

HOW VIDEO ATTRIBUTES INFLUENCE FARMER LEARNING ABOUT MAIZE POSTHARVEST HANDLING PRACTICES AND TECHNOLOGIES IN KAKUMIRO DISTRICT, UGANDA

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Abstract

In Sub-Saharan Africa, video has been earmarked as an important tool to enhance learning among smallholder farmers. The study evaluated how the inherent video attributes influence learning about postharvest handling practices and technologies from the perspective of maize farmers in Kakumiro district of Uganda; using the case of Access Agriculture maize videos. An action-oriented research involving showing of four videos, on-site participant observation, six key informant and 50 exit individual interviews were conducted in February 2019. While thematic-content analysis was applied for qualitative data, quantitative data were analyzed using SPSS 18.0 version. Our results clearly illustrate that the video's ability to influence farmer learning depends on the complementarity of its positive attributes including: demonstration ability, attractiveness and clarity of images, ability to arouse interest and curiosity; thus, fostering interactions among viewers. The nature of video content in terms of clarity, practicability, relevance, applicability and content sequencing are also perceived to be key attributes of video in enhancing learning among the viewers. However, the effectiveness of video is likely to be compromised by the socio-economic and cultural factors more especially if such factors are not well taken care of during the filming process. If possible, when developing videos for farmer learning, focus should be on creating local content that is context specific, which farmers can enjoy and relate to for easy adaptation and eventual application.

Keywords: ICTs, Video Attributes, Maize Farmer, Learning, Postharvest Handling, Uganda.

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Introduction

Globally, since the 1990s, the advancements in Information and Communication Technologies (ICTs) have opened new windows of opportunity for improvement in development communication (Karubanga *et al.*, 2017; Karubanga *et al.*, 2019). In Sub-Saharan region, in particular, the increasing availability and access to ICTs is providing new opportunities for enhancing interactive learning among smallholder farmers (Bentley *et al.*, 2015; Barber *et al.*, 2016; Irungu *et al.*, 2015). The ICTs consist of computers, Television (TV), radio, telephone and video (Bentley *et al.*, 2011). Access Agriculture, an international Non-Governmental Organization has been producing and distributing videos in various foreign and local languages which several local and regional organizations in Uganda have

used to train farmers to enhance learning (Karubanga *et al.*, 2017), especially in aspects of postharvest handling practices and technologies. In the perspective of this study, learning is defined as the ability of the video attributes to foster interactions and acquisition of new knowledge about maize postharvest handling practices and technologies among farmers. For instance, farmer videos are reported to have high potential in enhancing the effectiveness of agricultural extension service delivery especially in aspects of maize postharvest handling practices and technologies because of its inherent attributes (Bedé Lauréano, 2016).

Earlier scholars argue that despite the language used, videos can speak for themselves to enhance

learning among viewers (Bentley *et al.*, 2014; Bede Lauréano, 2016), because they encompass pictures, words, demonstration capacity and body language which are important for enhancing the ability to communicate effectively (MacGregor, 2007; Karubanga *et al.*, 2017). For example, the pictures in the video are reported to arouse and maintain the interest of the learner (in this case, the maize farmer) as they engage the hearing and sight senses (MacGregor, 2007; Bede Lauréano, 2016). Because of these attributes, farmers are able to see, hear and remember very well what is being demonstrated in the video (Karubanga *et al.*, 2017); thus, aiding greater learning and understanding about maize postharvest handling practices and technologies (Karubanga *et al.*, 2019). Because of its attributes, the video is premised to deliver simple, clear, applicable, reliable and relevant information to the satisfaction and needs of the viewers; which are cardinal for more effective learning. The messages in the video should also be able to foster interaction and arouse interest among the viewers for effective learning to occur. However, how the video ensures all these is not clearly known from the perspective of the viewers. Therefore, this paper provides an evaluation of how video attributes influence learning about maize postharvest handling practices and technologies from the perspective of farmers in Kakumiro district of Uganda.

