

The three pedagogical moments and the portfolio methodology: analysis of a pedagogical practice aimed at achieving a critical environmental education

ABSTRACT

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The objective of this article is to reflect on the joint action of the pedagogical dynamics of the Three Pedagogical Moments and the Portfolio methodology in the development of a pedagogical practice that involved environmental education. This work was conducted in a public school in the city of Curitiba, in times of social distancing due to the COVID-19¹ pandemic. The research was produced in a qualitative perspective of pedagogical intervention type considering the research corpus constituted from the pedagogical practice "waste generation and consumerism". In the process of Textual Discourse Analysis, eighty-four meaning units emerged from the research corpus, providing the formation of eleven initial categories, and from their congruent elements, three final categories were formed, these being: (1) The student's understanding, as a future building technician, of his/her role in building a sustainable society; (2) The student's understanding of the participation of science, technology and human beings in the structuring of a new culture of consumption for society and (3) Indications of the student's autonomy. The dialogues established by the Three Pedagogical Moments and the Portfolio stimulated the student's reflections about the reality of the society in which he is inserted and this dialog offered an opportunity to deepen the reflections, respecting the other and developing the student's understanding of his role as a human being and future professional in the construction of a sustainable society, besides making him realize the participation of science, technology and people in the structuring of a new culture of consumption for society.

KEY WORDS: Three Pedagogical Moments. Portfolio. Consumerism. Environmental Education.

INTRODUCTION

It is still predominant the anthropocentric look³ on the environmental situation, in which the human being minimizes the problem of socio-environmental issues, originated by the civilizing model adopted, in which occurs a devastation on the ecosystems and an inequality between human beings (SAUVÉ, 2005; LOUREIRO; LIMA, 2009; CARVALHO, 2017).

To break this hegemony, we need an environmental education that permeates the formal and non-formal⁴ fields, which provides reflections on political, social, and cultural conceptions of our society in its historicity and its interrelations (TOZONI-REIS, 2008) and that can "contextualize and politicize the environmental debate, problematize the contradictions of development and society models" (LAYRARGUES; LIMA, 2014, p. 33).

According to Layrargues and Lima (2014, p. 29), the principles of critical environmental education "bring a pedagogical approach that problematizes societal contexts in their interface with nature." Thus, the practices of environmental education proposed in a critical perspective, "[...] must understand teaching and learning of concepts irrigated by their social implications, reflecting and questioning the various faces of the environmental crisis for the acquisition of knowledge for a citizen formation of students [...]" (BARBOSA; SOARES; ROBAINA, 2020, p. 3).

Barbosa, Soares and Robaina (2020) also clarify that the dialogue between critical environmental education and education in science, technology and society can expand the possibilities of developing a teaching and learning process that includes scientific knowledge and socio-environmental issues, associating these with social relations and the development model of society.

Thus, we understand that this process of developing critical environmental education requires from its participants, above all, the frequent exercise of dialogue, the realization of reflections and being open to new learning about the necessary transformations for the construction of a new reality facing the multiple facets that our society presents. In this sense, it is a challenging context for teachers to build and develop learning situations that enable the formation of students through curriculum content and also develop a critical environmental education with the understanding that the environment suffers interference from society, and that such interference can be influenced by the inter-relationships between science, technology, and society.

Thus, the role of teaching is to articulate an educational process that provides situations in which students can get involved, learn, and share the knowledge they have acquired. This educational practice must involve mechanisms that enable their participation and meet their learning needs, while awakening in them their participatory responsibility in their education and provide the teacher with possibilities to perceive himself as an integrating character as well as in the exercise of his citizenship (FREIRE, 1987). And, for this desired transforming education, a teaching and learning process that meets this context is necessary. With this perspective in mind, the question is: **what is shown in a pedagogical practice aimed at the realization of a critical and transformative environmental education, when using for its development the Three Pedagogical Moments articulated with the Portfolio methodology?**

To answer this question, the purpose of this article is to reflect on the joint action of the Three Pedagogical Moments (3PM) pedagogical dynamics and the Portfolio methodology in the development of a pedagogical practice involving environmental education.

THE PORTFOLIO AND THE THREE PEDAGOGICAL MOMENTS

When considering the complexity that the world reveals nowadays, it is important to consider that there is a great challenge to education, focused on human formation, which implies the use of action strategies based on ethical principles with an environmental focus, the transformation of relationships between people and the improvement of the social reality to which they belong. Vasselai, Nascimento and Morais (2020, p. 1) argue that:

As for the commitment to human formation, it is necessary to have it under a critical thinking to reality and the transformation of the human being with a view to freedom; attributing to human formation the understanding of the complexity of the world and the reflection on the social, economic, scientific, and cultural implications of human productions. The role of the school should also be so that the student comes to perceive himself in the world, because as young people they will be future professionals, active citizens in the world of life.

