

SUSTAINABLE WATERCOLOR: REPRESENTATIVE IMAGES OF THE CONCEPTION OF SUSTAINABILITY BASED ON DRAWINGS BY CHILDREN AND ADOLESCENTS FROM JOÃO PESSOA

Received on: 14/05/2018

Approved on: 27/09/2018

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ABSTRACT

Beginning with the fact that today's children and adolescents will be the managers of future societies, for the viability of any form of future sustainability, it is important to understand how these individuals imagine managing available resources to subsequently enable the alignment of these ways to conceive with the principles of this new way of managing through education for sustainability. Thus, the objective of this study was to analyze notions of sustainability based on the drawings of elementary and middle students from a private school located in the city of João Pessoa, Paraíba. The results showed that the conception of most elementary students is focused primarily on the environmental pillar and, to a lesser extent, on the social pillar, whereas middle school students tackle broader conceptions in their drawings involving environmental, social, and economic elements. These results serve as preliminary evidence of the effectiveness of educational actions for sustainability in the school investigated. However, they do not prove it, thus allowing for more in-depth investigation.

Keywords: education for sustainability, drawings, children, adolescents, conceptions.

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1 FIRST TRACES: [...] ON ANY PAPER SHEET I DRAW (FABRÍCIO ET AL., 1983)

In recent decades, the concept of sustainability has increasingly intensified. This reality is likely because we live in a capitalist economy that is socially and environmentally degrading in the long term (BARCELOS, 2008).

Currently, according to the field and the aims of research studies, there are various interpretations of the concept of sustainability; however, all of them agree in some way that this concept guides the basis of the transdisciplinary approach, covering various fields (MIKHAILOVA, 2004). For Melo (2008), sustainability is a commitment to future generations. Leff (2001) addressed the concept by arguing that sustainability limits economic rationality, thus enabling other values to come into focus such as social justice and the responsibility to coming generations.

Lopes and Tenório (2006) argued that education is fundamental in all processes of the constitution of citizenship, which is a crucial point for what we now call education for sustainability (EFS). This understanding shows us that people are only changed through knowledge, and knowledge is only possible through education, which is a well-known assumption of the educator, pedagogue, and philosopher Paulo Freire: “Education does not transform the world. Education changes people. People transform the world” (FREIRE, 1996, p. 29). Thus, there is a need to reflect on what sustainability-based education would be like and how school management responds to this new reality. To do this, one must understand what education for sustainability is and the role that schools play in this context.

According to Moura (2016), for some time, the field of education has been receiving great attention and influence from business administration because school management models are increasingly present in the educational environment. Various authors have investigated administrative practices in school management, fostering debates about how this management can contribute to these educational institutions and (trans)form children and adolescents into citizens and professionals who are more active in dealing with social issues (LEÃO, 1945; TEIXEIRA, 1961; RIBEIRO, 1986; LOURENÇO FILHO, 2007).

Business administration studies must transcend organizational boundaries; that is, they must move away from theory and corporate boardrooms and reach broader contexts, positively intervening in the formation of a more active and engaged society in the search for a better world.

The National Curricular Guidelines for the Undergraduate Program in Business Administration identifies this commitment through the skills and abilities that must be exercised by administrators (BRASIL, 2005). Thus, administrators act as agents of social change. Azevedo and Grave (2011) emphasized that this commitment goes beyond any type of simple existence — it is dedicated to a better world in which humans are able to live well. To achieve this much-desired improvement, it is necessary to live sustainably, meeting the needs of the present without compromising future generations. This path can be followed within education focused on sustainability. To do this, one must understand what EFS is and its role in schools.

EFS is a relatively new concept that arose from the need to narrow the relationship between development and education (MOCHIZUKI; FADEEVA, 2010). It is a process of transformative learning in which the participants — whether students, teachers, or anyone interested in the topic — develop a new way of thinking and acting to attain economic prosperity allied with ecological diversity and responsible behavior within society (DUBEY; GUNASEKARAN; DESHPANDE, 2017).

Within the context of EFS, the school assumes the role of balancing a systemic function of preparing citizens for both developing their abilities and living in society while exercising its critical function and seeking solutions to local problems (PIRES, 2007). In this context, the school

is seen as a tool for practicing citizenship, aligned with the condition in which students must position themselves and express their opinions as individuals, members of a society, promoting debates and constructing and sharing knowledge (PALMA; ALVES; SILVA, 2013).

Given this situation, it is imperative that this awareness comes as early as possible — still in childhood, mainly in elementary and middle school. However, all the sociocultural, economic, and educational levels must provoke these reflections, transforming today's children and adolescents into adults who are more responsible for and engaged with sustainability.

This study uses graphic representations (drawings) to investigate what children and adolescents understand about sustainability.

Drawing can be considered a graphic expression, a form of human communication practiced since the prehistoric era. Through the markings and records made on cave walls, humans created symbols and began to write his history (DERDYK, 1990). Drawings are a playful way for children to represent their conceptions of various themes, stimulating their creativity and imagination. For Moreira (1984), a child's drawing is the first way they find to express themselves, beginning even before they master reading and writing. Similarly, Junqueira Filho (2005, p. 54) argued that children

learn about their own humanity, to the extent that, when drawing, children are doing — reaffirming and updating — something ancestral to their humanity: the ability and the need of human beings to leave themselves in markings. It was human beings who invented drawing and, in so doing, they could say something about themselves through images, they could see themselves represented graphically in aspects of their humanity; they left themselves in markings that contributed to the production of their humanity, of their history; that contributed to the demarcation, communication, and significance of their passage through life, through planet Earth, through the world.

In childhood, drawing is a universal language, understood by all cultures and capable of expressing thoughts and feelings, involving cognitive and emotional aspects (DERDYK, 2004). Melanie Klein (1975/1997) emphasized that

children cannot and will not associate in the same way as adults. [...] probability it is chiefly that children cannot, not because they lack the capacity to put their thoughts into words (to some degree this would apply only to quite small children), but because anxiety resists verbal associations (KLEIN, 1975/1997, p. 176).

According to the National Curriculum Framework for Early Childhood Education (BRASIL, 1998), drawing as language suggests historical and social manifestations that allow humans to represent the world. Thus, elementary and middle school education is a space to experience childhood and adolescence, which fosters the assimilation of different languages and expressive manifestations, among them, drawing, a manifestation loaded with conceptions.

