American Journal of Educational Research, 2016, Vol. 4, No. 12, 878-889
Available online at http://pubs.sciepub.com/education/4/12/5

DOI:10.12691/education-4-12-5

Sustainability and Teacher Education: A Curriculum Study on Teacher Training Courses from Universidade Estadual do Oeste do Paraná, Brazil

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Abstract This work seeks to contribute to discussions around sustainability, in relation to formal education. One way to follow is the insertion of Environmental Education (EE) in educational institutions of all levels. This paper regards a research that had as main objective to verify the insertion of sustainability content in the undergraduate courses at the Universidade Estadual do Oeste do Paraná – UNIOESTE (Western Paraná State University) in order to answer to the following problematic: "The teacher training courses, from UNIOESTE of the campus of Cascavel, are in a process of a curriculum environmentalization?" The objectives of this research were: (i) to understand the meanings of sustainability and its variations considering the different points of view through a bibliographic research (ii) to analyze national legislation for environmental education and curricula of undergraduate courses at Unioeste through document research (iii) to interview students, teachers and coordinators through audio recordings and questionnaires in field research (iv) to identify if the courses used in this research as object of study are in a curriculum environmentalization process using as parameter the Diretrizes Curriculares Nacionais (National Curriculum Guidelines - DCNs) and the Rede de Ambientalização Curricular do Ensino Superior (Curriculum Environmentalization on Higher Education Network - ACES). The theoretical framework seeks to understand the following themes: sustainability, sustainable development, eco-development, environment, education, environmental education, curriculum, curriculum environmentalization. The understanding of the theoretical framework guided the methodological approaches and criteria used for data collection and analysis, through the inflection of Bardin (2010) technique with Content Analysis. The results indicate a fragile teacher training regarding to environmental education and that it, by having an inter and transdisciplinary character, can permeate on any area of knowledge if the educational institutions have a commitment to become into a sustainable educator's spaces. Given the results in this research, reflections are made about the relationships of formal education to the nature in which we belong.

Keywords: *teacher education, sustainability, environmental education, curriculum*

Cite This Article: Talita Rechia Vasconcellos da Rosa, and Vilmar Malacarne, "Sustainability and Teacher Education: A Curriculum Study on Teacher Training Courses from Universidade Estadual do Oeste do Paraná, Brazil." *American Journal of Educational Research*, vol. 4, no. 12 (2016): 878-889. doi: 10.12691/education-4-12-5.

1. Introduction

Sustainable development is currently in worldwide discussion in various areas of knowledge, due to the current environmental problems and threats to the future of humanity as, for example, discussions about global warming. The current climate change is at the top of the discussions relating to environmental issues, since the gradual increase in global temperature can cause environmental disasters such as: the melting of glaciers, which would cause: flooding of some coastal cities; the increase drought in warmer regions; the increase in typhoons and hurricanes; death or even the extinction of some arctic animals; etc [17].

According to international organizations that deal with the environment, the global warming is caused by greenhouse gas emissions such as methane and carbon dioxide. The insertion of this theme in various social spaces, among them the educational institutions, has the potential to contribute to a more conscious society of the consequences of the production and current consumption mode [33,34]. It is known that most economists advocate that economic growth, currently, must take priority, especially in developing countries like Brazil, for example. However, some authors [5,17,33,34,39,40] claim that current society goes to the extinction of the human species, once, since the Industrial Revolution (1760), there was a strong economic growth and the encouragement by capitalist societies to consumption.

In our current way of life, there is no way to avoid the consumption due to survival needs and / or well-being. However, it is possible to combine the consumption conciliating the economic growth with the sustainable development. Facing these problems and changing the

behavior related to the production and consumption of society can ensure provisioning of future generations' needs for a long period [5,17,28,33,34,39,40].

The formal education can be a way to spread the sustainability issue because it reaches the majority of the world population[1]. William Nordhaus (2007 *apud* VEIGA, [39]), considered the oldest researcher of global warming economy, believes it would be more convenient to start investing in education, science, technology and innovation while moderately reducing emissions, to further enhance the reduction of emission of gases that cause greenhouse effects [39].

Educating environmentally is one of the ways to form responsible citizens of a society committed to the common good and the future generations [12]. In Brazil, it is in advance to face the problem in question the creation of the National Curriculum Guidelines for Environmental Education (DCNEA) as well as the National Policy for Environmental Education (PNEA), which guide that educational institutions become sustainable educator spaces. The establishment of the discipline of Environmental Education, for its interdisciplinary character, is not mandatory in Brazilian National scope as a specific discipline, but must be discussed transversely among other disciplines and may also be optional. Despite the legislation, we ask: How educational institutions are inserting environmental education in their curricula?

