

How a good video can remove 'barriers' for a more inclusive science communication

I.A.S-C.N.R. di Capo Granitola



“How a good video can remove 'barriers' for a more inclusive science communication”

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Introduction

There is a burgeoning body of evidence suggesting that technology can enhance learning, and multiple studies have shown that videos represent a very effective tool in science engagement and education. In fact, video media can transform the complexities of science and nature into something more tangible and tractable (Dabylchuk et al., 2018). Documentaries can hence be powerful tools for learning, to raise awareness for important topics, and adding a scientific approach makes it possible to deepen knowledge about the world. According to Dale's cone of experience (Fig. 1), people memorize 10% of what they read, 20% of what they hear, 30% of what they see and 50% of what they hear and see (Wiman and Mierhenry, 1969). These statistics seems to convey a very clear message: blind or visually impaired people are penalised in the learning compared to sighted ones.

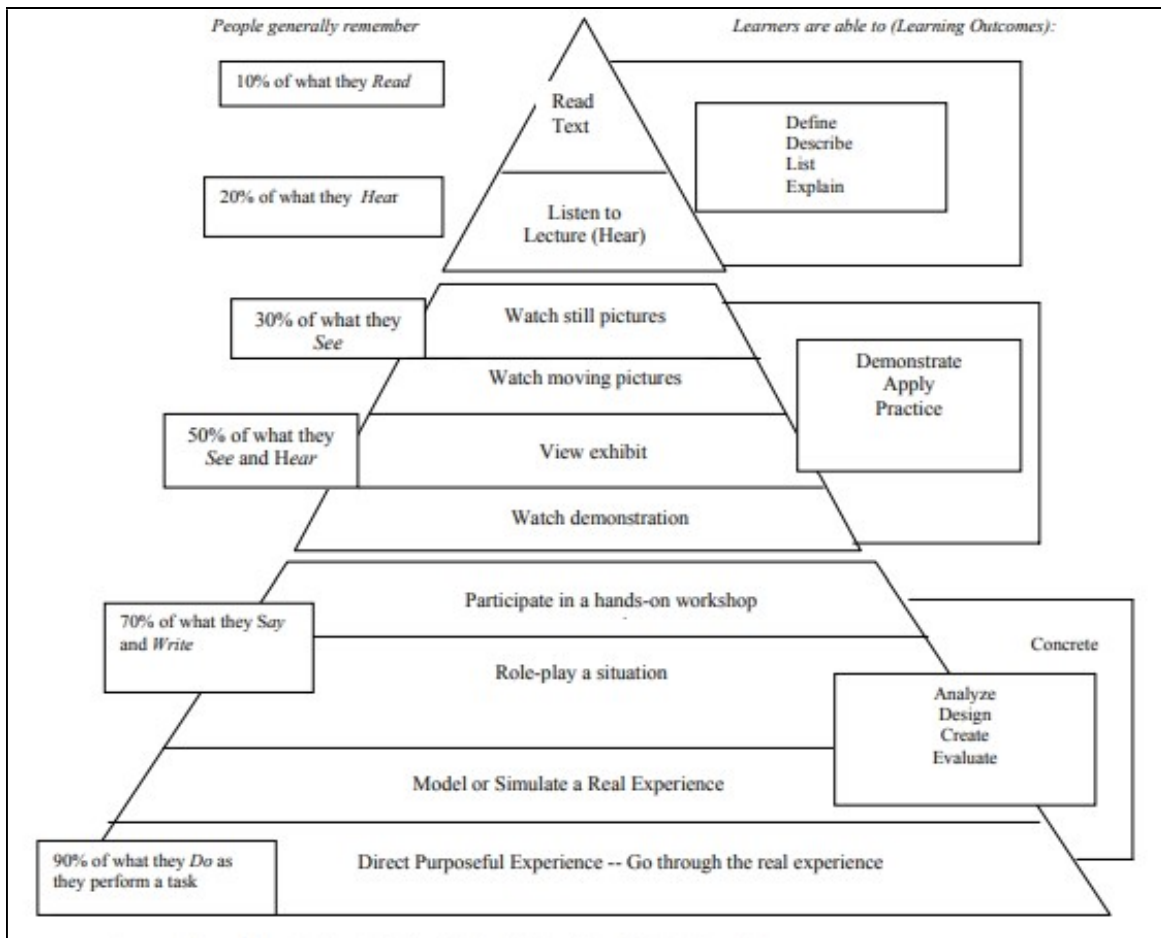


Fig. 1: The Cone of Experience adapted from E. Dale, Audiovisual Methods in Teaching, 1969, NY: Dryden Press.

