



**Nutrition Literacy as a promoter of Critical Environmental Education in  
Elementary Education: a necessary articulation**

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**SUMMARY**

It is unquestionable that Food and Human Nutrition, as school contents, are extremely important, since they aim to promote human and citizen development, while making students capable of managing and choosing the foods they will consume, from a critical reflection, in order to directly and decisively impact the health and longevity of students. However, this theme cannot be restricted to discussing only issues related to food, as the formation and perpetuation of healthy eating habits depends on the holistic understanding of the eating process. Thus, this work aimed to develop Pedagogical Workshops, with elementary school II students, from a public school, to articulate reflections on Literacy in Human Nutrition and Critical Environmental Education based on the theme: “How can my power of food choice impact on the society?”. Through this pedagogical intervention, it was possible to verify that students have a hygienist view of human food, perceiving it as an isolated act, which impacts exclusively on their own health, evidencing the need and urgency of articulation between Critical Environmental Education and Literacy Nutrition in Basic Education.

**KEYWORDS:** Human Nutrition. Scientific Literacy. Citizenship.

## 1 INTRODUCTION

The current post-modern society, characterized by globalization and neoliberalism, has among its woes hedonistic individualism, rooted in consumerism, as well as fragmentation leading to the disconnection of human beings from the ecosystem and the biosphere. This has had a rapidly negative impact on both the environment and the human species, making this reality a real threat to the preservation of life.

In this context, there is a growing concern about the demand for food, as well as the types and dynamics of food production, as they are intrinsically linked within a complex web that encompasses the topics of nutrition and sustainability, as previously emphasized by Ribeiro, Jaime, and Ventura:

Nutrition is an activity that involves much more than the act of eating and the availability of food. There is a production chain that begins in the fields, or even earlier, in the preparation of seeds, seedlings, and inputs, passing through cycles from planting to harvest, where elements of nature play a crucial role but are increasingly entangled with technological, financial, and social issues. In the production stages in the field, the interrelations with sustainability appear clear. In fact, the very term sustainability was coined with a strong influence from agricultural activities. However, the subsequent stages, until the food reaches our tables, and its disposal thereafter, involve complex issues that are not encompassed by a single area of knowledge. They also undergo a daily dynamic that is increasingly artificial and accelerated (RIBEIRO; JAIME; VENTURA, 2017, p. 185).

It's important to highlight that human food and nutrition, as a social act, have their origins and development in culture and the experiences to which individuals are exposed and subjected. This favors the development and perpetuation of dietary habits that may extend throughout life and will significantly impact an individual's quality of life and longevity. Additionally, these habits can also have a profound impact on societies and the planet as a whole if the issue is not addressed in all its complexity.

The discussion of the impacts of food production methods is not recent. Rachel Carson, an environmentalist and renowned researcher, in the 1960s, in her book "Silent Spring" (CARSON, 1962), issued a warning about the dangers arising from modern society's agricultural production based on the indiscriminate use of pesticides. This not only compromised human health but also all ecosystems and their components ( water, soil, air, and other living beings).

Therefore, it is of utmost importance that institutional basic education promotes Scientific Literacy and Environmental Education, proposing debates and reflections that can intervene in this reality, motivating and encouraging transformation.

Thus, this research aimed to develop Pedagogical Workshops with middle school students with the purpose of promoting discussion and the development of healthy eating habits from the perspective of Scientific Literacy, expanding conceptions about this topic by proposing the following problem situation: "How can my power to choose food impact society and the environment?"

In this way, it became necessary to understand how the theme of human nutrition and food is interconnected with Critical Environmental Education in the process of citizen education - the subject of Scientific Literacy - in Basic Education.

### **1.1 A Scientific and Nutritional Literacy as a Proposal for Critical Environmental Education and Scientific Literacy**

Scientific Literacy has its origins in the term "Scientific literacy," proposed and characterized by Pella O'Hearn and Gale in 1963 through exhaustive documentary research. According to the authors, an individual literate in Science, and therefore scientifically literate, is capable of understanding basic concepts, recognizing their implications, and their relationships with Science itself, Society, and Technology (CHAGAS, 2000).

School education should assist students in the development of increasingly higher levels of Scientific Literacy (BYBEE, 1995). Therefore, when considering scientific literacy, it is necessary to analyze its three foundational pillars: (I) basic understanding of terms, concepts, knowledge, and scientific phenomena; (II) understanding the nature of science and the ethical and political factors that surround its practice; (III) and understanding the relationships between Science, Technology, Society, and the Environment (SASSERON; CARVALHO, 2008).

