were low resource based farmers who work very hard in their field and hesitate to dedicate time for any other purpose other than something which is beneficial to them.

Among the psychological variables risk orientation was medium (44%) to high (22%) and economic motivation was high for nearly half of the respondents. The purpose of visit of most of the farmers who were attending the VRC programmes is to gain information on farming activities so that they can improve their income from the farms. The findings are in accordance with the results of Dhananjaya (2008). Most of the respondents had scored low (42.5) to medium innovation proneness (27.5%). Majority of the participants of VRC Programmes were marginal farmers who had very less land holdings in which they hesitate to try out new

ideas. The other probable reasons for low and medium level of innovation proneness by majority of the participants may be lack of interest, non-availability of resources, lack of knowledge and also lack of amenities to aspire for better options.

Table 1. Profile of the participants of VRC programmes on farming activities (n=200)

Sl. no	Variable	Category	Respondents	
			No.	Per cent
I Personal variables				
1	Age	Young (less than 30)	66	33.0
		Middle (30 to 50)	76	38.0
		Old (Above 50)	58	29.0
2	Gender	Male	126	63.0
		Female	74	37.0
3	Education	Illiterate	51	25.5
		Primary School	68	34.0
		Secondary School	46	23.0
		Higher secondary and above	35	17.5
4	Experience in farming	Low (<13 years)	78	39.0
		Medium (13-23 years)	63	31.5
		High (>23 years)	59	29.5
II Economic variables				
5	Annual Income	Low (< 30,000 Rs)	49	24.5
		Medium (30,000 to 50,000 Rs)	46	23.0
		High (> 50,000 Rs)	105	52.5
6	Size of Land holding	Marginal (<2.5 acres)	90	45.0
		Small (2.5 to 5 acres)	73	36.5
		Medium (5 to 10 acres)	24	12.0
		Big (> 10 acres)	13	6.5
III Social variables				
7	Family size	Small (<5)	85	42.5
		Medium (5 to 7)	89	44.5
		Big (>7)	26	13.0
8	Family dependency ratio	Low (<40)	88	44.0
		Medium (41 to 80)	41	20.5
		High (> 80)	71	35.5
9	Social participation	Low (<3.49)	108	54.0
		Medium (3.5 to 6)	22	11.0
		High (>6)	70	35.0
10	Cosmopolitaness	Low (<6.35)	80	40.0
		Medium (6.35 to 8)	75	37.5
		High (>8)	45	22.5
11	Leadership ability	Low (<5.04)	99	49.5
		Medium (5.04 to 6.7)	31	15.5
		High (> 6.7)	70	35.0
IV Psychological variables				
12	Risk Orientation	Low (<3.37)	68	34.0
		Medium (3.37 to 4.39)	88	44.0
		High (>4.39)	44	22.0
13	Economic motivation	Low (<3.91)	37	18.5
		Medium (3.91 to 4.83)	72	36.0
		High (>4.83)	91	45.5
14	Innovation proneness	Low (<8.18)	85	42.5
		Medium (8.18 to 10.84)	54	27.5
		High (>10.84)	61	30.5

3.2 Advantages of the Village Resource Centres -Case Studies

3.2.1 Case study – 1: Fisheries venture by a small farmer

Ravi Kumar, M.J., a farmer from Melekote, Doddaballapura, Bangalore Rural District was a regular visitor to VRC programme especially the programmes on agriculture given from University of Agricultural Sciences, Bangalore. From the VRC programme of KVK Hadonahally, he came to know about the possibilities of fish farming. The programme on fish rearing given through VRC created interest in him. He collected more information about the fish breeds that can be grown, through interaction with the experts. He decided to give a trial and took up fish farming by leasing waterbody at the rate of Rs. 2500 per year for two years and released 15,000 fingerlings in to it. Around 10,000 Rs was spent for fish food. He could get around five tonnes of fish when harvested which he sold out in the nearby market based on the demand, at a rate of 80 Rs per Kg and got good profit out of this. He is now transformed as fishery information provider for fellow farmers.

3.2.2 Case study 2: Cropping pattern change from groundnut to potato

A programme on improved cultivation of potato made a turnaround for Anantharam, N.L., aged 35, a farmer from Nilumnahalli, Pavagada. He had participated in many farming related programmes at VRC. Among those, one which gave him more benefit was that of the programme on improved cultivation of potato. He interacted with experts and gained sufficient information about potato cultivation. With the advice of the experts he could obtain the planting material of Kufri Jyothi variety of potato. He had sown it in his one acre field on a trial basis and followed the cultivation practices as suggested by the experts from the University through VRC. He got a yield of 40 Quintal per acre and a total income of Rs 20,000/-. A few of his fellow farmers also started growing potato in their fields and this success has spread all over Nilumnahalli village. He was very proud to say that he is the first one to grow potato in his village. He also expressed greater satisfaction over the VRC programmes for farmers.

