Educational Films in Understanding the Relations of Organisms with Their Living Environment

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Abstract

The purpose of this research is to analyse how two educational videos from YouTube could be useful for learning activities. The content of these videos refers to the environmental adaptation of forest creatures during autumn and winter. Thus an online experiment was designed, on Zoom platform, which was structured in several stages: the initial testing; the pupils' individual watching of two educational videos, on their own, at home; the after watching testing; the learning activity based on conversations held on Zoom platform; playing an interactive game with the help of Mentimeter; the final testing. Considering the analysis of the videos, the unfolded activities, and the results obtained by the pupils from the primary education cycle, the efficiency of both learning strategies used by the teacher and educational videos were equally established.

Keywords:Mentimeter application, Online education, Learning platform, Primary education, Zoom

1. Introduction and Theoretical Background

Visual Technology is a way to bring the world to the student (Good, 2019), to enable the study of faraway places, of dangerous phenomena or of those that happen within a wide area and taking much time (DulamăandRoșcovan, 2007). Films and videos are an excellent way for children to observe the components of the environment, where plants and animals live, as well as their influence on the living creatures (Dulamă, 2012). They contribute to the process of raising awareness about the vulnerability, resilience and sustainability of geographical systems and of the complex relationships within our living environment (Cocean and Ilovan, 2008;Petrişor, Petreand Meita, 2016; Petrişor, Meita and Petre, 2016; Roșian et al., 2016).

The field literature review shows teachers' tendency of using films and videos in order to facilitate the process of obtaining information about a certain topic (Michel, Roebersand

Schneider, 2007; Vereș andMagdaș, 2020), to assimilate concepts and to increase the level of knowledge (Wijnker et al., 2019), and to build representations about the environment (Dulamă and Ilovan, 2007).

Teachers use various films with educational purpose, even animations (Roosand Van den Bulck, 2019; Vereș, Dulamă andMagdaș, 2019, 2020),a great variety of videos that can be classified in terms of quantity and structure of the information, the audio-visual way of presenting the contents (Wijnker et al., 2019).

Some studies state that by means of the films and videos, not only the interest for knowledge is stimulated, but also the efficiency of teaching, the received volume of information and its long lasting is equally enhanced (Markiewicz-Patkowska et al., 2019). Previous research proved that both the right educational film and the teacher's guidance on the understanding process related to the representation of the visual content, help pupils from the primary school to improve their observation and thinking skills, to build proper representation about the environment and to increase the production of knowledge (Ilieand Cristea, 2020;Ilie et al., 2020).

In the context of previous research on implementing educational software and products in Romania (Vlada and Jugureanu, 2007; Vlada, Jugureanu and Istrate, 2009), the aim of the study is to investigate the role of the educational films and videos in understanding the relationship between organisms and their living environment. Furthermore, we seek answers to several questions: How do we find and choose the most appropriate educational videos to show the relationship between plants and wild animals in the woods? Which is the volume of knowledge gained by the pupils after watching on their own the suggested videos? What role does the teacher play afterwards, when the pupils had already watched the videos?

2. Material and Method
2.1. Research design
In August2020, we prepared a learning activity that included the following steps: first, a knowledge test was shared on the classroom's Facebook group, then the links for two educational videos about understanding the environment - organism interaction were posted. The pupils were asked to watch them attentively, on their own, at home (the reverse learning method), thus having the opportunity to watch them again in case of need. After pupils confirmed that they had watched the two videos, we created a Messenger group chat where we added solely the parents whose children had previously filled out Test no. 1 (the initial test) and watched the films. In this chat group, after the independent watching of the videos, the second test was uploaded, using Google Forms once again, in order to verify if the pupils' level of knowledge about the influence of the environment on the organisms increased.

We organised two asynchronousmeetings, on Zoom platform, where we discussed the topics of the two videos with the pupils, making sure that the concepts were correctly understood, as well as the relationships between plants and wild animals and the environment where they lived in (the forest, during autumn and winter season). At the end of the discussion, the pupils played a game in real time (a game designed by means of the Mentimeter) and got the chance to check the answers and the results at the end of the game.

