



AUDIO-VISUALITY IN NATURE STUDIES: THE USE OF VIDEO IN NATURE RESEARCH AND EDUCATION

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ABSTRACT - The teaching of and research on nature must encompass both its biophysical and social dimensions. With its ability to present realities in multimodal ways, video can be employed for documenting research into nature, disseminate empirical results to a wider audience, and educate learners on the scientific principles behind natural processes and the complex relationship between people and the environment. In spite of these, the use of video in nature studies is limited by technical limitations, lack of familiarity with the medium, and cultural bias for verballity (spoken and written text). Recommendations on how the use of audio-visuality in nature research and education can be maximized are offered.

Keywords: video, audio-visual, nature research and education

INTRODUCTION

Nature is comprised of both the biophysical and the social. The relationship between the two has always been precarious. Lately, humankind's intrusions to nature and unabated exploitation of the natural resources have led to a host of environmental disasters, threatening the very source of life that has sustained human civilization for millennia.

The academic community – both teachers and researchers – have turned to scientific forms of inquiry to understand natural processes, identify solutions to address the pressing environment-related problems, and educate the public about the imperatives of natural conservation. In the production and dissemination of knowledge, academics have always relied on 'verballity' – the written and spoken text (Yue, 2011). In recent years, however, the increasing visual literacy of the community accompanied by the accessibility of new forms of media technologies has encouraged the use of audio-visual methods not only in representing natural and social phenomena but also disseminating knowledge about them.

Video, in particular, has been tapped in science education for the 'accessible visual and emotional experience' it provides to learners (Lance and Kitchin, 2007: 113). Video has the capacity to record the dimensions, details, and movement of the biophysical world as well as the nuances, emotions, and gestures of the social actors who inhabit it, thus making it a potent tool for research in nature studies. Despite the affordances of video as tool for education and scientific inquiry, there are some technical and socio-cultural issues that hinder its maximized use for the said purposes. It is imperative that such affordances and limitations are understood so that nature researchers and educators can optimize the use of this medium for their respective disciplines. This conceptual paper: (1) explored the affordances, limitations, and the hindrances to video's adoption in nature research and education, and (2) recommends approaches for the greater appreciation and application of audio-visuality in nature studies.

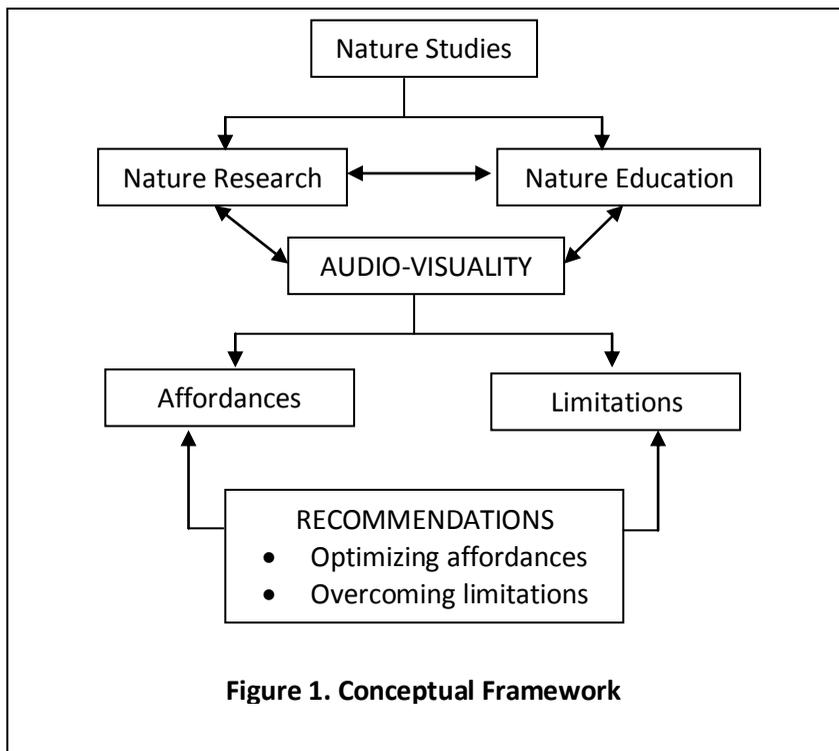
METHODS

The authors gathered published literature – both conceptual and empirical – on the use of video for education and research. Based on these, the

affordances and limitations of using video for these purposes were identified and classified into thematic categories. Based on the findings gathered from the literature as well as drawing upon the authors' experiences in technology-mediated education, recommendations on how audio-visibility can be capitalized on for nature research and educations were formulated, so that the affordances and limitations of the said medium are optimized and overcome, respectively (Figure 1).

