



ARTE E SUSTENTABILIDADE – EXPERIÊNCIAS DE CRIAÇÃO PLÁSTICA REALIZADAS POR PROFESSORES EM FORMAÇÃO
ART AND SUSTAINABILITY – PLASTIC CREATION EXPERIENCES CARRIED OUT BY TEACHERS IN TRAINING
ARTE Y SOSTENIBILIDAD – EXPERIENCIAS DE CREACIÓN PLÁSTICA LLEVADO A CABO POR PROFESORES EN FORMACIÓN

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RESUMO

Introdução: Na formação de professores, a abordagem à expressão plástica pode incidir sobre o conhecimento de materiais e a sua transformação e extensão de vida, o *upcycling* e a *upcycled art*, perspetivando práticas de educação para a sustentabilidade em diferentes contextos.

Objetivo: Compreender em que medida as experiências de criação plástica através da reutilização criativa de materiais preparam os futuros professores para educarem para a sustentabilidade.

Métodos: Investigação-ação, com os seguintes momentos e ações: 1. Diagnóstico – aplicação de um questionário inicial; 2. Planificação – planeamento das aulas práticas e dos recursos necessários; 3. Implementação – realização de aulas de experimentação e criação plástica; 4. Reflexão – aplicação de um questionário final. Posteriormente, procedeu-se à análise de conteúdo para tratamento dos dados recolhidos.

Resultados: Emergiram as categorias «Aprendizagens no domínio das artes visuais», «Aprendizagens sobre desenvolvimento sustentável» e «Aprendizagens sobre práticas de educação para a sustentabilidade».

Conclusão: Os estudantes evidenciaram aprendizagens no domínio das artes visuais; relativas à prática artística enquanto meio de reflexão sobre sustentabilidade, pelos materiais que se transformam e pelas mensagens veiculadas; e relativas à transferibilidade do processo vivenciado para diferentes contextos educativos.

Palavras-chave: arte; expressão plástica; formação de professores; sustentabilidade

ABSTRACT

Introduction: In the training of teachers, the approach to plastic expression can focus on the knowledge of materials and their transformation and life extension, *upcycling* and *upcycled art*, with a view to sustainability education practices in different contexts.

Objective: To understand to what extent the experiences of plastic creation through the creative reuse of materials prepare future teachers to educate for sustainability.

Methods: Research-action, with the following moments and actions: 1. Diagnosis - application of an initial questionnaire; 2. Planning - planning of practical classes and necessary resources; 3. Implementation - conducting experimentation and plastic creation classes; 4. Reflection - application of a final questionnaire. Subsequently, content analysis was performed to treat the collected data.

Results: The categories "Learning in the field of visual arts", "Learning about sustainable development" and "Learning about education practices for sustainability" emerged.

Conclusion: Students showed learning in the field of visual arts; concerning artistic practice as a means of reflection on sustainability, for the materials that are transformed and for the messages conveyed; and related to the transferability of the process experienced for different educational contexts.

Keywords: art; plastic expression; teacher training; sustainability

RESUMEN

Introducción: En la formación de docentes, el abordaje de la expresión plástica puede centrarse en el conocimiento de los materiales y su transformación y extensión de vida, *upcycling* y *upcycled art*, con miras a prácticas de educación sustentable en diferentes contextos.

Objetivo: Comprender en qué medida las experiencias de creación plástica a través de la reutilización creativa de materiales preparan a los futuros profesores para educar en sostenibilidad.

Métodos: Investigación-acción, con los siguientes momentos y acciones: 1. Diagnóstico - aplicación de un cuestionario inicial; 2. Planificación: planificación de clases prácticas y recursos necesarios; 3. Implementación: realización de clases de experimentación y creación plástica; 4. Reflexión - aplicación de un cuestionario final. Posteriormente, se realizó un análisis de contenido para tratar los datos recopilados.

Resultados: Surgieron las categorías "Aprendizaje en el campo de las artes visuales", "Aprendiendo sobre desarrollo sustentable" y "Aprendiendo sobre prácticas educativas para la sustentabilidad".

Conclusión: Los estudiantes mostraron aprendizajes en el campo de las artes visuales; sobre la práctica artística como medio de reflexión sobre la sostenibilidad, por los materiales que se transforman y por los mensajes que se transmiten; y relacionados con la transferibilidad del proceso vivido para diferentes contextos educativos.

Palabras clave: arte; expresión plástica; formación de profesores; sustentabilidad.