The last step involved solving the third test, characterised by a higher degree of difficulty, which had the same purpose as the two previously applied tests. All three tests were intermediated by the parents who read the items to their children, while the pupils were the ones who checked the right answers. They were all familiar with this type of questionnaire because it was constantly used during the online learning system, on Zoom platform. It is worth mentioning that neither the questionnaire, nor Mentimeter as evaluation tools were used for the first time in the process of learning. The latter was engaged in an extracurricular activity, that was held online, with a banking company.

2.2. Data Collecting, Procedure and Research Material.

Research data was provided by the answers to the three tests that were carried out, by the content and the manner in which the learning activity was performed, based on the two educational videos, and the results that the pupils received at the end of the designed game. Through the three tests, administered with the help of Google Forms and through the above mentioned game, we aimed to create learning contexts in which the pupils would define concepts (flora and fauna, species, organisms, herbivorous animals, carnivorous animals, hibernation), to indicate the components of the environment and food chains, to analyse the continental domain, the influence of the environmental factors on the plants and animals, the relationships within the ecosystem (forest). The pupils' answers at the three tests were subjected to both numerical analysis and content analysis. The speech from the two educational videos was analysed by means of the thematic analysis method, and the images through visual methods. We observed and analysed the learning activity performed on Zoom platform. Besides the answers to the items from the three tests, the research material was also represented by assertions during the discussion and the answers to the teacher's questions.

2.3. Participants

On this research, a number of 16 pupils in preschool from "Gh. Ruşeţ-Roznovanu", inRoznov, Neamţ County, participated along with their teacher for primary education, the first author, who is also a Ph.D. student at Babeş-BolyaiUniversity in Cluj-Napoca. The selection of the participants was based on the initial test during which 19 pupils had filled in the first test, to have a similar level of knowledge and to form a group of the same level. Three pupils were excluded from the study because, despite the fact that they filled in the initial test, one of them did not watch the videos in the allocated time (two days), blaming the lack of access to technology because his parents were at work; another student filled in Test no. 2 without having seen the videos previously and the third pupil could not take part in the activity organised by the teacher, on Zoom platform, because the meeting unfolded while his both parents were at work and he was not able to connect to the platform (he could only use his parents' phones).

3. Results and Discussions
3.1. Selection process analysis of the educational videos

Finding the most appropriate video started on YouTube website, known for the wide collection of films and videos that can be used for educational purposes. According to the present operational objectives, the following keywords "wild animals of the forest" were entered into the search engine. A series of videos were listed below, which were sequentially watched. The one with comments and explanations was considered to be a better option for the educational purpose of the activity than the videos that only had a musical background (Ilieand Cristea, 2020).

"Wildlife in Bukovina's Mountains during Autumn" was the first option, given all the additional written information. While watching this documentary, a series of recommended videos emerged, among which, the second part of the previously selected educational film, entitled "Wildlife in Bukovina's Mountains during Winter." This was also chosen as learning material.

Next, the presented information was written down in order to extract the main ideas from the two videos for the future learning strategies. The process of selection was quite difficult given the fact that the films had to match a topic and, to do so, a great amount of time was spent on watching and selecting them. Furthermore, they had to correspond to several criteria identified in previous research (design, purpose, author, time, filming position, destination, speed (Ilie et al., 2020).

3.2. Analysis of the educational videos

The two educational films, selected from YouTube, present the influence of the environment on the organisms who live in the forest, during autumn and winter seasons. The first educational video ("Wildlife in Bukovina's Mountains during Autumn", 2014,https://www.youtube.com/watch?v=vf6-onHMyGQ) lasts for 27 minutes and 41 seconds, while the second one ("Wildlife in Bukovina's Mountains during Winter", 2015,https://www.youtube.com/watch?v=tJT8KoYxsR4) lasts for 30 minutes and 33 seconds. Both videos were created by "Wild Bukovina" Association; documented with information by StelianBodnariandMarius MarcuOrhean; edited by StelianBodnari. These documentaries reveal aspects of the wildlife of the Bukovina's Mountains. Although the best average time length of an educational video is around 10-15 minutes (Ilieand Cristea, 2020), we decided to use the two above mentioned films because we took into account the fact that they would be seen by the pupils at home, on their own, in their own rhythm and at the right moments.

