

Extension Environment Characteristics Influencing the Use of Video Mediated Technology in Teaching Agricultural Knowledge and Skills to Farmers in Homa-Bay County, Kenya.

Javan O. Owiti¹

Egerton University, Department of Agricultural Education and Extension, P.O Box 536-20115, Egerton, Kenya.

Tel: +254-726-860-202 E-mail: owitijavan07@gmail.com

Jacob J.J.Ochieng' Konyango¹

Machakos University, Department of Agricultural Education and Extension, P.O Box 137-90100, Machakos, Kenya.

Tel: +254-722-460-523 E-mail: jaonyango2003@yahoo.com

James Obara²

Egerton University, Department of Agricultural Education and Extension, P.O Box 536-20115, Egerton, Kenya.

Tel: +254-722-604-782 E-mail: jobara@egerton.ac.ke

Mark N. Mutinda³

Africa Nazarene University, Department of Environment and Natural Resource Management (EMR), P.O Box 53067-00200, Nairobi, Kenya.

Tel: +254-721-299-114 E-mail: mmutinda@anu.ac.ke

Abstract

The study assessed extension environmental factors influencing the use of video mediated technology (VMT) by public extension agents in Homa-Bay County, Kenya. All the 85 extension agents in Homa Bay County were assessed using a structured questionnaire. The collected data was then cleaned, coded and analysed using descriptive and bivariate linear regression. The internal reliability of the created indices was determined using Cronbach's alpha (α) and an alpha of above .70 was considered adequate for this study. The study found out that there was low rate of use of VMT, and that the extension environmental characteristics had a positive and significant influence ($\beta = .215, p = .048$) on the use of VMT by the extension agents in Homa-Bay County. The influence of extension environment on the use of video mediated technology was rated as average (mean of 5.2) on a scale of 1 to 10. The extension environmental characteristics affecting the level of use of VMT among the extension agents in Homa-Bay were found to be low level of response by the farmers to VMT trainings, lack of electricity away from training centres in the local agricultural areas and inaccessibility of training centres by farmers due to long distances and poor road networks. The study recommended that the public education of the farmers on video mediated learning, establishment of Video Viewing Shops (VVS) strategically, adequate electricity connectivity and improved road network systems within the local areas would improve farmers'

attitude towards the usefulness of VMT and increase their ability to access agricultural information in the attempt to improve farm productivity through better agricultural practices.

Keywords: Video Mediated Technology, Extension Environment, Teaching, Agricultural, Knowledge, Skills

Introduction

Agriculture plays a major role in the socio-economic development of many countries globally and remains to be the backbone of economic growth and stability of many African countries and Kenya in particular. Agriculture is the main source of income for almost 90% of the African population. About 70% of the African population, Kenya inclusive, lives on less than 1\$ (one dollar) a day and the larger population of smallholder farmers in Kenya lives in rural areas and depends directly or indirectly on agriculture (Omorogiuwa, Zivkovic & Ademo, 2014). To improve farm productivity, these smallholder farmers need access to improved technologies, best practices, and to appropriate, timely and comprehensive information, skills and knowledge on production, value addition and markets (Umar, Musa, Olayemi & Suleiman, 2015). This can be achieved through use of proper agricultural extension information and communication channels such as video mediated technology by extension agents which make local farmers to be in tandem with better global agricultural ideas, knowledge and practices to boost their farm productivity (Van Mele, Wanyoeke & Zossou, 2010a).

Video mediated technology involves the application of participatory or educational videos in solving instructional challenges in extension and in improving farmers' ability and interest to learn new agricultural knowledge and skills (Ferriman, 2013). In these videos, farmers with a knowledge, skills or an idea in a given agricultural activity or enterprise within a particular locality are recorded demonstrating a practice or a process, then the videos can be aired on television, or extension agents can take them to villages, show them and discuss them with farmers (Van Mele et al., 2010c). The world's knowledge on use of videos in facilitating learning of agricultural skills by extension agents among farmers has been a great intervention (Suarez, Ching, Ziervogel, Lamaire, Medler & Wiser, 2008). It has been used to enhance self-learning by grassroots people and has emerged to be a powerful medium for knowledge sharing and in producing change in attitude in a cost effective format and engaging for both creators and users (Van Mele et al., 2010b; Okello et al., 2012; Soniia & Asamoah, 2011).