The objective of this study was to analyze the conceptions of sustainability of elementary and middle school students from a private school located in the city of João Pessoa, Paraíba, Brazil, based on drawings. Elementary and middle school education — corresponding to the 1st to 9th grades, with a student mean age (MA) of 6 to 14 years — was chosen because this learning period is the phase for the initial formation of students. In other words, it is the time when these students acquire their principles and values and relate their knowledge and experiences with the reality around them. Furthermore, in this phase, children and adolescents not only internalize the meanings and values of the world, they also contribute to its production and change, individually and collectively (re)producing and (re)creating the behaviors that accompany them throughout life (NEVES et al., 2017).

Finally, it is important to present a quick reflection on the contribution of the present study to the field of business administration. Business administration is the science that leading organizations toward achieving their goals through efficient and effective management of available resources (ETZIONI, 1984; SCHEIN, 1982). For many centuries, this occurred in an environment in which little thought was given to the impacts that the unplanned use of these resources has on the environment and society; however, since the end of the twentieth century, the global community has been moving toward a consensus that a drastic change is urgently needed in the unplanned and thoughtless use of natural resources by some organizations to preserve these resources to also meet the needs of future generations, thus promoting sustainable development (MACÊDO; OLIVEIRA, 2005; JACOBI, 2006; NASCIMENTO; CURI, 2013).

When sustainability and sustainable development are understood as being the sustainable administration of the available financial, natural, and social resources, the connection and relevance of this study to the field of business administration becomes clear because, based on this understanding, through this study we analyze the conceptions of sustainable administration of elementary and middle school students.

Considering that the “children of today” will be the “managers of the future”, it is important for sustainable administration to understand how they imagine this new way of managing the available resources, to thereby enable the alignment of these conceptions with the principles of this new way of managing, through EFS.

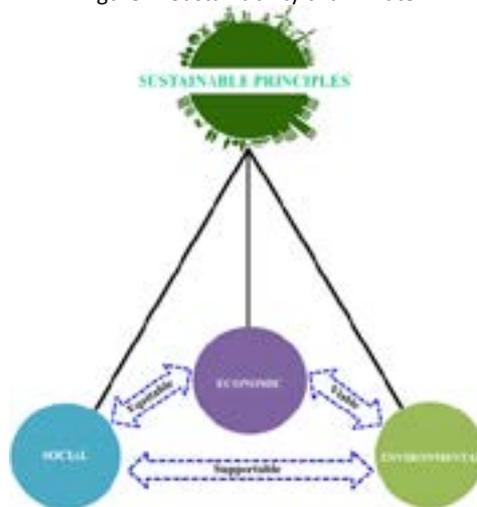
2 SUSTAINABILITY AND ITS BOUNDARIES: [...] WITH FIVE OR SIX LINES IT IS EASY TO CREATE (FABRÍCIO ET AL., 1983)

One of the characteristics that emerges from the interdisciplinary nature of the concept of sustainability is the plurality of existing understandings regarding it (LANKOSKI, 2016). In this regard, Dovers and Handmer (1992) state that sustainability is a concept that has increasingly influenced development policy in the last two decades, but the concept remains poorly defined. Thus, it is known that there is a multitude of ways to understand what sustainability is.

Initially, the concept of sustainability was directly linked to environmental preservation (MELO NETO; BRENNAND, 2004). According to the authors, sustainable projects focused only on reducing environmental risks; however, over time, various other concepts emerged. In its etymology, sustainability means everything that is preserved, maintained, and renewed over time. Bermejo (2001) found that there are more than 200 concepts regarding sustainability, which still generate various discussions concerning the definition of the term.

To facilitate its presentation, two major groups have emerged regarding the number of aspects within the scope of sustainability. The first group comprises those who address the theme based on the three basic aspects of sustainability (better known as the sustainability triumvirate (Figure 1), which involves the social, economic, and environmental aspects), arguing that by balancing decision-making by taking into account relevant sustainable principles of these three aspects, individuals, organizations, and society can achieve sustainability — these authors include Elkington (1997), Jacobi (2003), Cavalcanti (1998), and Jones, Selby, and Sterling (2010).

Figure 1. Sustainability triumvirate



Source: Adapted from Elkington (1997).

The second group also considers as an essential condition the balance between the three basic aspects for achieving sustainability but proposes additional aspects — besides the three basic ones — that are also considered to be relevant for attaining sustainability. These additional aspects represent details of the three main aspects as well as extra dimensions or aspects. Examples include Sachs (2002), who expanded the range of dimensions in his approach, considering the following eight dimensions: social, cultural, ecological, environmental, territorial, economic, national policy, and international policy; and Lopes and Tenório (2006), who added the educational dimension to the sustainability triumvirate.

Thus, because sustainability does not have a single, consensual concept, as advocated by Huckle (2014):

It assumes distinct meanings in different ideologies and programs supported by the most varied types of knowledge, values, and political philosophies. Its meanings are challenged, and one of the key functions of education for sustainability is to help people reflect on and act on these meanings, and, based on this, to perceive alternative futures of more informed and democratic ways (HUCKLE, 2014, p.18).

Because of the interdisciplinary nature of the concept of sustainability (RATIÚ; ANDERSON, 2015), this study adopted, as a basis for the data analysis, the concept of sustainability as a decision-making process based on the economic, social, and environmental dimensions — a concept defended by authors such as Elkington (1997), Jacobi (2003), Cavalcanti (1998), and Jones, Selby, and Sterling (2010). The choice of this line of thought rather than a more complex line of thought, or an understanding of sustainability that has more aspects or dimensions — such as the understanding defended by Sachs (2002) or Lopes and Tenório (2006) — occurred because the data analyzed in this study consisted of drawings produced by children and adolescents in elementary and middle school; thus, the comprehension of most of the extra dimensions proposed by the latter mentioned authors would be difficult to access at this level.

Based on this understanding, the next section will address the topic of EFS, due to the belief that through critical awareness, society is able to generate citizens who are truly capable of changing the world (SPRINGETT, 2005; GADOTTI, 2008; SAMUELSSON; KAGA, 2008; JICKLING, 2009; SARTORI; LATRÔNICO; CAMPOS, 2014; GRISWOLD, 2017; DUBEY; GUNASEKARAN; DESHPANDE, 2017)

3 EDUCATION FOR SUSTAINABILITY: (RE)DESIGNING A (NEW) SOCIETY — [...] IF A DROPLET OF INK FALLS ONTO A BLUE PART OF THE PAPER (FABRÍCIO ET AL., 1983)

Lopes and Tenório (2006) proposed education as a fourth dimension of sustainability and sustainable development, with this dimension receiving the important and strategic mission of spreading the principles and foundations of this new vision and this new model of development throughout society, to provide individuals with a new way of seeing themselves and the world around them.