INTRODUCTION

Nowadays, there is no question regarding the importance that teachers' training should approach fundamental concepts, connected to «sustainable development» and educational practices for sustainability. The conducted study describes a training experiment developed in the curricular unit (UC) of Artistic Expression, integrated in the Bachelor's Degree in Primary Education, in the School of Education and Social Sciences in Politécnico de Leiria. This experiment strived for knowledge regarding the materials, their transformation and life extension; upcycling (reuse of materials); and upcycled art (conception of artistic objects through the creative reuse of materials). Therefore, we tried to get to know previous ideas that students had regarding «art and sustainability»; a process of teaching and learning was planned and implemented; and, in a final moment, the students were led to reflect and identify the acquired knowledge.

In this process, the students should aim to: a) create an artistic object through the creative reuse of waste material (packaging paper; plastics; metal; undifferentiated material); b) acquire knowledge regarding expression and visual communication contents (shape, structure, composition); c) acquire knowledge regarding simple processes of material transformation (cutting techniques, connecting elements techniques); d) recognize that artistic practice can convey ideas regarding sustainability, both through what it represents, as well as through the materials that it transforms; and e) envision, through their teaching, practices that promote sustainability, when engaging in pedagogical practices in the future, they should be able to promote the artistic practice through the creative reuse of materials and reflection around upcycling.

When following a research-action methodology, the study conducted around the mentioned experiment aimed to understand in which sense the art creation experiments through the creative reuse of materials pave the way so that future teachers can educate about sustainability.

1. THEORETICAL FRAMEWORK

There are several documents that guide teachers' action and that allude to the interaction between «art» and «sustainability». Besides curriculum master guidelines, the reference in the inscribed guidelines in the Students' Profile by the End of Compulsory Schooling is highlighted, in which «Sustainability» is one of its «Principles»; in the guidelines of the Strategy for the National Plan for the Arts 2019-2024, since it stimulates the artistic practice in schools through a transdisciplinary dynamic; and in the guidelines of the National Strategy for Citizenship Education, in which it is mentioned that «Issues relating to sustainability, interculturality, equality, identity, participation in democratic life, innovation and creativity are at the heart of the discussion» (p.1) and in which «Sustainable Development» is integrated in the 1st group of domains for Citizenship Education, therefore being a compulsory approach to every schooling level and cycle.

Eça (2010, p. 13) mentions the importance of this relationship by referring that «art and education through art have an important role in the building of a sustainable future because they promote creativity, innovation and critical thought, essential abilities for an emancipating culture, with equality and social responsibility and essential conditions for the development of a sustainable future».

When observing the definition of «sustainable development», we understand which role the school can have when preparing the children and youth for the future. We're referring to the development that fulfills the needs of the current generation, without compromising the future generations' ability of fulfilling their own necessities. We're also referring to the satisfying level of social and economical development and of human and cultural accomplishment which, at the same time, uses Earth resources reasonably, preserving the species and natural habitats (Eça, 2010). In order for that to happen, United Nations proposes that a global model of performance is implemented, guided by the Sustainable Development Goals (United Nations – Regional Information Centre for Western Europe, 2021).

Since artistic education is a field that provides transdisciplinary approaches, it allows for the development of critical and creative abilities that may result in responsible action dynamics, by the youth, citizens of the present and of the future, related with serious problems of the planet and the needed search for sustainability. Children draw, sing, tell stories, dance, act, invent, paint and play in a creative interaction with their daily experience (Matarasso, 2019). We learn that the artistic act has, as its intention, the creation and communication of meaning and makes it possible, through art, to express beliefs, values, principles and experiences that we consider important, both in a conscious and unconscious way. Since the artistic object is a cultural product that reflects the production conditions and proposes new meanings (Rocha, 2013), it's possible to convey and develop acts of awareness, rupture and change, favorable to sustainability.

2. METHODS

While considering the stated goal, the descriptive and qualitative study followed a research-action methodology which, in the words of Pérez Serrano (2004, p.111), is a methodology «aimed for the enhancement of the practice», that privileges reflection over action, and through it, acquires scientific knowledge and get a social change through intervention. To this author, the process of research-action is developed according to the following sequence: (1) Diagnose or discover a subject concern or problem; (2) Assemble an action plan; (3) Implement the plan and observe the way it works; and, at last, (4) Reflect, interpret and integrate the results.