In Kenya and particularly in Homa-Bay County, ICIPE has successfully and effectively used video in training farmers on how to control Striga weed, stem borer and to improve soil fertility (Amudavi et al., 2009). The empirical evidence from Suarez et al. (2008) study concluded that the power of videos could thus enable extensive and intensive learning of various agricultural skills and technologies by farmers. Using videos as learning tool engages the farmers and enables skills and practices to be shown in a short period, and standardizes the technical information disseminated (Vidya & Chinnaiyan, 2010).

Dissemination of agricultural information and skills in the past two decades has been through extension methodologies such as field days, print materials, radios, farmer teachers, Farmer Field Schools (FFS), among others (Amudavi et al., 2009). Adoption of new knowledge and skills that is facilitated by these existing extension service delivery methods only may be short-lived due to large number of farmers, vastness of the area to be traversed by the agents and poor transport infrastructure (Bentley, 2009). The speed of changing technology calls for effective access of new knowledge and skills. Farmers who are illiterate can easily access information through their mobile phones or television at their convenient time allowing them to give more time to farm work (Okello, Kirui, Njirani & Gitonga, 2012).

Video mediated teaching and learning is considered as an empowering extension methodology that offers considerable strength for improving the effectiveness of dissemination of agricultural information, knowledge and skills, for it uses the power of images and enables storage and quick retrieval of information. It is being promoted as an intervention to improve the extension service delivery. Despite the many benefits of VMT, its use in solving agricultural information dissemination problems still faces hurdles. Farmers have greatly benefited from video mediated learning, which has proved successful through trials by ICIPE in the same county. However, its use and acceptance by agricultural extension agents in Homa Bay County remains low. This study sought to determine why the rate of use and acceptance of VMT by agricultural extension agents for dissemination of agricultural knowledge and skills to farmers in Homa Bay County remains low. This study was designed to provide the missing information.

Objectives of the study

The objectives of this study were to examine level of use of VMT among extension agents in Homa-Bay County and to assess the influence extension environment characteristics (availability of electricity, responsiveness of the farmers to VMT and accessibility to the training centres) on use of VMT for teaching of agricultural knowledge and skills by public extension agents in Homa-Bay County.

Methodology

The study was conducted in Homa Bay County in Kenya. The County is in the Western part of Kenya, along the shores of Lake Victoria. Homa Bay County was selected for this study due to its vast agricultural potential and the increase in the number of farmers arising from school dropouts who have taken up farming as a livelihood. The County has challenges that include transport and low level of agricultural knowledge.

A structured questionnaire was used to obtain information from all the 85 extension agents working in Homa Bay County, Kenya, on availability of electricity, training centres and accessibility in enhancing the use of VMT in training farmers. The data was then analysed using descriptive and bivariate linear regression.

Measurement of variables

A self-rating scale (1-5) was used by the extension agents to rate their levels of use of the VMT and their perceptions of the different variable indicators used in this study. The extension agents rated the indicators of the three independent variables, extension environment; availability of electricity away from the training centres, responsiveness of the farmers to VMT and accessibility to the training centres. The individual scores of each extension agent were then added together to form an index which was used in subsequent analysis (Bryman & Bell, 2011).

The dependent variable, level of use of VMT by extension agents was operationalized as the level of use undertaken by the individual agricultural extension agent on each of the following VMT, which included: Whiteboards, Flip charts, Overhead Projectors, Video Camera, Computers, CD-ROM, DVD, Television, Digital Cameras, Smart Phones, Agricultural Video clips, The Web, Search Engines, E-mail, Scanner, Web Publishing and Internet connectivity. The agents assessed

their level of use of each of the item on a scale of 0 to 5, 0 indicating no use and 5 indicating high use.

The internal reliability of the created indices was determined using Cronbach's alpha (α) and an alpha of above .70 was considered adequate for this study.

Results and Discussion

Level of use of VMT by extension agents in Homa-Bay County

In this study, Video Mediated Learning (VML) will be frequently used alongside instructional media and instructional materials or Video Mediated Technology (VMT) to mean all video materials and equipment that are used to enhance the teaching and learning process by extension agents in extension teaching, while use will refer to a purpose for which something may be employed. In this study, the term will refer to incorporation of videos as part of extension teaching to reinforce learning by farmers.