2010; Laurier and Philo, 2002). It works well with nature studies in which the interaction between humans and the environment are not only dynamic but also enacted at various levels – biophysical, social, cultural, economic, etc.

Early geographers have long recognized the value of film in capturing the behavior of animals, the growth and diversity of plants, and other natural phenomena. The “olfactory and tactile sensory” nature of high-definition video (Garrett, 2010: 532) imbues the representation of the object of research with heightened realism.



RESULTS AND DISCUSSION

1. Affordances of video in nature research

Recording data. As Garrett (2010: 522) argued, video is a good “research tool because it captures movement; video tracks the multi-sensual fluidity and rhythms of everyday life” (Hindmarsh et al.,

Video has been long used in ethnographic research, particularly in recording communal activities. The visual nature of the medium allows the capturing of non-verbal communication that provides another contextual layer for the interpretation of phenomena.

Showing research procedure. Video can be used to present information that cannot be fully explained by text alone, like in the case of research procedure. Pascuali (2007: 713) argues that video's multimodal qualities of "color, position, duration, shape and motion" can depict the intricacies of research protocols better. Many laboratories are now using video to document their experimental methods and protocols and are tapping digital repositories (e.g., <http://www.nature.com/nprot/>) for the dissemination of such videos. Adopting this mode of representation not only facilitates easier reproduction of experiments but also enables both reviewers and researchers to critically evaluate their research processes (Pascuali 2007).

Conducting participative methods of research. Nature conservation often involves working with communities that inhabit the natural environment in question. Without the participation and support of the community, nature conservation research and extension programs are bound to fail. Cleland and Wyborn (2010) argue that traditional research methods like surveys and interviews often turn into an interrogation in which power is concentrated in the hands of the researcher (Wyborn and Cleland, 2010). As a result, research participants tend to keep to themselves. To address this, more participative approaches in the form of games, role play, and workshops are used (Harper, 2012). Video can be employed to encode these activities since traditional modes of data encoding (e.g., note taking) are not adequate for this purpose. Furthermore, video documentation when properly used can be an unobtrusive way of doing exploratory research on social processes.

Promoting reflexivity in research. Recording the research procedures on video provides a third-party viewpoint on the process. This enables the researcher to take stock of his or her decisions in the course of doing the research. While research has been traditionally represented as a clean-cut process that starts with problem identification and ends with making conclusions, researchers in actuality go through in an iterative fashion. In lights of postmodernism's concept of the crisis of representation (Harper, 2012), it is incumbent on researchers to take account of the inter-subjective aspect of the research process, particularly the

power relations between them and their subjects. This is especially true in nature studies where the nature of inquiry is not straight forward given the complex relationship between humans and their biophysical environment.

Communicating research results to a wider public. Science, in general, has been either ignored or negatively portrayed in mainstream media (Pasquali, 2007). Many scientists have complained about the rendering of scientists as socially inept or the inaccurate reporting of scientific results and issues in mass media. Scientists can use video to directly reach the public. With its visual language, video is more attractive to a public that has been accustomed to television and other visual media. It is also a better mode to demonstrate a process given its ability to portray "color, position, duration, shape and motion" (Pasquali, 2007: 713). Adopting a narrative format in presenting research findings is also more evocative and communicates to the audience both at the cognitive and affective levels. Scientists can tap social media to disseminate their videos and relay their message in their own words and images.

Video as object of analysis. Naturally occurring videos on the Internet can also be subject to analysis. Videos are means through which people share their stories about certain realities (Wilkins et al., 2005), nature included. By analyzing such naturally occurring materials, researchers can investigate how people or communities make sense of their natural surroundings, their lives in it, and with it. In another research being conducted by the authors for instance, YouTube videos of TV commercials of "natural" products were analyzed to unpack how nature is socially constructed in and through audiovisual terms and how this construction is drawn upon to sell a product.

2. Video affordances in nature education

Delivery of content. Video is a potent tool for explaining complex scientific concepts to learners. It has been demonstrated that video can be as effective as conventional teachers in teaching environmental issues and generally as a medium

for instruction (Dannenbergh and Capell, 1997; Kumar et al., 2003; Isiaka, 2007).