This study aims at an evaluation of the process of curricular environmentalization in teacher training courses at the Universidade Estadual do Oeste do Paraná - UNIOESTE (State University of Western Paraná), Cascavel campus, by problematizing the engendering of sustainability issues in teacher education, using as parameter the National Curriculum Guidelines (DCNs) and Curricular Environmentalization in Higher Education (ACES) Network. The ACES Network conducted a project in 2000, based in the University of Girona (Spain), which involved 11 universities from 7 countries (Germany, Argentina, Brazil, Cuba, Spain, Italy and Portugal), highlighting, here, the Brazilian ones: UFSCar, UNICAMP and UNESP. The network aimed to the training of future professionals and managers committed with the permanent pursuit of the best possible relations between society and nature, given the values of justice, solidarity and equity, applying the universally recognized ethical principles and the respect for diversities [19].

The first moment of the research went by the literature review process, in order to obtain information about the current scenario, in a broad sense, of the research focus: teacher training and its relationship with sustainability. At this moment, we still had not intended to prove any hypothesis raised, but know sources and efficient methods for the work steps aimed towards the primary objectives.

The second moment of the research was done by document research of the Pedagogic Political Project (PPP) of the courses studied. The objective was to conduct a survey of curriculum environmentalization process indicators in the curriculum structure of the courses established as objects of study in this work. To identify these indicators we used the criteria of ACES Network and the document analysis of the legislation regarding the Environmental Education on National level, in order to expose the minimum standards set by the highest organ of Education in Brazil, the Ministry of Education (MEC).

As the research is intended to apprehend the perception of sustainability and Environmental Education for the future teachers, and how they are being trained for this issue, field research has become essential, which comprises the third moment of the survey. In the field research, questionnaires were completed by students enrolled in the final year, besides audio-recorded interviews with coordinators and teachers previously selected, where the interviewee were asked about sustainability content and its importance in their knowledge area.

The perception of the teachers and the students has demonstrated a perspective of a training more focused to the specialty of each course without cover issues that run through all courses, such as the case of sustainability.

2. Materials and Methods

This topic presents the description of the methodology for conducting this research, built through a triangulation of data, with bibliographic, document and field research, in a quantitative and qualitative character.

The composition of the quantitative and qualitative aspects is based on the recognition that the combination of Quantitative and Qualitative aspects contribute to the studies of complex issues, such as the ones in Education. And that, by using these two approached to analyze the same problem, results can contribute to minimize the limitations of quantitative and qualitative methods used separately [35].

In the bibliographic research we seek to "unepistemologize" the debate, or even simply "ignore the paradigmatic differences" ([35], p. 48), taking in to consideration all the information around sustainability and environmental education, independent of the line of thought, following the criteria of relevant authors on this field.

In this regard, we anchored in Feyerabend (1924-1994), philosopher of science, which considers the "anything goes" principle highly important for the development of scientific knowledge. This author reflects, with a rather critical look, on the contemporary rationalism, Popper (1902-1994) critical rationalism and Lakatos (1922-1974) rationalism. The form of science proposed by Feyerabend [14] is not opposed to the existing methods, but he criticizes it as the only way of conception and validity. His criticism around the methods is the disposal of nonconforming theories or low empirical content and, also, the disregard of the plurality of theories.

In the document research, we analyzed the subjects curricula from the teacher training courses of Universidade Estadual do Oeste do Paraná and the Environmental Education Brazilian legislation through the document analysis technique defined as "[...] an operation or an operation set that aims to represent a document content in a different way, in order to facilitate, in a subsequent state, its consult and differentiation" ([3], p. 51). The objective in this analysis modality was to extract the largest information number possible (quantitative

[1] According to data provided by the United Nations Educational, Scientific and Cultural Organization (UNESCO) for The World bank working for a world free of poverty. On the website is possible to verify statistics on education in each country.

aspect) in a high coherence level (qualitative aspect), regarding to sustainability content on those documents.