The dependent variable of this study was the level of use of video mediated technology for teaching of agricultural knowledge and skills by public extension agents. The variable was operationalized as an index involving three different indicators, which included Use of VMT by the extension agents, frequency of use of VMT by the extension agents and the choice of VMT by the extension agents in relation to other extension methods.

The extension agents scored the three indicators on a scale of 0 to 5. The score of 0 referred to no use of VMT and 5 high use of VMT. The scores were then combined to form the index of level of VMT use. The frequency distribution, descriptive statistics and the chi-square test for the index are shown in Table 1.

Table 1**Frequency Distribution and Descriptive Statistics for Index of VMT Use**

| Level of VMT Use | Frequency | Expected N | Residual | Chi-square test |
|-------------------------|------------------|-------------------|-----------------|------------------------------------|
| .00 | 13 | 14.2 | -1.2 | $\chi^2=93.659$ df =5 p=.001 |
| 3.00 | 46 | 14.2 | 31.8 | |
| 5.00 | 13 | 14.2 | -1.2 | |
| 7.00 | 8 | 14.2 | -6.2 | |
| 9.00 | 3 | 14.2 | -11.2 | |
| 13.00 | 2 | 14.2 | -12.2 | |
| Total | 85 | | | |

Mean 3.67±.281, median 3.0, Std. dev 2.59, minimum 0, maximum 13, range 13

The results on Table 1 show that the level of VMT use by extension agents in Homa-Bay County was low with a mean of 3.67 on a scale of 0 to 15. The majority of the extension agents (54.1 %) rated their use of VMT as low, the category of high (score of 9) and very high (score of 13) had only 5.9 %. These differences in the extension agents use of VMT were found to be statistically significant (Chi-square 93.659, df 5, p<.001).

Extension environment characteristics

The variable extension environment characteristics used in this study was conceptualized as an index involving assessment of three (3) indicators of good extension environment. The indicators were rated on a 5 point scale to gauge the condition of the environment. The extension environment indicators that were used included: (i) availability of electricity away from training centre, (ii) responsiveness of the farmers to VMT, and (iii) accessibility of the centres based on distance. The rating for the three indicators were then added together to form the index of extension environment characteristic and rated on a scale of 0 to 10 for the study. The descriptive statistics and the frequency distribution of the index are shown in Table 2.

Table 2

Frequency distribution and descriptive statics for the index of extension environment

| Scale for the index | Frequency | Percent |
|----------------------------|------------------|----------------|
| 3.00 | 3 | 3.5 |
| 4.00 | 11 | 12.9 |
| 5.00 | 45 | 52.9 |
| 6.00 | 16 | 18.8 |
| 7.00 | 6 | 7.1 |
| 8.00 | 3 | 3.5 |
| 9.00 | 1 | 1.2 |
| Total | 85 | 100.0 |

Mean 5.2± .11, median 5, mode 5, std. dev. 1.08, Minimum 3, maximum 9, range 6.

Majority of the extension agents (52.9%) had a low score index of 5. The average level was 5.2, ranged between 3 and 9. The low index reveals lack of electricity away from training centres, low level of response by the farmers to VMT and inaccessibility to training centres.

Influence of extension environment characteristics on the use of VMT

The influence of the individual extension environment characteristics (availability of electricity away from training centres, responsiveness of the farmers to VMT and accessibility to the centres based on distance) on use of VMT by extensionists was determined by use of bivariate linear regression and the results of the regression model are presented in Table 3 and Table 4.

The adjusted R² value of 0.035; this means that the independent variable extension environment characteristics explained approximately 3.5% of the variation in dependent variable use of VMT by extension agents as shown in Table 3

Table 3**Regression summary for the influence of environment characteristics on use of VMT**

| Model | R | R square | Adjusted R square | Standard error of the estimate |
|-------|-------------------|----------|-------------------|--------------------------------|
| 1 | .215 ^a | .046 | .035 | 2.551 |

^a predictors: (constant), index of extension environment characteristic

The regression coefficients, t test and significance of the effects are given in Table 4.