3.2.3 Case study – 3: Successful control of rats from field and storage yard

Mahendra aged 35, a young farmer from KR Nagar, Mysore, Karnataka State is a member of

Janki Samudaya Sampanmoola Kendra. He is also a member of Farmers Cooperative Society who is an active participant of all VRC programmes related to farming. One major problem that he was facing in his field and storage yard was the rat menace. He tried rat traps, rat poison etc. but nothing worked out for the complete elimination of the rats.

There was a programme in VRC on rat control from University of Agricultural Sciences, Bangalore. Complete information on rats and its control measures was explained in the programme. Through interaction with experts, he came to know that rats release a chemical substance once it is trapped and it act as a signal for other rats to avoid the rat traps. He also learnt to wash the traps thoroughly once a rat is trapped. The experts also explained other methods of rat control. Further he got solution for rat control in coconut garden using thin aluminum sheets. He testified that the information was very much useful to him. He could avoid the damage of coconuts by rats and got good yield from coconut garden.

He expressed that VRC as a good source of information to farmers because they can have direct interaction with the experts from University and other reputed institutes. He also expressed that the farmers feel the source of information as credible as each programme was given by respective experts in the subject matter.

3.2.4 Case study 4: Authentic source of advanced technology for vegetable growers

Muniraju, aged 28 is a farmer from Patcherlahalli, Budikote, Kolar District, Karnataka. He believed that farmers in his area were very lucky to have a VRC in their proximity. According to him any authentic information regarding farming can be obtained through VRC at Budikote. He was cultivating traditional varieties of vegetables and ragi like others in his village. Farmers in his area were doing farming in their own way. He told that when the people in his village started receiving agricultural related information through VRC from University of agricultural Sciences, Bangalore, they came to know about different high yielding varieties suitable to their region, pest and disease management methods and other latest cultivation aspects. He told that they were free to ask the experts even about the crops to be selected for the season. He gained additional income of Rs12000 from his crops that year after following

the expert's suggestions from VRC. He thanked VRC for helping him to gain confidence in farming.

Individual case studies on selected farmers revealed that the programmes on farming activities given through the Expert Centre at GKVK were of great help to them. The conclusions that can be drawn from the studies are VRC is a great boon to the farmers, farmers felt greater satisfaction as they could interact with the experts directly and could solve their problems, could save money and time, could find new enterprises that are profitable to them, could plan their farming related activities in a better way, gave the farmers a sense of pride because of their participation in the VRC programmes and more over the farmers gained confidence in farming.

The above observations show that VRCs can definitely change the existing situation of farming by reaching more and more farmers with location specific technologies. VRCs can also reach one to one as well as a mass to solve their farming related problems and deliver new technologies with more effectiveness. The provision for immediate feedback is one of the greatest advantages of the system which can be made use of effectively. Interactive video conference helped farmers to develop self-confidence as they learn to approach and interact with the modern world [9]. People living in rural areas are empowered with information to face current challenges. Even those in the remotest of villages can feel connected to the rest of the world and benefit from its progress through exposure to new technology. Thus many more

success stories are there flagging VRC's sustainable rural transformation role of helping farmers gain confidence in advance farming. The findings are in line with the findings of Bhatia [10], Ghosh [11], Bello et al. [12] and Shivram and Sultana [13].

3.3 Constraints Experienced by Users of VRCs

A detailed analysis of constraints experienced by the users of VRCs were conducted (Table 2) and the results are discussed in the subsequent paragraphs.

More than two third of the respondents (69.5%) opined that VRC programmes on farming activities were time consuming. Most of the farmers had work in their own farms right from morning. Due to shortage of labour and high labour charges, many farmers' own labour also contributed to the total labour force. Hence they find it difficult to attend the VRC programme for two and half hours. They would rather like to spend forty five minutes at the most in the VRC.

Some farmers told that they were not informed in advance about the programme. So they could not plan their activities accordingly to attend the VRC programmes. Delay in informing the farmers may be due to delay in uploading the time table in the VRC system. VRC operators sometimes may not keep track of things and inform farmers. Sometimes VRC operators fail to give information about time schedule to all the farmers because they are geographically dispersed.