In the field research we've conducted semi structured interviews with the coordinators of the analyzed courses and previous selected teachers based on the content of the subjects that presented relation with sustainability or flexibility to work with it, in order to apprehend their understanding about the issue of this research. Questionnaires were also used to interview the students that enrolled in the last year of the course by the criteria that they would have accomplished most part of the disciplines in their courses. All the questions both at the interviews and the questionnaires were related to Sustainability, Environmental Education, the University and their teacher training courses.

2.1. Collecting Data

The sample includes the teacher training courses at UNIOESTE, Cascavel/PR campus. The data collection was made in three stages: in bibliographic, documentary and field research. The agents involved in the data collection are: National Curriculum Guidelines, National Curriculum Guidelines for Environmental Education, National Policy for Environmental Education, Indicators of ACES Network, PPP's of the courses that are part of this sample, questionnaires to students in the last year of their course and interviews with the coordinators and teachers.

The bibliographic research had reached books and academic works of authors who currently discuss the theme sustainability, aiming to outline the current environmental situation and some diagnostics to environmental problems caused by human intervention, as well as those who study in the field of education, giving importance to environmental education in all knowledge areas. The objective of this moment of the research was to understand the concepts and definitions of sustainability so then we could verify whether and how these concepts are approached in educational institutions. During this process it was possible to identify which are the mondial and national organizations involved with environmental problems, Brazilian legislations, network projects and academic works that transit through this thematic.

To know the current environmental impacts and a certain fragility [23] found in educational institutions regarding to the theme insertion led us to the second part of the work, the document research. We sought to know the documents created by organizations, conferences, networks and projects, legislation, curricula, etc. In this paper we mention the main organizations, national legislation, conferences, networks and national and international projects found on the bibliographic research that concern the curricular environmentalization and curriculum of teacher training courses from UNIOESTE, Cascavel campus.

For a deeper understanding of how the issue has been included in the courses, it was not enough just to analyze their curriculum, but also made use of a field research, involving students enrolled in the final year of each course, pre-selected teachers and coordinators.

The students' questionnaires were made in the classroom, and to the teachers and coordinators we made pre-scheduled interviews. By using the interview as a source of research data, we satisfy what Skalinski Junior ([36], p.174) calls the basic premise: "[...] to collect a data that cannot be obtained only through bibliographical or observation research." The author also refers to Minayo (2007) and Lakatos & Marconi (2006) when he add that: "[...] the basic criterion that justifies the interview techniques application remains the same, to know, the relevant collected data that would not be reached if not involving human being as a verbal information source" ([36], p. 174).

A total of 50 students had answered the questionnaire, which lasted about 20 minutes, being 39 pedagogy, 7 biological Science, 3 mathematics and 1 literature and language students of each course. We also interviewed 9 teachers and 4 coordinators, which lasted between 10 and 50 minutes, being 3 pedagogy teachers and 2 teachers from each course, as well as the coordinators.

The three research sources brought relevant data and were equally considered, the sum of the data collected at each stage was indispensable for this research in its entirety.

2.1.1. Data Processing

At the first moment we attempted to identify the national educational standards for each course involved in this research, as well as for environmental education, specifically. By means of a content analysis [3], the most relevant data were extracted from documents of DCNs and PNEA which concerned to environmental education in higher education institutions, alongside the indicators of ACES Network, settled, in this research, as parameters to identify sustainability content in Pedagogical Politics Projects (PPP) of the focused courses.

After extracting data from the base documents of this work, we used categories that could point the aspects that identify one environmentalized course. The categories regarding the ACES network were established by the ten indicators considered essential for the characterization of courses with a environmentalized curriculum: (1) Commitment to the society-nature relations transformation; (2) Complexity; (3) Disciplinary order (flexibility and permeability); (4) Local - global - local and Global - local – global Contextualization; (5) Consider the subject in the knowledge construction; (6) Consider the cognitive and affective aspects of people; (7) Coherence and reconstruction between theory and practice; (8) Guidance to alternative scenarios; (9) Methodological adequacy; (10) Reflection spaces and democratic participation.

These ten indicators were created by members of eleven universities, among them three Brazilian: Universidade Estadual Paulista (UNESP - Rio Claro *campus*), Universidade Federal de São Carlos (UFSCar) e Universidade Estadual de Campinas (UNICAMP).

From the National Curriculum Guidelines we create three categories, the minimum parameter stipulated to environmental education, which can occur: (1) By transversality, by issues related to the environment and the socioenvironmental sustainability; (2) As content from the yet constant curriculum components; (3) By the combination of transversality and curricular component treatment.