Regarding the foundational pillar I- Basic understanding of terms, concepts, knowledge, and scientific phenomena, it is necessary to understand and comprehend these aspects so that science can be identified and, therefore, become a tool for human empowerment and emancipation by enabling students to engage as informed citizens in society and overcome alienation.

Regarding the foundational pillar II - Understanding the nature of science and the ethical and political factors surrounding its practice, there is a need to comprehend the epistemology of science, including its historical, temporal, and human aspects. This involves moving away from common-sense ideas about science, which is often popularly perceived as an absolute truth produced by individuals seen as geniuses with salvational objectives.

Regarding the foundational pillar III - understanding the relationships between Science, Technology, Society, and the Environment, it is justified by promoting the development of holistic thinking in which reality finds verisimilitude. Fragmentation, on the other hand, hinders the possibilities of informed judgment and decision-making, as it interferes with the perception of the applied consequences of a given knowledge and its societal and environmental impacts, disconnecting humans from other interfaces.

In this way, the concept of literacy, beyond the development of reading and writing skills, should promote cognitive development through learning about the interplay between culture and society. In other words, a literate individual is integrated into reality, as they are capable of critical reading and expressing their opinions and ideas.

The perspective described above, anchored in Paulo Freire's ideas, conceives literacy as going beyond the mastery of skills, such as symbolic language, and includes the potential for emancipation and autonomous development, ultimately leading to effective citizenship.

[...] Reading the word and learning how to write the word, so that someone can read it later, are preceded by learning how to "write" the world, that is, having the experience of changing the world and being in contact with the world. (FREIRE; MACEDO, 1990, p.31).

Building on this premise, Kickbusch (2001) presents several literacy modalities that a

person needs to master to live in today's society, titling them as qualitative literacy, scientific literacy, technological literacy, cultural literacy, media literacy, and computer literacy. According to the same author, health literacy should be added to this list.

Health literacy is defined by the Centers for Disease Control and Prevention (CDC) (2017) as “[...] an individual's capacity to obtain, communicate, and comprehend basic information and services about human health, in order to make decisions about one's own condition. (p.1 - our translation).

Furthermore, health literacy encompasses three levels: (a) functional, which involves the capacity to learn, communicate, and provide information about hygiene, nutrition, safety, drugs, relationships, sexuality, parenthood/motherhood; (b) interactive, which includes the development of personal skills such as problem-solving, food preparation, personal hygiene, and communication using appropriate scientific language; (c) critical, which aims to engage individuals in social initiatives that enable the development and implementation of public health policies as well as actions to promote the quality of life in society (LEGER, 2001).

Therefore, it is not enough for an individual to have knowledge related to human health, such as anatomy, biochemistry, and pathology. Instead, they should have the ability to relate their own health condition to environmental and social issues, as achieving health is not possible in a reality of environmental destruction and degradation.

Following the United Nations (UN) (1993), the concept of health needs to encompass environmental perspectives and is referred to as Environmental Health. It is described as those aspects of human health, including quality of life, that are determined by physical, chemical, biological, social, and psychological factors in the environment, as well as the theory and practice of preventing or controlling such risk factors that have the potential to harm the health of current and future generations. According to the Pan American Health Organization (PAHO), around 5.9 million children under the age of five died worldwide in 2015, and among the main causes is poor environmental conditions. PAHO's research indicates that 26% of deaths and 25% of the disease burden in children under 5 years old could be prevented by reducing environmental risks such as air, water, and soil pollution, contamination with heavy metals, and lack of access to basic sanitation. Therefore, it is not possible for an individual to be Health Literate without Environmental Education being achieved (FUNASA, 2020).

Given the understanding above, schools are recognized as a privileged space for the construction of concepts and knowledge about health and the development of healthy habits. They are considered by Leger (2001) as the “primary establishment” in building a nation's capital and health. According to Denuwara and Gunawardena (2017), the critical level of health literacy will be achieved more rapidly if the basic school system (comprising elementary and secondary education) takes on the role of promoting health literacy.