As Bruce (2009) explained, “video composition relies on multiple modes which include “various aspects of audio (ambient sound, sound effects, voiceovers, music) text, graphics, audio, still images, moving images, special effects, and transitions” (Bruce, 2008a: 13) to create and articulate understanding (Miller & Borowicz, 2005). Its multimodal character allows for the juxtaposition of concrete images (i.e., actual footage of natural phenomena); texts (i.e.; concepts underlying the phenomenon); graphics (i.e., causal relationship between concepts or variables operating in the phenomenon); and sound (i.e., voice over to explain the concepts and principles at hand) to teach nature to learners. It can concretize – at least visually -- ideas (i.e., subatomic reality) that are difficult for learners to comprehend through text. Natural phenomena (e.g., typhoons, volcanic activity, or planetary movement) that are challenging for learners to directly observe in ordinary circumstances can be best portrayed by video. Compared to photographs, video have the advantage of being able to show movement, patterns, dynamics, and fluidity in nature. In addition, its other aesthetic features – like sound, effects, and transitions -- can present these ideas in a more engaging and evocative manner, thus influencing learning not only at the cognitive but also at the affective level. Videos are an effective means to present environmental problems to students in a classroom. It can enable students to visualize worlds that are happening half way across the globe and still appreciate the natural, and social, and cultural realities in those areas without leaving their own worlds. Isiaka (2007: 107) further explains:

Real life activities – illustration, demonstration and specimens in agriculture and the environment are brought to the pupils in the classroom in a neat and exciting package. Learning experiences that would have cost much (in terms of field trips) could be recorded with a video camera and shown on a television through VHS or VCD at much less cost. Environment

issues such as effect of erosion, bush burning, pesticides poisoning, HIV/AIDS, forest degradation, global warming and climatic changes could be taught through video. The beauty of video is that it can be watched repeatedly as often as it is required. (Spencer, 1991; Ahmad, 1990; Adedoyin and Torimiro, 1999).

Video as a learning object. Francis and Murphy (2008: 475) defines learning object as “one or more digital assets combined and sequenced to create or support a learning experience addressing a curricular outcome(s) for an identified audience(s)” (Alberta Learning, 2002-2008, Online Glossary section). Videos are a good example of learning objects because they can easily be tracked, shared, adapted and reused. They can be employed as an object for analysis of an issue, takeoff point for class discussion, or a case study for problem solving. Videos either of scientific concepts or real-world human-nature interactions can be utilized as supplementary material for teaching. Videos can “link theoretical knowledge with real-world practices, increase student interest in a subject, and stimulate their critical thinking ” (Liao 2012: 53).

Video as a means for motivating students. Due to their novelty, videos can pick the interest of learners. As Bravo and others (2011) also reported, students also appreciate the efforts spent by teachers in creating videos, viewing them as indicative of their teacher’s commitment to teaching and learning. Moreover, video makes complex lessons more understandable and allows people of slower learning rhythm to go back to the video material or review synthesis made by teachers on video. In this case, videos “foster self-directed and self-paced learning by enabling learner-centered activities” (Zhang, 2006: 17). The positive effect of videos on student motivation is especially crucial in the teaching of science subjects where intangible concepts tend to intimidate some learners (Azis et al., 2011).

Video as a tool for developing student-generated content. Teachers who have used video for instruction have also realized that it can also be done in student-generated content.

Students can make their own videos to communicate their ideas and express their feelings towards a subject matter. Students can also employ it as a tool for observation, analysis, and reflection and metacognition (Kearney and Schuck, 2005). In the case of nature education, students can be taught how to use video to document their natural surroundings, observe the interrelationships between the biotic and abiotic components of the ecosystem, analyze the environmental problems in their respective communities, and reflect on their potential roles in addressing the said problems. As Kearney and Schuck (2005: 2) argued, the “process of generating and editing video about a curriculum issue encouraged deeper level thinking by students about that subject matter.”

3. Challenges in the use of video for nature education and research

Availability of appropriate videos. Most of the videos available on the web are normally produced for purposes other than learning. Videos are often produced with a specific audience in mind and sometimes, teachers find it difficult to find videos that focus on the topics they want to discuss or highlight as well as address the learning outcomes intended for their students (Liao, 2012).

Even if there is a range of educational and informative videos in the web (e.g., <http://www.open-video.org/index.php>), many of these reflect Western realities and perspectives (Liao, 2012). While scientific principles behind natural processes are in the realm of universal knowledge, people’s relationship and interpretations of these remain context-bound and culturally defined.

Related to the concept of availability is the quality of videos. There are a lot of user-generated videos that tackle scientific and natural phenomena. However, many of these materials have been uploaded by amateurs and so their technical and scientific quality remains questionable (Lance and Kitchin, 2007).

Even if appropriate videos are available, many are subject to copyright laws. Teachers also do not have control over the continuous availability of

such resources on the web (Lance and Kitchin, 2007).

Preparedness of the academic community. The relatively low adoption of video for teaching and research can be attributed to lack of technical skills and cultural bias of the academic community. For researchers and educators to utilize video in their academic work, they have to be conversant with its language (Lance and Kitchin 2007).