In this sense, as stated by Habermas (2012), those who participate in the construction of an argument demonstrate their rationality in the way they act and respond to the reasons presented to them. Thus, to form an individual in this context, a collaborative teaching and learning methodology is needed, one that develops critical and reflective aspects in the student and in the teacher, which can bring educational principles closer to teaching methods, in addition to presenting students with scientific knowledge added to the school curriculum.

Thus, a teaching and learning methodology that can meet these premises is the Portfolio, which is the constructive process of the teaching and learning Portfolio, and this, in turn, is a demonstration of the best productions and their previous versions, developed by the student in a given period and that have affinity with the purposes of learning, and may be texts, drawings, photos, reflective accounts, films, research, news and other records (AMBRÓSIO, 2013; KLENOWSKI, 2014).

Thus, it is much more than making a collection of the work developed by the students, it is a constant construction, and, for such, it requires a new pedagogical thinking for those involved in the teaching and learning process. For its implementation, the teacher's actions need to be focused on the construction of a problematizing and dialogic education, recognizing the student's capacity for participation. The latter needs to take responsibility for his role for his own learning, in order to develop his autonomy (KLENOWSKI, 2014). For this reason, the Portfolio organizes the continuous movement of the actions of the teacher and students, regardless of their difficulties, so that they can understand new concepts, linking them to those already learned, in order to move from a simpler to a more complex level of knowledge (MORAN, 2018).

On the other hand, the challenges of a dynamic and critical teaching and learning process that can overcome the traditional way and ensure learning grow every day. The Portfolio, understood as a teaching and learning methodology, respects the movements of human thought and the promotion of a humanizing and citizen education, in a dialogical and reflective process, and can establish relationships with any didactic-pedagogical dynamics that presents in its context the dialogue, collaborative activities and that values student participation, such as the dynamics of the 3PM (DELIZOICOV; ANGOTTI; PERNAMBUCO, 2018), which presents characteristics such as dialogicity, problematization and collaborative work, qualities originating from the Freirian conception in the perspective of the thematic approach (FREIRE, 1987). Below, the 3PM (DELIZOICOV; ANGOTTI; PERNAMBUCO, 2018) are presented:

- a) **Initial problematization (IP):** it is the moment when the teacher presents the problem situation and at the same time verifies the students' previous knowledge regarding such situation, in order to instigate them to the need of acquiring new knowledge and expanding their repertoire to solve the problem situation;
- b) **Organization of knowledge (OK):** is the moment when the teacher provides the indicative studies to the new knowledge required; and
- c) **Application of knowledge (AK):** it is the moment when the student, by socializing the knowledge acquired in that problem situation, will be able to put it into practice in other situations that are understood by the same knowledge (MUENCHEN; DELIZOICOV, 2012). Paniz *et al.* (2015) clarifies that the dynamics of the 3PM is not limited to a classroom methodology, but that it can also be used to structure curricula and discussions in events, in addition to the development of teaching materials and teacher training.

Therefore, in this work, we chose to articulate the Portfolio methodology with the 3PM dynamics to enable the implementation of a process of critical and transformative environmental education integrated to the development of school contents.

METHODOLOGICAL APPROACH

This article is a cut from a master's thesis defended in the Graduate Program in Scientific, Educational and Technological Training, **The Portfolio as a teaching and learning methodology: reflections on its potentialities**, from the Universidade Tecnológica Federal do Paraná, written by the first author and supervised by the second author.

The research was conducted in a qualitative perspective. Gray (2012, p. 135) states that qualitative research seeks to "understand phenomena within their own specific contexts" and can be conducted from a real-life situation. The study is of the pedagogical intervention type, that is, it is a means to evaluate the potential of the practice presented and is proposed to establish improvements in the teaching and learning processes (DAMIANI *et al.*, 2013).

Thus, for data analysis, the authors used the Textual Discourse Analysis (TDA), which consists of an organized process in which meanings are built on a sum of

texts, which are the textual productions called corpus. Moraes and Galiazzo (2011, p. 12, emphasis added) clarify that the TDA consists of a sequential process of three segments: "the deconstruction of the texts of the 'corpus', the unitarization; the establishment of relationships between the unitary elements, the categorization; the capturing of the emergent in which the new understanding is communicated and validated", which compose the metatext.

Thus, the data collected for the composition of the research corpus were obtained during the planning and development of the pedagogical practice, consisting of the journal of one of the researchers, the comments made by ten students and posted on Classroom⁵, and the Portfolios built by the same ten students (narratives, reflections, evaluations, class comments, and research reports).