The videos fulfil several criteria of the previously stated ones in previous research: qualitative (clear image, normal frequencies of the video frames, soundtrack in Romanian), technical (digital formats, usable with the devices that teachers own), pedagogical (highlights the studied topic, the content matches the learning objectives and the characteristics of the pupils, allows the teacher to use different learning strategies) (Ilieand Cristea, 2020).

The oral speech of the first educational video (the one about autumn) contains 638 words, while the second one (about winter) contains 1,021 words. The main concepts from the documentaries refer to flora, fauna, species, organisms, herbivorous animals, carnivorous animals, hibernation, food chains, and the continental domain. The main ideas relate to the components of life environment, the influence of the environmental factors on plants, animals, and relationships within the respective ecosystem. The text of the documentaries is very valuable in terms of concepts' explanations and compatibility with the proposed topic. The added comments match the presented frames and complement the images.

3.3. Analysis of the interactivity degree enhancement of the lesson by using Mentimeter Application

Mentimeter is a digital instrument of brainstorming or feedback which allows creating both interactive presentations and interactions with virtual audiences in real-time, being used for making lessons more activating. The most important advantages of this application are the following: it does not need to be installed; each user can create unlimited events; the number of users is also unlimited; it allows data export; it intermediates the share of knowledge between pupils and teachers, having a wide range of presentation models.

With the help of this application, a three-slide presentation was designed. The first slide contained a multiple-choice item which required that pupils select the images of the plants that grow in the forest (nine right answers out of 13 possibly ones). The second slide asked them to choose 18 suitable options (out of a total of 25 probable right answers). The third slide showed the picture of the teacher and a thanking message which the pupils could react to by sending a heart symbol to express their satisfaction towards the solved tasks. The advantage of this evaluation instrument was represented by the feedback that the pupils received immediately on the mail address that they had inserted on the last slide.

3.4. The analysis of the educational activity

Watching the videos. During the discussion with the teacher, the pupils declared that they enjoyed watching the documentaries and the explanations of the author which were very interesting. One pupil watched the second video twice, motivating his action with the desire to see in chronological order both movies because he had initially started with the documentary about winter and, in addition to this, he wanted to see it on a larger screen (he passed from laptop to TV).

The fact that the other pupils did not watch again the videos was argued by the length of the documentaries and the short period of the time allocated for watching them (two days). The parents were asked not to provide further explanation or help their children to fill in the three tests. The pupils were happy to find out that they could also watch on YouTube, a similar video, focused on the life of plants and wild animals in the forest, during spring and summer ("Wildlife in Bukovina's   Mountains   during   Spring-Summer",   2012, https://www.youtube.com/watch?v=5WWduPjgSD8, lasting for 30 minutes and 46 seconds). This educational movie was not on the list of recommendations, along with the other two videos, because the Autumn and Winter seasons presentations had already a high amount of informationand the pupils would have lost their interest in watching all of them in such a short time.

The discussion with the teacher and pupils. Firstly, an asynchronous meeting was held on Zoom platform, but due to the high number of pupils who took part in this research, a second meeting was organised right afterwards, in order to offer them the possibility to detail the issues and potential difficulties that they confronted while watching the documentaries. During the discussion, questions from the first two tests were addressed with the purpose of verifying the representations that the pupils had built in their minds based on the documentaries, of helping them to build proper representations and offering them appropriate feedback. The dialogue with the pupils included questions like: *What kind of plants grow in the forest? What type of wild animals live in the forest? What kind of animals eat only plants? What is the name of the deer female? What is the name of the venomous snake which lives in the forest? What type of plant grows in the forest in shady places? What is the name of the fir fruit? What does the wild cat eat? What kind of animals eat only meat?*

A series of other topics were equally brought into discussion with the pupils: hibernation, food, and birds' migration, the falling of the tree leaves, the relationship between plants, animals and water, the adaptation of the animals to low temperatures, life and behaviour of deer (how females become more affectionate and males begin to thump), the adjustment of animals to the environment and survival strategies, measures of preservation of the species.