For those categories, we used the knowledge insertion regarding to environmental education in the Basic

Education and Higher Education curriculum, which can be found at Art. 16 (2012, p. 5).

Finally, eight categories were established regarding PNEA: (1) The humanistic, holistic, democratic and participatory approach; (2) The conception of the environment in its entirety, considering the interdependence between the natural environment, the socio-economic and cultural, with a focus on sustainability; (3) The pluralism of ideas and pedagogical concepts, from the inter, multi and transdisciplinary perspective; (4) The link between ethics, education, work and social practices; (5) The guarantee of continuity and permanence of the educational process; (6) The permanent critical evaluation of the educational process; (7) The articulated approach of local, regional, national and global environmental issues; (8) Recognition and respect for plurality and individual and cultural diversity. For these categories, we identified the basic principles established for environmental education in PNEA.

After defining the categories established as a guide to identify curriculum environmentalization processes in undergraduate courses, we sought the PPP of the highlighted courses in the university's own website and on their collegiate bodies.

The access to the documents allowed the analysis of the curriculum of all subjects from all periods of the courses, in order to identify whether they work with sustainability content in their curricula, using the categories as parameters.

In the last data processing stage, the analysis of the most subjective part of the work was made, which were extracted fragments of the interviews and the questionnaires conducted with students, teachers and coordinators, in order to identify what is their understanding of sustainability and how the contents have actually been applied in the subjects of the courses.

Finally, the exposure of the data of this research will support the response of the problematic in focus: UNIOESTE's teacher training courses are in a curriculum environmentalization process?

3. Results

This chapter presents the literature review and the analysis and discussion results of the document research conducted in the curricula of the following courses: Biological Sciences, Literature and Language, Mathematics and Pedagogy, and field research conducted in the four teacher training courses in order to establish relations with different sources for the realization of a data triangulation. The analysis of the documents, interviews, and questionnaires were conducted by Bardin [3] content analysis technique.

In the interviews and questionnaires, we sought to identify perceptions about sustainability, and to verify if changes were made in the curriculum of courses and if these changes have satisfactory results for the understanding of the theme. We sought to, also, apprehend the existence of discussions on sustainability and environmental education in the courses, as well as their insertion in the curricula.

3.1. Sustainability

Veiga (2010a; 2010b) exposes three concepts of sustainability. The first basic discourse is defended, mainly, by economists that, although there is no scientific evidence, claim that we can conciliate economic growth with environmental conservation. Basing on the assumption of the American economist Simon Kuznets Smith (1901-1985), winner of the Nobel Economics Prize in 1971, the creators of this strand (GROSSMAN & KRUEGER, 1995 *apud* [39]) believe that the environment would be harmed by a certain level of economic performance, determined by per capita income and, after passing certain level of wealth, the tendency would be improvements in environmental quality [39,40].

On the other hand, there is the opposition of this discourse that argues that the current capitalist mode of production is in an unsustainable pattern for the human species. The economist Herman E. Daly, quoted by Veiga [39,40], proposes a stationary economic conditions, in which is valued the quality of life without expanding economic development, planning a no growth progress transition, in which the economy would continue to improve qualitatively, following biophysical principles, such as the replacement of fossil fuels by clean energy, for example.

Another slope comes to those who consider inconsistent the economic position facing the contemporary environmental problems and unviable the ecological position facing the current consumption culture. If we consider that the economic, political and social development is inevitable, we should at least find alternatives to do it in a way that prioritize the life of all living creatures that inhabit this planet. It is by the way of eco-efficiency [5,39] that the third discourse unfolds, reconfiguring the current production process.

It is believed that the concept of sustainability has a historical landmark in the 1970s from the UN meetings, and in 1987, it has expressed for the first time in the Brundtland Commission's report, entitled "Our common future". However, according to Boff [5], this concept has been around since the year 1560, drawn up in Germany since the forestry (practice of rational use of forests).

The term "sustainable development" is defined in almost all literature that relates to the subject at issue as "[...] the one that attends the needs of the current generations without compromising the capacity of future generations to attend their needs and aspirations" ([5], p. 34).

From this perspective, it is emphasized that natural resources are finite and there is a big necessity to reduce the use of raw materials, increase the reuse and recycling and plan the economic, social and cultural future of the society. This is a big challenge that permeates all areas of knowledge: reconciling economic and social development with environmental impact.

The enormous social and economic transformations of the modern man show how this modernity subordinated the nature to the development of science, technology and ideas of progress.