Given the above, the pedagogical intervention was developed during the social withdrawal period, due to COVID-19, in the year 2020. Based on the context of remote classes, the 3PM were conducted sometimes in synchronous classes, which is the one where the interaction between teacher and student occurs in real time, via a videoconference platform; and sometimes in asynchronous classes, which is the one where the teacher and student do not interact at the same time, via Classroom. The development of the pedagogical intervention took place in a public school, in the city of Curitiba, in a class with 30 students, in the subject Environmental Control and Protection, in the 4th grade of the Integrated High School⁶ course in Building Construction, with the duration of a full school year. Five pedagogical practices were established for this intervention. For the first one, a socio-environmental theme was defined, which was approached in a contextualized way to reality with dialogicity, and from the second practice on, the theme was determined based on the reflections and discussions of the previous practice, proceeding this way until the fifth practice performed.

The pedagogical practices and their respective themes, developed during the trimesters, were organized as shown in chart 1.

Table 1. Organization of pedagogical practices by quarter

Period	Order of pedagogical practice	Title of the pedagogical practice	Developed theme
1st Quarter	First	Social representation of environment	Sustainability in civil construction
	Second	Socio-environmental issues and the construction industry	Social Inequality
2nd Quarter	Third	Solid waste generation and consumerism	Consumism
	Fourth	Relationships in science, technology and society and the construction industry	Technology and the construction industry
3rd Quarter	Fifth	Sustainability in civil construction	Popular Housing

Source: elaborated by the authors (2022).

In this research section, the evidence of the third practice will be presented and detailed, **solid waste generation and consumerism**, which had as main curricular contents:

- a) Durability of materials and sustainability;
- b) The generation of solid residues from the civil construction by losses;
- c) Logistics of the construction site regarding selective collection; and
- d) Classification of civil construction waste - Resolution number 307/02, from the National Council of Environment, by Brazil.

SOLID WASTE GENERATION AND CONSUMERISM

As the pedagogical intervention aimed to develop a critical and transformative environmental education intrinsic to curriculum content, the learning purposes of this practice aimed at environmental education were thus established: (a) that the student understood the relationship of solid waste generation with society and consumerism; and (b) to recognize and discuss the economic, cultural, and social interests that may involve environmental management in construction.

It is worth mentioning that the theme proposed to be worked on in the pedagogical practice emerged as a result of the dialogues established in the previous practice, **socio-environmental issues, and civil construction**. In this practice, after the research and dialogues, the students highlighted consumerism as a socio-environmental issue, and this became the theme of the third pedagogical practice of the intervention.

The activities developed in each of the Three Pedagogical Moments will be presented below.

The First Pedagogical Moment - Initial Problematic

To contemplate the objectives with the stipulated theme was proposed a problematization that would lead young people to reflect on the production process from the extraction of raw materials to their final disposal and the relationship of this process with society, considering the social, cultural, economic, ethical, and environmental aspects. To begin this moment, in dialogue with the students, the teacher performed a contextualization highlighting the importance of reflecting on the culture of consumption in society and the technological potential that involves the construction industry. Then, the teacher presented the initial problematization: what determines both the production of materials and the generation of solid waste? What is their relationship with environmental sustainability? In small groups, the students held discussions about the presented problematization.

The Second Pedagogical Moment – Organization of Knowledge

During the discussions, questions arose about "the relationship between obsolescence and the quality of materials", and in order to provide a theoretical

basis that would enable the construction of arguments by the students, they conducted free research related to the proposed theme and the problem presented. The students also read the article "Durability and Sustainability: Challenges for the Brazilian Civil Construction" (JOHN, V. M. et al., 2001) offered by the teacher and, in a brief dialogue with her participation, the students agreed on the understanding of some concepts, such as: consumption, consumerism, the consumer culture, durability of materials and environmental sustainability. Then, they watched the movie The Story of Stuff (2007) and, at the end of the video's reproduction, a discussion in small groups was proposed in order to propose answers to the presented problematic.

It was also requested by the teacher that students conduct a search for information about the course of urban cleaning in human history, for which were offered consultation materials and indication of websites for research. The students formed teams and each one was responsible for a historical period (Antiquity, Middle Ages, early modernity, colonial Brazil, and 20th century Brazil). Of all the teams, three were responsible for making a comparison between the solid waste collection procedures between a developed and an underdeveloped country today. In this way, the students produced audios by means of podcasts based on their research and presented them to their classmates.