Materials and Methods

Action oriented research involving participant observations was conducted in Kakumiro District, Mid-Western Uganda in February 2019. The videos about maize postharvest handling and management were shown in four villages selected from three sub-counties. For example, while in Nalweyo sub-county the videos were shown in Kakora and Kinunda villages, for Katikara sub-county the shows were in Kitabona village and for Kitaihuka sub-county in Kirira village respectively. The selection of the villages was through the guidance of the Nalweyo Seed Company (NASECO) extension worker who said that the farmers in area lacked particular knowledge and experience in maize postharvest handling and management. The English videos that were shown to farmers were downloaded from Access Agriculture website (www.accessagriculture.org). The videos shown were originally developed in Benin. Irrespective of the language used in the video, the purpose of showing them to farmers was to promote better practices and technologies in maize postharvest handling and management. Among the practices and technologies that were shown to maize farmers included: proper harvesting, sorting and shelling, drying and storage of maize. However, this study does not address how much knowledge farmers acquired about these aspects but how the

video attributes enhanced learning through creating awareness about these practices and technologies. The video shows were open for all people interested to attend. Mobilization of farmers for attendance was through the NASECO extension worker. The video shows were located at places determined and preferred by the farmers following consultations made by their extension worker on specific days. The shows started from 7:00pm and ended at 9:00pm. The equipment used to show videos included; a smart projector, speaker, laptop, two stools, a white cloth (used as a screen), benches and plastic chairs.

Participant observations were employed to assess the interaction patterns among the video viewers. It also involved capturing the farmers' comments during the shows; assess farmers' interest, curiosity and excitement. Immediately after the video shows, a total of 50 quick exit interviews were conducted with 31 males and 19 females to assess their perception about how the video attributes influence their learning in terms of demonstration ability, clarity of images, duration of the video, ability to foster interactions, arousing interest and curiosity. Other attributes that were evaluated were related to video content such as clarity, practicability, relevance, applicability and content sequencing. The 50 video viewers who were interviewed included only those that accepted to remain after the shows that ended late at night. Six key informant interviews were carried out with video viewers (two men and four women) to gain a deep understanding about their opinion on how video attributes influence learning. A critical review of the video was also done by playing and replaying it to assess the content with reference to farmer's explanations.

Viewing and critical analysis

Qualitative data generated through participant observations and key informant interviews were processed through coding and content analysis by extracting and relating information on various video attributes. Qualitative data analysis started while in the field during video shows to minimize the loss of meaning of nature of interactions and respondents' explanations on video attributes and their influence on learning about postharvest losses in maize. Quantitative data on video viewers' opinions about how the video attributes influenced learning were analyzed using SPSS 18.0 version to generate descriptive statistics such as percentages. Quotes from the respondents are used to support the viewer's narrative explanations.

Results and Discussion

Socio-demographic characteristics of respondents

Table 1 summaries the profile of farmers who attended and watched the videos on maize postharvest handling and management.

Table 1. Socio-demographic features of video viewers (n=50).

Variable	Percentage
Sex	
Males	62
Females	38
Age	
Below 30 years	16
Between 31-50 years	72
Above 50 years	12
Level of education	
No formal education	14
Formal education	
<i>Primary</i>	60
<i>Secondary</i>	22
<i>Tertiary</i>	04
Occupation of respondents	
On-farm activities	92
Off-farm activities	8
Group membership	
Yes	30
No	70

Source: Exit interview data, 2019

Exit interview results indicate that the sample comprised of more males (62%) who attended and learnt from the video shows than females. The least participation of females could perhaps be explained by the timing of the video shows coupled with their multiple gender responsibilities (Karubanga *et al.*, 2016a). Table 1 further shows that most of the maize farmers (72%) who participated in the video shows on postharvest handling and management belonged to the age category of 31-50 years. Because of the entertainment element embedded in the video more youth attended the video shows (Karubanga *et al.*, 2017). Thus, the use of videos in training can enhance diversity of farmers attending and learning from age mix; which is critical in providing labour during the implementation of the acquired knowledge related to postharvest handling practices and technologies (Ssebagala *et al.*, 2017). Because of its inherent positive attributes such as clarity of images, demonstration ability and fostering of interactions, to some extent the video has enhanced learning among farmers without formal education (14%) as they were able to see and hear what was being demonstrated (Bede Lauréano, 2016; Karubanga *et al.*, 2017). Video provides a better tool in targeting information as evidenced by over 92% of the farmers engaged in on-farm activities. Since the video acts as social magnet, it attracted a considerably high proportion of

farmers (70%) who did not belong to any farmer organization; which is a key attribute of a video in mobilizing viewers (Bentley *et al.*, 2015).

