

E-learning Natural Sciences and Visual Imagery

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Abstract

This research aims to analyse an online learning activity based on an original training model and the preschoolers' learning outcomes. A narrative text and a PowerPoint presentation regarding the environment of a rural household, the domestic birds and their connections and living environment were created to approach this activity. The evaluation of children's knowledge was achieved through an online game. The following were studied: the storyline, the PowerPoint presentation, the learning activity, the children's scores, and the learning efficiency as a result of using this audio-visual resource.

Keywords: Representations, Rural area, Learning outcomes, COVID-19, Online education

1. Introduction and Theoretical Background

Studies show that visual literacy underlies comprehension processes (Sinatra, 1986, p. 4) and that experience in visual environments contribute to the improvement of cognitive skills (Messaris, 1994, p. 3). Visual aids (films, photographs, drawings and others) are necessary and useful in shaping representations about the environment (Dulamă and Magdaş, 2014; Dulamă et al., 2017; Antal et al., 2020a, 2020b; Drăghici et al., 2020), or spatial representations (Ilovan et al., 2019). Photographs play a key role in deepening the living experience in nature (Socha et al., 2016). As such, curiosity and interest are stimulated and the engagement rate in environmental education activities increases (Dulamă, 2012; Ardoin et al., 2014). The use of photographs is very valuable when preschoolers cannot directly explore those aspects in reality (Dulamă, 2012).

PowerPoint presentations are frequently used by teachers in their teaching activities (Magdaş, Vereş and Dulamă, 2019). The efficient use of PowerPoint in the classroom is influenced by the PowerPoint structure and management, the topic and the teacher's teaching skills (Abdelrahman, Attaran and Hai-Leng, 2013). In previous studies, we found that the curiosity and interest of preschoolers for natural science is stimulated by a story or the teacher's narrative-informative-

descriptive commentary, visually supported by a PowerPoint presentation and complemented by a game on the Zoom platform (Drăghici et al., 2020).

In order to provide preschoolers new contexts for natural science online learning, after the stop of face-to-face activities in March, 2020, because of the coronavirus pandemic, and considering previous research on e-learning in Romania (Magdaş and Răduţ-Taciu, 2016; Manea and Stan, 2016, 2018; Vlada and Jugureanu, 2007; Vlada, Jugureanu and Albeanu, 2011; Vlada, Jugureanu and Istrate, 2009; Vlada et al., 2010), we set out to conceive a story and deliver it to them on the video conferencing Zoom platform during a PowerPoint presentation. The aim of the research is to analyze the process that the teacher goes through in creating original aids (literary text and collages from photographs), designed to facilitate learning a topic in natural sciences, consolidating and systematizing preschoolers' knowledge about a familiar topic, and to assess the impact of these online resources provided through the Zoom platform.

2. Material and Method

2.1. Research design. This research included several stages: preparing the resources (outlining the story plot; searching for appropriate visual aids to illustrate the story; making a collage of these visual aids; making PowerPoint presentations); carrying out activities with preschoolers on the Zoom platform in August, 2020 (storytelling accompanied by visual aid; evaluation of preschoolers' scores through a game adjusted to the videoconferencing platform); analyzing the online activity and the preschoolers' outcomes.

2.2. Participants. 5 preschoolers aged 4-6 from the "Reconstrucția" Kindergarten of Petru Rareş Highschool, Feldioara, Braşov County were benevolently involved in the research. Parents' consent was requested to involve preschoolers in a Saturday activity, during a time interval when they were available to help them use devices (smartphone, tablet, computer) and to supervise their children. The first author was perceived by preschoolers as a teacher for preschool education.

2.3. Data Collecting, Procedure and Research Material. We collected the data about the way of looking for the visual aids, about making collages of these visual aids and making the PowerPoint presentation, about the online activity through the method of the semi-structured interview and through participatory observation. We used the text analysis for the data provided by the interview and the storyline created by the teacher. We used the visual methods to analyze the visual aids in the collages and the slides in the PowerPoint presentation. Overall, being a single activity, the research is a case study. We collected the preschoolers' scores through a game and processed them by statistical methods. The research material includes: the storyline and the visual aid created by the teacher, the teacher's observations, answers and opinions, the preschoolers' answers to the questions in the game and those provided during the learning activity, and the online activity.