In accordance with Père-Rodrigo and Aranceta (2003), during the school-age years, students begin to make their own decisions regarding the development of healthy or unhealthy habits. In this process, the family becomes less important, while friends, social groups, and media trends become decisive factors. Therefore, the school plays a crucial role as the institution that has the most significant impact on health promotion and, consequently, health literacy (ALDINGER; JONES, 1998; DIXEY et al., 1999).

Therefore, starting from the understanding of the connection between Nutrition Literacy and Scientific Literacy, basic formal education, in its goal to develop them, needs to seek methodologies and approaches that empower students regarding related school subjects. It should promote the integration of ideas rather than fragmentation, meaning the reflection on health and human nutrition-related content and, through critical environmental education, connect ideas and knowledge, fostering the development of holistic and complex thinking.

Critical Environmental Education, based on Marxist and Frankfurt School thinking, in Brazil, has its pedagogical foundation in popular education, with key thinkers like Paulo Freire, Moacir Gadotti, and Carlos Rodrigues Brandão (LIMA, 2009, p.148).

Critical Environmental Education, which has its foundation in the ideas of Paulo Freire, aims for citizen emancipation, ensuring the political, social, and environmental freedom of all. It is permeated by a praxis that finds in the collective the driving force for transformations that can generate equity and equality, overcoming the vulnerabilities of post-modernity. According to Freire,

“[...] The fact that I perceive myself in the world, with the world, and with others places me in a position in relation to the world that is not that of someone who has nothing to do with it. After all, my presence in the world is not that of someone who merely adapts to it, but rather that of someone who is embedded within it. It is the position of someone who strives not to be just an object but also a subject of history.” (FREIRE, 1996, p.54)

Furthermore, Environmental Education recognizes itself as counter-hegemonic by opposing the reductionist, dogmatic, and one-dimensional scientific and mechanistic approaches characteristic of the capitalist system. Thus, Environmental Education is one of the dimensions of education, constituting an intentional act of social practice aimed at developing the learner for environmental social and ethical engagement (BRASIL, 2012, p.2).

In this perspective, Critical Environmental Education promotes Nutrition Literacy and Scientific Literacy by proposing that the school should be a space for education and development in which students are capable of analyzing their own reality, considering its various dimensions, and using scientific thinking as a basis to transform that reality.

In order to promote the type of education described above, schools need to break away from the traditional and banking model of education, which focuses on the accumulation of concepts through memorization processes that perpetuate the dominant culture. It is essential to seek out teaching and learning strategies and methodologies that are reflective and critical.

In this scenario, pedagogical workshops emerge as a potential teaching and learning strategy because they are based on collective tasks, promoting investigation, action, and reflection, integrating theoretical knowledge with its practical application. In the workshop, students engage with the subject of study through problematization, involving thinking, feeling, and acting. Therefore, when designing a workshop, the proposed activities aim to promote reflection.

In this perspective, Paviani and Fontana (2009) state that pedagogical workshops aim to provide students with the experience of meaningful situations related to their own reality and the school community. Therefore, it is a strategy that shifts the focus away from a typically

traditional lesson, as it incorporates action and reflection based on real situations.

In pedagogical workshops based on constructivist theoretical and epistemological frameworks, the student is an active participant in their own learning, and it is the role of the teacher to accompany them in the process of knowledge construction. The teacher does not simply impart what they know but rather facilitates what the students need to know, without maintaining a hierarchical dichotomy between student and teacher (CASTELLANO E COCO, 2006; PERKINS, 1995; PAVINAI E FONTANA, 2009).

Therefore, learning in pedagogical workshops occurs through problematization, contextualization, and interdisciplinarity, allowing students to reflect on their own ideas, concepts, and knowledge, correlating different points of view in a process of action-reflection-action. This aligns with the proposal of scientific literacy put forth by Sasseron and Carvalho (2008).

According to Vieira and Volquind (2002), pedagogical workshops should be based on three presuppositions: (a) the pedagogical process of didactic intervention in which the teacher is involved; (b) theoretical-practical reflection, which enables the realization of theory in practice; (c) interdisciplinary relationships, aiming for the unity of knowledge.

Thus, the characterization of pedagogical workshops, according to Ander-Egg (1991), is based on five pedagogical principles: (I) "learning by doing," which aims to bring the student closer to reality through contextualization and problematization, overcoming the segregation of theoretical-practical knowledge; (II) cooperation, as it promotes collaborative work; (III) the pedagogy of question and answer, understanding that knowledge is not transmitted and accumulated but is the result of scientific investigations; (IV) interdisciplinarity, given the complexity of reality and its dimensions; (V) co-participation, as it recognizes that both students and teachers are part of the context and are involved in the problem being studied.