Table 2. Constraints experienced by the users of VRC (n=200)

Sl. no	Statements	No.	Percentage
1	Programme was time consuming	139	69.5
2	Advance intimation about the programme was not given	128	64.0
3	Question answer discussion duration was not sufficient	118	59.0
4	VRC located at a distant place from the location of user	116	58.0
5	Information was lengthy	108	54.0
6	Specimen shown was not very much clear	99	49.5
7	Programme was not relevant for our situation	77	38.5
8	Video transmission quality was not good	72	36.0
9	No new information was supplied by the resource persons	69	34.5
10	Programmes were repetitive	61	30.5
11	Time schedule of the programme was not suitable	51	25.5
12	Power problem	49	24.5
13	Programme was not timely	41	20.5
14	VRC operator was not trained properly	33	16.5
15	Connectivity problem	16	8.0
16	VRC operator was not present always	16	8.0

Few farmers were not satisfied with duration of question answer discussion. This may be due to the difficulty of experts to attend many questions from different centres within the stipulated time schedule. This had created dissatisfaction to those farmers who could not interact with experts.

Another constraint expressed by some of the farmers was VRC is located away from their village. At present VRCs are only limited in numbers. Farmers visit these centres from nearby villages also. Sometimes they have to travel long distance and the mode of transport is also very inadequate. For this reason they feel the need for a VRC in their village. Some of the farmers expressed that the programme through VRC are lengthy especially lecture session. Many were not having the patience to listen for one to one and half hour. They also expressed that the specimens shown were not very much clear.

The respondents also pointed out that programme being not relevant to their situation as a constraint. In Karnataka, VRCs are located in different agro ecological zones and it is quite natural that crops of one region do not suit to the other regions. For this reason, programme on a particular crop cannot be of same importance to all the agro-eco regions. Video transmission quality was not good according to 36 per cent of respondents. This may be due to lack of picture clarity or lack of a projector or big screen to see the video clearly. Some farmers also felt that no new information was supplied by resource persons. The probable reason may be many farmers who are attending the VRC programme are progressive farmers who are already following latest cultivation practices in their own fields. Some programmes were repeated based on the request from various centres as it is very much relevant to their location. This repetition of programmes created boredom among the farmers of other centres.

Some farmers have expressed that the time schedule of the programme was not suitable. They had indicated that generally Mondays are market days in their localities and they fall in short of time to visit VRC. A few had indicated that since the water is released from canals in to their fields during this time, they faced difficulty in attending the programmes. Some had expressed that the programme was not timely. They felt that the programme on a particular activity in field should be given well in advance as against scheduling the programme just one week before.

They told that this will help them in taking better decisions and planning the activities accordingly. Another constraint pointed out by some of the farmers is VRC operator was not trained properly. Sometimes when problem arises in audio or video reception, it was not solved immediately. According to farmers more training to VRC operators will help to solve the problems to an extent.

The least expressed constraints were connectivity problem (8%) and VRC operator was not present always (8%). In rainy season and due to heavy winds, sometimes problems arise in receiving satellite signals due to the disturbance in the position of antenna. Due to lack of sufficient staffs in some centres, the VRC operator also had to attend other works. Hence the VRC operator may not be able to concentrate entirely on the VRC programme. These may be the reasons for the above mentioned constraints. The findings are supported by the findings of Purohit [14] and Miller et al. [15].

3.4 Suggestions to Improve the Performance of Village Resource Centres as Indicated by the Users

It could be seen from Table 3 that majority of the participants of VRCs expressed that programme through VRCs should include more of experiences of progressive farmers and success stories followed by the suggestion to carry out need assessment before finalizing the programme schedule, conduct meeting of VRCs every month end for feedback, make the visuals more clear and readable, include more demonstration and live specimen. Nearly three fourth of the respondents also suggested to conduct quiz competition for farmers once in a month and allow sufficient time for question answer. They also suggested adding an element for entertainment.

Around two third of the respondents suggested to make the presentation simple and understandable and to check the system well in advance. More than half of the respondents suggested including the use of more teaching aids. Most of them also had the opinion of provision of some facilities at the student end to record the programmes and save the power point slides in the system for future use. Some of the above results are on par with the studies of Purohit [14]. Effectiveness of the system for the farming community can definitely be improved if the above suggestions can be incorporated in the system.