In the 1970s, we witnessed natural global disasters - as, for example, cyclone in 1970 and flooding in "hunger year" 1974, both in Bangladesh, drought in 1975 in Ethiopia - related to this progress, pointing also for the first evidence of the lack of natural resources, which is a reflection of the excessive use of raw materials [23].

These transformations were exhibited in the mid-twentieth century, especially in the Group of Seven (G7 – Canada, France, Germany, Italy, Japan, United States, and

United Kingdom) that, due to health, education, sanitation, work and power needs, suffered a growing demand for energy, communications and transport consumption, main items of economic infrastructure, causing enormous environmental impacts in urban and rural areas. This fact also occurred with higher evidence from the 1980s, in developing countries, particularly the BRICS (Brazil, Russia, India, China and South Africa).

With the new necessities arisen due to the population increase and exaggerated consumption initially and mainly stimulated from the G7, in order to keep their economies, the production of consumer goods was transferred to developing countries, causing them enormous environmental impacts [22].

Such referrals only began to be discussed in the late twentieth century, with the creation of rules to minimize the main environmental aggressions: the deforestation; the agricultural expansion; urbanization; and pollution. As a consequence of these discussions, according to the International Union for Conservation of Nature (IUCN), 12% of the world's land is under the shelter of laws, the double than it was in the early 1990s.

The discourse of an effectively sustainable development reached the twenty-first century by the pressing need to keep up with advances of science and technology combining with current cultural needs and the harmonious coexistence with the environment. For this, it became necessary environmental education, pointed out as one of the ways to sustainable development.

In an informal meeting with Anna Maria Geli (2014), the coordinator of the ACES Network of the University of Girona (Spain) said that, before the emergence of the word Sustainability people were talking about Environmental Education, because the term did not yet exist. It is a contemporary term to name the Environmental Education in a broader sense, that escapes the walls of educational institutions and go to the daily life of every citizen of the world.

Preceding the term "Sustainable Development", was launched the word "eco-development" by the director of UNEP[2], Maurice Strong, in the halls of the Stockholm Conference[3] in the 1970s, even before having a content on this issue:

> [...] first there was the vocable, and then we began to dig into the content. Therefore, we would work for several years on perfecting the concept of eco-development, which in the meantime had turned into "sustainable development" ([39], p. 234).

During the conference, there were two opposite sides in relation to the positioning on sustainable development. On the one hand the optimists, who put economic development in the first place, as a priority objective so the developing countries could reach the already developed countries. Once this goal has been achieved, it may be thought on solving the impacts on the environment.

On the other hand, the pessimists who believed that the demographic and economic growth should be suspended immediately or the humanity would suffer the lack of resources and serious environmental problems, or even the disappearance of our species. However, between the two oppositions, emerged a plausible alternative that would extend to both sides. "The economic growth still was necessary. But it should be socially receptive and implemented by favorable methods to the environment" ([40], p. 52).

International organizations that deal with the environment as the "World Wide Fund for Nature" (WWF) which has a non-governmental organization (NGO) in Brazil (WWF-BRASIL), define the concept of sustainable development as the proper development to the needs of the present generation without jeopardizing the needs of future generations. It is, therefore, a development that does not exhaust the resources for the future.

Sachs [40] also points on criteria to move towards sustainable development. According to the author, it is necessary social, cultural, ecological, environmental, territorial, economic and national and international policies changes.

Sustainability, for its inter- and transdisciplinary characteristic, has the possibility to carry over into all areas of knowledge. However, despite legal requirements and social demands for an education that encompasses the environmental dimension, the researches showed a weak formation in environmental education in Brazilian higher education institutions.

3.2. Curriculum

To define which content should be included in the curricula of educational institutions at any level of education is a major challenge for contemporary education and has been studied by many researchers of different fields of knowledge [1,15,16,25,26,28]. This topic will discuss the thought of Edgar Morin, which is expressed in the perspective of Montaigne's (1533-1592) epigraph: “Rather a well-made than a well-filled head”.

To form new generations in the perspective of provide an accumulation of knowledge, as it is so vaunted in the Brazilian educational discourse, it does not seem to make sense in the context of a society whose information’s are produced and disseminated at high speed, due to communication and information technologies.

Therefore it seems more pertinent to move towards a training that aims "a well-made head" with competence to establish connections from a knowledge to other, giving them meaning and situating its relations with the current context, rather than a training aimed at, so only, the accumulation of knowledge.