After the research, the students and the teacher had a dialogic moment about the initial problematization and the results of the research. As a provocation to encourage them to reflect on consumer culture, the teacher suggested they listen to the songs "Admirável gado novo" by Alceu Valença and Zé Ramalho (1979), and "Geração Coca-Cola" by Renato Russo (1985), and then have a chat with their peers about the relationship between these songs and the problem presented in the first pedagogical moment. As the dialog progressed, there was the possibility of conducting new research on the arguments presented and the new questions that presented themselves; including some of the contents proposed for the pedagogical practice.

The Third Pedagogical Moment - Application of Knowledge

For this moment, the question was proposed: what is the relationship of obsolescence and durability of materials with sustainability in construction, considering all phases of construction of a building? The students established dialogues among their peers and later with the participation of the teacher. The teacher asked the students to present in their Portfolios the records of the reflections and discussions they considered most relevant, as well as the answer to the question.

In this way, to check the advances in the teaching and learning process, evaluative activities were performed, in which the students had to solve situations that involved the contents and the discussed theme. During the process, they were performed, corrected, and returned to them by the teacher. Each student prepared a second, improved version, made corrections or perfected the evaluation, to insert it in his or her Portfolio.

To enrich the research, they were asked to bring in their Portfolio news clippings from internet pages or newspapers about the theme, with information

about the source of the material and necessarily including the student's comment about the content of the clipping, relating it to the theme discussed or the content worked during the quarter.

In this way, it was also up to the students to reflect on the activities and dialogues established, after they had occurred. With the pre-structured Portfolio, the students performed their self-evaluation by rereading their productions. Then, he would order what he produced to compose the teaching and learning Portfolio, in order to reflect both on the contents worked on and on his participation in the proposed classes, recording these reflections. It is important to note that, in this constructive cycle of the Portfolio, at any time the student could resume the previous stages according to his learning pace.

At the end of the activities and dialogues, the students structured all their records about the pedagogical practice, since the presentation of the learning situation, with the initial problematization.

As the 3PM were developed together with the Portfolio, we now report the concomitance of its development with the steps of the Portfolio methodology:

First Pedagogical Moment:

a) Learning Situation.

Second Pedagogical Moment:

a) Concepts; and

b) Research.

Third Pedagogical Moment:

a) Dialogues; and

b) Evaluations.

It is also worth mentioning that the authorization for this research was approved by the Research Ethics Committee of the Universidade Tecnológica Federal do Paraná, consubstantiated opinion number 4.394.018, from november 11, 2020.

RESULTS AND DISCUSSIONS

Under the performance of the TDA, in response to the research question, "what is shown in a pedagogical practice aimed at the realization of a critical and transformative environmental education, when using for its development the Three Pedagogical Moments articulated with the Portfolio methodology?" 84 (eighty-four) sense units emerged from the research corpus, extracted from the Portfolios (PC - Portfolio, comments, PP - Research Portfolio and PR - Reflection Portfolio) of 10 students, from the journal of one of the researchers (DO), and from the records of the Classroom wall (CL). For each unit we determined a code so that it can be located in the mentioned corpus. Thus, for example, U2_CL_Rudá; it means that this is the 2nd unit found (U2), in the Classroom (CL) instrument, from where this text fragment was extracted, and Rudá is the fictitious name given to the student who made the comment.

From the 84 meaning units, 11 initial categories emerged, and, from the congruent elements present in these categories, three final categories were formed, which represent the totality of the data: (1) The student's understanding, as a future technician, of his/her role in the construction of a sustainable society. (2) The student's understanding of the participation of science, technology, and the human being in the structuring of a new culture of consumption for society. (3) Indications of student autonomy.

From the final categories originates the metatext, which is the communication of the interpretations formulated by the authors considering the whole corpus of research analyzed. In this process, the categories compose the parts that will be interpreted for the understanding of the whole (MORAES; GALIAZZI, 2011). In the metatext: "The meeting of two oceans of pedagogical knowledge: the Three Pedagogical Moments and the Portfolio", the understandings that emerged around the researched phenomenon will be explained.

THE MEETING OF TWO OCEANS OF PEDAGOGICAL KNOWLEDGE: THE THREE PEDAGOGICAL MOMENTS AND THE PORTFOLIO

For the elaboration of the pedagogical practice presented, the constructive cycle of the teaching and learning Portfolio was developed in stages, which the students went through, and which were repeated by some of them. To assist in this cycle was important the partnership of the 3PM, developed in some stages of the constructive process of the Portfolio and resumed in others, as an open system. "Over the years, the 3PM have been revised and extrapolated their initial use, becoming a parameter for the process as a whole, fundamentally because of the dynamic aspect" (MUENCHEN; DELIZOICOV, 2014, p. 633).

