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Abstract

Videos continue to be useful educational tools for low-literacy adults in rural developing areas. This article outlines a project that combined applied cognitive science and participatory video methodology to design and create high-quality skill-learning videos for adults in The Gambia, West Africa. First, it provides an overview of the collaboration involved in the project design and development. Then, it reviews the characteristics of the videos created. We examine the project merits through interviews with villagers. These interviews revealed that village women valued video education because learning was easily accessible and the skills presented had benefits for their lives. Project reflections and recommendations are provided at the end in order to support participatory video projects in similar settings.

Keywords: Participatory Video, International Education, Cognitive Load

Introduction

In international development work there has been an identified gap in educational opportunities for low-literacy adults in rural developing countries (Grotlüschen et al., 2016). These populations are hard to reach for many reasons, including physical, time, and resource constraints. Prior studies about the utility of video have shown promise for the practice of using videos to educate (Lunch & Lunch, 2006). In adult education, videos are used to provide practical instruction, aid in the adoption of good practices, and share local innovations (Lie & Mandler, 2009). Skill learning is an especially appropriate application, because the visual nature of video allows for a great deal of procedural information to be communicated in short periods of time.

This participatory video project was first envisioned in 2013 as a locally-produced, educational video library for The Gambia, with skill-based videos sharing local technologies and innovations on a variety of subjects, such as agriculture, health, and small business projects. The project began as a way to support low-literacy adult women in rural areas of The Gambia. These women were seen as having little access to new skill learning. The project goal was to provide access to new skill learning through a video format in a manner that allowed for introductory practice with the skill without a facilitator present. To optimize learning without an instructor, the videos were constructed by applying cognitive science research to regulate cognitive load and aligning instructional material with the ecocultural context.

The Gambia is a small country in West Africa, bordered by the Atlantic Ocean on the West and surrounded by Senegal on all other sides. It is a former British colony composed of multiple tribes with different histories and languages. The national language is English, and this is the language used in schools. The Gambian local languages are oral, not written. Reading and

writing are primarily learned in formal school education, where the language learned is either English or Arabic, and in 2012, The Gambia had an adult literacy rate of 51.1%, with most of the literate population living in the urban, rather than the rural, regions (UNICEF, 2012). Given how inaccessible written material is for low-literacy learners, video was considered a beneficial alternative.

After an initial trip to The Gambia in 2013 to assess local interest, the project was designed, and a pilot study, working with Gambian collaborators, was conducted in 2015. This article will share about the pilot study, conducted over six months, from February to July, 2015. This process consisted of a number of steps: a collaborative group of Gambian development workers was recruited, possible video topics were identified, videographers were trained, the video framework was designed, partners were identified to serve as subject matter experts, resources and filming locations were obtained, base materials—including raw footage, scripts, local language translations, and audio recordings of scripts—were created, a demonstration video was created, and potential users were surveyed about their attitudes around video education.

Collaborative Team

This project was a cross-cultural collaboration in which the video making process combined Gambian expertise with applied cognitive science techniques. All Gambian collaborative participants were volunteers. They were recruited through prior connections, social interactions, and their work in the government and at local NGOs. Participants varied in level of education, ability to devote time to the project, the accessibility of their respective locations, and skill experience. As a collaborative team, we divided work among participants based on what needed to be done and who had the desire to do it. The training in videography and post production was provided to interested collaborators by the researcher.

Needs Assessment

Several steps were conducted to assess the video topic needs of the community. This process began with a feasibility analysis, which was proposed to a number of community leaders and development workers. This proposal was well-received, and several community members offered support by committing to the participatory video process. This was followed by a literature review of video development work in Africa and best practices in video work. Next, several sources were assessed to determine possible video topics. This included focus groups with development workers, informal interviewing at a national-level craft fair, interviews with government officials, observing community level meetings, and a preference analysis of the attitudinal interviews. Data about feasibility was collected at different points in the process and used to iteratively refine the developing project.