For the aforementioned authors, the only way to promote such a drastic change in the way humans think of development is through education because it is through education that the various social actors acquire a large part of their values and factors guiding their decisions.

A number of other authors have advocated in favor of the position adopted by Lopes and Tenório (2006) regarding the strategic importance of education for sustainability and sustainable development (SPRINGETT, 2005; GADOTTI, 2008; SAMUELSSON; KAGA, 2008; JICKLING, 2009; SARTORI; LATRÔNICO; CAMPOS, 2014; GRISWOLD, 2017; DUBEY; GUNASEKARAN; DESHPANDE, 2017).

After having defended the importance of EFS for sustainable development, it is important for the objectives of this study to differentiate EFS from conventional education or similar concepts such as environmental education and to present and debate its main concepts and characterizations of EFS.

First, in regard to the differentiation between conventional education and EFS, while the former mainly seeks to train the workforce to basically feed the organizations that operate within the capitalist mode of production — offering for this a fragmented, disciplinary, and narrow handling of knowledge, to make the view of the whole unfeasible and, consequently, foster the uncritical positioning of individuals regarding the reality they are collaborating to construct (SMITH; STEVENSON, 2017), the latter aims to develop in students, in addition to technical/scientific knowledge, principles and ways of seeing that will enable them to be questioners of the logic that guides the world they live in (SPRINGETT, 2005).

Thus, it is evident that those who operate within the logic of capitalism — having the financial dimension as their only bias — are opposed to the implementation of the sustainability education model and are adherents of the former because both the continuation of their ideology and the maintenance of their necessary workforce depends on this model. This is one of the greatest difficulties in implementing this new educational model.

The distinction between environmental education and EFS is notable. Education for sustainability is in fact an expansion over the years of environmental education. Expansion in the sense that, while environmental education focuses narrowly on preserving the environment, EFS has widened its scope and sought to integrate environmental preservation with the needs and desires of society so that these needs are provided for in the present and future. Thus, Jacobi et al. (2011) further add that

In European terminology, environmental education (EE) is a concept quite distinct from education for sustainable development (ESD). Both represent educational currents focused on the environment, but with the difference that ESD is committed to the empowering of learners so that they become protagonists in actions and decision making, whereas EE represents a narrower and more instrumental vision based strictly on the dissemination of scientific knowledge and to change behaviors (JACOBI et al., 2011, p. 5).

However, in Brazil, the various education laws developed do not differentiate between the two types of education, referring to an educational approach that follows the assumptions and principles of EFS — presented and discussed hitherto — but calling it environmental education (CARVALHO; BRUNSTEIN; GODOY, 2014).

Thus, starting from these two initial debates, one can begin the effort of conceptualizing EFS in the sense of seeking to give substance and form to its content. Consequently, this starts from the perspective that EFS is essentially a critical, interdisciplinary, and multidimensional educational model. Critical because, according to Springett (2005), it aims to provide students something more than efficient technical performance, namely, the possibility of criticizing the logic that weaves their reality. EFS is also interdisciplinary and multidimensional because it considers various dimensions (e.g., social, environmental, and economic) in its teaching-learning processes.

Starting from these initial assumptions, several other authors have complemented the conceptualization and characterization of EFS (GADOTTI, 2008; BENFICA, 2012; MELO, 2012; DUBEY; GUNASEKARAN; DESHPANDE, 2017; FELGENDREHER; LÖFGREN, 2017).

For Dubey, Gunasekaran, and Deshpande (2017), EFS is a transformative teaching-learning process that aims to develop new knowledge and logic in students, which will enable them to have a balanced world in the social, economic, and environmental dimensions, so that these individuals can enjoy the privileges of nature, economic prosperity, and a harmonious society in both their present and future.

Dubey, Gunasekaran, and Deshpande (2017), in their extensive literature review and the results their rigorous empirical study conducted in India with five exemplary universities on EFS practices, also argue that government policies, market demand, peer pressures, values, attitude, pedagogy, resources, behavior, and promotion are the main factors shaping sustainable education. It is worth noting that most of these influencing factors were identified in the literature review conducted by the researchers; however, attitude, behavior, and promotion were identified in the empirical study at the universities.

Reinforcing the idea advocated by Dubey, Gunasekaran, and Deshpande (2017), that EFS is a process capable of transforming students' worldview, Felgendreher and Löfgren (2017) argued that EFS can indeed cause changes in the principles and moral perceptions that guide the decision-making of individuals, even if these are not the only factors influencing these decisions (there are also others); however, EFS does not homogeneously influence the moral values of students, but rather does so differentially, according to the characteristics of each student.

According to Gadotti (2008) and Benfica (2012), EFS aims to build a balanced and harmonious environment, from which all life forms can benefit and coexist. Concern not only with the sustainability of human societies but also with the sustainability of all life forms that inhabit the Earth can also be seen in this conceptualization of the authors. Thus, and seeking to theorize about how EFS should be, Gadotti (2008) argues that

Educating for sustainability means **changing the system**, it involves respect for life, caring daily for the planet, and caring for the whole community of life, of which human life is one chapter. This means sharing fundamental values, ethical principles, and knowledge, such as respect for the Earth and the whole diversity of life; caring for the community of life with understanding, compassion, and love; and building democratic societies that are fair, participatory, sustainable, and peaceful. Sustainability is a central concept of a future-oriented educational system (GADOTTI, 2008, p. 76 — emphasis added by the authors).

Another important aspect to be incorporated into the understanding of EFS is that of Melo (2012). Regarding the interdisciplinary character of this educational model, for him, due to this characteristic, EFS should not be treated as an isolated discipline — it should be interconnected to the various other disciplines developed by educational institutions.

Palma, Alves, and Silva (2013) followed the same line of thought as Melo (2012). For them, EFS presents a great challenge associated with its interdisciplinary character, which is the development

by teachers and researchers of a methodology that makes possible including the issue of sustainability into all disciplines, or in as many as possible. They also added that this methodology should be part of the pedagogical day-to-day of the institutions, regardless of the level of education — whether elementary, middle school, high school, or university education — and the area of activity.

Melo (2012, p.16) states that when it comes to EPS “is based on the premise that students must broaden their worldview, rethink their own values, and be capable of questioning practices that foster unsustainability and that may not be amenable to simple solutions”. It can be seen that the author’s ideas are in line with the ideas of Dubey, Gunasekaran, and Deshpande (2017) and Felgendreher and Löfgren (2017) regarding the understanding that EFS is a process capable of transforming students’ worldview, which further reinforces this characteristic of this type of education.

