

### Ways to develop a positive attitude of students – digital natives – to reduce disaster risks

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**Abstract.** According to Prensky (2001) the today students have some special learning characteristics directly related to technology („digital natives“). The purpose of this study is to identify the most appropriate ways that digital natives can acquire knowledge and develop a positive attitude towards environmental education, seen as a prerequisite for disaster risks reduction. The findings showed that digital natives develop an increased positive attitude when learning occurs based on the use of digital technology.

**Key Words:** education, knowledge, learning, digital technology, environmental education.

#### Introduction

Environmental Education (EE) should be started at early ages. How we raise and educate our children is crucial to our future as individuals and for the conservation of the planet in general (Petegem & Blicek 2006). Many supporters of environmental sustainability consider that the development of positive attitudes towards the environment has a particular importance (Gayford 2009). The attitude is a very important variable that influence and predict the human behaviour and many researchers in their studies revealed this attitude-behaviour relationship (Newhouse 1990; Kraus 1995; Bogner 1998; Stern 2000; Milfont & Duckitt 2004; Heimlich & Ardoin 2008; Johnson & Manoli 2010; Boeve-de Pauw 2011; Bogner & Wiseman 2004, 2006; Wiseman et al 2012; Manoli et al 2014). In addition, the ecologicistic and moralistic attitudes for environment are correlated with an environmental education whether done at home, in the family or in any other possible place (Eagles & Demare 1999). We are born, live and then disappear, but it is important throughout life to preserve the surrounding nature, to leave behind a better planet, a favourable unaltered environment.

In the present study, we consider the positive attitudes for Environmental Education of the preschool children of 6-7 years old as an important goal of the construction of their future ecological understandings and self-reported behaviour. The ecological behaviour of early age children is a prerequisite for a life with nature care and ensures the reduction of disaster risks (Davis 2012). The interaction between the environment and man must be perfect, harmonious, should be seen as a whole, state of the environment allows human beings to understand the role of conservation its care or damage and also to understand the consequences that may occur on the way we live (Moreno et al 2011).

Environmental Education (EE) started from the Stockholm Conference, held in 1972. An important next step was Tbilisi Declaration (UNESCO 1978), the document produced as a result of the first world's Intergovernmental Conference on Environmental Education (held in Tbilisi, Georgia, 1977). It becomes the foundation of EE setting out guiding principles and framework, containing details on the role, objectives, and characteristics of Environmental Education to be used to develop EE at the local, national, and global levels. The Environmental Education is defined as “a process aimed at

developing a world population that is aware of and concerned about the total environment and its associated problems, and which has the knowledge, attitudes, motivations, commitments and skills to work individually and collectively toward solutions of current problems and the prevention of new ones" (UNESCO 1978). The objectives defined for EE by Tbilisi Declaration are: awareness, knowledge, attitudes, skills, participation. The Environmental Education of pre-school children is one of the principles highlighted by Tbilisi Declaration. "EE should be a continuous lifelong process, beginning at the pre-school level and continuing through all formal and non-formal stages" (Tbilisi Declaration, UNESCO 1978).

In 1997, TED (Teacher Education Division) gives another definition of Environmental Education: "Environmental Education is a learning process to understand human interaction and how we need to manage smart environment with full responsibility, harmony and peaceful life" (Lateh & Muniandy 2010). Srbinovski et al (2014) defined environmental education as an "active learning process in which individuals and groups achieve basic knowledge of understanding and decision skills, motivation, responsibility, and collective action to achieve and maintain dynamic equilibrium in the environment". Environmental Education aims not only increase the information in the education of individuals but also turning positive environmental attitudes in positive behaviours towards it. According to researchers Pooley & O'Connor (2000), an optimal solution for solving ecology is the education companies. Environmental education became an issue both individual and social (Arslan 2012).

It is a great challenge for adults, be they parents or teachers to find the best learning method adapted to children to educate them, so their motivation to learn, and hence the level of emotional and cognitive development of children to be touched up. But the current generation of children born in an environment of increasingly technological, is different from the previous generations for which that computer was a beautiful dream. What are the characteristics of this new generation of children? How do they learn? Here are the questions that many studies trying to answer. It is essential to adapt the old methods of learning so that they are suitable for children today.