3. Results and Discussions

3.1. Analysis of the cooperation process in the virtual community of teachers for preschool education

There is a private group called *Activităţi Grădiniţă* [Kindergarten Activities] created on Facebook social media on March 27, 2014 by the educators at no. 2 Kindergarten in Huşi, Romania. The members of this group post several useful aids for the teaching process carried out in kindergartens. We chose to look for images on this group because these were great chances to find visual aids made by other teachers, suitable for this activity. In the process of searching for images with domestic birds, we discovered a collage containing several images of the way of life, food, and other elements specific to a species. Through a message addressed to the members of the group, we asked if there were similar collages for other birds in the household. As a result of the request, along with Likes and suggestions to search on Pinterest.com, we received the collage format, but with images about mammals in the household. When choosing the topic on 'Domestic birds', we targeted one apparently known by preschoolers, but less approached in preschool

education. What we appreciate as significant in this informal professional group is that teachers can ask for support, ideas, resources, suggestions and colleagues, who have similar professional concerns, unconditionally share resources and personal expertise. There is a beneficial transfer of knowledge by sharing what we know, this group thus functioning as a learning community.

3.2. Analysis of the process of creating resources for online activity. Lacking the resources in the desired format, and having the one discovered on the Internet, but not with the targeted content (*Poultry*), we decided to make the collages for the other domestic birds following this model. The resources were designed in several stages. After choosing the topic and the format of the collage, we structured the PowerPoint presentation (number of slides; structure, format, content of the slide), we surfed the Internet and we selected the necessary photographs. We made the collages in word format, we performed some screenshots that we cut by using the Paint application and we saved them in image format (.png). The process of searching and processing the resources was carried out in an informal setting over three weeks, in about eight hours per week. We notice that, in order to design and make the aids needed for this activity, we have spent a large amount of time, which is not currently possible and is a good reason to share with other teachers the resources created to increase work efficiency at the level of the whole group of teachers for preschool education.

To this material, we associated a literary text that we created considering the objectives pursued and aiming to logically build the text, in relation to the collages and the presentation made. We inserted the visual aids – the collages – in a PowerPoint in a specific order, following the agreement between the text and the image. In making the necessary support aid for the activity, we identified a series of difficulties: the online images were not appropriate for the age level; lack of supporting texts for the activity; the need to know the applications necessary to make the support aid.

3.3. Analysis of the visual aid. We designed the visual aid according to the amount of knowledge and the preschoolers' level of understanding. To draw the preschoolers' attention and avoid monotony, we arranged the images in the template in Fig. 1. The presentation includes 7 slides: a slide with the title; two slides with the main character; four slides with domestic birds – one collage for each of the most common / known domestic birds in rural households (chicken, turkey, duck and goose). Regarding each bird, we presented photos with the bird, its mate, the chicks, the way of life (shelter, food), and benefits for people in the collage. This representation is, in fact, a bunch scheme, but the words have been replaced with photographs. This visual organizer helps preschoolers to systematically approach a topic and to systematize/ order/ mentally group their knowledge about birds.