The pupils improved their knowledge about the influence of the environment on the organisms, as the discussion with the teacher during the online activity showed.
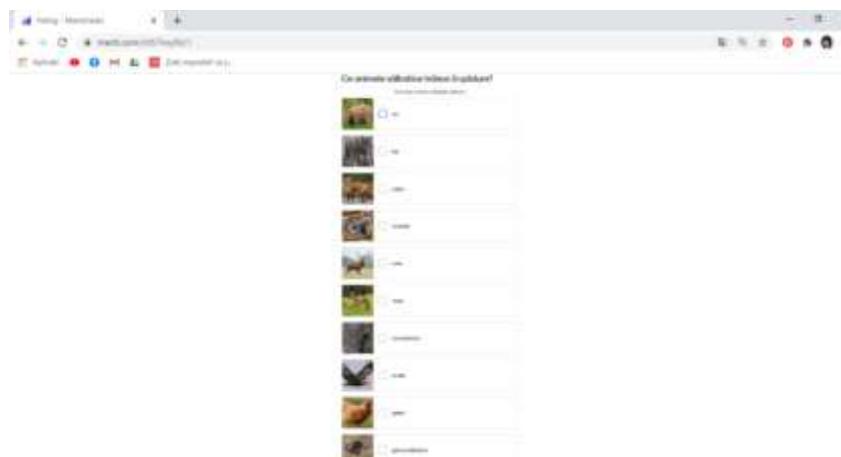

Figure 1. Screenshot of "What type of wild animals live in the forest?" item from the game that was created using Mentimeter application

The level of difficulty of the subject was very high, given the fact that the pupils had just finished the preparation educational stage, and understanding complex information as the one presented in the two documentaries requires several learning activities with the teacher. By analysingpupils' answers, we learned that those who live near the forest had obtained better results in comparison with their peers.

The didactic game. In the last 10 minutes of the activity, we sent to the children, by chat, the link to the application website (www.menti.com) and the code of the Web page (The forest – relationships of the organisms with the environment), designed with the help of Mentimeter application. The children enjoyed playing the game and, in the end, they received the results after the analysis of their answers.

3.6. Analysis of the pupils' results

For Test no. 1 (the initial one), the percentage of right answers given by the group was 33.87% (m - 10.5 out of 31 maximum of possible points), which indicates the need of learning support and assistance provided by the teacher so that the pupils could properly understand the presented information. Taking into account both the wide range of correct answers (5 - 25 points) and the similarintellectual level of the pupils, we assumed that the two students who scored 20 and 25 points, were helped by their parents in choosing the right answers. One of them lived in an apartment and neither of them had relatives interested in forestry. Considering the high difficulty of questions, we concluded that the two results did not reflect the reality in terms of pupils' knowledge. Moreover, during the discussion with the pupils, on Zoom platform, we asked them some questions that were correctly answered within Test no. 1, but when rephrased, the two pupils gave wrong answers.

The percentage of right answers for Test no. 2, which was administered after the individual watching of the two documentaries, was 69.47% (m - 11.81 out of a total of 17 points) and varied between 8-15 right answers, given by each pupil.

At the final test, the pupils obtained between 7 and 17 points (m - 11.69 out of a total of 20 points), representing 58.45%. It can be observed an increase with 24.58% in comparison to Test no. 1, but also a decrease with 11.02% in comparison to Test no. 2, distributed after watching the videos. This diminution was caused by the high difficulty level of the items from the final test, that compared to the second one, introduced new questions about the food chains and questions that required detailed answers about the food of wild animals. This test was filled in in the evening and this probably influencedpupils' levels of concentration and attention.

Previous research (Ilieand Cristea, 2020) showed that pupils obtainedweaker results when watching a documentary that lacked explanations and comments in contrast to watching activities accompanied by teacher's explanations on what they saw, offering the necessary information to enable understanding.