***Characteristics of the current-generation - digital native.*** "Digital Native" is a concept introduced by Prensky (2001) to refer to those students who are "native speakers" of the digital language of computers, mobile phones, video games and the Internet. He did, however, since 2001 a major distinction between digital immigrants and digital natives. In 2008, Prensky renamed the digital natives as: "i-kids": they are permanently connected to mobile phones, mp3 players and games consoles. Adults belong to the second category: digital immigrants. Even they eventually succeed to adapt to this new world, they are similar to geographical immigrants: even if they learn the language of the new country, they will never be as fluent as children born in that country. Moreover, some experts even talk about digital extra-terrestrials (they always fail to learn the language of the digital world).

Let's see what features have our children (as digital natives) and the features of teachers (as digital immigrants). Thus, digital natives are exceptionally inquisitive, open to contradictions, smart, focus, adapt with a high self-esteem and having a global orientation (Autry & Berge 2011). Schulmeister (Margaryan et al 2011) considers the following essential psychological characteristics: sociability and open to new experiences. Another researcher (Long 2005) has noted that unlike digital immigrants digital natives do not need instructions, they simply discard headlong and solve its job. As Marc Prensky even remark, the natives have a low patience for reading and for learning logic, step by step. At the opposite pole digital immigrants need instructions, believes that learning is a serious.

But things may be more tinted. As White and Le Cornu observed (cited by Kuehn 2012) the metaphor „digital natives - digital immigrants" can be seen and in another way. The two authors note that continued use of such metaphors may cause a panic among educators (which are automatically classified in Group digital immigrants); they may perceive to be caught off guard and unable to cope.

That is why it is easier to make a distinction between simple digital visitors and residents digital. Visitors are people who use technology to achieve certain goals, but does not assume an identity in the virtual space (and here falls and teachers). Residents (who are students) see the Web as a place where they are close friends and colleagues, where they can share ideas and information about their life and work.

**How digital natives learn.** In their studies, Bennett et al (2008) and Bennett & Maton (2010) show that learning preferences of digital natives differ from students in the past because of their upbringing and experiences with technology. Digital natives are active experiential learners, are confident in technology, solve easily multitasking activities and communicate using icons even without the need for too many words (Oblinger & Oblinger 2005; Teo 2013).

Dede (2005) shows that the advance in technology has as result new learning styles that were adopted by digital natives. These new learning styles features are: the usage of digital tools such computer and mobile technology (just in time information), a greater and fluency use of multimedia, the usage of virtual simulations (to provide experiential cognitive learning), designed learning experiences that meet individual needs and preferences.

## **Material and Method**

**The purpose of the research.** The aim of this study is to identify the most suitable modalities by which digital natives aged 6-7 years can develop a positive attitude towards Environmental Education as a prerequisite for reducing the risk of disasters. There are two methods of learning considered in this study: the classic pencil-paper learning and teaching using digital technology, through the use of educational software game type.

It was considered that at this age the educational digital game would be the best tool for learning (Papert 1980). De Grove et al (2012) show in their study related to the usage of digital games in the classroom some advantages for formal education revealed by many researchers during time. Thus Egenfeldt-Nielsen (2005) shows in his researches some advantages of digital games used in educational process. Digital games stimulate learning by doing, the students experiment in the game world (Bogost 2007; Kirriemuir 2002). Students are actively solving many problems by play, without feeling any difficulty (Antonietti & Cantoia 2000; Price & Rogers 2004). Games provide the opportunity to be creative, improve critical thinking skills (Aliya 2002; McFarlane et al 2002). They offer the opportunity for students to control their own learning processes, the student can learn at his own pace (Sitzmann 2011). The games can be adapted to the skill level of the player (Paraskeva et al 2010). In addition, there is a widespread belief that digital games increase the positive attitude and motivate students to learn (Mitchell & Savill-Smith 2004; Paraskeva et al 2008; Prensky 2001; Tüzün et al 2009).

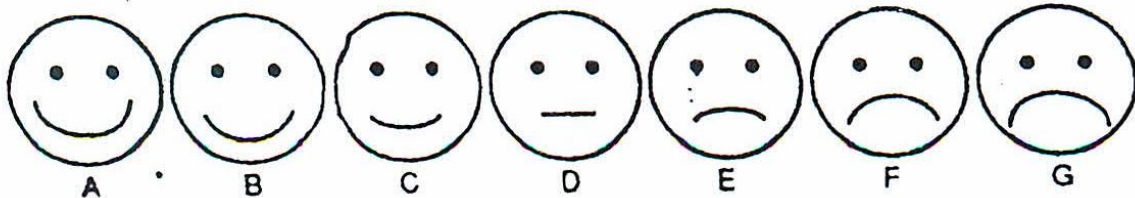
During the present study there were used educational games from a series with educational content endorsed by the Ministry of National Education (PitiClic serie). The main subject of the lesson is maintaining a clean environment and unaltered by separate collecting of the garbage. A statement is always true: kids play. During play, the children acquire knowledge, skills and attitudes useful for their development. The children play with computers, mobile phones and tablets, so the digital games are a useful tool for providing lessons.

