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Extending the MVD model and produce a video to foster students' understanding of climate change

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The term climate change refers to the change in the global climate and to changes in meteorological conditions that extend over a large scale of time. Such changes include statistically significant fluctuations in the average state of the climate or its variability, extending over a period of decades or even more years. Climate change is due to natural processes, as well as human activities with an impact on the climate, such as changing the composition of the atmosphere.

Students' everyday ideas of climate change and greenhouse effect are difficult to change. Students may enter science lessons with already developed ideas and explanations of these natural phenomena. Integrating environmental issues into the science classroom is one way to increase students' knowledge and improve students' attitudes and behaviors toward climate change. Environmental education faces the challenge of developing instructional settings that foster students' conceptual
understanding of these natural phenomena. However, teaching and learning about environmental education are conceptually challenging, since everyday thinking may be incompatible with, or incomplete in relation to, school science.

The use of multimedia in education has significantly changed the way teaching is done in recent years. Knowledge about multimedia educational content applications accumulates over time, due to the ability to directly provide material from texts, images, sounds and various other forms of data. One of the main multimedia that has been widely used in recent years in the teaching process is the educational video. The widespread use of educational video is due to its effectiveness as a means of transferring knowledge, as new research shows that audio-visual stimuli more easily stir students' interest than traditional teaching.

Following a modification of MVD (Methodology for educational Video Development), we created an educational video that aims to highlight how one can easily construct and process the information one wants to convey. It should be emphasized that our research is not a mere repetition of previous work on a different subject. We extend MVD so as not only to resort on the transformation of the scientific knowledge and how appropriate is for the students' understanding this complex subject, but also to find out how the students conceive the video as a media and whatever attracts their attention.

We propose that the most appropriate framework to present the climate change is through the energy balance model. Therefore, the concepts needed to be included in the video are the energy transferred from the Sun to the Earth, and the radiation of energy from Earth to space and the factors that control these processes. Regarding the evaluation of the video, we investigate the functions of video as an educational tool, but also the proper use of multiple representations, to address students' misconceptions about climate change and the greenhouse effect. According to the results from the pre-and post-tests, the learning objectives we set during the design of the video were achieved for the most part and most of the participants were satisfied by our video as an educational tool.

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