Based on these assumptions, Vieira and Volquind (2002) suggest that pedagogical workshops can be prepared in three steps: contextualization, in which students investigate the proposed problem situation; planning, in which students and teachers conduct an in-depth study of the scientific perspectives involved in solving the problem; and reflection, in which students, by synthesizing the knowledge produced, promote an intervention in reality (REGINA, 2014).

## 2. METHODOLOGY

The present work, characterized as a participatory action research (PAR) (SOUZA, 1997, p.67), was conducted with 34 students from the 8th grade of secondary school at a public school. The choice of conducting the research with the 8th grade was made because the content to be addressed is allocated to this grade level according to the curriculum of the State of Paraná (CREP) (2018).

Five pedagogical workshops were developed, following a sequence of 6 class hours, according to the proposal of Vieira and Volquind (2002), with the aim of promoting reflection on the process of building and perpetuating healthy eating habits from the perspective of Scientific and Nutrition Literacy, anchored in Critical Environmental Education, through the problem situation "How can my power of food choice impact society and the environment?"



Initially, the students were organized into five teams that developed strategies to understand the problem situation, that is, to comprehend how adolescents make decisions when choosing food and then analyze, based on this reality, the impacts of these decisions on both health and society, and the environment. This initial stage aimed to contextualize the problem situation.

To stimulate reflection on the various dimensions involved in food choices, the Ecological Footprint was used as an example. This concept assesses human consumption pressures on natural resources. Therefore, students conducted research on the water demand for food production, handling, and access processes.

This second moment, which occurred in parallel with the contextualization of the problem situation, aimed to highlight the complexity of reality, contributing to the planning stage.

For the reflection stage, students were encouraged to develop communication strategies to raise awareness within the school community about the need for the development of healthy eating habits, starting from an expanded and complex view of reality.

Thus, based on this structure, data collection was carried out through participant observation (MAY, 2001, p.177) and the administration of semi-structured questionnaires (MARCONI; LAKATO, 1999, p.100). Out of the 34 student subjects in the study, consisting of 21 boys and 23 girls, only 31 participated in the initial questionnaire, which took place before the development of the workshops, providing insights into how students perceived the interrelationship between the development of eating habits and environmental issues. This instrument, administered by the science teacher of the class, consisted of 5 open-ended questions, presented in Chart 1, in which students were required to express their ideas and viewpoints. The questionnaire was analyzed using the Content Analysis method proposed by Bardin (1977).

Chart 1. Questions proposed in the Initial Questionnaire.

Questions
1. What do you understand by Healthy Eating?
2. In your opinion, what is the importance of having healthy eating habits?
3. For you, what factors are determining for building healthy eating habits?
4. Based on your life experience, what prevents people from developing healthy eating habits?
5. What could help you improve or maintain healthy eating habits?

Source: THE AUTHORS, (2023).

### 3. PRESENTATION AND ANALYSIS OF DATA

In the questionnaire initially applied - Chart 2 - it was possible to see that, before the pedagogical intervention, the students had a hygienist view of the process of building and perpetuating healthy eating habits.



Chart 2. Analysis of the initial questionnaire.

Questions	Categories	Example
1	1.1 Eating healthy foods.	<i>"It's eating foods that are good for us, like fruits and vegetables, and not eating too much junk food, like snacks and instant noodles. You have to eat real food that has vitamins and not too much fat or calories."</i>
	1.2 Perform Diets	<i>"To have good nutrition, you have to go on a diet and eat properly at the right times and eat the foods that are there, like having breakfast and not eating cake if there's no cake, only on a junk food day."</i>
	1.3 Being healthy	<i>"Healthy eating is having a healthy body, for example, not having diseases like high sugar levels and other things that are bad for the heart."</i>
2	2.1 Being healthy	<i>"Well, it's about staying healthy, having a strong body, and good health."</i>
	2.2 Not being healthy	<i>"Not getting sick and having to take a bunch of medicine, which sometimes is for the rest of your life."</i>
3	3 Food availability.	<i>"Having good things to eat, like having fruit, having salad, having whole wheat bread. If you only have cookies, even if you think they have fats, it's not as good as what you eat."</i>
	4. Enjoying healthy food healthy	<i>"You have to like eating the good things on the table, right? If you have them but don't eat them because you don't like them, it's no use."</i>
4	4.1 Taste	<i>"The worst thing is not liking to eat things that we know are good, like rice and beans, broccoli, salad, you know, but then you don't like it and don't eat it."</i>
	4.2 Prize	<i>"I think it's the money, healthy things, for example, whole wheat bread, whole wheat cookies, yogurt that doesn't have milk and is bad for you, diet food is much more expensive in the market."</i>
5	5.1 Knowledge	<i>"For those who don't know how to eat, I think they need to learn to know what to choose."</i>
	5.2 Taste	<i>"It has to be delicious, it doesn't matter if it's not tasty, no one will want to eat it, that's the truth."</i>
	5.3 Access	<i>"The person needs to replace things and have only things that are good for them in the fridge, sometimes also not going to a place where you know they only have that if you can't eat it, it's not about depriving yourself but making it easier for you not to want to eat junk food."</i>