2.1 Sample

The study was carried out in the context of the Artistic Expression UC, in the 2nd year of the Bachelor's Degree in Primary Education, and involved 51 students. The training experiment described in this study occurred in the beginning of the 2020-2021 academic year, when the students were getting ready to begin their first experiments of pedagogical practice in diverse education contexts.

2.2 Data collection techniques and instruments

The involved students answered an initial questionnaire, with an open question, and a final questionnaire, with an open question as well. The *elearning* platform was used for the application of these questionnaires. The data collection was also achieved through participant observation and by photographic records. The data was processed through content analysis.

2.3 Procedures

The study followed the phase sequence proposed by Pérez Serrano (2004), with a set of actions developed by all intervenients, matched with each of those phases. In an initial moment, associated to the «Diagnosis», there was the application of a questionnaire about «art and sustainability», before the theoretical approach to UC contents. This approach focused on «Sustainable Development Goals», proposed by the United Nations, the «Action Plan for Circular Economy in Portugal», namely in «Action 3 - Educating for a Circular Economy», and also on the contributions of Eça (2010) and Cabral (2017) in this regard. The questionnaire included one single open question: «What are your thoughts about “art and sustainability”? ».

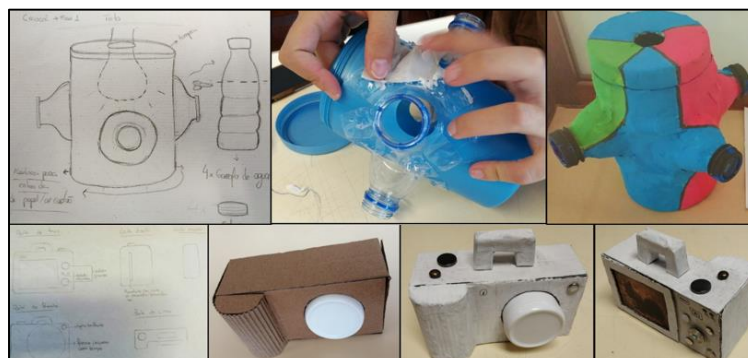
When analyzing the content of the answers, two categories arised: «Art as a mean of expression and communication of ideas regarding sustainability» and «Art and the way it materializes» (see Table 1 - each student is represented by the letter «E», followed by an attributed number).

Table 1 - Some representative records of answers to the question: «What are your thoughts about “art and sustainability”? »

Categories	Record Unities
Art as a mean of expression and communication of ideas about sustainability	<p>E11: “Art has the power of making us reflect about the problems”</p> <p>E43: “It makes us aware that we are also involved in the problem”</p> <p>E14: “Art is a way for the Human Beings to express themselves and the world around them”</p> <p>E29: “(...) around us are many artworks that communicate sustainable ideas”</p> <p>E30: “Art is mainly a mean of expression (aesthetic and emotional) that allows us to reflect about the future of the planet”</p> <p>E12: “Art shows us new concepts, stemming from what we know”</p> <p>E6: “Art, namely in the public space, is able to grasp the attention and the gaze of many people, and despite being an artistical object, it also transmits a great message to the society, as is the case with the work “Grey Heron” by Bordalo II, located in Leiria, which is built from waste”.</p>
Art and the way it materializes	<p>E24: “The material may already exist and be transformed in a creative way”</p> <p>E18: “We reduce the waste, by using the materials creatively”</p> <p>E3: “Through the shape of an object, we can always create another”</p> <p>E14: “We have a closer relationship with the objects that we create, because we go through a different challenge”</p> <p>E22: “By reusing materials, we will be able to create artistic compositions”</p> <p>E7: “Resource economy is an attitude that its also demonstrated in the materials chosen for the artistic creation”</p>

The second moment, «Planning», refers to the planning of practical classes and necessary resources, which was then followed by «Implementation». This third moment included the execution of artistic creation classes, planned by the students (data collection about materials, image creation regarding the expressive intention of composition) and the artistic object building, through the application of simple transformation techniques of plastic, metal and packaging paper. In the end, the «Reflection» was carried out regarding the acquired knowledge, through the application of a final questionnaire.

Figure 1 - Creation process of an object.



3. RESULTS

The last phase of the process regards the «Reflection» and includes the individual presentation of artistic objects to the group and the filling of a final questionnaire, composed by the open question «Reflect about the experienced process, mentioning the main knowledge acquired».