The current curricular organization hinders the development of general skills and facilitate the specializations development, however “[...] the more developed is general intelligence, the greater its ability to deal with special problems” ([25], p.22).

For general intelligence development, it is necessary to instigate the subject to doubt, a necessary attitude for the critical thinking development. This intelligence comprises what the Greeks called a *métis*, “[...] set of mental attitudes ... that combine the 'flair', the wit, the prediction, the lightness of spirit, the resourcefulness, the constant attention, the opportunity sense.” (MAIRENA *apud* *[25]* p.22).

[2] UNEP: United Nations Environment Programme, the leading global authority on the environment, is the agency of the United Nations System (UN) responsible for promoting environmental conservation and efficient use of resources in the context of sustainable development.

[3] Stockholm Conference: First UN Conference on the Environment held in June 1972 in Stockholm, capital of Sweden.

Morin proposal [25,26,27,28] comes from the fact that the knowledge fragmentation has been training "arrogant", "cold" specialists, with a humanistic perspective lack and that it is necessary to rewire the fragmented knowledge. This rewiring of knowledge, dispersed, imposes another position facing the "dynamics of planetary living systems" and requires the refusal of the division of natural sciences and culture. In this sense:

> The parceled, compartmentalized, mechanistic, reductionist and disjunctive intelligence breaks the world's complex in disjoint fragments, fractionates problems, separates what is united, makes the multidimensional into one-dimensional. It is a short-sighted intelligence that turns out to be usually blind (MORIN, 2000b p.43).

Although it is not possible to imagine everyday life without the experts of education, medicine, law, engineering, among others, given the high level of sophistication of the knowledge production at the present time, it is paramount to educate in a more systemic way. It means forming intellectuals who have the ability to think about the culture in a broader sense. Therefore, it is necessary to train teachers to work at all levels, who are able to integrate their subjects and who can articulate nature and culture, man and cosmos, in a perspective of train people who are committed to what Markus Raskin (1986) calls "the common good".

For Morin ([25], p. 9-11), the education reform necessarily involves the reform of thought. First, Morin [25] differentiates some common words related to teacher training. The "Education", for example, relates to the use of methods that provide the formation and human beings development. Regarding the term "Forming", carries a sense that denotes "molding and resignation" and that, for him, does not stimulate auto didacticism which favors "the autonomy of the spirit". Regarding the word "Teaching", Morin (2000a) states that is the "[...] art or action of transmitting knowledge to a student, so that he will understand and assimilate, has a more restricted sense, because it is only cognitive." ([25], p.11).

The word "Teaching" restricts and the word "Education" has "an excess and a lack" [25]. Thus, he develops his thought keeping in mind an 'Educational Teaching", since teaching is not restricted to the transmission of knowledge, but to a culture appropriation that assists to live thinking openly and freely about the human condition. In synthesis, for this thinker, the Education has the potential to contribute to the transformation of people to a more humanized world.

On the one hand, universities, separate, fragmented knowledge, compartmentalized between subjects, and on the other hand a world with problems, "[...] polidisciplinaries, transversal, multidimensional, transnational, global, planetary questions" ([25], p.13).

For Morin (2000a), the hyperspecialization does not allow to apprehend a global view of problems that the reality presents neither allows to visualize the essential, because the essential problems cannot be fragmented and, furthermore, global problems are increasingly essential. Particular problems can only be reflected in the right way within their contexts which, in turn, are included in the planetary context.

Also according to Morin [25], the challenge of globalization is, also, the challenge of complexity. Important to highlight, here, what the author meant by complexity:

> There is complexity, in fact, when the components that constitute a whole (such as economic, political, sociological, psychological, emotional, mythological) are inseparable and there is an interdependent web, interactive and inter-retroactive between the parts and the whole, the whole and the parts. Well, the developments of our century and of our planetary era, inevitably and more often confront us with the challenges of complexity. ([25], p.14)

The curriculum content organized in a fragmented way makes the already complex task, providing formal education to instigate and promote reflections on a world that has problems with many dimensions, even more difficult. Although the science divisions have brought the advantages of the division of labor, it also brought the limitations of hyperspecialization, isolation and over division. Therefore, not only knowledge and information were produced, but also the "ignorance and blindness" ([25], p. 15).