Source: THE AUTHORS, (2023).

In the hygienist perspective of building and perpetuating healthy eating habits, individuals correlate only the aspects related to human health in its physiological dimension, that is, the act of eating itself, the nutritional composition of foods, the process of human digestion, for example. The concept of health is within the health-disease binomial, disregarding other aspects such as culture, society, economy, and the environment. For the students in general, having healthy eating habits implies choosing foods with low calories and that are sources of nutrients. According to the Guia Alimentar da População Brasileira (2014, p. 138), healthy eating habits are not restricted to individual food choices but also encompass sociocultural, economic, and environmental aspects.

This hygienist view, demonstrated by the students, is also observed in other research in the field of human nutrition, which shows that in various populations, the construction and meaning of the term "Eating Habit" is always related to a reductionist perspective that considers only the human being and human physiology, disregarding other aspects (KLOTZ-SILVA; PRADO, SEIXAS, 2017; SCHEUNEMANN; LOPES, 2015; SILVA; TEIXEIRA, FERREIRA, 2012).

Based on the reality described above, the development of the Pedagogical Workshop entitled "How can my power of food choice impact society?" was proposed.

The students, thus, initially, to understand how their peers in the school community make their food choices, chose to collect data during science classes and during breaks, using mobile apps that record and organize data such as the Quizizz App and Google Forms. Both apps

are part of a package of services offered by the state government to students for free.

Based on the activity above, groups of students were able to see that their peers have dietary habits and ideas related to their own, that is, according to a hygienic and even childlike perspective, as evidenced in the statements presented in Chart 3.

Chart 3. Students' Statements in the Contextualization Process of the Pedagogical Workshop.

Talks
"People are like that, we're like that, we often don't think to eat, to feed ourselves, we just eat, we have no idea that it involves production processes, buying and selling, it's not that we don't know, we know, but we don't really think, it's automatic, but I think that's exactly what this capitalist movement wants, right, the less we think, the better for them.
"In our group, we noticed that our teenage peers tend to eat more based on their cravings and what's available rather than making a conscious choice. They don't often consider the reality of how things work, like how food is produced, transported, and how it gets to the market and into their hands. Nobody really remembers that there are many more factors at play, like water consumption, the wages of those who work in the market, which we know aren't great, and the environment, which suffers throughout the whole process, and we suffer along with it, we just don't realize it."

Source: THE AUTHORS ,(2023).

Simultaneously, to highlight the issue to the students, the class teacher conducted research on the Ecological Footprint and food to help students understand how dietary habits impact society and the environment.

In this second phase, the students were able to realize that the most commonly consumed foods by people determine production processes that directly impact the economy and the environment, as seen in the students' transcribed speech below in Table 4. This shows that they were able to reflect on the multifactorial aspects involved in the development of dietary habits.

Chart 4. Students' speech during the Contextualization and Planning of the Pedagogical Workshop process.

Questions
"Wow, how can it be, right? 25,000 liters of water to produce butter, that's a lot of water for so little food, and sometimes people let it spoil in the fridge, there are people who don't even have enough water to drink the bare minimum."
"Look at that lettuce plant, it takes a lot of water and investment, and the amount of stuff people throw away. So you use drinking water, which is already scarce, to produce a good, nutritionally adequate food, and people either don't buy much of it or, if they do, they throw it away. The waste rate is enormous."
"Another thing is, there's polluted soil, water, air, and even healthy food can't stay healthy anymore. Even in breast milk, there's contamination."
"People want to consume a lot of meat because people like a barbecue, but look at how much water it costs, and there's also the whole issue of how the animal is treated until the meat is put on the market, we don't even think about it, right, we forget, I think, or we just don't know, and it's super important."