Thus, to start the construction of the Portfolio, in the Learning Situation stage, the first of the 3PM, the initial problematization, came into play, and this was later resumed in the Dialog stage, as well as in the Assessments, Reflections, and in the Portfolio Structuring itself. This happened because the IP is the base that structures the other pedagogical moments; it is from this IP that the students shared their experiences and knowledge about the theme, and the teacher, under a pedagogical and critical view, was able to define not only what to teach, but also the pedagogical paths to follow. As Freire (1987) presents, the teacher needs to systematize what the student delivered to him in an unstructured way.

The second of the 3PM, the organization of knowledge, was developed in the Concepts and Research stages, and redeemed in the Dialog and Reflections stages. For the students to appropriate the scientific knowledge necessary to understand the theme and the problem that surrounded it, it was necessary to move them, to make them active participants in the teaching and learning process. It was a challenge for the teacher to propose learning activities, but at the same time, the possibilities brought by the dynamics of the 3PM, and the Portfolio methodology made it possible to use different strategies, with dialogic and collaborative approaches, allowing a diversity of techniques. In this sense, the student Tuane (U28_PR) brings her understanding about the activities performed:

We work with different study methods than what we are used to, i.e., the standard 'thing' of reading text and answering long questionnaires. We were

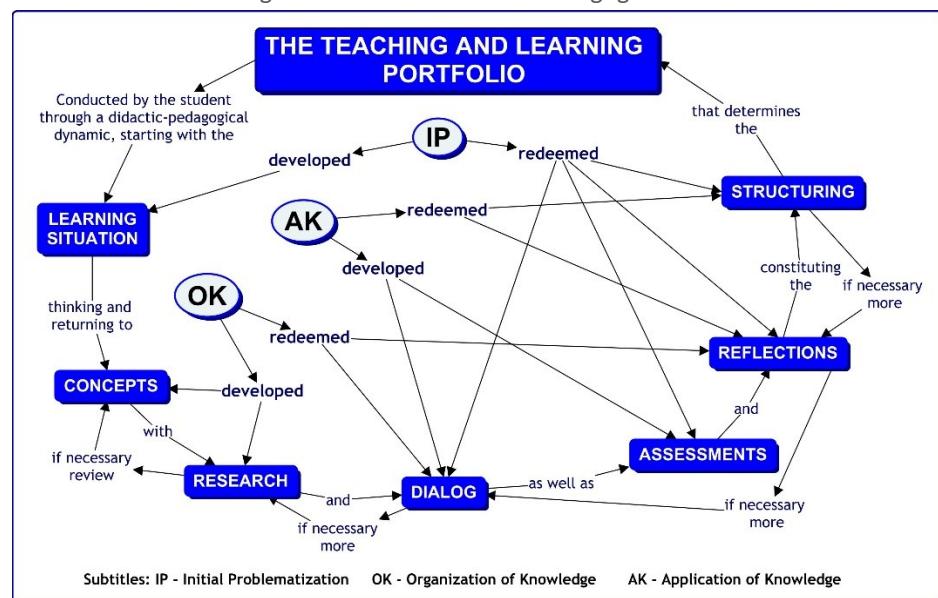
able to produce podcasts, watch videos, and even work with music in our reflections. Overall, I was incredibly happy with the results of the activities.

The third of the 3PM, the application of knowledge, was requested in the stages of Dialogue and Assessments, being resumed in the stages of Reflections and Structuring of the teaching, and learning Portfolio. Here there is a return to the first moment; in the Portfolio stages where there was the application of knowledge, it was also necessary to resume the initial problematization, as explained by Muenchen and Delizoicov (2012, p. 206):

There is a return to the discussion of what was initially proposed in the first moment, that is, a return to the initial questions as well as the proposition of new questions that can be answered by the same scientific conceptualization addressed in the second moment, with the intention of transcending the use of knowledge to situations other than the initial one.

These relationships presented between the 3PM, and the Portfolio steps are represented in figure 1.

Figure 1 - Interactions between the stages of the constructive cycle of the teaching and learning Portfolio and the Three Pedagogical Moments



Source: elaborated by the authors (2022).

Working with the methodology set Portfolio and the Three Pedagogical Moments is like sailing across two large oceans. It is not easy to evaluate where one begins and the other ends. Both have imaginary borders, and it is difficult to establish the differences at a first glance. But, in reality, they have their own characteristics and are in constant exchange of waters. This is how the relationship between the 3PM, and the Portfolio methodology worked, sometimes with its own characteristics, sometimes articulating. In this sense, in the next sections, we present the three categories that emerged from the process of Textual Discourse Analysis.

