EFFECTIVENESS OF KNOWLEDGE BROKERAGE, GUIDANCE, AND ADVISORY NETWORK (KBGAN) LEARNING VIDEOS ON IMPROVING THE KNOWLEDGE, ATTITUDE, AND PRACTICES OF DAIRY CARAPRENEURS

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ABSTRACT

This study assessed the effectiveness of Knowledge Brokerage, Guidance, and Advisory Network (KBGAN) learning videos in improving the knowledge, attitudes, and practices of dairy carapreneurs in six Philippine provinces. Using a quasi-experimental design, 93 carapreneurs were divided into three groups: Lecture+Demo, Video+Demo, and Video-Only, each engaging with KBGAN technology topics. Data were collected through surveys, focus group discussions, and key informant interviews with field veterinarians and progressive farmers. Statistical analyses, through Paired Samples T-Tests and Repeated Measures ANOVA, revealed significant knowledge gains. The Lecture+Demo group was notably effective in calf management (p=0.028), while the Video+Demo group excelled in feeding management (p=0.02). Mean scale scores indicated a generally positive attitude towards the technologies, but the Wilcoxon Signed Rank Test showed no significant attitude changes post-intervention. McNemar's test indicated significant practical changes in the Lecture+Demo group for proper feeding ratios (p=0.0012) and calf deworming (p=0.0233). In contrast, the Video-Only group showed significant negative changes in managing mastitis (p=0.0233) and buffalo health (p=0.0055), with farmers discontinuing such practices post-intervention. This study highlights the need for tailored instructional methods and supports combining traditional and digital approaches for effective technology dissemination. Recommendations include enhancing video content, ensuring accessibility, and maintaining interactive training.

Keywords: knowledge, attitude, practice, dairy carapreneurs, learning videos

INTRODUCTION

The DA-Philippine Carabao Center (DA-PCC), in partnership with the Grameen Foundation, developed its first set of learning videos under the Knowledge Brokerage, Guidance, and Advisory Network (KBGAN) program. These five short videos, ranging from 4 to 6 minutes each, focus on critical aspects of dairy buffalo management, including health and nutrition, artificial insemination, calf management, and hygienic milking

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practices. Disseminated across various digital platforms, these videos achieved significant engagement metrics. From November 2020 to September 2022, they garnered between 500 and 1,000 interactions on Facebook and 100 to 800 views on YouTube. However, despite this outreach, no empirical evaluation has been conducted to assess their effectiveness in improving the knowledge, attitudes, and practices (KAPs) of dairy carapreneurs (or "carabao entrepreneurs"), the primary target audience for these educational resources.

Evaluating agricultural educational interventions is a well-documented necessity, with research consistently highlighting video as a powerful medium for knowledge dissemination. For instance, Zossou *et al.* (2012) demonstrated that participatory video methods significantly enhance learning outcomes by fostering active communication and self-learning among farmers, addressing barriers such as local power dynamics and community conflicts. Similarly, Cai and Abbott (2013) found that video can effectively complement traditional teaching methods, particularly for audiences with limited prior knowledge.

Since the 1970s, videos have been utilized to engage farmers and promote the adoption of agricultural technologies, such as high-yielding rice and maize varieties (Davis and Sulaiman, 2018). Bentley *et al.* (2015) highlighted the roles of videos in raising awareness, training, and farmer-to-farmer extension. They recommended incorporating diverse video types (e.g., instructional, participatory) while adhering to principles like content relevance and quality. In Ethiopia, Abate *et al.* (2019) examined a video-mediated approach (VMA), demonstrating its cost-effectiveness and broader reach compared to traditional methods. While VMA improved farmers' knowledge, limitations included inadequate measurement of skill adoption and a lack of pre- and post-test data.