Farmer evaluation of influence of video attributes on learning

Exit interview results in Table 2 reveal that the effectiveness of video in fostering learning is dependent on a combination of its inherent attributes which are essential in enhancing use of both seeing and hearing senses among the viewers (Bentley *et al.*, 2015; Karubanga *et al.*, 2017). For example, majority of the viewers perceived the video as being good in demonstrating better maize postharvest handling practices and technologies. Because of this, farmers after the video show were able to remember the content being demonstrated including proper harvesting, sorting, shelling and storage. Observations indicated that each of the video that was shown took on 9-14 minutes. The farmers perceived that the length of time of a particular video show was adequate to demonstrate a single practice or technology for effective learning to occur among the viewers. In their opinion, farmers said that drying on tarpaulins and cemented floor was well demonstrated and well understood by viewers as these are vital in enhancing quality of maize produced. A critical review of the video content coupled with the farmers' observations revealed

that most of the demonstrations on the practices and technologies were basically performed by women. Given the already existing triple chores of women, the content might send an inclined message regarding gender roles and responsibilities in maize postharvest handling (Ssebagala *et al.*, 2017). Thus, paying attention to this perceived gender-related concern during the development of farmer videos would allow for more equitable involvement of both genders in postharvest handling and management. Much as the viewers were not able to fully comprehend what was being demonstrated in the video due to the language used (English), the demonstration ability of farmers in the video regarding the postharvest handling practices and technologies reportedly enhanced farmer learning. This finding implies that language is not an important factor in using videos particularly in cases where the practices and technologies are well demonstrated to the viewers. However, this finding contradicts Karubanga *et al.* (2017), where they point out that for effective farmer learning to occur, the video needs to be documented in local languages to enhance comprehension of messages and for easy identification with each other.

Exit interview results also show that all video viewers who were interviewed regarded the clarity and attractiveness of images in the video as being key in fostering interest and curiosity of video viewers (Bandura, 1997; MacGregor, 2007). In this regard, the clarity and visibility of images was enhanced by showing the videos at night. This allowed some farmers to view the video even at a distance of approximately 10 metres from the screen. During key informant interviews the extension worker said, "because we do not have community halls where farmers can sit and watch the video, it is necessary that shows start at 7:00pm to allow for clarity and visibility of images" (Key informant interviews, February 2019). Much as this was a better option for the farmers to clearly watch the video, the timing of the shows compromised attendance by the distant and female farmers (Karubanga *et al.*, 2019). Even those who attended hurriedly went back home before the end of the shows (Karubanga *et al.*, 2016b). This result implies that for more effective use of videos in extension, it is required to have community halls where farmers especially the women and distant can watch the shows any time and then return home early.

Table 2. Farmer evaluation of video attributes on learning (n=50).

Variables	Farmers' opinion	Percentage
Demonstration capacity	Good	94
	Fair	6
	Not good	0
Clarity of the images	Good	100
	Fair	0
	Not good	0
Audibility of demonstrators	Good	82
	Fair	14
	Not good	4
Duration of a single video	Good	54
	Fair	46
	Not good	0
Fostering interaction	Good	78
	Fair	22
	Not good	0
Arousing interest	Good	82
	Fair	18
	Not good	0

Source: Exit interview data, 2019

Results in Table 2 further show that the video is good in arousing interest and curiosity among the viewers and because of these positive attributes, it triggers and sustains farmer interactions. Interactions are cardinal for enhanced comprehension and sharing of experiences on the acquired knowledge about maize postharvest handling practices and technologies. Participant observations indicate that the key trigger for

aroused interest was the attractiveness of images, which eventually initiated and sustained farmer interactions and sharing (Bede Lauréano, 2016). For example, during the video shows, it was observed that the viewers got excited when they saw a big sized cob, which they related with their small sized cob of a local variety. Similarly, they were also excited when they saw farmers in the video using small cylindrical tools to shell maize.