Videography Training

To have the video filming capacity necessary for the project, volunteers were trained to use a project-based, experiential learning approach. The volunteers were Gambian young adults with little background in photography or technology. The skills necessary were filming in focus with the appropriate content, creating audio files, interviewing subject matter experts about their expertise, writing a script describing how to do a task, editing filmed segments for visual and audio components, and creating finished videos. The researcher trained the first videographers, and later volunteers were guided through this process by their predecessors. This process gave videographers practice in using the hardware and software needed to do the tasks necessary for making the project videos. It created the skilled personnel we needed and provided volunteers with an economically valuable skillset.

Collaboration Summary

Our collaborative team worked together to create videos about agriculture, health, and small-business skills seen as useful for a rural Gambian villager. Each video focused on one particular skill modelled by local experts in local contexts, and used locally available materials. Examples included soap-making, tie-and-dye, garden-bed digging, and cooking mango jam.

The videos begin with the project logo and theme music. A title slide appears with the topic of the video and an acknowledgement to the experts who modeled the skill being shared. The introduction was intentionally lengthened, to give people time to gather and situate themselves for group video viewing. To create continuity between the films, all videos begin with the same introduction section of music, logo, and title. Skills were modelled in a step-by-step manner, showing the process of the task accompanied by a local-language auditory script that described the process being conducted in words that match the action. Auditory information was provided to guide in the understanding of the process being shown.

Project Characteristics and Design

The defining aspect of this project was its combination of a participatory video methodology and an applied cognitive science approach with the goal of optimizing accessibility of information in the videos. After the appropriate guidelines were identified, they were applied to define the overall video creation process.

Participatory Video Methodology

Involving members of the intended audience as collaborators in the video creation process is known as participatory video. Participatory video is a best practice in video methodology when designing skill-based training for adult learners (Lie & Mandler, 2009). There are many methods of producing participatory video. This research used a modified version of the “zooming in-zooming out” methodology of Paul van Mele (2006). First is the “zooming

in”: in this stage, communities provide input regarding their needs. Next, community participants become collaborators in the video production process. This supports community development and aids collaborators in understanding the needs being met as they create the video. Once the video is complete, participant feedback is again incorporated. In the process of “zooming out”, communities are presented with the created learning media, and the audiences’ input is used to further refine the video creation and distribution process.

To create videos that were optimized for the ecocultural context that surrounded their intended audience, participatory video methodology was applied to many aspects of the video design process, including selection of potential video topics, video creation, linguistic choices, identification of culturally appropriate practices, and evaluation of people’s attitudes about video education.

Design Principles

These videos were created to be usable in situations with no learning facilitator. To improve information access from the videos, a set of videography guidelines were created based on cognitive science research, primarily multimedia learning and cognitive load frameworks (Mayer, 2009). These techniques have been demonstrated in lab studies to improve learning in multimedia settings (Mayer & Sims, 1994; Harp & Mayer, 1998; Leahy & Sweller, 2011). In this project, evidence-based cognitive science approaches were applied to the creation of the learning media and guided the project videography.

The videos were created for an audience that was not accustomed to either video or school learning, and formal schooling is associated with increased abilities to manage cognitive loads (Ventura, Pattamadilok, Fernandes, Klein, Morais, & Kolinsky, 2008). To improve product quality, the team looked for ways to minimize the cognitive loads associated with the video

learning, particularly for ways to remove unnecessary, extraneous, loads from learning materials. These included loads related to perception, attention, information integration, and ecocultural alignment. As a video guideline, both visual and auditory processing cues were applied by accompanying the visual procedure of conducting a skill with an auditory explanation of the process.

Another guideline applied was to monitor information complexity, knowing that when the information presented was too complex, viewers forgot what they heard, but remembered what they saw (Leahy & Sweller, 2011). Limited attentional load from target learners mandated limits to the length of videos and complexity of the skills to teach. Field-based research with similar audiences indicated that the ideal video length would be between five and 15 minutes (Van Mele, 2011). In addition, the organization of the information presented also impacts learning. Intentionally simplifying the organization of information can simplify the learning process. In this project, a simple cause-and-effect chain format was applied to help viewers to process information in the videos.

When working with an audience that has considerable contextual information associated with the skill being learned, previous understanding can interfere with learning of new information (Tversky, Morrissony, & Bétrancourt, 2002). For this reason, this project used real-world media and participatory video techniques. Real-world media helped build ecocultural alignment by allowing the audience to connect their understanding to a similar visual field and contextual base.