Similarly, David and Asamoah (2011) reported that Video Viewing Clubs (VVCs) effectively improved cocoa pest management practices in Ghana, but recommended further research on gender roles and facilitation effects. Sousa *et al.* (2016) explored mobile phone videos in Mali and Burkina Faso, finding them transformative for agricultural extension while emphasizing the need for broader participant inclusion. In India, Vidya *et al.* (2010) observed that interactive video DVDs effectively enhanced dairy farmers' knowledge, though extended studies and skill measurements were lacking. Mooventhan *et al.* (2017) employed multimedia modules for disseminating dairy practices but noted accessibility challenges for uneducated farmers. In the Philippines, Abdulkadil and Orejudos (2010) developed VClass, a self-directed learning tool for rice farming. While it improved extension workers' knowledge, it lacked broader farmer accessibility and strong justification for participation.

These findings suggest that the KBGAN videos could potentially improve KAPs among dairy carapreneurs, provided their effectiveness is systematically evaluated. To maximize their impact, it is essential to assess the educational and training needs of the target audience. Engaging farmers in participatory assessments can yield valuable insights into their specific challenges and learning preferences. Research shows that participatory approaches empower farmers and enhance the relevance of educational content. For example, Barakabitze *et al*. (2017) emphasized that participatory methods improve the sustainability of educational interventions. Similarly, Zoundji *et al.* (2020) noted that farmer organizations demonstrated greater motivation to disseminate educational videos, resulting in better learning outcomes compared to NGO-led initiatives. Karubanga *et al.* (2017) also highlighted the importance of diverse participation in video-based education to enhance effectiveness.

The DA-PCC's initiative represents a significant step forward in educational

outreach for dairy buffalo management. However, a comprehensive empirical evaluation of the KBGAN learning videos is crucial. Such an evaluation should measure their impact on KAPs and identify areas for improvement. Incorporating feedback from dairy carapreneurs and leveraging evidence-based strategies will enable DA-PCC to refine its knowledge products, ultimately contributing to the sustainable development of the Philippine dairy sector.

The theoretical framework guiding this research is rooted in Experiential Learning Theory, as articulated by John Dewey and expanded by David Kolb. Dewey's view that learning is a continuous, active process involving interaction with the environment to construct knowledge (Kemouss *et al.*, 2023) underpins the design of the KBGAN videos, which aim to engage dairy carapreneurs in active learning. Kolb's cyclical model of experiential learning (Kolb and Fry, 1975), comprising concrete experience, reflective observation, abstract conceptualization, and active experimentation, provides a structured approach to understanding how dairy carapreneurs can benefit from the videos and supplementary learning activities. This framework aligns with previous studies emphasizing the value of active participation and reflection in agricultural training (Baker *et al.*, 2012). When integrated with other instructional methods like demonstrations and traditional lectures, the KBGAN videos are expected to enhance practical knowledge and skill development in critical areas such as calf management and feeding practices.

The study mainly aimed to evaluate the KBGAN learning videos as a modality for delivering technologies to improve the KAPs of dairy carapreneurs. Specifically, it seeks to: (1) assess the effectiveness of different methods of utilizing the KBGAN learning videos on the knowledge, attitudes, and practices of participating carapreneurs; (2) identify the perceived educational and training needs of participating farmers or carapreneurs in managing dairy carabao, and; (3) provide recommendations for improving the video platform for technology dissemination. This study addresses the need for an empirical evaluation of the KBGAN learning videos while examining other factors that could enhance their content and distribution. Findings can serve as valuable guide in developing DA-PCC's knowledge products, both print and audio-visual, to deliver better services to carapreneurs and improve their management practices.

MATERIALS AND METHODS

Experimental design

This study employed a quasi-experimental design (Wimmer and Dominick, 2005), where participants were not randomly assigned to treatment groups but grouped based on their availability. The design included three distinct treatment groups: "Traditional Lectures with Demonstrations," "Videos with Demonstrations," and "Videos Only" (Table 1). Each group received varying levels of instructional support, as described below.