The research hypothesis from which we started is: if learning concepts of Environmental Education is made through educational software, then there is an increase in positive attitudes towards it in comparison with learning through classical pencil-paper method.

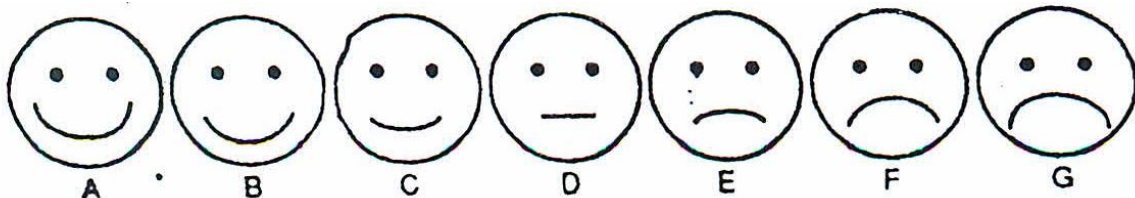
**Subjects.** The participants in this study are 30 children aged 6-7 years, "digital natives", both feminine and masculine, from an educational institution in Bucharest, Romania. The subjects had some training at the beginning of the test.

**Methods.** For the study we used the questionnaire method. We constructed a questionnaire with four items, three responded with Lickert scale from 1-7 (1 = extremely happy, 2 = very happy, 3 = happy, 4 = indifferent, 5 = sad, 6 = very sad, 7 = extremely sad), using graphic symbols for values (happy or sad faces).

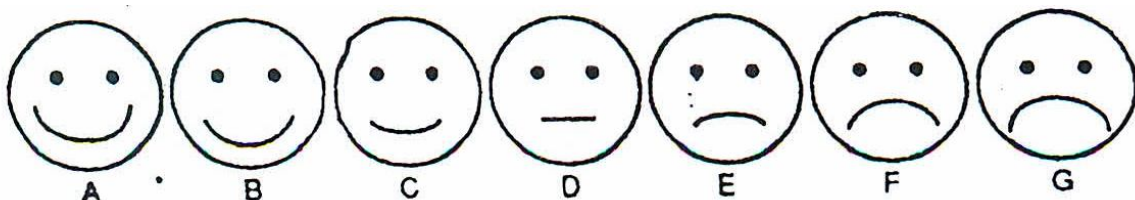
- A. Apply during the activity of teaching using educational software.  
1. Colour the face that shows how you feel during this lesson.



- B. Apply during the activity of teaching using the paper-pencil learning method.  
2. Colour the face that shows how you feel during this lesson.



- C. Apply after the first two activities  
3. If we will present a new lesson tomorrow, check how you would like it to be presented:  
 Lesson presentation using the computer and animated educational software  
 Lesson presentation using paper-pencil activities
4. Suppose you need to fold a half hour of play to separate the garbage produced by you and your family, to help save the planet. Colour the face that shows how you feel by doing so.



Within an hour of Environmental Education, children have received first information and were evaluated using educational digital games. After that, the children should respond to the item 1 of the questionnaire.

In stage two of the study, children have received environmental information and were evaluated using classical paper-pencil method. After that, the children should respond to the item 2 of the questionnaire. Then followed the third stage, in which the subjects should respond to questionnaire item 3 and 4.

## Results and Discussion

The data obtained in the test were selected and the scores obtained from the questionnaire were entered into SPSS program and processed. Below are the descriptive statistics of the responses.

Table 1

The descriptive statistics of the responses

	<i>Descriptive statistics</i>				
	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. Deviation</i>
Colour the face that shows how you feel during this lesson (using educational software)	30	1.00	3.00	1.20	0.48
Colour the face that shows how you feel during this lesson (using paper-pencil method)	30	1.00	6.00	3.00	1.43
If we will present a new lesson tomorrow, check how you would like it to be presented	30	1.00	2.00	1.16	0.37
Suppose you need to fold a half hour of play to separate the garbage produced by you and your family, to help save the planet. Colour the face that shows how you feel by doing so	30	1.00	7.00	1.86	1.73

### Frequency tables

Table 2

Colour the face that shows how you feel during this lesson (using educational software)

	<i>Variables</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid percent</i>	<i>Cumulative percent</i>
Valid	Extremely happy	25	83.3	83.3	83.3
	Very happy	4	13.3	13.3	96.7
	Happy	1	3.3	3.3	100
	Total	30	100	100	-