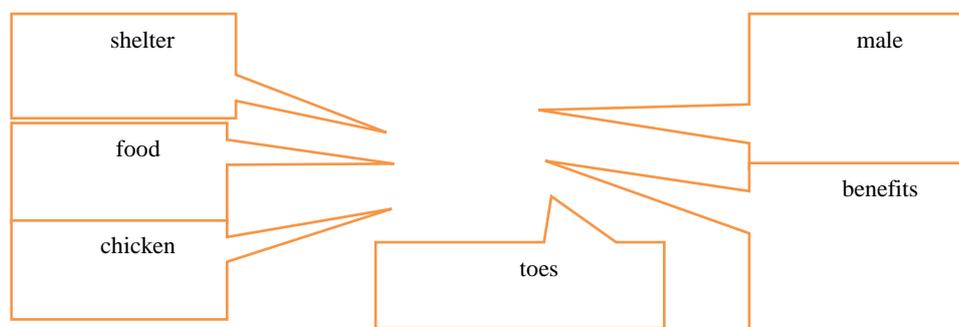


Figure 1. Collage template for the presentation of a domestic bird

3.4. Analysis of the storyline

Even if the topic on ‘Domestic birds’ belongs to the field of Science, to facilitate preschoolers’ access to knowledge, we included the information in this field in a narrative context, we introduced an innocent, newcomer, curious character – Duckling – to go through an exploratory journey into the world of domestic birds, whom preschoolers can identify with. The exploration is performed in a chronological order, having several stops where the little adventurer interviews, in a polite manner, Mrs. Hen and Mr. Rooster, Mr. and Mrs. Turkey, Mr. Gander and Mrs. Goose, Mr. and Mrs. Duck. The dialogue with each family develops in several directions: the name and appearance of their shelter, the shape and size of their eggs, the characteristics of the chicks, the features of the food, the benefits that people have from each bird species, some aspects of the environment and the adaptation of birds to various environments (for example, geese and ducks to the aquatic environment).

The text is also built to offer the child a behavioral model and use of some politeness formulas (“Thank you, Mr. Rooster!” “Goodbye”). Being an online resource where the teacher uses the spoken language on the Zoom platform, the text also contains onomatopoeias: quack-quack, cluck-cluck, and gobble-gobble-gobble. Although the story presents a foray into the real world, in order to adapt to the specifics of the preschoolers’ age, birds are personified: they talk about their current life and their purpose. The exploratory journey ends with the return at home of the curious and fearful duckling, where it talks about its discoveries and adventures. The conclusion was created so that the preschooler is taken out of the story and led under the protective wing of the mother, where he/she meditates on what is seen and heard.

3.5. Analysis of the experimental teaching activity on the Zoom Platform

The activity was carried out online during the preschoolers’ summer holiday. The invitation to participate in the activity and the confirmations were sent through messages on Whatsapp group of parents. The preschoolers had problems accessing the links for the activity, the success rate of the connection being 66.66%. The length of connection setup time for five preschoolers’ devices varied between 25 minutes for the first link and 15 minutes for the other one.

The time resources for the teaching activity were as follows: 30 minutes for the story, 15 minutes for the discussions about the birds in the story, 15 minutes for the True / False game. In order to be able to evaluate the preschoolers’ responses to the game, expressed by raising their hands, this session was recorded. The preschoolers liked Duckling, the main character, which proves that the choice of this character and his characteristics was suitable for preschoolers. A child specified that he has got all the birds that were characters in the story at home in his yard. Three children said they saw ducks and a swan in the pond near the village and that these birds really like the water.

The ‘True / False’ game included 30 questions about the Duckling character and the studied birds. The maximum score that could be reached by the preschoolers in the group is 150 points, and 30 points at the individual level (Table 1). The preschoolers managed to correctly identify 109 correct statements out of 150 possible, having a success rate per group of 74.66%. The high score can also be explained by the fact that preschoolers have previous knowledge about poultry.

Table 1. The preschoolers’ scores in the game about domestic birds

Types of questions	No. of statements	Score		Success rate (%)
		Maximum possible	Preschoolers	
Duckling	6	30	26	86.66
Duck	4	20	17	85
Turkey hen	8	40	28	70
Geese	5	25	16	64
Hens	7	35	22	63

Total	30	150	109	74.66
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4. Conclusions

The success of the activities on the Zoom platform with preschoolers depends chronologically on the parents' availability to "assist" their children, on the existence and performance of devices, on the internet access, which limits access to online education, the teacher's educational support and the preschooler's willingness to get actively involved and intrinsically motivated. The results of this study prove that the attention of preschoolers is kept focused during a longer learning activity (30 minutes), which addresses information in the field of science, in a narrative context (story) where a character with whom children identify reveals his discoveries in an exploratory journey in a household and visually capitalizing on a series of photo collages.

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