Traditional Lecture-with-Demonstration Group. Participants received traditional lectures with demonstration training conducted by a community-based trainer (CBT). The lecture portion lasted 60 minutes and covered topics derived from the five KBGAN learning videos, aided by PowerPoint presentations. This was followed by 420 minutes of demonstrations of select technologies in a natural environment.

Video-with-Demonstration Group. This group was shown five sets of four to six-minute KBGAN learning videos followed by an open forum and actual demonstrations of

technologies. No lectures were conducted.

Video-Only Group. Participants watched the KBGAN Learning Videos twice, with minimal facilitation and no traditional lectures or demonstrations. CBTs organized the training and promoted discussion for this group.

Table 1. Treatment groups, training component, and duration.

TREATMENT	TRAINING COMPONENT	DURATION (MINUTES)
Lectures + Demos	1) Pre-test of KAPs	10
	2) Traditional lectures	60
	3) Open forum	15
	4) Farmer demos	420
	5) Post-test of KAPs	10
Videos + Demos	1) Pretest of KAPs	10
	2) 5 KBGAN Videos	30
	3) Open forum	15
	4) Farmer demos	420
	5) Posttest of KAPs	10
Videos-only	1) Pretest of KAPs	10
	2) 5 KBGAN Videos	30
	3) Open forum	15
	4) Posttest of KAPs	10

Topics for the Learning Videos

Table 2 summarizes the five learning videos that were shown to the "video + demo group" and "video-only group". Adult education and learning approaches were applied to create informative, relevant, relatable, and actionable content so that each video facilitates reinforcement and adoption of good practices among the farmers.

Sampling and Distribution to Experimental Groups

Based on the municipality in which they resided, individuals were allocated to experimental groups (Table 3). The study engaged 93 pre-selected participants (at least 5 participants per treatment per site or a total of at least 15 participants per site) in six provinces.

Experimental Procedure

Participants took a KAPs test before training (pretest) and provided basic demographic information. Despite prior training on various technologies, many participants had forgotten key steps in applying the said technologies. This finding aligns with previous research indicating that knowledge retention can be a significant challenge in agricultural education (Fitrah, 2023). After training, participants took a posttest to assess the training approach and their KAPs. Skilled interviewers, trained in relevant techniques and data

collection skills, conducted individual interviews at the training location before and after the training. Informed consent was obtained, ensuring voluntary participation and the option to withdraw at any time.

Table 2. List of topics for the learning videos.

TOPIC	VIDEO LOCATION (ALL IN NUEVA ECIJA)	VIDEO LINK
Silage	Brgy. Parista, Lupao	https://vimeo.com/472918141
Feeding Management	Brgy. Sibut, San Jose City	https://vimeo.com/472929642
Hygienic Milking	Brgy. San Agustin, San Jose City	https://vimeo.com/472917704
Calf Management (Colostrum, Purgative)	Brgy. Catalanacan, Science City of Muñoz	https://vimeo.com/473693011
Health Management (Body Score System, Mastitis)	Brgy. Porais, San Jose City	https://vimeo.com/473698669

Table 3. Distribution of participants.

TREATMENT	PROVINCES[a]						TOTAL
	A	B	C	D	E	F	
Lectures + Demos	5	5	5	5	5	5	30
Videos + Demos	5	5	5	5	5	5	30
Videos-only	5	8	5	5	5	5	33
Total	15	18	15	15	15	15	93

[a]A-Pampanga, B-Bataan, C-Isabela, D-Pangasinan, E-Iloilo, F-South Cotabato

Data Collection and Analysis

Data collection methods in the study included surveys, focus group discussions (FGDs), and key informant interviews (KIIs). An on-site survey using KoBoCollect gathered primary sociodemographic data. Survey tools were translated for simplicity and pretested before data collection. FGDs involved DA-PCC project beneficiaries not in the initial survey, selected based on agreed criteria. KIIs were conducted with pre-identified key informants

such as veterinarians, AI technicians, and progressive farmers.