Project Merits

To better understand video's utility, we created a prototype video following our design principles. This was a Mandinka-language video about making a quick compost. We shared the

video in three rural villages. From these three villages, ninety-one participants agreed to provide individual interviews about their attitudes towards video education. All participants were women (aged between 18-80) who spoke the Mandinka language and had little English school experience. Attitudinal information was collected through short, open-ended questions. These questions were mostly cultural value questions, intended to collect a framing of individuals' perspectives related to video learning in order to understand what they valued about video education and why they valued it. The qualitative information collected during the interviews was also useful for an iterative refinement of the video project development to better tailor it to the needs of the community. Informed consent was obtained from all individual participants included in the study, and all procedures performed were in accordance with the ethical standards of the national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Attitude Questions

Access. This project used video as a tool for learning, to provide a group with access to information that they would not have received otherwise. If this information were considered readily available, there would be less need for videos presenting this information. To explore the concept of access, participants were asked, "When this video wasn't here, how could you learn how to make compost." The lack of information access identified more generally in the literature created by development workers was supported by participants' responses (van Mele, 2011). Fifty-one out of ninety-one participants responded that they could think of no other way in which to access that information.

Sharing. It is helpful to understand whom the participants recommended as needing the learning media. To explore this question further we asked, "If you wanted to share this video

with someone, who would that be?” The goal of this question was to better understand the potential avenues of reaching audiences. All participants wanted these videos widely distributed. The responses fell into three groups of distribution: family ($n = 26$), community ($n = 34$), and “funds of knowledge.” The “fund of knowledge” classification was built upon the theoretical concept that skill-knowledge can be a resource that villagers can barter in exchange for social and cultural capital (Moll and González, 1994). This was the preferred distribution for information sharing, as 49 participants referred to a group that fit into this classification. In this category, the specific individual was not the driving factor of the distribution; instead, it was ways to spread or increase overall capital available to the community with the capital available in the video.

Multiple viewings. One of the key benefits of video learning is its ability to be viewed multiple times. To explore the role of multiple viewing on perceived learning, participants were asked, “With this video you just saw, how many times would you need to view it until you felt you knew all the information”. This question was added to post-viewing interviews in the second day of interviews, and therefore the study collected data for only 82 respondents. Eleven respondents answered, “one or two”; 40 respondents answered, “two or three”; 24 respondents said, “three or four”; and 7 respondents said, “four or five.” Overall, three-fifths of viewers felt that they would know all the information in at most three viewings. Informally, this indicated that participants felt that the information in the videos was accessible and reasonably easy to learn.

Thematic Exploration of Values

Most of the questions in the attitudinal interview were cultural value questions. They were meant to explore attitudes about video. Four of these questions were included: 1) How

much do you want to make this compost?; 2) What about this video is useful?; 3) Do you think that learning from video is good (“Yes”)/What makes you think that it is good?; and 4) Why is learning from video useful to people in The Gambia?

These questions ranged from specific (relating directly to the video just seen) to abstract conceptual valuations. Villagers preferred to answer them more generally. After coding, answers to all four questions exhibited thematic overlap. This overlap was used to identify domains of valuation attributed by the respondents to video education. Four main themes emerged: Access to Knowledge, Benefits of Knowledge, Empowerment, and Visual Presentations. These themes were interrelated, and often touched upon repeatedly between and within questions.

Access to knowledge. This theme’s categorizing principle was that video gave participants access to information that they would otherwise not have. This was the most prominent theme, mentioned in 85 of the interviews. A common response format involved the comparison of not knowing before but knowing now. One example of this type of response: “It is good because what you don’t know, you know that; what you don’t understand, you understand that.” This implies an appreciation for knowledge of the skill’s existence, in addition to learning how to do the skill. Knowledge and access to knowledge are woven together in this category and both were framed by participants as valuable commodities.

Benefits of knowledge. The “benefits of knowledge” theme was also common, mentioned by 58 participants. This theme relates to the value of the knowledge presented and the future benefits brought through the learning. This included an aspect of access to information, but focused more on the tangible, often economic, benefits associated with the access. The perceived benefits of video presentations included bringing development,

getting The Gambia out of poverty, and bringing a brighter tomorrow. One economic barrier this audience is trying to overcome is lack of access to the skills that can make them money. By improving access to skill learning, videos support viewers in improving their financial lives. The participants appreciated this.