Although developed in the early 1990s, the concept assigned to EE (or EFS) in the preparation of ECO-92 also provides important features for this new educational model. An example is the issue of adaptation to regional realities and to the historical context, as seen in the following passage: “should consider the conditions and stages of each country, region, and community from a historical perspective[...].” (BAGGIO; BARCELOS, 2008, p. 132).

Palma, Alves, and Silva (2013) identified another characteristic that deserves attention within the scope of the composition of education focused on sustainability. According to the authors, EFS can be developed in both formal and informal contexts. That is, those who learn about sustainability should be encouraged to develop their knowledge, skills, attitudes, and competencies within the formal teaching-learning environments, as well as in the various informal learning environments available to these individuals.

Lopes and Tenório (2006) argued that in addition to education, ethics must also be linked to sustainability. Thus, in addition to the four dimensions (economic, environmental, social, and educational) proposed by the authors for sustainability, they also proposed the application of ethics to sustainability and EFS. Thereby proposing the transformation of the sustainability tetrahedron into a pyramid.

Through the concepts and characterizations presented and discussed thus far, it is feasible to define the fundamental guiding principles of EFS. Table 1 presents a summary of these principles, to guide the implementation of EFS at the different levels of education.

Table 1. Summary of the fundamental principles of EFS

Authors/year	Principles	Description of the principles
Springett (2005), Stevenson (2017), and Dubey, Gunasekaran, and Deshpande (2017)	Break away from conventional education	While conventional education seeks to train the workforce to fuel capitalist organizations, EFS focuses on developing in student principles and ways of seeing that will enable them to be questioners and critics of the logic that guides the world they live in.
Jacobi et al. (2011)	Difference between EE and EFS	While environmental education focuses narrowly on preserving the environment, education for sustainability seeks to integrate the environmental preservation with the needs and desires of society.
Springett (2005)	Interdisciplinarity and multidimensionality	EFS considers various dimensions/aspects (e.g., social, environmental, and economic) in its teaching-learning processes.
Felgendreher and Löfgren (2017)	Individualized transforming potential	Although EFS is capable of transforming the moral values of students, it does not do it homogeneously, it does so differentially, according to the characteristics of each student.
Gadotti (2008)	Integration with the environment and decentralization	Through EFS, learners should only see themselves as one more interconnected part of the environment, not as the center.
Melo (2012)	Cross-sectionality	EFS should not be treated as an isolated discipline but interconnected with various other disciplines that are taught in an institution.
Palma, Alves, and Silva (2013)	Universality	EFS can be developed in both formal and informal contexts
Baggio and Barcelos (2008)	Geographic-historical contextualization	EFS seeks adaptation to regional realities and to the historical context of the society in which it is developed.
Lopes and Tenório (2006)	EFS with ethics	EFS actions should always be developed in a way that links ethics to the teaching-learning processes.

4 METHODOLOGICAL PROCEDURES: [...] IN AN INSTANT I IMAGINE (FABRÍCIO ET AL., 1983)

The epistemological position used in this study was the interpretative one. This approach presupposes the understanding of the world through the researcher's interpretation (MERRIAM, 1998). The study has a qualitative focus, which presupposes its own unique methodology. For Godoy (1995), qualitative research refers to the method of scientific investigation that focuses on the subjective character, understanding its particularities from the perspectives of the participants. According to Merriam (1998), the focus of qualitative studies is interpretation and meaning.

The phenomenon broached in this study is sustainability, and the object of study are the conceptions regarding sustainability of the elementary and middle school students of a private institution located in the southern area of the city of João Pessoa, Paraíba, Brazil. The school was founded in the mid-1980s with the intention of innovating the teaching method. Currently, the school has 300 regularly enrolled students. In general, the students come from families with intermediate purchasing power, which, according to the Strategic Affairs Department of the federal government, are those with a family income ranging from R\$ 1,764.00 to R\$ 4,076.00 (BRASIL, 2012). In addition to a preschool, the institution accepts students from the 1st to 9th grades, which are the focus of this study.

Data were collected between July and November 2016. In that year, the generating theme of the school was “Our planet, our home” — a work focusing on EFS, which is why the institution was chosen.

The study included 180 students from 7 to 14 years of age, from the 2nd, 3rd, and 5th grades of elementary school and from the 6th to 9th grade of middle school. The 1st and 4th grade classes were excluded — they were participating in another study and, at the suggestion of the school, it was preferred not to include them in this study. Of the total number of participants, 93 were female and 87 were male, together comprising 59.4% of the total school population. Approximately 20% of the images representative of sustainability — chosen by random draw — were analyzed. In this type of sample, the assumption is that each individual of the studied population has the same chance of being chosen to be a part of the representative sample (PEREIRA, 2003).

For the data collection, first a presentation was made to the school administration. The objective of the study was explained and how it could be conducted was discussed. After the administration’s approval, a meeting was held with the teachers of each class, and the dates and classes for application were defined. Because the elementary and middle schools have different class schedules (the elementary school meets in the afternoon and the middle school in the morning), the study was conducted at both times.

The data were collected by conducting drawing workshops with a thematic direction. Students were asked to do a drawing on the theme of Sustainability. At this point, they were instructed not to be concerned with their ability to draw but rather to represent through images what came to mind regarding the theme. It was informed that the drawings did not need to be filled in with color pencils if they did not wish to do so. All students were invited to draw; however, not all of them finished or handed in their drawings. The time given was thirty minutes. There was no discussion prior to the drawing session — only the following activity was instructed: “Draw what comes to mind when you hear the word Sustainability”. After the stipulated time, the drawings were handed in for later analysis of the data. In addition to the drawings, these analyses were also based on the children’s speeches when they were drawing.

The sociohermeneutic analysis of visual materials (ROSE, 2001; SERRANO, 2008; SERRANO; ZURDO, 2012) sought to make explicit, in addition to the sensory immediacy that an image provokes compared to written text, what it which can connect to the emotional (MIRZOEFF, 2003). The gender, mean age, and level of education of the second to ninth graders were also taken into consideration, excluding the first and fourth graders, which were involved in another study, and whom the school administration decided would not participate in the study.

Initially, the 180 drawings were analyzed, and it was decided to select a significant sample, given that many of the drawings had homogeneous elements. As the classes had different numbers of students, some drawings (approximately 20%) were selected from each class. Table 2 shows the number of drawings analyzed and the number of participating students, as well as the gender division — M for male and F for female. The age presented is the mean age (MA) per grade.