The use of focus groups is particularly effective in agricultural research as they facilitate rich discussions and insights from multiple participants, allowing for a deeper understanding of community perspectives (Nyumba *et al.*, 2018). For data analysis, descriptive statistics (frequency counts, means, and percentages) were used initially.

To assess participants' knowledge, they completed questionnaires featuring multiple-choice, fill-in-the-blank, matching, and puzzle items before and after exposure to three instructional modalities (Traditional Lecture + Demo, Video + Demo, and Video-Only). Total scores for each questionnaire were calculated to obtain mean pre- and post-test scores. Researchers conducted a paired samples t-test to evaluate the effectiveness of the instructional modalities on participants' knowledge, identifying significant differences in mean scores between pre- and post-tests within each treatment group. Additionally, Repeated Measures ANOVA was used to assess the impact of the instructional modalities on knowledge gain over time.

A pre-test/post-test questionnaire was administered to assess participants' attitudes toward various technologies, including silage, feeding management, hygienic milking, calf management, and health management. Participants rated their level of agreement with statements related to these technologies on a five-point Likert scale, where 1 indicated strong disagreement and 5 indicated strong agreement. This approach allowed for the evaluation of changes in attitudes over time. Additionally, the Wilcoxon Signed Rank Test was used to identify significant differences in attitude scores before and after exposure to the technologies.

McNemar's test was employed to evaluate the effectiveness of the three instructional modalities on farmers' buffalo management practices. Multiple-choice questions, which provided binary responses, assessed participants' adherence to various practices and technologies before and after exposure to the instructional interventions. Significant differences in practice changes were identified through p-values.

RESULTS AND DISCUSSION

Demographic Characteristics

The majority of farmer-respondents (32%) are aged 51 to 60, indicating a significant presence of middle-aged to older farmers that may impact workforce dynamics and succession planning. This finding is consistent with previous studies that highlight the aging demographic of farmers, which poses challenges to the sustainability of agricultural practices and succession planning in rural areas (Palis, 2020). Most respondents (84%) are married, which influences decision-making and labor distribution within agricultural households. Gender-wise, 86% are male, reflecting traditional trends in agricultural communities, a pattern also observed in other regions where male dominance in farming roles persists (Ani and Casasola, 2020).

In terms of education, 47% have completed high school and 22% have attained college-level education, suggesting a moderate level of formal education that affects their adoption of modern agricultural practices and participation in educational programs. This aligns with findings that indicate higher education levels correlate with increased adoption of innovative agricultural technologies (Paltasingh and Goyari, 2018).

Instructional Modalities and Farmers' Knowledge

Table 4 provides insights into how different instructional modalities impact farmers' knowledge of technologies for buffalo dairying. In **calf management**, the Lecture+Demo method resulted in significantly higher knowledge gains compared to the Video+Demo method, as indicated by a significant mean difference (p=0.028). Conversely, the Video+Demo method showed significantly lower knowledge gains compared to the Lecture+Demo method (p=0.03). Comparisons involving Video-Only, however, were not statistically significant. The overall ANOVA test confirmed a significant effect of instructional modality on knowledge gained in calf management (p=0.035). These results underscore the effectiveness of interactive and hands-on learning approaches, such as lectures combined with demonstrations, in enhancing knowledge retention compared to passive methods like video-only presentations. For example, Umar and Daniel (2023) highlight that the discussion method in agricultural teaching occupies a significant portion of instructional time, which correlates with improved learning outcomes through the active exchange of ideas between teachers and students. Similarly, Burnett *et al.* (2019) emphasize that interactivity fosters elaboration, a critical component of effective communication in agricultural contexts. This supports the principle that active learner involvement promotes better retention and practical application of information.