When analysing the produced answers, the following categories arised «Knowledge in the field of visual arts», «Knowledge about sustainable development» and «Knowledge about educational practices for sustainability», from which we present some significative record unities, in the Tables 2, 3 and 4, respectively.

The category «Knowledge in the field of visual arts» accomodates three subcategories: «Theoretical knowledge about tridimensional plastic exploration», «Creative and expressive process» and «Material transformation techniques».

Table 2 - Some representative records regarding the category «Knowledge in the field of visual arts»

Category	Subcategories	Record Unities
Knowledge in the field of visual arts	Theoretical knowledge about tridimensional plastic exploration	E4: "I've learnt about volume composition" E23: "Since I've explored the texture, I've improved the knowledge about this element of plastic language" E7: "I had a better notion of the material properties to build in 3D" E15: "It made me think about aesthetical issues of composition, because I haven't always liked the result that I was getting" E4: "I've learnt some specific vocabulary to talk about the formal and expressive qualities of an object" E51: I had the notion of the structure/support that organizes the volume"
	Creative and expressive process	E25: "I've learnt to use materials that I had never experienced and some techniques that were still unknown to me" E27: "(...) I've also learnt to make a mistake and try again, since many times the techniques that I used weren't always working in the best way" E16: "It was an experiment in which it was necessary to combine unusual elements in a group" E36: "In a composition of this type, the "decoration" doesn't matter, every element must mean something" E21: "Through simple things that are no longer useful, we are able to create multiple things, we only need to have creativity and explore"
	Material transformation techniques	E38: "Materials may be transformed in several ways, being through ripping, folding, cutting, denting, gluing, among others" E32: "I got to know functions of some tools" E15: "I've learnt how to heat and shape plastic" E46: "I've learnt that I can transform a carton of eggs in an adhesive paste, to create shapes or texture in a certain surface" E43: "Ways to join parts, considering the material and aesthetical result" E30: "I got to know different types of glues and how these should be chosen according to the material" E29: "I've learnt that almost every material around me can be transformed in different ways, some need force, others need heat, others need cutting tools" E11: "Each material has its way of being transformed"

The category «Knowledge about sustainable development» is divided in two subcategories: «Communication of ideas» and «Upcycling (creative reuse of materials) ».

Table 3 - Some representative records regarding the category «Knowledge about sustainable development»

Category	Subcategories	Record Unities
Knowledge about sustainable development	Communication of ideas	E10: "Through plastic expression, it is possible to disseminate important ideas about this issue" E12: "This work encouraged the reuse and transformation of recyclable materials" E32: "My work represents the suffering planet. I've thought a lot about this while building it and wanted to cause impact in others" E6: "I was able to demonstrate something about the ocean polution and I think I was able to" E14: "What I've made is symbolic but it carries an important message"
	Upcycling (Creative reuse of materials)	E32: "(...) therefore reducing not only the consumerism in the sense that I don't need to buy things, I just need to use my creativity and build" E26: "The objects may be enjoyed again or, sometimes, be even more valued than they were originally" E51: "When practicing plastic expression, it is possible to reutilize the already existing materials and, therefore, reducing consumption" E13: "Give a new life and new use to materials and, sometimes, we get unique things which are perfectly suit what we want to do or what we need" E6: "With this work I concluded that, with a small gesture, like using recyclable materials in an artistic practice project, we are already making a huge difference for planet Earth, since the material used in these projects gets a new life and new opportunity"

The category «Knowledge about educational practices for sustainability» accomodates the subcategories «Promotion of artistic practice», «Stimulation of coordination abilities» and «Stimulation of the reflection about sustainability».

Table 4 - Some representative records regarding the category «Knowledge about educational practices for sustainability»

Category	Subcategories	Record Unities
Knowledge about educational practices for sustainability	Promotion of artistic practice	E34: "An experiment of this sort materializes aspects of Curriculum Guidelines for Pre-School Education and Essential Learning in a wonderful and creative way" E1: "It's very transversal concerning contents: it approaches shape, structure, materials, (...)" E10: "It provides an opportunity to stimulate creativity and expression" E3: "It promotes the learning of many material transformation techniques" E45: "This work should also include artistic references - such as the work of Bordalo II"
	Stimulation of coordination abilities	E27: "Children may be able to develop hand movements by manipulating several types of instruments" E12: "There are many practical/technical procedures which will only occasion themselves in this sort of works" E28: "Building enables actions in fine motor skills, which is not provided in any other school work"
	Stimulation of reflection about sustainability	E51: "We sensitize for sustainable development" E34: "It's an opportunity to discuss the finitude of resources which are available nowadays" E35: "It puts them in contact with information that they handle already in other situations (ex. learn how to separate trash), but in a different way - by building, they give a second life to objects that would be placed in the recycling bin" E16: "It's fundamental to reflect about environmental questions and the context of this experiment is very appropriate for that reflection" E22: "This type of work makes sense of a reflection regarding the role of each person in the defense of the planet"