(1) THE STUDENT'S UNDERSTANDING, AS A FUTURE TECHNICIAN, OF HIS ROLE IN BUILDING A SUSTAINABLE SOCIETY

This category presents the dynamics that the set of 3PM and Portfolio brought to the teaching and learning process, providing the opportunity to share knowledge, which was effected by students in dialogues, which intensified the level of complexity of the reflections made by them, as the student Poti exposes in his comment: "One of the biggest problems of garbage is that most people think that just throw the trash in the can and the problem of dirt will be solved. Not at all, the problem only starts there" (U27_PC_Poti). In this annotation, Poti reveals his understanding about the scope of the solid waste issue, and in another point, he considers the importance of his professional role in the transformation of the environment:

Our role in the transformation of the environment as future technicians: we can build a more responsible and aware thinking about the situation of the environment by disseminating technical knowledge on the subject in order to convey the real importance of starting a transformation in the environment and bring about its restoration (U19_PP_Poti).

The student Inara shares this concern of their participation as future professionals and reflects their performance as designers, as is noticeable in her speech:

Another thing that can help is to think about the future, who will live there, what will be done there, even if we can't really predict what will happen, it will help to make that part or the whole building slow to become obsolete (U83_PC_Inara).

Here, the Portfolio, in its formative character, provided a way for students to reflect on their educational process. In this way, the specificity of the formation was evidenced as restlessness, an anxiety of students who developed a sense of caution before their professional performance (SÁ-CHAVES, 2009), by compiling information in the teaching and learning Portfolio that will be useful for their professional future.

Poti, Inara, and the other students were able to demonstrate both the understanding, as future technicians, of their role in building a sustainable society and the understanding of the participation of science, technology, and the human being itself in the structuring of a new culture of consumption for society, due to a collective construction of knowledge through dialogue and reflection. Freire (1979, p. 15, emphasis added) explains that the human being is unique,

Only he is capable of taking distance from the world. Only man can distance himself from the object in order to admire it. By objectifying or admiring - admiring is taken here in the philosophical sense - men are capable of consciously acting upon the objectified reality. It is precisely this, the "human praxis", the indissoluble unity between my action and my reflection about the world.

What Freire (1979) states - and with which the researchers agree - is that the human being needs to approach the world, to become aware, which is not yet a critical awareness, and with action-reflection it will be possible to acquire it, and consequently the transformation of the world will come about. For, "[...]

conscientization is the most critical look at reality possible [...]” (FREIRE, 1979, p. 17). But this action-reflection does not occur without the reflection of the other. The construction is collective from the moment the human being perceives himself in reality and relates to it, opposing himself to it; with confrontational relations and conflicts with other human beings. Freire (1979, p. 20) also presents the relationship of each individual with reality, stating that it is “a challenge to which he must respond in an original way”.

Therefore, let's see what Poti and Tuane students reveal to us: “The environmental problem grows gradually with the proliferation of discarded waste, because the desire to consume and have more surpasses the appreciation and protection of the environment” (U29_PC_Tuane). “Our role in transforming the environment as human beings is that we can show more responsibility and respect for the environment and our fellow man” (U20_PP_Poti). In the context of this discussion, Tuane considers that in reality, for people, decreasing consumption is a challenge. Poti, on the other hand, considers as the role of human beings, the respect for the environment and for others. It is about these conflicts and confrontations that these young people reflect when they perceive reality. It is the awareness that is built from the reading of reality.

(2) THE STUDENT'S UNDERSTANDING OF THE PARTICIPATION OF SCIENCE, TECHNOLOGY, AND THE HUMAN BEING IN THE STRUCTURING OF A NEW CONSUMER CULTURE FOR SOCIETY

One characteristic of the 3PM that enhanced the use of the Portfolio methodology was the possibility to offer students conditions to establish relations between their knowledge and scientific knowledge, in addition to the apprehension of new knowledge. Thus, the set of the 3PM and the Portfolio offered conditions for students to enhance their participation in the teaching and learning process, through dialogues and research, which contributed to their understanding of consumer culture and the relationship with social and environmental problems.

It is possible to verify evidence of this in Rudá's annotation about the research: “Highlighting even more those who make the Urban Cleaning, who are the most forgotten politically, socially, and culturally. Yes, the collectors of urban solid waste” (U59_PP_Rudá). Such reflection on the generation of social inequality by the system demonstrates that, in the dialogues, environmental education was discussed with a focus on science, technology and society, because “not only technology and not even science generated in a socioeconomic environment marked by social inequality can serve to leverage a process of reducing this inequality” (DAGNINO, 2002, s.p.). This means that Rudá established relationships and learned new knowledge when he realized the marked presence of social inequality in environmental issues.