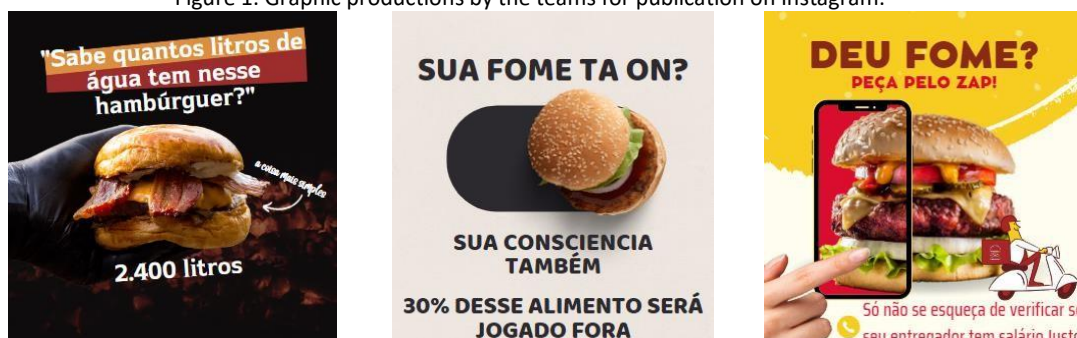
Source: THE AUTHORS, (2023).

Critical Environmental Education applied as a guiding principle in School Education processes aimed at Scientific Literacy can contribute to the construction of complex thinking, related to reality, and therefore to human and autonomous formation by allowing students to

perceive the reality in which they are inserted and the need for transformation, seeking ways of intervention (LOUREIRO, 2006, p.134).

Thus, from the contextualization and planning of the workshop, the groups of students, for the reflection phase, chose to produce graphic materials, both for publication on WhatsApp, Instagram, Facebook and other digital communication media that the students use and for display at school, in the cafeteria area, aiming to sensitize their peers to reflect on the perpetuated eating habits and the other factors involved in this process, as shown in Figure 1.

Figure 1. Graphic productions by the teams for publication on Instagram.



Source THE AUTHORS (2023).

The image above shows that, from the workshop, the students were able to reflect on other aspects that have a direct impact on the construction and perpetuation of healthy eating habits and on the condition of human health, which, beyond the anthropocentric and individualistic vision, is made up of the various aspects that make up reality, such as society, culture, the economy and the environment. Ignoring these dimensions, whether due to a lack of scientific knowledge or being immersed in a context of alienation, not only jeopardizes citizenship but also people's lives, relegating them to a subordinate position where their very existence is diminished. According to LOUREIRO et al., (2009, p.90).

“[...] the exercise of citizenship (...), with the perspective of reordering the relations between the public and the private, aiming to stimulate individuals' politicization (participation) or the construction of a collective identity (public interests), in opposition to prioritizing immediate individual interests.

Furthermore, according to Tozoni-Reis (2008, p.158), Critical Environmental Education's main purpose is to build knowledge that serves for the emancipation and transformation of society, aligning with the principles of Scientific and Nutritional Literacy proposed.

#### 4. FINAL REFLECTIONS

Eating and human nutrition are inherent aspects of life, being part of people's daily routine. Beyond physiological and biochemical aspects, the act of eating directly influences the configuration of reality and is not separate from current problems such as individualism and consumerism. This has resulted in social, economic, and environmental changes that directly or

indirectly threaten human existence.

Therefore, it is essential for schools, as spaces for the construction and perpetuation of knowledge and for citizenship education, to develop pedagogical practices that enable Scientific Literacy in its various dimensions, including Nutrition Literacy, as well as Critical Environmental Education.

Through the development of pedagogical workshops based on a constructivist perspective, it was possible to demonstrate the potential to break away from reductionism and the fragmentation of content, promoting the overcoming of the hygienist view of dietary habits previously presented by students.

This new perspective, which expands students' understanding and promotes the development of a more holistic and complex view of nutrition and its relationship with sustainability, allowed them to perceive the reality in which they were immersed. It served as a driving force that propelled the need for transformation in their reality, within the students' current possibilities.