In **feeding management**, significant differences were observed between the Video+Demo and Video-only methods, with the Video+Demo method leading to higher knowledge gains (p=0.02). This finding aligns with studies highlighting the advantages of multimedia instructional methods. For instance, video-based education has been shown to enhance comprehension and retention of information, particularly in complex subjects. Research by Cai and Abbott (2013) demonstrates that audiovisual materials facilitate better conceptual learning compared to traditional text-based resources. Furthermore, the ANOVA test results indicated a significant effect of instructional modality on knowledge gained by participating farmers (p=0.005). In **health management**, however, no significant differences in knowledge gains were found across the instructional methods. Neither pairwise comparisons nor the ANOVA test yielded significant results (p=0.17).

These findings suggest that the effectiveness of instructional methods may vary depending on the topic of livestock management. For example, Fadairo *et al.* (2023) assert that knowledge acquisition is significantly influenced by exposure to reliable information and the educational background of farmers. This aligns with the observation that instructional modalities yield varying outcomes depending on the subject matter being taught. While methods such as Video+Demo are effective for areas like feeding management, they may not significantly enhance learning in other areas, such as health management. Amenu *et al.* (2017) provide additional context, noting that the quality and effectiveness of animal health management in small-scale livestock systems are influenced by a combination of farmer characteristics, as well as economic, institutional, and biophysical factors. They emphasize that the education level and experiences of livestock keepers play a crucial role. Pastoralists, for instance, possess a deep knowledge of animal health through lifelong experiences and proximity to their livestock, often comparable to trained animal health professionals. This highlights the potential for integrating pastoral knowledge with veterinary systems to address livestock health challenges. The lack of significant differences in health management knowledge gains across instructional methods may, therefore, reflect the complex interplay of these factors, underscoring the need for more context-specific educational strategies.

Table 4. Comparative analysis of instructional modalities on farmers' knowledge in various dairy buffalo management topics.

TOPICS	TEST STATISTIC	PAIRWISE COMPARISON					
		LECTURE+DEMO		VIDEO+DEMO		VIDEO ONLY	
		VIDEO +DEMO	VIDEO ONLY	LECTURE +DEMO	VIDEO ONLY	LECTURE +DEMO	VIDEO +DEMO
Calf Management	Mean Difference	0.95*	0.77	-0.95*	-0.18	-0.77	0.18
	p (α= 0.05)	0.028	0.07	0.03	0.68	0.07	0.68
	Repeated Measures ANOVA; p (α= 0.05)	0.035					
Feeding Management	Mean Difference	-0.61	0.19	0.61	0.81*	-0.19	-0.81*
	p (α = 0.05)	0.08	0.58	0.08	0.02	0.58	0.02
	Repeated Measures ANOVA; p (α= 0.05)	0.005					
Health Management	Mean Difference	-0.5	-0.1	0.50	0.40	0.10	-0.40
	p (α = 0.05)	0.20	0.80	0.20	0.30	0.80	0.30
	Repeated Measures ANOVA; p (α= 0.05)	0.170					
Hygienic Milking	Mean Difference	0.63	-0.47	-0.63	-1.10*	0.47	1.10*
	p (α = 0.05)	0.23	0.38	0.23	0.04	0.38	0.04
	Repeated Measures ANOVA; p (α= 0.05)	0.048					
Silage Making	Mean Difference	-0.18	0.32	0.18	0.50	-0.32	-0.50
	p (α = 0.05)	0.64	0.40	0.64	0.19	0.40	-0.19
	Repeated Measures ANOVA; p (α= 0.05)	0.071					

Hygienic milking revealed significant differences between Video+Demo and Video-Only, with Video+Demo leading to lower knowledge gains (p=0.04), and the ANOVA test confirmed a significant effect (p=0.048). Lastly, in silage-making, none of the pairwise comparisons or the ANOVA test (p=0.071) showed significant differences, indicating no effect of instructional modality on knowledge gains.

Overall, the findings suggest that the effectiveness of instructional methods varies by management practice, with Lecture+Demo generally being more effective in calf management, and Video+Demo showing mixed results across different practices.