Table 2. Distribution of students for the 2nd to 9th grade elementary education classes

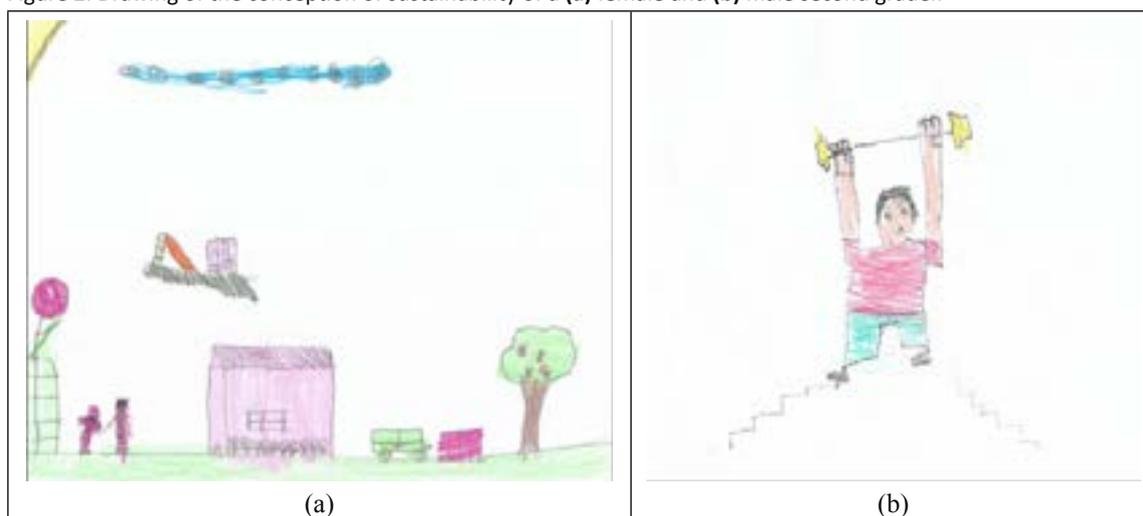
GRADES	2nd grade MA = 7		3rd grade MA = 8		5th grade MA = 10		6th grade MA = 11		7th grade MA = 12		8th grade MA = 13		9th grade MA = 14	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Gender	9	17	8	9	16	10	14	17	15	15	9	14	16	11
Total	26		17		26		31		30		23		27	
Sample (20%)	5.2		3.4		5.2		6.2		6.0		4.6		5.4	
No. of drawings per grade	5		3		5		6		6		5		5	
MEAN NUMBER OF DRAWINGS SELECTED PER GRADE = 5 DRAWINGS														

5 IMAGES REPRESENTATIVE OF ELEMENTARY AND MIDDLE SCHOOL: [...] IT FLIES ON, SKIRTING THE VAST NORTH-SOUTH CURVE (FABRÍCIO ET AL., 1983)

Images can represent a theme, an argument, a meaning, or a thing and address something. A thing may be what appears in the image, what you see or observe, concrete and objective, whereas another is what the image suggests, or what the image addresses, abstract and subjective (GASTAMINZA, 2001).

Among the drawings of the second graders (MA = 7 years), four contained elements related to the natural environment, represented by Figure 2 (a), and one drawing presented a conception distant from nature (Figure 2 (b)); however, both contained the representation of people.

Figure 2. Drawing of the conception of sustainability of a (a) female and (b) male second grader.



It is important to emphasize that sustainability is communicated in several ways in both figures, and what is intended here is to capture the various conceptions of the students about sustainability. In Figure 2 (a), elements such as the sun, sky, trees, and flowers are present in the drawing, and they give the idea of a healthy and happy life. The image takes us to a quiet and familiar environment, where humans live in harmony with the environment. The figure 2 (b), a man is shown as the main element, and he seems to raise a dumbbell on top of a podium, which demonstrates the strength and commitment of the human being in reaching an objective, and in these terms,

sustainability is a goal to be achieved through healthy and harmonious ways. Such representative images converge with the vision of Dovers and Handmer (1992) that sustainable development is the way to achieve sustainability; that is, a pathway to reach sustainability (end goal).

Figures 3 (a) and (b) show the drawings made by third graders (MA = 8 years).

Figure 3. Drawing of the conception of sustainability of a (a) female and (b) male third grader.



In the analyzed drawings of the 3rd grade students, the images refer to the idea of the nature-human relationship. In Figure 3 (a), the student presents practically the same elements covered by the students from the 2nd grade; for example, the sun, sky, fruit trees, and people. The human can be seen in the image, portrayed through the various people taking care of nature, watering the trees, and planting flowers. This care demonstrates the relationship of responsibility that humans must maintain with the environment, cultivating a harmonious climate. Figure 3 (b) also shows the human in nature, with the presence again of the elements mentioned above. Furthermore, it highlights the phrase “No mean jokes, be careful what you do”. It is possible that a negative action by humans — for example, throwing trash on the ground (like a banana peel) — can impact other beings, as well as cause damage to the environment. In the image, we see that a man is falling down or slipping on something (something thrown by another person, because it is not an element of nature).

Figure 4 shows images representative of sustainability from fifth grade students (MA = 10 years).

Figure 4. Drawing of the conception of sustainability of a female fifth grader.