Therefore, it is of utmost importance that pedagogical work with the content of human nutrition and food aims to reflect on the processes of genesis and perpetuation of eating habits, which, Beyond what humans eat, this approach can lead to the development of humans who think and transform their reality.

## RERERENCES

- ALDINGER, C. E.; JONES, J. T. **Healthy Nutrition: An Essential Element of a Health-promoting School**. WHO Information Series on School Health. Document four. Geneva: WHO, 1998.
- ANDER-EGG, E. **El taller una alternativa para la renovación pedagógica**. Buenos Aires: Magisterio, 1991.
- BARDIN, Laurence. **Análise de conteúdo**. Lisboa: Edições 70, 1977.
- BRASIL. Ministério da Educação. Secretaria de Educação Básica. Secretaria de Educação Continuada, Alfabetização, Diversidade e Inclusão. Secretaria de Educação Profissional e Tecnológica. Conselho Nacional da Educação. Câmara Nacional de Educação Básica. **Diretrizes Curriculares Nacionais Gerais da Educação Básica**. Ministério da Educação. Secretaria de Educação Básica. Diretoria de Currículos e Educação Integral. Brasília: MEC, SEB, DICEI, 2013. Disponível em: [http://portal.mec.gov.br/index.php?option=com\\_docman&view=download&alias=10988-rcp002-12-pdf&category\\_slug=maio-2012-pdf&Itemid=30192](http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=10988-rcp002-12-pdf&category_slug=maio-2012-pdf&Itemid=30192). Acesso em: jun. 2023.
- BRASIL. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. **Guia alimentar para a população brasileira**. Ministério da Saúde, Secretaria de Atenção à Saúde, Departamento de Atenção Básica: Brasília: Ministério da Saúde, 2 ed, 2014.
- BYBEE, R.W. **Achieving Scientific Literacy**. The Science Teacher, v.62, n.7, 28-33, 1995.
- CASTELLANO, S; COCO, L. M. **Hacia una conceptualización teórica de la modalidad taller**. UNIrevista, v. 1, n. 3, p.1-10, jul. 2006.
- CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC). **Health Literacy—A Public Health Priority**. In: Health Literacy for Public Health Professionals, 2017. Disponível em <https://www.cdc.gov/healthliteracy/learn/index.html>> Acesso em: jun. 2023.
- DENUWARA, H. M. B. H.; GUNAWARDENA, N.P. **Level of health literacy and factors associated with it among school teachers in an education zone in Colombo, Sri Lanka**. BMC Public Health, v.17, n.631, p. 1-9, 2017.
- DICKMANN, I. CARNEIRO, S. M. M. **Paulo Freire e Educação ambiental: contribuições a partir da obra Pedagogia da Autonomia**. R. Educ. Públ. Cuiabá, v. 21, n. 45, p. 87-102, 2012.

DIXEY R; HEINDL I; LOUREIRO I; PÉREZ-RODRIGO C, SNEL J; WARNKING P. **Healthy Eating for Young People in Europe**. A School-based Nutrition Education Guide. Copenhagen: European Network of Health Promoting Schools, 1999.

FREIRE, P. **Pedagogia do Oprimido**. 22. ed. Rio de Janeiro: Paz e Terra, 1987.

FREIRE, P. **Pedagogia da Autonomia: saberes necessários à prática educativa**. São Paulo: Paz e Terra, 1996.

FREIRE, P.; MACEDO, D. **Alfabetização: leitura do mundo, leitura da palavra**. 3 ed. Rio de Janeiro: Paz e Terra, p. 167, 1990.

FUNDO NACIONAL DE SAÚDE – FUNASA. **Saúde Ambiental para Redução dos Riscos à Saúde Humana**. 2020.

Disponível em: < <http://www.funasa.gov.br/saude-ambiental-para-reducao-dos-riscos-a-saude-humana>>. Acesso em: jun. 2023.

KICKBUSCH, I.S. **Health literacy: addressing the health and education divide**. Health Promot Int. v.16, n.3, p.289-97, 2001.

KLOTZ-SILVA, J; PRADO, S. D; SEIXAS, C. M. **Comportamento alimentar no campo da Alimentação e Nutrição: do que estamos falando?** Rio de Janeiro: Physis Revista de Saúde Coletiva, v. 26, n. 4, p. 1103-1123, 2017.