Thus, while videos can play a valuable role in technology promotion, particularly when combined with demonstrations, they cannot universally substitute for traditional lectures with demonstration methods. The traditional methods appear to offer significant advantages in certain areas, such as calf management, where hands-on and interactive learning might be crucial. This is consistent with the findings of Zhang *et al.* (2016) wherein the perceived efficacy of instructional methods significantly influences farmers' adoption of best practices. The choice of instructional modality should consider the specific agricultural practice and the nature of the knowledge being imparted.

Table 5. Mean pretest and posttest attitude scale scores toward dairy buffalo management topics across instructional modalities

INSTRUCTIONAL MODALITY	TOPIC	PRE-TEST SCORES	POST-TEST SCORES
Lecture+Demo	Silage Making	3.39	3.65
	Feeding Management	3.68	3.89
	Hygienic Milking	3.87	3.98
	Calf Management	3.86	4.16
	Health Management	3.39	3.75
Video+Demo	Silage Making	3.39	3.48
	Feeding Management	3.36	3.65
	Hygienic Milking	3.83	4.00
	Calf Management	3.68	4.00
	Health Management	3.29	3.63
Video Only	Silage Making	3.45	3.61
	Feeding Management	3.58	3.72
	Hygienic Milking	3.56	3.80
	Calf Management	3.73	3.97
	Health Management	3.34	3.64

Instructional Modalities and Farmers' Attitudes

The mean scale scores for the different instructional modalities reflected generally positive attitudes, with most scores exceeding 3.5. This indicates that farmers held favorable

perceptions of the technologies presented during the training sessions (Table 5). However, the results of the Wilcoxon Signed Rank Test showed no statistically significant changes in farmers' attitudes toward the technologies after participating in the instructional sessions, regardless of the modality used (Table 6).

These findings suggest that the instructional modalities employed did not significantly influence farmers' attitudes. The lack of notable post-training changes raises concerns about the effectiveness of these modalities in shifting attitudes. This observation is consistent with Shahbaz *et al.* (2022), who highlighted that while training and information dissemination play a critical role, the adoption of climate-smart livestock practices often hinges on external factors beyond educational interventions.

Overall, the findings imply that while instructional modalities may foster initial favorable attitudes, they are unlikely to drive long-term behavioral changes or sustained adoption of technologies without addressing other key barriers, such as limited access to resources and the need for continuous support.

Table 6. Wilcoxon Signed Rank Test results for the difference between pre- and post-attitude scale scores across all technologies of farmer respondents using different instructional modalities.

TECHNOLOGIES	INSTRUCTIONAL MODALITIES		
	Lecture+Demo	Video+Demo	Video-Only
	p-value		
Silage Making	0.5535	0.4009	0.4515
Feeding Management	0.4166	0.2596	0.6871
Hygienic Milking	0.4648	0.3769	0.9000
Calf Management	0.4655	0.2765	0.9137
Health Management	0.4595	0.4762	0.6384

Instructional Modalities and Farmers' Practices

The results of McNemar's Test indicate that certain instructional methods significantly impacted specific buffalo management practices (Table 7). The **Lecture + Demo** method led to significant improvements in assessing proper feeding rations and deworming practices for calves. This aligns with Hossain *et al.* (2021), who emphasize that training and demonstration are effective tools for technology adoption in livestock management. Trained beneficiaries often exhibit better practices compared to those without training.

In contrast, the **Video-only** method showed significant changes in managing mastitis and ensuring buffalo health, but these changes were negative, meaning farmers who initially practiced proper mastitis and health management stopped doing so after the intervention. While visual aids can be helpful, they appear insufficient on their own to instill lasting behavioral changes in farmers. Liu *et al.* (2019) support this observation, noting that comprehensive information about specific technologies is essential for successful adoption. Mere exposure to video content may lack the depth required for effective practice changes.