Another evidence of the students' understanding of the relationship between society and environmental problems is the reflection presented by the student Piatã (U49_PR): “I still think that the production and consumption mode based on the capitalist system generates exaggerated consumption, besides the great social inequality”. The student Porã (U65_PR), on the other hand, goes further, clarifying in his reflection the need for a change in attitudes by society,

Society needs to realize how much it over-consumes, and consequently generates a huge amount of solid waste, besides waking up to the control of corporations over the masses, so only then would it be possible to change attitudes, making citizens worth more than just numbers in the capitalist system.

(3) INDICATIONS OF STUDENT AUTONOMY

The freedom granted to the students by the 3PM, and the Portfolio methodology contributed for them to assume themselves as students and to actively participate in their teaching and learning process. A freedom that demanded their commitment to their attributions as students. Freire (2002, p. 36-37, emphasis added), states that "it is with it, autonomy, painstakingly building itself, that freedom fills the 'space' previously 'inhabited' by its **dependence**. Its autonomy is based on the **responsibility** that is being assumed". This is what the teacher's account in her diary shows us: "the students have researched more than what was requested. All the contents of the Teaching and Learning Portfolio have come with research material" (U80_DO_Professor).

Given this, by recognizing in the students the ability to write, explain, produce, plan, criticize, and organize, among many others, the teacher showed respect for their autonomy, and they expressed themselves; as evidenced by the placement of student Tuane (U36_PC): "It was a short class, but it generated good research about a consumerist society. In one of my research projects I saw about Rhino Horn Trafficking, I was extremely shocked and curious". Such a situation is in line with Freire's (2002, p. 41) view on autonomy: it is a process of maturing towards oneself, "it is a process, it is becoming. It does not happen on a set date".

The dialogues established by the 3PM and by the Portfolio methodology stimulated the students' reflections about the reality of the society in which they are inserted and about them appropriating their role in their learning, in a dynamic and critical way, making them active in their pedagogical relationship with learning. Thus, when the students realize their strength as active participants in their teaching and learning process, they liberate themselves and provide this liberation to the teacher when she contemplates and understands this active action. In this way, they, the students, will be the "restorers of humanity in both" (FREIRE, 1987, p. 16). Another aspect evidenced in the research was the collaborative work. It was possible to notice that this brought other meanings to the students, the collaborativeness was present in the development of the activities, activated by the dialogs, as Tuane reflects: "My concern turned to the challenge, I even put my family to help me, but without success, until my group manifested, and we researched about it" (U39_PR_Tuane).

The dialogicity offered an opportunity to deepen reflections, which are required of students by the Portfolio methodology articulated with the 3PM. An indication of this issue is presented by the student Kaike, when reporting in his Portfolio his reflection after conducting a dialogic class, "whenever I heard environment I imagined natural landscapes, regardless of whether they were green or desert landscapes, but I did not imagine that the constructions made by mankind were considered part of the environment" (U55_PC_Kaike).

The dynamism of the 3PM, which became evident when they remained active in all stages of the teaching and learning Portfolio construction process, i.e., being initiated in one stage and resumed in others, made the dialogues more flexible and vice-versa. As Freire (1987, p. 47) states, dialog that requires criticality is capable of generating education.

Hence, for this conception as a practice of freedom, its dialogicity begins not when the educator-student meets the student-educators in a pedagogical situation, but rather when the educator-students ask themselves what they are going to dialog about with them. This question about the content of the dialog is the question about the programmatic content of education.

Thus, for the dialogues to happen, it was necessary that the teacher was clear about the point of arrival, because she participated dialogically, bringing the knowledge so that students understood the theme and the problem presented, because "the dialogue to be held refers to the knowledge that both subjects of education, student and teacher, have about the theme, object of study and understanding" (DELIZOICOV; ANGOTTI; PERNAMBUCO, 2018, p. 149).

It was in the dialogues that the teacher raised the contents listed by her and that were related to the initial problematic. Delizoicov, Angotti, and Pernambuco (2018, p. 150) present that

[...] the approach to scientific concepts is the end point, both in the structuring of the syllabus and in student learning, the starting point being the themes and significant situations that originate, on the one hand, the selection and organization of the list of contents, when articulated with the structure of scientific knowledge, and, on the other hand, the beginning of the dialogical and problematizing process.

By using the theme that emerged from the discussions with the students themselves as a starting point for the initial problematization, the teacher generated interest in them to participate in the discussions, to report their similar situations and to seek knowledge not yet learned. Using the reflections of the previous pedagogical practice to base the next one and to define the theme increased the complexity of the thinking, connecting one cycle to another of the teaching and learning Portfolio construction process, articulating it with the 3PM. From these situations - connecting one cycle to another and the gradual increase in the complexity of thought - the interaction between the 3PM and the Portfolio allowed the students to exercise, through dialogue, reflection to understand their participation in building a new reality, a sustainable society.