Table 3

Colour the face that shows how you feel during this lesson (using paper-pencil method)

	<i>Variables</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid percent</i>	<i>Cumulative percent</i>
Valid	Extremely happy	4	13.3	13.3	13.3
	Very happy	9	30.0	30.0	43.3
	Happy	7	23.3	23.3	66.7
	Indifferent	5	16.7	16.7	83.3
	Sad	3	10.0	10.0	93.3
	Very sad	2	6.7	6.7	100
	Total	30	100	100	-

Table 4

If we will present a new lesson tomorrow, check how you would like it to be presented

	<i>Variables</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid percent</i>	<i>Cumulative percent</i>
Valid	Lesson presentation using the computer and animated educational software	25	83.3	83.3	83.3
	Lesson presentation using paper-pencil activities	5	16.7	16.7	100
Total		30	100	100	-

It can be seen that respondents preferred modern learning methods that use computers and age-appropriate educational software.

Table 5

Suppose you need to fold a half hour of play to separate the garbage produced by you and your family, to help save the planet. Colour the face that shows how you feel by doing so

	<i>Variables</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Valid	Extremely happy	21	70.0	70.0	70.0
	Very happy	4	13.3	13.3	83.3
	Happy	1	3.3	3.3	86.7
	Sad	1	3.3	3.3	90.0
	Very sad	2	6.7	6.7	96.7
	Extremely sad	1	3.3	3.3	100
Total		30	100	100	-

It can be seen the positive attitude related to an ecological activity of these children of 6-7 ages after this environmental education lesson. It is quite difficult to make a child at this age to quit playing in favour of selective collection of garbage. Let's see the histograms:

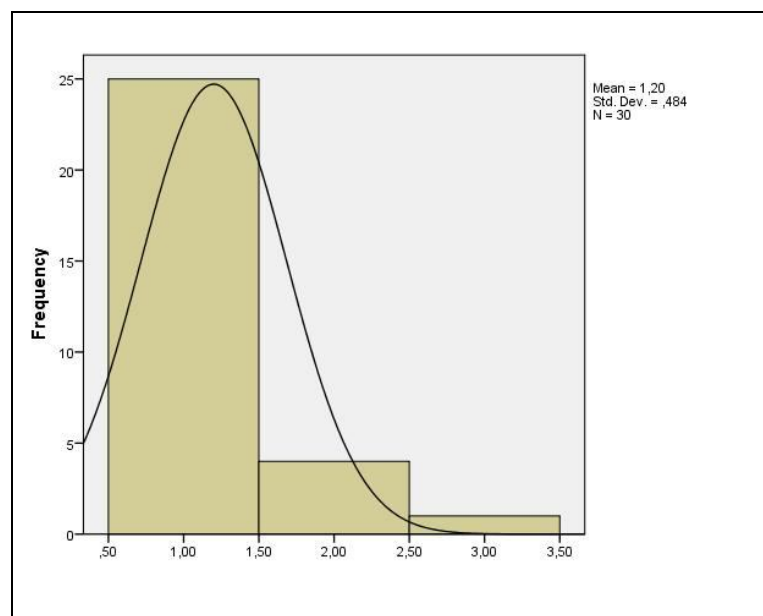


Figure 1. Colour the face that shows how you feel during this lesson (using educational software).

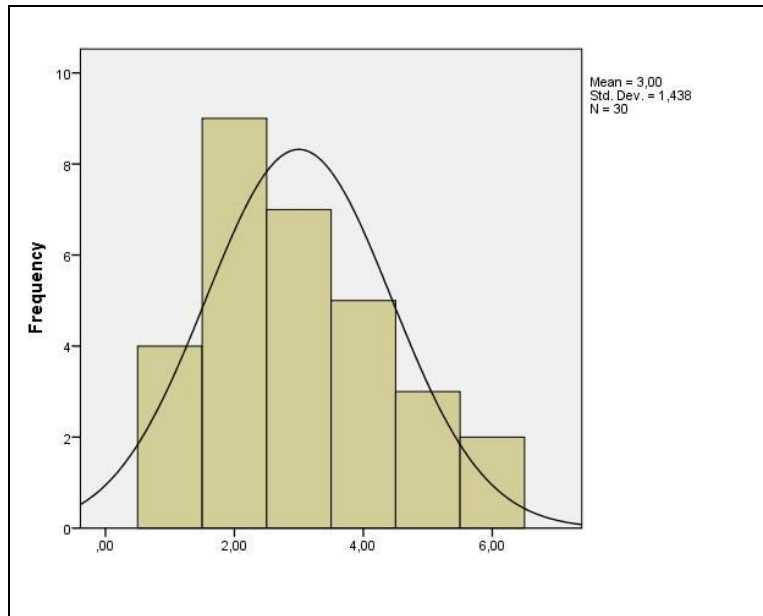


Figure 2. Colour the face that shows how you feel during this lesson (using paper-pencil method).