Table 3. Suggestions to improve the performance of village resource centres as indicated by the users (n=200)

Sl. no	Statements	No.	Percentage
1	Programmes through VRCs should include more of experiences of progressive farmers and success stories.	178	89.0
2	Carry need assessment before finalizing the programme schedule	176	88.0
3	Make the visuals more clear and readable	164	82.0
4	Conduct meeting of VRCs every month end for feed back	164	82.0
5	Include more demonstrations	153	76.50
6	Include more live specimens	151	75.5
7	Conduct Quiz competition for farmers once in a month	149	74.5
8	Allow sufficient time for Questions and answers	147	73.5
9	Add an element for entertainment	145	72.5
10	Make the presentation simple and understandable	137	68.5
11	Provide facilities to record the programme at student end	136	68.0
12	Check the entire system well in advance of the programme.	139	65.5
13	Provide the programmes in a CD format to the Student ends for future reference	130	65.0
14	Include the use of more teaching aids	113	56.5
15	Provide more training to VRC operators	62	31.0
15	Avoid repetition of programmes	36	18.0
17	Provide generator to all VRCs	28	14.0

4. CONCLUSION

Village Resource Centre which is a satellite communication application has many advantages when compared to other mass media like Radio and Television where the communication is one way, where as in case of Village Resource Centres the information is given to farmers through two way audio and video conferencing. The results of the study showed that the interactive video conferencing can play a great role in increasing the knowledge of farmers on various farming activities. VRCs helped the farmers to get credible information directly through experts of different research centres from their village itself in a two way interaction mode. This had saved their time and travel expenditures. In a similar way location specific new technologies can be disseminated to rural farmers in short time period .The constraints reported by the farmers can be addressed by modifying the programme timings to suit the farmers participation and by informing the villagers well in advance about the future programmes. The major suggestions included the inculcation of experiences of progressive farmers and success stories. There is a vast scope for VRCs to reach millions of farmers with modern farming technologies. Hence, this media or channel should be made use off to empower farmers on new technologies and for the effective transfer of the technologies from lab to land.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Manjunath AS, Jain DS, Rajendra Kumar S, Anjaneyulu RVG. Role of satellite communication and remote sensing in rural development. IETE Technical Review. 2007;24(4):215-224.
2. Shamna A, Gowda KN, Gowda NSS. Performance of village resource centres in Karnataka: An Analysis, Indian Res. J. Ext. Edu. 2013;13(3):1-8.
3. Sulaiman Rasheed V, Andy Hall, Kalaivani NJ, Kumuda Dorai, Vamsidhar Reddy TS. Necessary, but not sufficient: Critiquing the role of information and communication technology in putting knowledge into use. Journal of Agricultural Education and Extension. 2012;18(4):331-346.
4. Saravanan R. ICTs for Agricultural Extension: Global experiments, innovations and experiences. New India Publishing Agency, New Delhi; 2010.
5. Samansiri BAD, Wanigasundera WADP. Use of information and communication technology (ICT) by extension officers of the tea small holdings development

- authority of Sri Lanka. Tropical Agricultural Research. 2014;25(4):460–475.
6. Dhananjaya B. Effectiveness of farm advertisements in mass media. Ph.D. Thesis (Unpublished), University of Agricultural Sciences, Bangalore;2008.
 7. Soumyashree GT. A Critical analysis on the functioning of Kisan Call Centres in Karnataka. M.Sc. (Agri.) Thesis, University of Agricultural sciences, Bangalore; 2007.
 8. Babu A. A comparative analysis of e-readiness and perception of information communication technology beneficiaries in Kerala. M.Sc. (Agri.) Thesis, University of Agricultural Sciences, Bangalore; 2005.
 9. Shamna A, Gowda KN, Gowda NSS. Village resource centres; a new approach in extension for increased agriculture production. Indian Res.J. Ext. Edu. 2013; 13(2):116-118.
 10. Bhatia BS. Satcom for extension training, In: Bhatnagar S, Schware, editors. Information and Communication Technology in Rural Development-Cases from India. R., Sage India. 2000;112.
 11. Ghosh DK. Digital India: Rural Empowerment and transformation. Delhi: UBS Publishers; 2006.
 12. Bello AD, Knowlton E, Chaffin J. Interactive video conferencing as a medium for special education: Knowledge acquisition in preservice teacher education. Invention in School and Clinic. 2007;43(1):38-46.
 13. Shivram, Sultana. Telemedicine: An alternate approach to health care. Journal of Communication Studies. 2008;26(2):91-97.
 14. Purohit M. Village resource centre-network utilization study in Gujarat. Study commissioned by Development and Educational Communication Unit, ISRO; 2008.
 15. Miller KT, Hannum WM, Morley T, Proffit WR. Use of recorded interactive seminars in orthodontic distance education. American Journal of Orthodontics and Dentofacial Orthopedics. 2007;132(3): 408-414.

© 2017 Shamna et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

*The peer review history for this paper can be accessed here:
<http://sciencedomain.org/review-history/18101>*