However, our experience in the area of inclusive science communication has led us to wonder: are we sure that sight is a fundamental means for learning? Or is it possible that sight is a predominant sense over others, and therefore it can even mislead or limit learning? To answer this question, we held an *ad-hoc* educational laboratory with the users of the "IstitutedeiCiechiOpereRiunite I. Florio – F. ed A. Salamone" of Palermo, with which we have established a convention on 29/01/2019. Specifically, we involved 20 users with different degrees of visual impairment, in the projection of three science videos, selected from those realised by the EDUlab divulgation group over the years. At the end of the video projection, users were asked to express their opinions and their personal interpretations of scientific issues, allowing us to understand what e how many information have been received and, above all, if sighted usersare really advantaged compared to the visually impaired ones.

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Fig. 2: A moment captured during the video projection at the "Istituto per Ciechi" of Palermo.

The proposed videos

The science videos were shown in a room set up to accommodate 20 people at the "IstitutedeiCiechi" of Palermo (Fig. 2). We selected three of the videos created by the Edulab group over the years:

a) "Biodiversity": the video lasts 8:29 minutes and explains the concept of biodiversity, extrapolating it from the strictly scientific meaning and contextualizing it in everyday life. Specifically, it addresses issues such as: the origin of life, the DNA, specific and genetic biodiversity, evolution and adaptation, effects of pollution on biodiversity, ecosystems and species distribution.



Fig. 3: some images from the video "Biodiversity".

b) "The Dolphins": the video lasts 10:55 minutes and can be view on Youtubeat the link<https://www.youtube.com/watch?v=meS2tZ6zqlk>. The video introduces the world of dolphins, describing their evolutionfrom terrestrial mammals, the most common species, their morphological characteristics, their ecology and behaviour, how they communicate and finally the complex interactions with humans.

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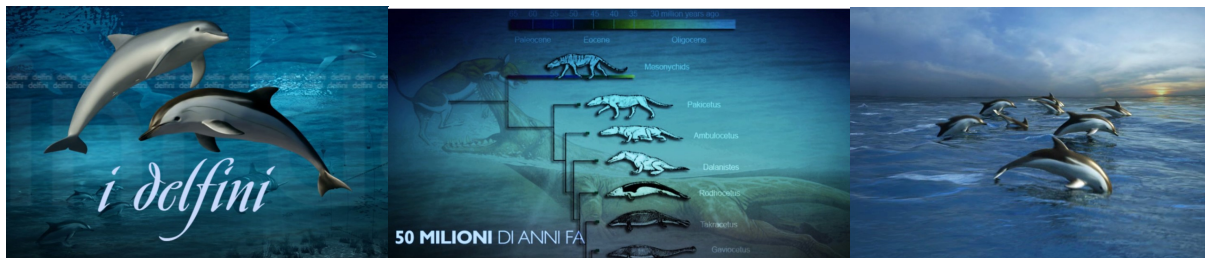


Fig. 4: some images from the video “The dolphins”

c) “The Plankton”: a 9:25 minutes – lasting video (<https://www.youtube.com/watch?v=vj4S0bpUZy0>) that explores the marine planktonic realm, discriminating the main features of the microplankton (both phyto- and zooplankton) and macroplankton, explaining the marine trophic web as well as the biological cycles and ontogeny.



Fig. 5: some images from the video “The plankton”

Important to specify these videos were created as a result of several projects and are not provided with audio-description for the blind.

Partecipants

The participants were 20 users with multi-sensory disabilities, including 10 blinds, 3 visually impaired and 7 sighted. Ages ranged between 19 and 54 years, the educational level was comparable, and all the spectators were eager to attend the screening.

Results and considerations

The results of this "experiment" were surprising. First, all the spectators showed considerable interest and followed the videos to the end, without distractions. Visually impaired have kept their concentration throughout the video, showing emotional reactions in response to both the scientific content and the compelling soundtrack.

At the end of each screening, the spectators were left free to express their considerations and appreciation, to say what they loved and to ask their curiosities. Surprisingly, blind people have shown that they have received more scientific contents than the sighted ones and have assimilated even complex concepts, hitherto unknown. This result therefore demonstrates that the sense of sight can sometimes be misleading, as it dominates other senses such as hearing. Probably, the sighted have been distracted by the spectacle of images from an unknown world (such as plankton or swimming dolphins) or moments of strong dynamism (such as the shark that catches smaller fish or the birth of a dolphin) and have not assimilated the concepts explained by the narrative voice.

In the light of our findings, we can therefore confirm video as one of the most powerful tools for the scientific dissemination, even inclusive, provided that it is well narrated and rich in suggestion, including soundtrack and natural sounds.

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References

Dabylchuk, A.J., Morgan C., Ring, N., 2018. So You Want to Make a Film: An Introduction to Creating Videos for Broader Impacts in Fisheries and Aquatic Sciences. *Fisheries* Vol. 43(3), 144-151.

Dale, E., 1969. *Audio-Visual Methods in Teaching*, 3rd ed., Holt, Rinehart & Winston, New York.

Wiman, R.V., Meierhenry, W.C. (Eds.), 1969. *Educational media: Theory into practice*. Merrill, Columbus, OH