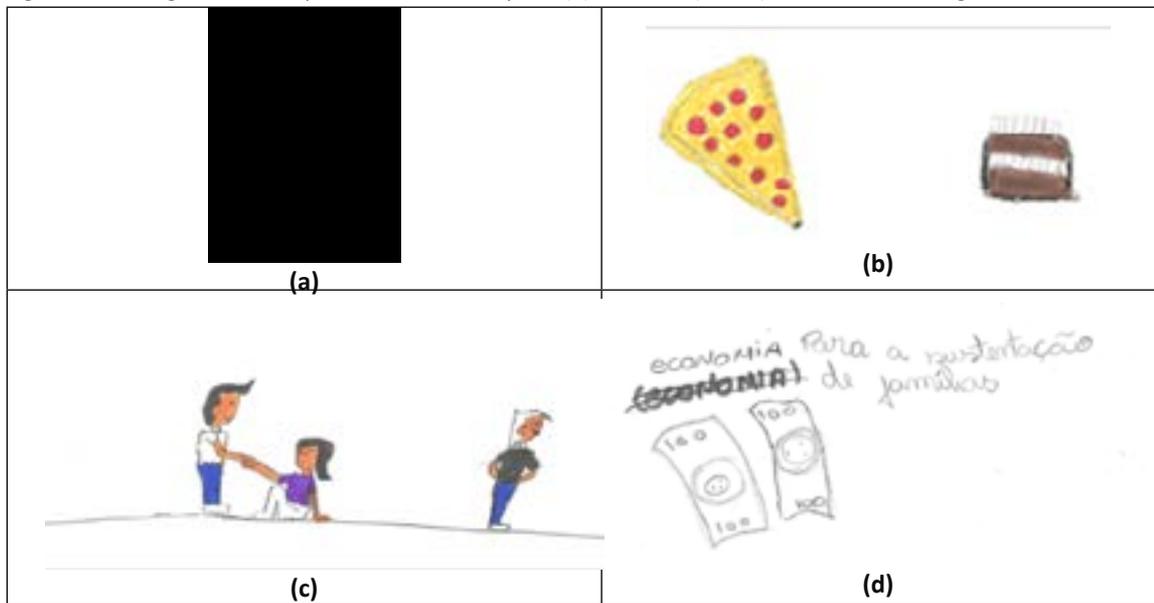
Figure 4 also shows the relationship between human and nature, portrayed through the drawing of a woman caring for plants, which refers to the awareness and sensitivity of humans in protecting and caring for the environment. In addition to the images, the student wrote that sustainability is about “caring for the world and the people who live in it”.

We observed that these elements were present in the five drawings analyzed from this 5th grade class. The image of a tree, the sun, and sky — in this case represented by the presence of flying birds — are recurrent elements in the elementary school classes. The presence of people in the drawings also shows the relationship of respect that the children imagine between humans and the environment, in a possible and positive coexistence.

None of the analyzed drawings of the elementary school students addressed elements that explicitly refer to economic issues, although in Figure 2 (a), the student presents elements related to land development (e.g., housing, “house” and transport, “car”). The other images representative of sustainability add elements related to environmental conceptions and, to a lesser degree, social conceptions. It is inferred that, although the drawings are associated with nature, none of them portray the subject with images related to deforestation, lack of water, or pollution.

Regarding the images representative of middle school (students from 6th to 9th grade, i.e., children and adolescents between 11 and 14 years of age), six drawings were analyzed from the 6th grade class (MA = 11 years). Due to the heterogeneity of the ideas, four images are presented (Figures 5 (a), (b), (c), and (d)).

Figure 5. Drawing of the conception of sustainability of a (a) male and (b, c, d) three female sixth graders.



Analyzing the four drawings, a disparity can be seen in the conceptions of the children and adolescents. Figure 5 (a) depicts the planet inside a house, which corroborates the generating theme of the school that was worked on during 2016: “Our planet, our home”. In other words, the idea that the planet is our home — it is the environment in which we live and not something distant from us, and that is why we must take care of it.

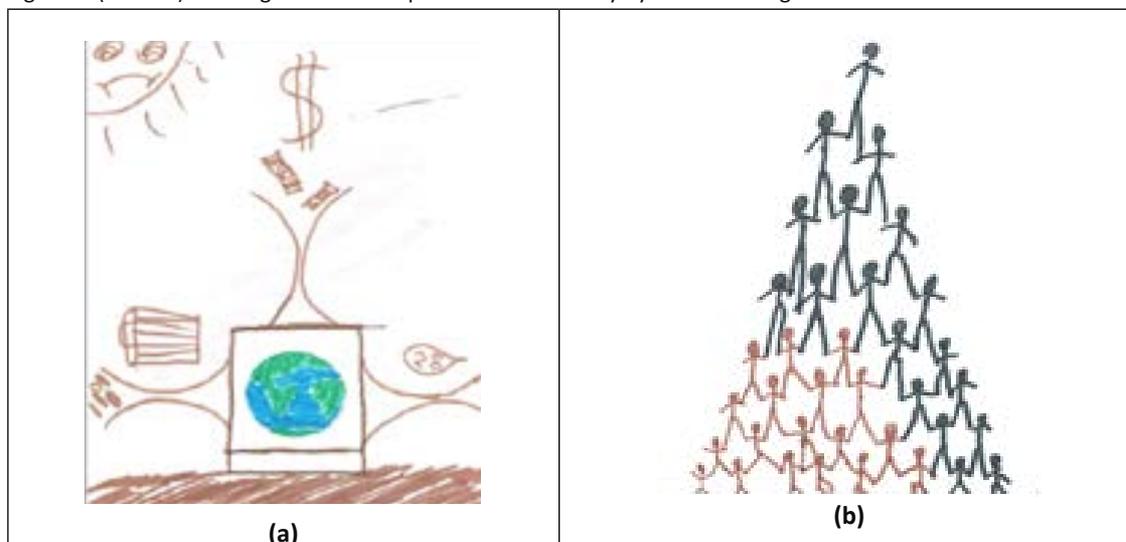
Figure 5 (b) presents a representation of a slice of pizza and a pot of chocolate, which indicates an idea connected to humans — after all, one must eat to live. However, we must pay attention to the fact that the current generation is immersed in a consumer society. The Haya Report — highlighted by Coelho (2012) — emphasizes that consumer society is unsustainable, and it is necessary to invest in health and education to correct social injustices and avoid increasing a social debt that will burden future generations.

Figure 5 (c), in turn, is associated with social relationships, represented by a boy helping a girl who is on the ground. There is another boy in the picture who is unresponsive to the situation, which often occurs at various times in real life. In this case, it is desirable to aspire to social sustainability in the pursuit of equality among all, thus enabling a better quality of life and reducing social inequalities, as asserted by Montibeller-Filho (2008).

Figure 5 (d) makes an association between sustainability and the economic conception, represented by the image of currency accompanied by the phrase: “Economy for the sustenance of families”. According to Sachs (1992), economic sustainability is based on multiple criteria including food security and the capacity for the continuous modernization of production instruments. However, as Sachs (1992) adds, the articulation of different sustainability criteria in search of ecodesvelopment will only be possible if it is based on the harmonization of social, environmental, and economic objectives.

Figures 6 (a) and (b) correspond to the 7th grade (MA = 12 years).

Figure 6. (a and b) Drawings of the conception of sustainability by two seventh graders.