Empowerment. The theme of empowerment, mentioned by 33 respondents, was about the role of video in making participants feel powerful within their worlds. “It wakes us up,” for example, was shared by one participant. These responses indicate that video learning affected people on a personal level, relating to their identities. The intensity of these reactions was also apparent, and showed their interest; as one participant shared, “It is very useful because your tomorrow benefit is there. These people helping you are giving you knowledge. Knowledge that enters your mind and someone can’t remove that.”

Visual presentation. This theme included responses about the visual modality of video making learning more accessible and memorable, and was mentioned by about forty percent of respondents. There were very positive responses to the video format. Comments such as, “...if someone explains it to me, if someone tells me, I will not easily understand it, but if my eyes see it. You watch it, you will easily understand”; this showed the preference for visual media.

Video Option Preferences

As part of the feasibility analysis, we were interested in video topics that villagers might find relevant. We first tried to explore this by asking participants an open-ended question about what other subjects they would like to see addressed in videos. Without suggestion prompts, participants had difficulty suggesting topics. After encountering this difficulty in the first several interviews, we converted the one open-ended question into five multiple-choice options. In each

question, we provided three video viewing options; participants had to choose which of three suggested videos they would prefer to see. The responses to these choices allowed insight into what skills were most desired by our participants.

Food Security. The first choice involved food security skill videos. In this choice, respondents determined whether they would prefer to watch a video on: a) Tomato paste making--an important ingredient used in everyday cooking (n = 45); b) Moringa powder making--a nutritional supplement highly valued in the development community, but less known in the villages (n = 29); or c) Honey processing--a highly prized commodity, but the skills involved with processing it are not well known (n = 6).

Crafting. This choice involved the option of viewing videos about crafting skills related to health products: a) body soap making (n = 36); b) neem lotion making—lotion including a plant-based insect repellent (n = 34); or c) body lotion making (n = 10).

Agricultural Development. This choice provided options related to development-sector, improved agriculture skills. These skills have correlation to traditional practices; however, the practices shared in the videos would provide research-validated techniques to improve outcomes. The three options in this choice were: a) the growing of garden things (n = 39); b) composting (n = 29); and c) using polypots for tree nurseries (n = 12).

Tree Crops. The options for this choice related to tree products and food security. These videos were about skills without relevant traditional practices—skills that were new and innovative. Nonetheless, the skills might have value for improving food security or overall quality of life. The three options were: a) Making mango jam (n = 48); b) Processing cashew fruit (n = 21); and c) Processing cashew seeds (n = 9).

Arts and Crafts. The final video selection included videos about arts and crafts. The goal of these skill-based videos would be sharing a skill that the audience could learn and use to make products that could then be sold for cash. They are meant to improve the overall quality of life for the viewers. The three video options were: a) tie and dye (n = 57); b) crocheting purses from plastic bags (n = 17); and c) wood-carving basics (n = 6). All three of these crafts require some initial financial investment for ingredients or tools.

These five video preference choices show how a complex mix of social, cultural, and environmental factors contributes to determining how valuable a video is to the intended audience. This information helps in creating media desired by the audience. The more useful and valuable the users see the resource, the easier the distribution process and the more likely the skills shared in the video would be adopted. Furthermore, the range of preferences supports providing multiple skill-based learning videos in one learning resource so that audiences have selection in the learning media that is most meaningful to them.

Project Reflection and Recommendation

One project goal was to provide access to skill learning for low-literacy Gambian women through a video format and optimizing that access using best practices in participatory video and multimedia learning. Additionally, information regarding Gambian women's attitudes towards, and valuations of, skill learning from video was collected to support the iterative product refinement.

In this project, participatory video methodology was included in the video design process. Collaborators were included in the selection of video topic, the identification of key learning elements, the determination of cultural relevance, and the assessment of media post-creation. Using cognitive load to guide video creation and assessment translated the material across the

disciplines was seen as successful from both a participatory video production perspective and a cognitive science approach.