In the dialogues there was the possibility of reflections and discussions about the relations of the theme with the elements science, technology, and society, dealing with the contradictions and interrelationships of this triad in relation to the socio-environmental issues presented. The context of the dialogical classes offered a personal freedom to the students but limited by the recognition of respect for the other, which is essential to structure the autonomy of young people.

Thus, the reflection requested in the Portfolio, even if it happened after the activity was conducted, was essential for the students to reflect on their understanding of the proposed contents and on their own action in the teaching and learning process, on what they did or did not do about that action - the self-evaluation. The reflections and self-evaluation were indispensable for each

student to understand their participation in the process, contributing to the formation of their autonomy.

FINAL CONSIDERATIONS

The joint work of the 3PM and the Portfolio methodology was flexible in the development of the teaching and learning process; the movement of the 3PM in the different stages of the Portfolio brought a dynamism that enhanced the students' expression. The dialogic exercise, fundamental for the development of critical environmental education, brought the work in line with the Freirian thematic approach, integrating the object of study to their reality, stimulating them to active and collaborative participation in the construction of knowledge, and promoting the formation of their autonomy.

Thus, the importance of the pedagogical dimension in this practice developed under the 3PM and Portfolio went beyond the understanding of the scientific concept. The process to reach the concept had a breadth and complexity greater than itself, as it provided a flexible learning environment, centered on interaction, in the teacher-student and student-student dialogic relationship, allowing the development of a problematizing pedagogical practice, focused on research and autonomy. As the process was not linear, it respected both the students' learning time, their differences, experiences, and lived experiences, and the teacher's freedom to express her critical pedagogical knowledge.

Therefore, the meeting of these two oceans, 3PM and Portfolio, gave the participants the opportunity to take on pedagogical attitudes consistent with the exercise of reflection, collaboration and dialogue, as well as the credibility in the participatory capacity; developing the student's understanding of his role as a human being and future professional in the construction of a sustainable society, besides making him realize the participation of science and technology and people in the structuring of a new culture of consumption for society.

Os três momentos pedagógicos e a metodologia portfólio: análise de uma prática pedagógica voltada para a realização de uma educação ambiental crítica

RESUMO

O objetivo deste artigo é o de refletir sobre a ação conjunta da dinâmica pedagógica dos Três Momentos Pedagógicos e da metodologia Portfólio no desenvolvimento de uma prática pedagógica que envolveu a educação ambiental. Este trabalho foi realizado em uma escola pública da cidade de Curitiba, em tempos de distanciamento social devido à pandemia da COVID-19¹. A pesquisa foi produzida em uma perspectiva qualitativa do tipo intervenção pedagógica considerando o *corpus* de pesquisa constituído a partir da prática pedagógica “geração de resíduos e consumismo”. No processo de Análise Textual Discursiva, oitenta e quatro unidades de sentidos emergiram do *corpus* de pesquisa, propiciando a formação de onze categorias iniciais, e dos seus elementos congruentes, formaram-se três categorias finais, sendo estas: (1) O entendimento do estudante, como futuro técnico em edificações, de seu papel na construção de uma sociedade sustentável; (2) A compreensão do estudante quanto à participação da ciência, da tecnologia e do ser humano na estruturação de uma nova cultura de consumo para a sociedade e (3) Indicativos da autonomia do estudante. Os diálogos estabelecidos pelos Três Momentos Pedagógicos e Portfólio estimularam a realização das reflexões do estudante sobre a realidade da sociedade na qual ele está inserido e essa dialogicidade ofereceu uma oportunidade de aprofundamento nas reflexões, respeitando o outro e desenvolvendo o entendimento do estudante quanto ao seu papel enquanto ser humano e futuro profissional, na construção de uma sociedade sustentável, além de fazê-lo perceber a participação da ciência, da tecnologia e das pessoas na estruturação de uma nova cultura de consumo para a sociedade.

PALAVRAS-CHAVE: Três Momentos Pedagógicos. Portfólio. Consumismo. Educação Ambiental.

NOTES

1. It is an infectious disease caused by coronavirus, first identified in December 2019 in Wuhan, China.
2. This article has been fully translated into English by Silvia Iacovacci. Lattes Curriculum: <http://lattes.cnpq.br/4304462285648864>. Email: siacovacci@gmail.com
3. Relating to anthropocentrism, according to which human beings are the center of the universe, of everything.
4. Formal environmental education: actions developed within public and private educational institutions. Non-formal environmental education: actions developed by conservation units, non-governmental organizations, museums.
5. Classroom is a virtual learning environment, an educational platform made available by Google For Education.
6. Integrated high school is high school incorporated to professional education. At the same time, it aims to provide professional education, it seeks to provide the student's human and scientific education.

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