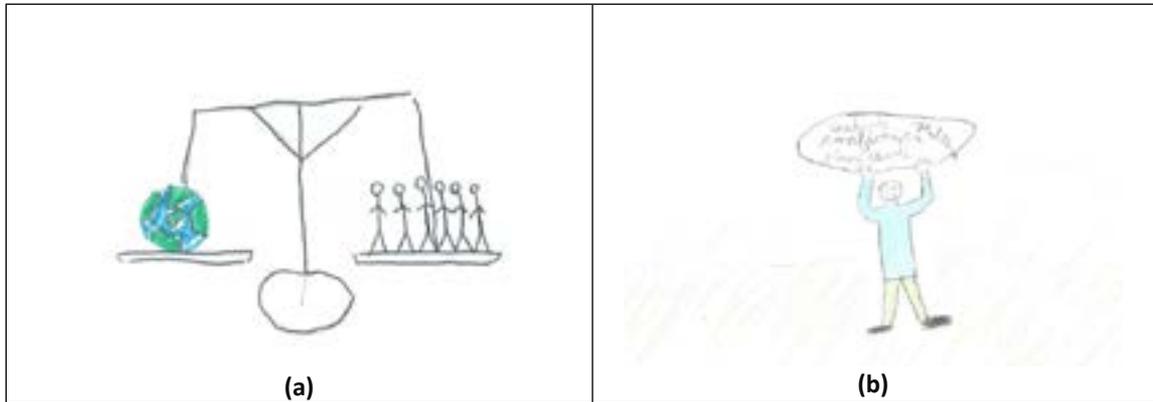
In the five 7th grade class drawings analyzed, absent are representations associated only to nature or the natural environment; however, there are elements that express associations with the whole (sustainability pillars/dimensions), which brings us back to Cavalcanti's concept (1998, p. 165):

Sustainability means the possibility of continually obtaining equal or superior quality of life for a group of people and their successors in a given ecosystem. The concept of sustainability equates to the idea of maintaining our life support system. It means behavior that seeks to obey the laws of nature.

The presence of the planet inside a type of receptacle is shown in Figure 6 (a). Above the planet, we see the sun with a sad facial expression and a symbol representing money with bills falling into another entry-point into the box. On the left side of the image, there is a trash can, and on the other (right) side, there is a drop of water, also with an expression of sadness. Both have entry paths to the planet. Below the box is the color brown, representing the earth, and there are no trees, no animals, no people. The visual features in this image representing sustainability are dispersed throughout it because there is no human figure.

By contrast, Figure 6 (b) represents a pyramid that is predominantly composed of people of different races and ethnicities. The shape is symmetrically balanced, based on a foundation formed by faceless "figures" that balance on each other. It communicates the idea of "one for all and all for one — the environment". The drawing contains an invitation for reflection upon the idea that we must be sustainable, and it makes us consider our responsibility as human beings. This image corroborates the thinking of Silva, Reis, and Amâncio (2014, p. 94) because, according to them, sustainability refers to the abandonment of an individualist conscience in search of a collective: "Sustainability would, therefore, be linked to a notion of collectivity that goes far beyond what is present in other forms of organizational action with social and environmental purposes, because these have a predominantly individualist purpose." Thus, for the authors, one of the characteristics and conditions for sustainability is the development of collective consciousness, that is, detachment with individualistic notions.

Figure 7. Drawing of the conception of sustainability of a (a) female and (b) male eighth graders.



As in the drawings from the 7th grade students, the drawings from the 8th grade students (Figure 7) present conceptions beyond the environmental and social and are associated with economic issues, which were not identified in the drawings by students in the elementary grades.

Figure 7 (a) represents the drawing of an 8th grader (MA = 13 years). It shows scales, apparently in equilibrium. On one side of the scale is the planet and there are people on the other, i.e., one side can only sustain itself with the help of the other side, and the image expands from the center to the sides. Again, the image is related to the individual's responsibility to the planet. Figure 7 (b) portrays the question of social relationships and the feelings involved in this context. In the center of the image is a boy with the words "Friendship, kindness, trust, and sincerity" written on a sign, which reinforces the plurality of understandings of sustainability, as emphasized by Lankoski (2016).

Figure 8 shows the representations of the 9th grade students (MA = 14 years).

Figure 8. (a and b) Drawings of the conception of sustainability by two ninth graders.



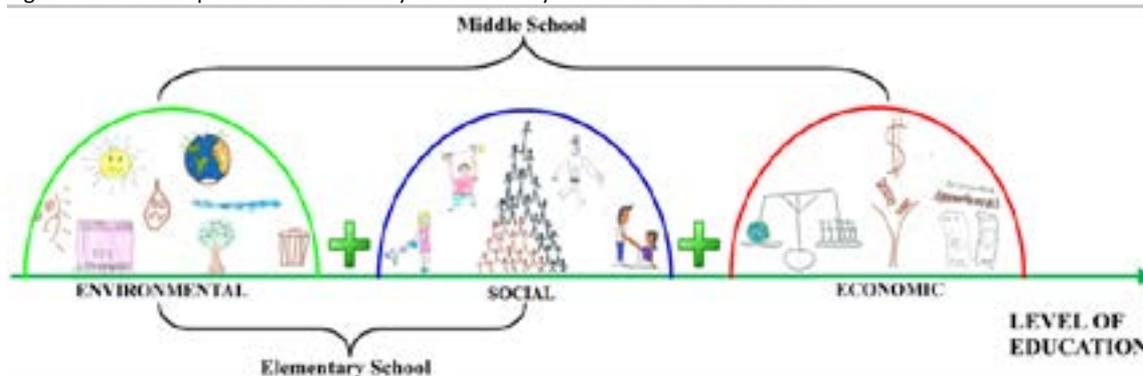
Figure 8 (a) shows scales balanced on a woman's head (representing Mother Nature). On one side is the natural environment, represented by a grouping of trees, and on the other side, buildings, in what seems to be a developing city or landscape or the activity of corporations. The scales are positioned as if they had come from the thoughts of Mother Nature; that is, as if everything were coexisting harmoniously. The phrase "Sustainability is the balance between human beings and Mother Nature" demonstrates awareness of the relationship between humans and the world as a whole.

Figure 8 (b) again shows the presence of a very colorful planet, with blue (water), green (nature), and brown (earth) predominating. Around the planet is the phrase “For us to continue this way [as he portrays the planet], we must be aware to the end, thus, eventually we will be sustainable”. It is interesting to note that in the 9th grade class, there are words written on almost all of the drawings, which appear not from the need to explain the drawing but to serve as tips for conceiving of sustainability.