The results from the attitudinal interviews also supported our project goals. Gambian women were receptive to the idea of video education, and wanted it in their worlds. They felt the access provided through video was unique, and wanted to share that access throughout the community. They were interested in a large range of video subjects, from food security to arts and crafts. The attitudinal themes identified in the interviews suggested a deep appreciation for the learning media itself and supported the assertion that video could be easily integrated into the economic and social structures of the village.

One of the goals in using participatory video was to take knowledge that is found in local communities, within their experts—their community funds of knowledge—and share that knowledge with the larger society (Van Mele, 2011). This is an attempt to commoditize knowledge and use it as leverage for a greater audience in real, economic, and ecocultural contexts (Moll & González, 1994). The frequency with which this theme was mentioned indicates that Gambians had little difficulty incorporating the possibility of video learning into their world or recognizing the sociocultural benefits of its accessibility. This relates both to the specific subject of learning composting through video and to the general utility of accessing information through video. Similar results were seen in Benin, where video viewing was seen to stimulate entrepreneurship, increase the creation of social associations, and build collaborations (Zossou, Van Mele, Vodouhe, & Wanvoeke, 2009a; Zossou, Van Mele, Vodouhe, & Wanvoeke, 2009b). All three of these have aspects of social, cultural, and economic capital that participants were able to perceive as being increased through having viewed the video.

It is easy to imagine how video education could be integrated into villagers' lives and serve as a social commodity for improving lives. Every single participant said that video education was useful. Overall, this project is evidence that educational videos can be an accessible form of learning for adults in developing countries and should be considered in the creation of adult education programs for these audiences.

We Can Do Better

In our video-making endeavors, things did not always go as expected. By sharing some of the difficulties in the process, we hope to make the path for others simpler. Our greatest difficulties came from environmental factors. The environment in which these videos were being recorded and constructed was a harsh environment: hot, dusty, and humid. Many aspects of the project were delayed due to limited access to either power or properly quiet environments. We routinely had equipment failures that had serious detrimental effects on the project. We had one laptop destroyed when its motherboard overheated. This was an easily replaceable Windows unit. More problematic was that the editing in the project was using the software iMovie, for an Apple product. Apple computers were not common in The Gambia. Right before the filming trip ended, the hard drive on the Mac computer failed. We were unable to get the computer repaired in-country. These equipment issues put the project behind schedule. While all the initial video filming process was completed in 2015, the video editing is ongoing. The project goal is to create 20 videos, in English, Fula, and Mandinka. Currently, only a few are complete. Fortunately, the collaborators are still dedicated to the project, and the work continues.

Recommendations

To support future practitioners, we offer a few recommendations based on what we learned from our process.

- **Train for capacity:** In many developing areas, there is not the skilled personnel necessary for conducting this type of work. While it is easy to bring your own technical professionals, locals have a much better understanding of environmental conditions and socio-cultural constraints.
- **Provide your volunteers tangible benefits:** The video project provided access to new skill learning for our volunteers. To maximize its benefit, we provided volunteers official documentation of their capabilities in the form of project identification cards and certificates of training completion. This allowed them to leverage their training in their future career development.
- **Focus on process and communication:** A challenge of participatory video is creating a shared understanding with collaborators about the project. This can be especially difficult while working cross-culturally in different ecocultural contexts. To support building the necessary shared understanding, communicate about your process with collaborators. This can include identifying ways that collaborators can contribute and eliciting their guidance in process design and development plans.
- **Plan for technical challenges:** In developing areas, it is necessary to account for factors related to environment and technological infrastructure. System complications should be expected, and it is a good idea to create back-up plans to account for them. Extra battery packs and memory cards can save a day of filming. Similarly, always make a couple of back-ups of files.
- **Build community connections:** Some of our most valuable collaborations came through random conversations with strangers and friends-of-friends with expertise they wanted to share. A fundamental aspect of participatory video is the added value brought by local knowledge. The way that knowledge is obtained is by interacting with the people who have it.

Overall, video can be a wonderful tool to bring access to new information to audiences with few alternatives for information access. Its impact is strengthened when one frames its creation in formats accessible and meaningful to the audience. This can be done by involving audience members into the video creation process.

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