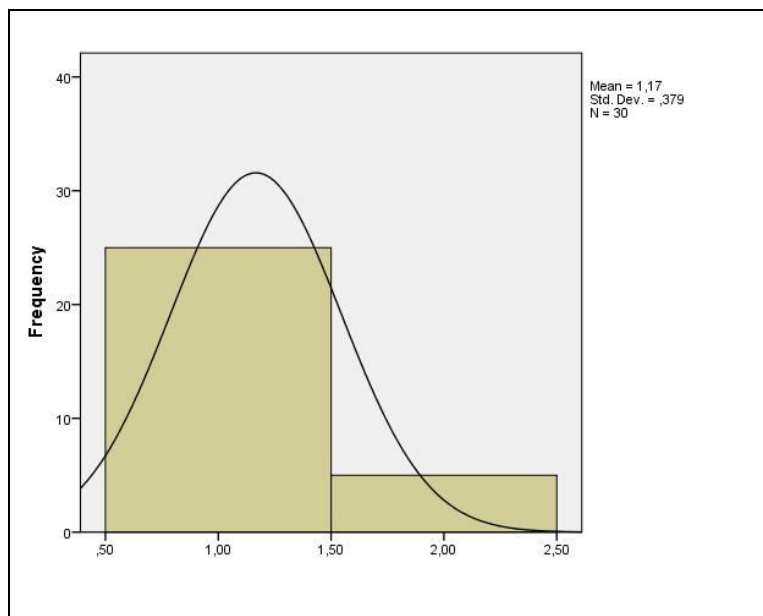


Figure 3. If we will present a new lesson tomorrow, check how you would like it to be presented.

The histograms show us the graphical differences between the responses of subjects regarding teaching/evaluation method based on educational software and classical pencil-paper method.

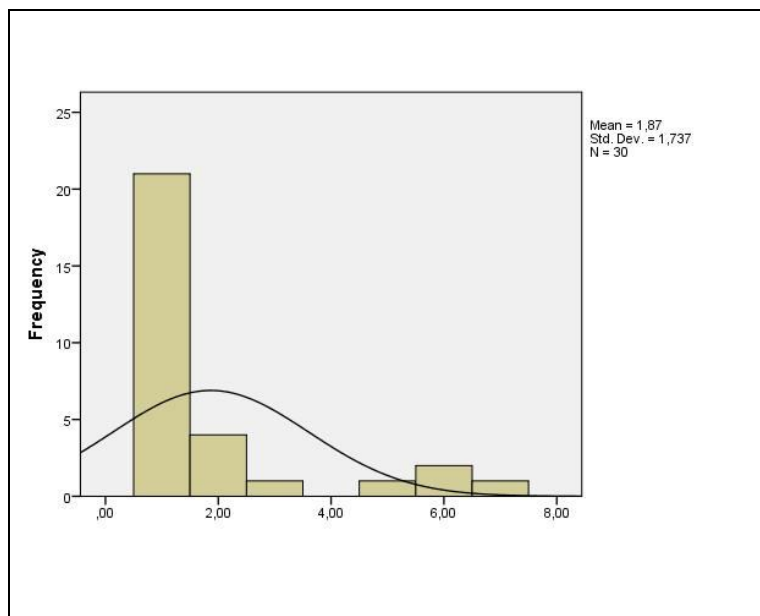


Figure 4. Suppose you need to fold a half hour of play to separate the garbage produced by you and your family, to help save the planet. Colour the face that shows how you feel by doing so.

It can be noticed an increase in positive attitude towards ecological education software during the presentation on the topic of natural disasters.

**Conclusions.** The study highlighted the importance of digital technology in increasing the positive learning attitude of notions of ecology at the age of 6-7 years, children's "digital natives" in that group. Thus, digital learning methods adapted to the pupils' age is really a good tool for the development of an ecological society, which means in fact a way to reduce the probability of damage to the ecosystem of the planet and thus reducing natural disasters.

Students can develop a positive attitude towards Environmental Education much easier and faster using the new technologies and can contribute to the protection of the ecosystem through their involvement in direct actions.

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