For this learning activity, which was held online, the teacher could not supervise either the way the pupils watched the educational videos, or the way they filled in the three tests. For these reasons, the results could have been influenced by unknown factors (parents, siblings, etc.). To ensure the attainment of relevant data, the evaluation activities of the students should be organised in the presence of the teacher, in real-time, irrespective if they are online or face to face (in the case of synchronous learning).

Figure 2 and Figure 3 present the results obtained by the 14 pupils to the game created with the help of Mentimeter application. Two students did not participate in this game. At the first item "What kind of plants grow in the forest?", 13 answers were listed as options, out of which four were wrong from the beginning. 100% represents all the answers of the pupils (right and wrong ones). The percentage listed above every column illustrates the share of the answer from 100%. It can be noticed that most pupils had selected the right answers: ferns, flowers, mushrooms, and

blackberries. At the second item, "What type of wild animals live in the forest?", from 25 choices, 7 were wrong from the beginning. The pupils did not opt for wrong answers.
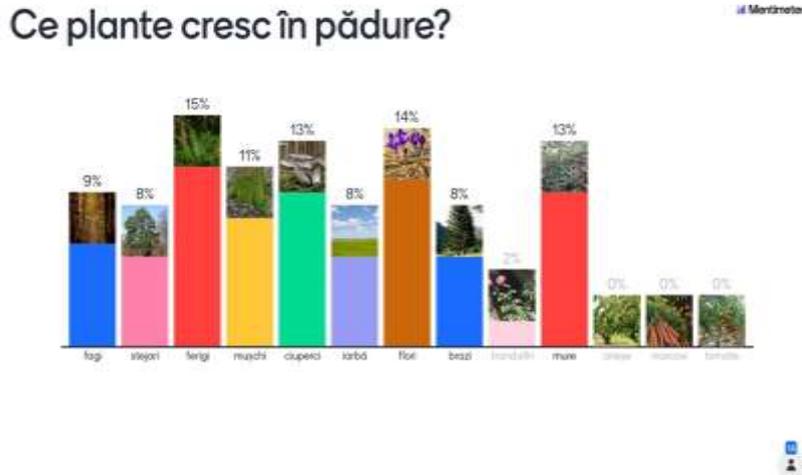

Figure 2. The answers of the pupils to "What kind of plants grow in the forest?"

Figure 3. The answers of the pupils to "What type of wild animals live in the forest?"

4. Conclusions

At the end of the study, it is worth mentioning that pupils expressed a real interest in watching the documentaries that captured the reality, the more so as the presented aspects could not have been seen by all pupils directly, which is very important in the process of building representations.

Regarding the acquired knowledge from watching the educational videos, we observed the predominance of the ones related to the characteristics of the plants, animals, and their environment. Besides, we identified difficulties in understanding the relationships between organisms (e.g. food chain) and their environment, which can be explained in terms of high difficulty level of the content and the pupils'low level of knowledge and understanding. Concerning the way that both pupils in preschool and their families adapt to the online educational activity, we perceived parents' availability in providing the essential equipment and devices (i.e.

laptops), ensuring surveillance of pupils'activities of watching and solving tasks, and, probably, assisting and helping their children to do their homework.

As a consequence of the results that the pupils had obtained in tests, along with the observations made during the activity with the teacher, we put an emphasis on the great role of the learning activities organised by the teacher, associated with watching educational videos and films, accompanied by appropriate comments and explanations. By designing such learning contexts, pupils can easily understand the relationships that are established between the components of their living environment, an ecosystem, the influence of environmental factors upon plants and animals, they can analyse the continental life domain and can define specific concepts.

From the teacher's point of view, who prepared the e-learning activity, it should be underlined the high amount of time consumption in order to identify suitable videos for the chosen topic, to design tests and items for the game and to create them using Mentimeter and Google Forms applications. The activity of e-learning itself was a real challenge for the teacher who had to use various software applications, available for free on the Internet and employ them with the help of the digital competence already owned at the beginning of the study. However, this competence was also developed due to the use of new applications which were all assembled in an online/virtual education system.

Finally, with this case study, we assert the advantages of introducing educational videos and digital instruments in learning contexts due to the positive impact that they have on both pupils' level of involvement and on the attractiveness degree of lessons.

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