4. DISCUSSION

The results emphasize that the developed process allowed the students to increase their knowledge about artistic language, about sustainable development and about educational practices for sustainability that may be adopted in the future, as teachers. The process was conducted through the presented steps and was permeated with theoretical approaches to key concepts - sustainable development, sustainability, upcycling, circular economy and upcycled art - through contact with several artistic references - works of Bordalo II, Aurora Robson, Phil Gyford, Sandra Oliveira, an artist presentes by Magalhães (2017), among other artists - considering what is suggested by Rocha (2013), when she refers that the interpretation of artwork is key in the teaching and learning of visual arts. The concepts of structure, shape and volume composition were equally approached, as well as simple techniques of plastic, metal and packaging paper transformation. These approaches were made in a contextualized way, in the moment that the artistic creation was occurring and in which the theoretical knowledge was required for the resolution of practical problems. We believe that this is the reason why students enumerated the several «Knowledge in the field of visual arts», referring the aspects related to the theoretical knowledge about tridimensional plastic exploration, about the creative and expressive process and about material transformation techniques.

When answering to the placed challenge and through tridimensional plastic exploration, the students built objects with shape-function: practical (an object to use, in which its shape relates to the physical aspects of its own use); aesthetical (objects that are ways of art, for example, a sculpture and in which the shape is solely related with the artistic aspects of creation); and symbolic (objects that work mostly as symbols, with that being their function).

The actions required for the building of artistic objects were pretty diverse, and this data was collected through participant observation: pierce resorting to several tools (nails; hole punch); make insertions; damp and «model» paper; cut with scissors, cutter, hand saw; use techniques to connect elements, such as knotting, sewing, glue, staple and fit together; apply appropriate glue to the materials (hot glue; wood glue; multipurpose glue); design mechanisms by building articulation joints between elements; manipulate materials in the cutting support and use it for measuring; among others. Regarding the level of eye-hand coordination (ability to control hand movement, guided by vision) and the awareness of the hand movements, the students had new experiences (or some that they hadn't experimented in a long time), understanding their importance when performed by a child - roll elements; screw; rotate elements; hold elements with precision; make movements with precision; pick up elements with different dimensions and formats; coordinate hands in different actions; strenght actions of hand (press; flat; crease; twist). The reference to the works of Cabral (2017) and Rodrigues (2002) were also present, namely when it comes to the suggestion of tridimensional creation experiments, such as «object assemblies», that may arise in the children's experiments.

The students also revealed that they understood the relationship that may exist between «art» and «sustainability», in the sense that artistic practice allows the reflection regarding the subject, through the materials that it transforms – subcategory «Upcycling (creative reuse of materials)» - and through the messages that it conveys – category «communication of ideas», merging this data with some of that obtained during the Diagnosis phase.

The students' reflections also focus on the value of the experiment for their training as teachers. The data showed that they learnt how to intervene in the field of education for sustainability, and that that intervention may happen through a plastic expression practice route, in the sense that it achieves the «Promotion of artistic practice», the «Stimulation of coordination abilities» and the «Stimulation of reflection about sustainability».

CONCLUSION

The results highlight the knowledge acquired by the students throughout the process, thus allowing the achievement of the goal that was initially devised for this study - understand in which measure the experiments of artistic creation, through the creative reuse of materials prepare future teachers to educate regarding sustainability.

These were relative to the UC contents as well as to the importance attributed by the students i) to the artistic practice as a mean of reflection about sustainability; ii) to the messages conveyed by plastic composition; and iii) to the portability of the experimented process for different educational contexts. The importance of these results is emphasized, mainly what concerns the fulfillment of these types of experiments in educational contexts. Training for awareness regarding individual and collective actions that contribute to sustainability is a widely present dimension in the documents that guide educators' and teachers' work. And, that being said, the results emphasize the value of this training experiment which, being portable to other contexts, will make sense of what is specified in the curriculum.

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