6 THE CONCEPTION OF SUSTAINABILITY IN ELEMENTARY AND MIDDLE SCHOOL: [...] FROM BETWEEN THE CLOUDS IT APPEARS [...] COLORING EVERYTHING AROUND IT [...] ALL YOU HAVE TO DO IS IMAGINE (FABRÍCIO ET AL., 1983)

Figure 9 provides a categorization of the images, distributed according to the students’ environmental, social, and economic conceptions. We emphasize that, with regard to gender, at this stage of development there were no major differences in the general context.

Figure 9. The conception of sustainability of elementary and middle school students.



The first pillar or dimension describes the environmental conception that is present in most of the elementary students’ drawings. This conception is represented by elements such as the sun, house, water, tree, sky, planet, and trash. In addition to the natural environment, some of the drawings included the presence of people, which indicates the formation of a conception that is also social, involving human accountability for the environment (Figure 9).

The second pillar marks the presence of the socially oriented conception, shown to a lower degree in elementary school but more present in middle school. The accountability of humans for the environment is an aspect addressed by the children and adolescents of both educational levels; however, social relationships are mainly represented by the middle schoolers from the 6th grade onward. The representative elements in this dimension include a man (boy), a woman (girl), children, and a pyramid of people.

The third pillar presents the economic conception, indicated by elements such as currency, a dollar sign, and scales. This view is presented only by the middle school students. It is important to note that, in most of the drawings, this idea is sometimes associated with a general context, and it is rarely presented alone. We also emphasize that gender did of the individuals investigated also not significantly influence the conception at this stage of development.

Therefore, it can be seen that throughout the years of basic education, the children and adolescents make more complete associations with regard to sustainability. The conceptions en-

compass a greater number of elements, ceasing to focus only on the environment and converging with a range of thoughts, which allows the children and adolescents to make interconnections between what they learn and the facts (associating environmental, social, and economic aspects). This likely occurs as a result of the development of maturity and the fact that the children are living and experiencing a greater number of situations that demand reflection and positioning in their everyday lives, and because of the work developed by the school on EFS. However, other studies are necessary to ascertain the actual causes of the broadening of these views.

7 FINAL REFLECTIONS: [...] FROM ONE AMERICA TO THE OTHER I CAN GO IN A SECOND, I TWIRL A SIMPLE COMPASS AND, WITH A CIRCLE, I CREATE THE WORLD (FABRÍCIO ET AL., 1983)

The science of business administration helps organizations to fulfill their goals. This is achieved through the efficient and effective management of available resources (ETZIONI, 1984). For many centuries, this occurred in an environment in which little thought was given to the impacts of the unplanned use of these resources on the environment and society. However, since the end of the twentieth century, the global community has been moving toward a consensus that a drastic change must be urgently made to this form of unplanned and thoughtless use of natural resources by some organizations, with a view toward preserving these resources to meet the needs of future generations and thus promote sustainable development (JACOBI, 2006; MACÊDO; OLIVEIRA, 2005; NASCIMENTO; CURI, 2013).

Nevertheless, to make possible this change in the way in which natural resources are managed by organizations, it is clearly necessary to first change the attitude of society as a whole (JACOBI, 2006; MACÊDO; OLIVEIRA, 2005; NASCIMENTO; CURI, 2013) given that organizations are made up of people (the adults of today and tomorrow).

According to Davis and Elliott (2014), children are the greatest agents of change that we possess. Thus, this study was prompted by the need to evaluate the views of children and adolescents regarding sustainability. Citing the school context as a place to form these views, the approach developed in this study sought to demonstrate the formation of children and adolescents throughout elementary and middle school. According to the results, although the conceptions present superficial elements in terms of the true meaning of sustainability, the pathway is being outlined and constructed in the naivety of children and youth, with traces of purity, without fear of still being happy and that everything is possible — it depends on us.

A few decades ago, the theme was only being addressed by scholars, already in adulthood, and, depending on the context, it was often ignored. Giving these students the opportunity to develop critical awareness of the subject and to assume roles in defense of sustainability creates the possibility of ensuring a better future than the present. These children and adolescents will be future adults, entrepreneurs, and business managers, and they must be prepared for the challenges that await them.

EFS is an option for the training of citizens who are more aware and sensitive to the cause of sustainability. The sooner the topic is addressed in childhood, the more changes can be brought about in individuals and in decision making. It is important to note that education begins at home and that, just as schools must reshape how they educate students to be compatible with the world, parents must also take ownership of subjects that were likely ignored in their childhood.

Therefore, we must promote institutional efforts that embrace the actors involved in the teaching-learning process — students, teachers, employees, and managers — to reformulate deeply rooted routines, structures, and practices, thus taking advantage of the transforming position that school can have in a society to effectively influence it in favor of sustainability.

Like a watercolor (a painting technique where paint is transformed by diluting it in water), we can transform a whole society, a world — change our habits and customs for a better world. The song *Aquarela* (Watercolor), written by Maurizio Fabrício, Guido Morra, Toquinho, and Vinícius de Moraes and released in the 1980s in Brazil, makes us reflect that people (child-boy-man and child-girl-woman) can color the world they imagine and desire, as in the highlighted passage; however, a simple action or attitude can diminish the brightness or deprive us of its use and its beauty:

[...] A boy walks and walking arrives at a wall
And there, right ahead, waiting for us is the **future**
And the future is a spaceship that we try to pilot
It has no time, no mercy, no schedule to arrive
Without asking permission **it changes our lives**
Then it invites us to laugh or cry
On this road, it is not up to us to know or see what's coming
Where it ends nobody knows for sure
We all go for a walk on a beautiful walkway
Of a watercolor that one day finally will **fade**
On any paper sheet I draw a yellow sun (which will fade)
And with five or six lines it is easy to create a castle (which will fade)
I twirl a simple compass and in a circle I create the world (which will fade)
(FABRÍCIO et al., 1983. **Our emphasis**)

What we observe from the visual materials of the elementary and middle school students in João Pessoa, Paraíba, Brazil, is that EFS as an instrument — together with the teaching-learning process — can foster such transformation and resignification and that if we are not careful, one day good part of reality may lose color, or rather, fade, as the verses of the song lead us to reflect. Perhaps the secret of the future is that it has something in store for us that we cannot know except through the unrelenting passage of time. We must build the future and interact with the environment in such a way as to affect it as positively as possible. This gives us freedom and creativity in our endeavors within life's boundaries. Even if we do so playfully, we can survive and provide the opportunity for others to also enjoy the earth's available resources. However, let us not be swept away by the poetry itself, since the process of change requires courage to face the dominant model (capitalist logic) that is present in our society. Breaking the paradigm requires new habits and customs as well as time and tenacity. In this sense, investing in future generations is a path forward.

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