Viewers perceived that the embedded teeth in the cylindrical tool allowed for quick and easy removal of maize grain from the cob; an innovation which farmers appreciated that can quicken the shelling of maize rather than using mere hands. Use of hands to shell maize was perceived by farmers as the practice that requires a lot of time and workforce. Another exciting scenario occurred when the farmer in the video was observed serving local beer to fellow farmers during harvesting. Another example involved cracking of maize grain by using the teeth to test for dryness. One of the female farmers in Kitabona village said;

"I am surprised that even those farmers in the video take local beer like us here. Since they are from other countries, I expected them to be taking other types of juice such as passion fruit juice and other related soft drinks. Besides, they would even be using moisture meters to test for dryness instead of using their teeth like us the

local farmers" (Key informant interviews, February 2019).

The implication of this finding is that in order to arouse the interest of viewers and enhance their learning, contextualizing the video content is an important attribute for initiating and sustaining farmer learning. This allows for adaptation, experimentation and localization of the acquired knowledge and practices through interactive sharing of experiences (Bentley *et al.*, 2015; Karubanga *et al.*, 2017).

Farmer evaluation of video content

Besides the above inherent attributes of the video in fostering farmer learning, its ability is also dependent on the nature of the content in terms of simplicity, clarity, feasibility, applicability and relevance of the messages communicated (Table 3). These are clearly explained in the subsequent paragraphs.

Table 3. Farmers' opinion on video content (n=50).

Variables	Farmers' opinion	Percentages
<i>Simplicity</i>	Simple	84
	Fair	14
	Complicated	2
<i>Clarity</i>	Clear	78
	Fair	20
	Not clear	2
<i>Practicability</i>	Practical	52
	Fair	36
	Not practical	12
<i>Applicability</i>	Applicable	44
	Fair	52
	Not applicable	4
<i>Relevancy</i>	Relevant	60
	Fair	36
	Not relevant	4
<i>Sequencing of the message</i>	Well sequenced	76
	Fairly Sequenced	24
	Poorly sequenced	0

Source: Exit interview data, 2019

Majority of the viewers (84%) indicated that the content in the video was simple to understand. This is perhaps explained by the demonstration capacity of farmers in the video coupled with the attractive nature and clarity of images. This is so evident where 78% of the viewers opined that the content in the video was very clear due to the well demonstrated procedures and supportive images that illustrated well the postharvest handling practices and technologies (Van Mele *et al.*, 2010; Zossou *et al.*, 2010). Those who said that the message was fairly simple and complicated based their argument on the nature of the language (English) and complex terms, which were used in

the video (Bentley *et al.*, 2015; Karubanga *et al.*, 2019). For example, it was demonstrated that during storage of maize, it is better for farmers to follow L' empilage A 3 SACS method, which was quite abstract for the viewers to comprehend. This literally meant that in the process of storing shelled maize, the farmers have to put three bags vertically and one horizontally in the store. However, why this should be done was not explicitly done by those demonstrating in the video. This means that if the video and/or translation were provided in the local language, this would not be problematic (Karubanga *et al.*, 2017).

Exit interview results further indicated that the content in the video was practical (52%) as a result of the demonstrations that were embedded in the video. Those who said that the message in the content was not practical based their intuition on that fact that the explanations were provided in a foreign language (either French or English) which perhaps affected viewer's capacity to comprehend the message (MacGregor, 2007; Karubanga *et al.*, 2016a). This conceivably explains why relatively more viewers perceived the video content as being fairly applicable in their own context. For example, during the key informant interviews, one of the females in Kakora village once said;

"In the video they are telling us to construct granaries which are a good strategy for keeping maize for a long time in good condition. However, this is only possible for households that are male based because in our culture women are not responsible for construction work, and if it was possible, the women cannot afford the costs involved. Besides, the granaries are taller and women are not culturally allowed to climb such structures. In case one is found climbing such structures, it is a shame and contradicts cultural values" (Key informant interviews, February 2019).

Other farmers said that applicability of a practice or technology is closely linked to the costs involved. For example, they pointed out that storing maize in drums, metallic silos and permanent warehouses is expensive for local farmers who not earn a lot of money as they depend on rain fed agriculture amidst climate changes. The implication of these findings is that while documenting videos and recommending certain practices and technologies, it is imperative to consider socio-economic and cultural issues if the message communicated is to be applied effectively (Bentley *et al.*, 2015; Zossou *et al.*, 2012).