LEGER, L. **Schools, health literacy and public health: possibilities and challenges**. Health Promotion International. v. 16, n. 2, p. 197-205, 2001.

LIMA, G. **Educação ambiental crítica: do socioambientalismo às sociedades sustentáveis**. Revista Educação e Pesquisa: São Paulo, v.35, p. 145-163, 2009.

LOUREIRO, C. F. B. **Complexidade e dialética: contribuições à práxis política e emancipatória em educação ambiental**. Educ. Soc., Campinas, v. 27, n. 94, p. 131-152, 2006.

LOUREIRO, C. F. B.; et, al. **Contribuições da teoria marxista para a educação ambiental crítica**. Cad. Cedes, Campinas, vol. 29, n. 77, p. 81-97, 2009.

MARCONI, M. de A.; LAKATOS, E. M. **Técnicas de pesquisa**. 3. Ed. São Paulo: Atlas, 1999.

MARIETO, M.L. **Observação participante e não participante: contextualização teórica e sugestão de roteiro para aplicação dos métodos**. Revista Ibero Americana de Estratégia, v. 17, n. 4, p. 05-18, 2018.

MAY, T. **Pesquisa social. Questões, métodos e processos**. Porto Alegre, Artemed, 2001.

ORGANIZAÇÃO DAS NAÇÕES UNIDAS - ONU. **Definition of Environmental Health developed at WHO consultation in Sofia, Bulgaria**. 1993. Disponível em: [http://health.gov/environment/Definition sofEnvHealth/ehdef2.htm](http://health.gov/environment/Definition%20of%20EnvHealth/ehdef2.htm) . Acesso em: jun. 2023.

PARANÁ. Secretaria do Estado de Educação. **Referencial Curricular do Paraná: princípios, direitos e orientações**. Curitiba: SEED, 2018.

PAVANI, N.M.S; FONTANA, N.M. **Oficinas pedagógicas: relato de uma experiência**. Conjectura, Caxias do Sul, v. 14, n. 2, p. 77-88, maio/ago. 2009.

PÈRE-RODRIGO, C.; ARANCETA, J. **Nutrition education in schools: experiences and challenges**. European Journal of Clinical Nutrition, v. 57, Suppl. 1, p. 82–S85, 2003.

PERKINS, D. **La escuela inteligente**. Barcelona: Gedisa, 1995.

REGINA, B.V. **O uso de oficinas pedagógicas como estratégia de ensino com o tema água: redimensionando a prática docente**. Maringá -PR. [Mestrado em Educação para Ciências e Matemática]. Universidade Estadual de Maringá, Maringá, 2014.

RIBEIRO, H; JAIME, P. C; VENTURA, D. **Alimentação e sustentabilidade**. Estudos Avançados, São Paulo, v.31, p.89, p 185-198, 2017.

SASSERON, L.H; CARVALHO, A.M.P. **Almejando a alfabetização científica no ensino fundamental: a proposição e a procura de indicadores do processo.** Investigações em Ensino de Ciências, Rio Grande do Sul v.13, n.3, p.333-352, 2008.

SCHEUNEMANN, C. M. B; LOPES, P. T. C. **Hábitos Alimentares e Concepções sobre Alimentação Equilibrada: Uma Investigação com Alunos do Oitavo Ano do Ensino Fundamental.** Alexandria: R. Educ. Ci. Tec., Florianópolis, v. 12, n. 1, p. 279-302, 2019.

SILVA, J. G; TEIXEIRA, M. L. de O; FERREIRA, M. de A. **Alimentação e saúde: sentidos atribuídos por adolescentes.** Esc Anna Nery, v. 16, p. 88- 95, 2012.

SOUZA, J.F. **Pesquisa-ação participante: realidade e desafios.** Tóp. Educ., Recife, v. 15, n.0 112, p. 65-104, 1997.  
TOZONI-REIS, M. F. de C. **A pesquisa-ação-participativa em educação ambiental como práxis investigativa e educativa.** Universidade Estadual Paulista, Botucatu, 2008.

CHAGAS, I. **Literacia Científica. O Grande Desafio para a Escola.** Comunicação apresentada no 1º Encontro Nacional de Investigação e Formação, Globalização e Desenvolvimento Profissional do Professor. Escola superior de Educação de Lisboa, 2000.

VIEIRA, E.; VOLQUIND, L. **Oficinas de ensino. O que? Porque? Como?** Porto Alegre: EDIPUCRS, 2002.