Furthermore, the absence of significant changes in practices such as silage

production, milking procedures, calf care, and mastitis treatment across all instructional methods suggests broader issues with the applicability of these training modalities. Okello *et al.* (2019) highlight that institutional factors can influence the effectiveness of training programs, potentially limiting their overall impact on specific farming practices. This suggests that while some approaches are effective for certain tasks, they may not universally address all aspects of livestock management.

These findings are consistent with Dhehibi *et al.* (2022), who stress the importance of tailored training approaches that consider farmers' specific needs and contexts. Customizing extension services ensures that all aspects of livestock management are adequately addressed, improving farm productivity and sustainability.

In summary, the effectiveness of instructional modalities on farmers' practices is multifaceted. While some methods are more effective for specific practices, others may yield unintended negative outcomes. The interplay between instructional content, delivery methods, and farmers' socio-economic contexts is crucial in determining the success of these educational interventions.

Table 7. Instructional modalities on agricultural technology practices for buffalo management.

PRACTICES	INSTRUCTIONAL MODALITIES		
	Lecture+Demo	Video+Demo	Video-Only
	p-value		
Current Practices in Silage Production	0.2207	0.6171	0.4795
Assessing Adherence to Proper Feed Ratios	0.0012*	0.3320	0.5224
Milking Practices and Procedures	-	0.2482	0.0771
Managing Mastitis in Buffaloes	-	0.1306	0.0233*
Calf Care Essentials	0.3173	0.2482	0.2482
Deworming Practices for Calves	0.0233*	0.0736	0.6831
Ensuring Buffalo Health	-	0.4795	0.0055*
Treatment Actions for Mastitis in Buffaloes	-	0.4497	0.6171

(*) indicates a significant difference in the proportion of farmer-respondents showing changes in practices before and after the learning from the instructional modalities.
(-) indicates "No variations observed among farmer respondents".
$\alpha = 0.05$

Perceived Education and Training Needs

Traditionally, farmers accessed information through on-site training by professional extensionists from DA-PCC, LGUs, and other government agencies. In Duenggas, Surallah, South Cotabato, new dairy farmers learned dairying techniques this way. However, due

to poor internet connectivity in this remote barangay, contacting technicians for advice or emergencies is difficult. Thus, traditional communication methods remain vital. Providing farmers with offline instructional videos is highly beneficial. Mobile technology, building on this traditional foundation, offers a versatile tool for communication and learning (Bello-Bravo *et al.*, 2018; Syiem and Saravanan, 2015). This is particularly important in areas where access to reliable internet is limited, as highlighted by Goli *et al.* (2022), who emphasize that effective training programs must consider local conditions and technological accessibility.

Trust in information from government agencies and seeing fellow farmers as peers both correlate with a higher likelihood of technology adoption among farmers. This peer perception significantly impacts the uptake and diffusion of new technologies. Uaiene (2011) highlights that social network effects influence individual decisions, with farmers sharing information and learning collaboratively. These insights are crucial for policymakers and institutions in shaping strategies for knowledge exchange and innovation diffusion tailored to specific farming communities (Manning, 2013). The importance of peer influence in agricultural practices has been documented, suggesting that farmers are more likely to adopt new technologies when they observe their peers successfully implementing them (see for example Magnan *et al.*, 2015; Xu *et al.*, 2022).

In Pampanga, respondents in the video-only group requested the featured farmer's contact information after watching his talk on silage. According to Fox *et al.* (2021), farmers often seek peer advice before adopting new technologies. Other studies show that farmers within social groups learn more about the benefits and usage of new technologies from each other.

The study revealed significant variations in farmers' knowledge and practices regarding carabao management across different sites, influenced by their experience and training participation. Farmers with over five years of experience exhibited considerable understanding of technologies promoted by the DA-PCC. For example, in Asingan, Pangasinan, one respondent has practiced silage making for two years, aided by sufficient corn plantations and the need to ensure carabao survival during the El Niño-prone summer season.