Preparedness of the academic community. The relatively low adoption of video for teaching and research can be attributed to lack of technical skills and cultural bias of the academic community. For researchers and educators to utilize video in their academic work, they have to be conversant with its language (Lance and Kitchin 2007). Just like the written language, video has its own grammar and syntax, as Bruce (2009) explained:

If the foundation of writing is word>clause>text, then the foundation of video is the frame>image>sequence (Bruce, 2008a; Messaris, 1994; Tyner, 1998). In the composing of images, visuals can be—either stand-alone or in combinations of—videography, digital photography of artifacts, and web-based images (Brass, 2008; Miller, 2007; Ranker, 2008).

To be able to understand audiovisual materials, academics need to be literate about the meanings associated with certain images and other artifacts. This will require them to be trained in the technical aspects of video production.

On the other hand, the academic community has also been slow to accepting publications in video due to lack of familiarity with the medium, technical limitations, and concerns over copyright and distribution and control (Garrett 2010). The academic publications that accept research presented on video (e.g., <http://www.audiovisualthinking.org/>) has remained quite few.

The popularity of the visual language among members of the general public makes it an effective medium through which to disseminate results of scientific research. To reach an audience, academics can turn to video for the popularization of complex scientific ideas video. There is, however, a general disdain for popularization among academics. As Hilgartner (2004) noted, popularization is sometimes seen as a “appropriate simplification or at worst, the distortion of science by outsiders.”

Incorporating video into the learning design. Video in itself does not necessarily lead to active learning. There is no direct indication that content delivered through video automatically enhances learning outcomes (Zhang 2006). For videos to be effective, it must be nestled in the context of a course. Teachers must be cognizant of the connection between the video content, the learning activities, and assessment objectives and articulate these connections to their students in an explicit manner (Eick and King 2012). Otherwise, learners may find the video simply as a distraction (Liao 2012).

CONCLUSION AND RECOMMENDATIONS

Audio-visuality has gained a more prominent role in the way we examine the world around us. This is understandable since as human beings, we have first to come to understand the world around us through our first hand experience of natural images and sounds. The vast popularity of the broadcast media, the pervading influence of advertising, and recent strides in information and communication technologies have raised a new generation of young people who are attuned to the grammars of the audio-visual.

Our previous discussion has shown how video, in particular, has the ability to work on multimodal levels – combining images, sound, text, and effects to create a multi-sensory experience for the viewer. In the field of nature studies, this is all crucial given the complex ideas behind natural processes as well as the multiple and contending meanings people associate with nature. Despite the popularity of the audio-visual, the academic community -- which has been the strongest

proponent of nature studies -- has not fully maximized the advantages of this media.

One of the impediments to the use of videos in education and research is the lack of familiarity of the community to the audio-visual language. Just like the written mode of communication, the audio-visual its own grammar and syntax. To be able to understand audiovisual materials, we need to be literate about the meanings associated with certain images and other artifacts.

To be able to appreciate video as a tool of research and education, scientists and educators need to be familiar with the visual language in the context of the multimedia. In the digital age, video does not exist solely by itself. It is combined with other texts connected by non-linear hyperlinks and nestled in an environment of un-ending conversations. Just as academics have become adept with the written language, they also need to gain mastery of this medium through formal training, exposure to exemplary applications of video in nature studies, and actual engagement with it.

As a form of mediated communication, video is also prone to manipulation of meanings. Video images can be manipulated digitally. Whether intentionally or unintentionally, treatments made on videos can twist the interpretations of research results and lead to misinformation. Teachers, researchers, and even reviewers of academic publications should be trained in spotting such misuses. By exposing researchers and educators alike to the technical aspect of video production, they can better distinguish the quality and integrity of video materials.

While the integrity of video was highlighted here, we also argue that videos should be treated as visual representations and not as visual facts. As such, they remain subject to human interpretations. Although video allows certain realities (e.g., gestures) to be represented with greater immediacy and realism, the images we see on the screen and subsequently interpret as audience members are also shaped by somebody else’s interpretation. The way the camera is positioned, the ways objects are foregrounded or back grounded, and the editing of the images all

form part of the narrative told by the video maker(s) and performed for the audience's interpretation. In analyzing the images portrayed on the video, researchers and educators must always be cognizant of its socially constructed nature.

STATEMENT OF AUTHORSHIP

The first author conducted the literature search, prepared the conceptual framework, identified thematic points, formulated recommendations, and undertook the writing up. The second author initiated the concept, identified some issues, formulated recommendations, and reviewed the paper.

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