Relatedly, despite the fairness in the applicability of the messages communicated in the video, over 60% of the viewers had a feeling that the content was relevant. Farmers indicated that the messages in the video were relevant and pertinent to their own situation (Van Mele *et al.*, 2010; Karubanga *et al.*, 2017). The explanation behind this was that farmers perceived postharvest losses as a big challenge in their community especially during the processes of drying, shelling and storage. Conversely, prior selection of the content to be included in the video is paramount to avoid inclusion of unnecessary and destructive messages. For example, one of the male youth in Kinunda village commented;

"The video is talking about maize postharvest handling practices and technologies. However, it

is surprising to also find dogs and sheep in the same video yet they do not explain why they were included in relation to postharvest handling and management. He added that, the farmers in the video are dressed smartly as they do not depict to be true farmers. Even women who are breastfeeding were included in the video which is irrelevant and destructs the viewers" (Key informant interview, February 2019).

As earlier pointed out, the scenarios presented here point to the fact that it is important to consider the prevailing environment and proper selection of content while documenting a video to avoid distorting the message being communicated (Van Mele *et al.*, 2010; Okry *et al.*, 2013). This is closely related to the sequencing of content where each topic was presented independently. This is clearly indicated by 76% of the video viewers who reported that the content in the video was well sequenced and demonstrated. However, some of the viewers (24%) said that the content was not well sequenced which caused systematic learning from the video quite difficult. Overall, an analysis of the video content indicated that the videos shown to farmers were not specific and well sequenced. For example, in a video showing how to harvest maize in a good way, several other contents were included such as storage structures, transportation and marketing activities, which reportedly destructed the viewer's attention. It is therefore important to document and show one specific practice and/or technology at a time for easy follow up by the viewers (Bentley *et al.*, 2015).

Conclusion

The action-oriented study was set out to evaluate how the inherent video attributes influenced farmer learning about maize postharvest handling practices and technologies in Kakumiro district of Uganda. Our results clearly illustrate that the video's ability to influence farmer learning about postharvest handling practices and technologies depends on the complementarity of its positive attributes including: demonstration ability, attractiveness and clarity of images, duration of a single video show, ability to foster interactions, as well as arousing viewer's interest and curiosity among viewers. Results further indicated that the nature of video content in terms of clarity, practicability, relevance, applicability and content sequencing are key attributes if the use of video in extension service delivery is to be effective. However, its effectiveness is likely to be compromised by the socio-economic and cultural factors more especially if they are not well taken care of during the process of video production.

However, we are aware that the farmers looked at the videos differently and what is presented in this paper are just the opinions of the viewers. Conversely, the results imply that language used in the video and the kind of people communicating do not matter as viewers cared little about the skin colour of people in the video and whether the background music was Asian or African. However, what was much interesting to them was how the video attributes enhanced their learning about maize postharvest handling practices and technologies. The video even helped viewers to analyze more technical content that was only shown in the images without necessarily mentioning in the narration. Irrespective of the language used, video is highly scalable even across regions and cultures because it allows verbal and visual communication, thus, making it possible to explain abstract concepts and underlying principles. Interestingly, viewers are capable to remember more of what they see than what they tend to hear. Thus, if carefully documented, the video can actually help to standardize technical information for accurate transmission through other media like radio or television and possibly can be used in combination with farmer field schools and/or other types of participatory research and extension approaches for more effective service delivery.

Lastly, documenting short videos and making them available in formats that can be uploaded on mobile phones is imperative as farmers are able to learn from clear images coupled with the inherent demonstration capacity of farmers in the video. This will foster more sustainable self-discovery and peer learning among farmers more especially in situations of low extension worker to farmer ratio. Thus, in future, video producers such as Access Agriculture needs to consider specific regional and national socio-cultural aspects while documenting videos on practices and technologies purposely to enhance more acceptance and application. When developing videos for farmer learning care should therefore be taken to create content that is context specific, which farmers can enjoy and easily identify with each other for easy scaling out.

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