Table 4**Regression Coefficients for extension environment characteristics**

| Model | Unstandardized Coefficients | | Standardized Coefficients | | Sig. | Collinearity Statistics |
|-----------------------|-----------------------------|------------|---------------------------|-------|------|-------------------------|
| | B | Std. Error | Beta | t | | |
| (Constant) | 6.391 | 1.381 | | 4.627 | .000 | |
| extension environment | .515 | .256 | .215 | 2.010 | .048 | 1.000 |

a. Dependent Variable: use of VMT by extension agents

Significant positive influence of extension environment characteristics on the level of use of VMT by the extension agents was found to exist ($\beta=.215$, $p=.048$).

Conclusion

Agricultural extension plays an important role in equipping both the extension agents and farmers with relevant agricultural information and knowledge. Video Mediated Technology is an important information communication tool in bridging the agricultural information gaps between extension agents and farmers for increased productivity. It has not been fully utilized in Homa Bay County due to some extension environment associated with low level of response by the farmers to VMT trainings, lack of electricity away from the training centres within the local agricultural areas and inaccessibility to training centres due to long distances and poor road networks.

There is therefore need for public education of the farmers on video mediated learning, establishment of Video Viewing Shops (VVS) strategically, adequate electricity connectivity and improved road network systems within the local areas to improve farmers' attitude towards the usefulness of VMT and increase their ability to access agricultural information in the attempt to improve farm productivity through better agricultural practices.

References

- Amudavi, D.M., Khan. Z.R., Wanyama, J.M., Midega, C.A.O., Pittchar, J., Hassanali A. (2009). Assessment of Technical Efficiency of Farmer Teachers in the Uptake and Dissemination of Push-Pull Technology in Western Kenya. In: *Crop Protection* 28 (11): 987-996.
- Bently, J. W. (2009). Impact of IPM extension for smallholder farmers in the tropics', in R.Peshin and A.K. Dhawan (eds). *Integrated Pest Management. Vol. 2: Dissemination and Impact* New York, NY: Springer.
- Bryman, A. & Bell, E. (2011). *Business Research Methods*, Third Edition, Oxford: Oxford University Press. Accessed on 23rd August 2018 from <https://www.researchgate.net>
- Ferriman, J. (2013). *How to effectively use video for training*. Accessed on 18th June, 2015 from www.learndash.com/how-to-effectively-use-video-for-training/.
- Okello, J.J., Kirui, K.O., Njirani, W.G. & Gitonga, M.Z. (2012). Drivers of Use of Information and Communication Technologies by Farm Households: The Case of Smallholder Farmers in Kenya. *Journal of Agricultural Science*, Vol. 4(2), pp. 111-124.
- Omorogiuwa, O., Zivkovic, J., & Ademo, F., (2014). The Role of Agriculture in the Economic Development of Nigeria. *European Scientific Journal*, Vol. 10(4), pp 133-147.
- Soniia, D., & Asamoah, C. (2011). Video as a tool for agricultural extension in Africa: a case study from Ghana. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, Vol. 7(1), pp 26-41.
- Suarez, P., Ching, F., Ziervogel, G., Lemaire, I. Medler, J.S., & Wiser, B. (2008). *Video-Mediated Approaches for Community-Level Climate Adaptation*. *IDS Bulletin*, Vol.39(4).
- Umar, S., Musa, M.W. & Olayemi, Y.T.(2015). Awareness and Use of Information and Communication Technologies among Extension Agents in Kaduna State of Nigeria. *Journal of Agricultural Extension*. Vol. 19(1), pp 66-76.
- Van Mele, P.J., Wanyoeke, J. & Akakpo C. (2010c). Videos Bridging Asia and Africa: Overcoming Cultural and Institutional Barriers in Technology-mediated Rural Learning. *Journal of Agricultural Education and Extension*, Vol.16 (1), pp. 75-87.

- Van Mele, P.J., Wanyoeke, J. & Zossou, E.P. (2010a). Enhancing rural learning, linkages and institutions. *Development in Practice*. Vol 20(3), pp. 414-421.
- Van Mele., P.J., Zossou, E,P. Vodouhe & Wanyoeke, J. (2010b). Women groups in response to public video screenings on rice processing in Benin. *International Journal of Agricultural Sustainability*. Vol. 8.4, pp. 270-277.
- Vidya, P., & Chinnaiyan M. (2010). Development of an educational Interactive Video-DVD on dairy health management practices. *International Journal of Education and Development using Information and Communication Technology*, Vol 6(1), pp. 19-24.