Agricultural training videos aim to encourage more productive and sustainable farming methods (Salm *et al.*, 2018). In health management, while most farmers knew about mastitis, they lacked skills in diagnostic tests and infection identification. Similarly, although familiar with artificial insemination (AI), not all knew how to perform it. Thus, the study recommends additional training on AI techniques and health management to enhance farmers' competencies. To increase the country's milk output, a strategic focus on nutritional technology is essential for significant dairy development (Atwa *et al.*, 2018). This need for targeted training is echoed in other studies, which emphasize that practical skills and knowledge are critical for enhancing dairy farming practices and increasing productivity. For instance, Xulu and Naidoo (2023) assert that appropriate training can significantly improve dairy farming practices and facilitate the adoption of technology among resource-poor households, indicating that regular training is essential for effective implementation.

Participants' Feedback and Recommendations on Training Methods

Farmer respondents emphasized the need to raise awareness and improve knowledge through effective extension strategies. They strongly preferred on-site training sessions due to their interactive nature, allowing direct communication with lecturers for immediate

answers. This direct participation was seen as highly advantageous. This preference aligns with existing literature that emphasizes the effectiveness of hands-on training in enhancing farmers' knowledge and practices (Young *et al.*, 2014; Hossain *et al.*, 2021). The interactive nature of these sessions fosters a more engaging learning environment, which is crucial for the retention of information and practical skills.

Farmers also valued learning videos as supplementary resources, with their visual content aiding in understanding farming practices. Providing easily accessible videos, even without an internet connection, is highly beneficial. Previous studies have similarly noted that integrating various instructional methods, including visual aids and hands-on training, can significantly improve learning outcomes in agricultural education (Cai and Abbott, 2013; Yusuf and Popoola, 2022)

For feeding management, farmers identified forage species that enhance milk production and adapt well to local conditions. They preferred grazing over making silage but reported limited knowledge about carabao diseases due to inadequate training and information sharing, compounded by the farms' distance from veterinary care (Young *et al.*, 2014). This gap in knowledge underscores the necessity for continued training programs that not only focus on practical skills but also provide comprehensive information about livestock health management. The use of videos to familiarize farmers with new technologies, such as silage-making techniques, has proven effective in bridging this knowledge gap (Cai and Abbott, 2013).

Overall, the findings indicate a need for continued training programs, accessible learning materials, and improved veterinary services to support effective carabao management. Respondents viewed videos as a valuable alternative for lectures and demonstrations during training sessions.

CONCLUSION AND RECOMMENDATION

The findings indicate that KBGAN learning videos can effectively enhance dairy carapreneurs' knowledge, particularly when combined with traditional teaching methods. Traditional lectures were most effective for calf management, while videos paired with demonstrations supported feeding practices. However, health management and silage-making showed no significant improvement across methods, highlighting the need for targeted and tailored training in these areas. Attitudinal scores were generally positive but attitudinal changes were not significant post-exposure to the instructional modalities, which suggests that knowledge acquisition does not automatically translate to attitudinal shifts.

Beyond practical implications, the study offers conceptual contributions by reinforcing the importance of context-sensitive instructional modalities in agricultural extension. It highlights the interplay between instructional design and farmers' cognitive and behavioral responses, offering insights into how multimedia tools can complement traditional training to enhance knowledge retention and application. Furthermore, the findings underline the significance of addressing barriers to practice adoption, such as access to veterinary services and contextual factors affecting farmer behavior.

To optimize learning outcomes, it is recommended to employ traditional lectures with demonstrations for complex topics and integrate videos for practical applications. Additionally, providing offline videos for remote areas and maintaining interactive on-site training will facilitate real-time feedback. Expanding training in health management,

particularly in artificial insemination and mastitis control, is crucial. Strengthening access to veterinary services through mobile clinics or telemedicine and promoting information sharing via social networks are essential for fostering technology adoption among farmers.

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