However, instead of correcting the distortions of knowledge division excess held by rationalist science, the educational systems were subjected to this logic. In formal education, at all levels, it is taught to separate the objects from the environment, to separate discipline, instead of "get together and integrate". The curricular organization logic requires to "[...] reduce the complex to the simple, separate what is connected, to decompose and not recompose, and to eliminate all that causes disorders or contradictions in our understanding" ([25], p.15).

The way knowledge is distributed in the curricular organization makes children and young people have difficulty of thinking in a contextualized way, namely, to place the information in its context. Moreover, for Morin [25,26,27,28], the knowledge develops more by the ability to contextualize and encompass information than actually by the formalization, sophistications and abstractions.

Morin [25] also points to the vertiginous knowledge speed and growth, which he compares with the great Tower of Babel that, according to the history, a united humanity, speaking a single language, agreed to build a city and tower. Seeing this, God confounded their speech so that they could no longer understand each other and scattered them around the world. They uttered multiple languages that did not communicate. For this author, it is important to highlight the difference between knowledge and information:

> Knowledge is only knowledge as an organization, related to the information and inserted in its context. The information constitutes dispersed portions of knowledge. Everywhere, both in science and the media, we are drowning in information. The expert from the more restricted discipline does not even know about his area information. Increasingly, the massive knowledge proliferation runs off human control ([25], p.16).

Another aspect to be highlighted of the thought of Morin [25] is the split between the humanistic culture and scientific culture, which began in the nineteenth century and has worsened in the twentieth century. He defines the humanistic culture as:

> [...] a general culture that, by means of philosophy, rehearsal and novel, feeds the general intelligence, faces the great human questions, encourages the

knowledge reflection and promotes knowledge personal integration ([25], p.17).

In contrast, the scientific culture "[...] separates the knowledge areas; brings wonderful discoveries, brilliant theories, but not a reflection on human destiny and the future of science itself" ([25], p.17). Due to the excessive separation between knowledge areas, expressed in hyperspecialization, the scientific culture may lose its ability to reflect on the social and human problems, often resulted from its own science development. According to Morin [25,26,27], various problems occurs from the hyperspecialization, among them we highlight:

The responsibility sense weakening - each one tend to be responsible only for their specialized task - as well as the solidarity weakening- no one preserves its organic link with the city and its citizens ([25], p. 18).

As a consequence of the hyperspecialization, the technical knowledge is limited to the "experts", who end up losing their "aptitude" to connect the issue of their studies with the world's problems, expressing itself through the incompetence of understanding, as a citizen, the planetary context.

The ability to establish relations between the phenomena and their contexts enables the subject to realize the reciprocal movement of the local to the global and vice versa. In this sense "to think locally, you need to think globally and to think globally you need to think locally" ([25], p.25).

The feasibility of a thought which Morin [25] calls "complex" requires a path that is not only break down the boundaries between disciplines, but radically change what engenders the separations that, for him, are the thought organizers principles. This means that:

We need to replace a thought that isolates and separates by a thought that distinguish and unites. We must replace a disjunctive and reducing thought for a complex thought, in the original sense of the term *complexus*: what is woven together ([25], p.89).

This replacement will be carried out by a reform to a complex and contextualized thought that unites replacing linear and unidirectional causalities by circular causalities with multiple references. This exercise of thinking has the potential to correct the rigidity of the classical rationalism, embracing concepts that are both complementary and antagonists simultaneously shown. [25].

It is important to highlight the seven principles of Morin [25] which are complementary and interdependent to a thought that is able to combine knowledge:

Systemic or organizational principle: the whole is not simply the sum of the parts, because it does not inhibit its differences in the set organization.

"Hologramatic" principle: points out that not only the part is in the whole, but the whole is inscribed in the part: "the totality of the genetic heritage is present in each individual cell [...]" ([25], p.94).

Retroactive circuit principle: It represents a break with the linear causality principle, because "the cause acts on the effect and the effect acts on the cause [...]" ([25], p.94).

Recursive circuit principle: It is a circuit that we, humans, are the producers of the society through our interactions, but we are also a product of this society, which provides us the language and the culture.

Autonomy / dependence (self-organization) principle: as well as the living creatures depend on energy for self-production, human beings depend on their cultures to develop their autonomy, that is why they are understood as self-ecoorganizers beings. The self-ecoorganization principle follows the Heraclitus (535 a.C. – 475 a.C.) recipe "live of death, die of life", in which the ideas are antagonistic, however they complement each other.

Dialogic principle: conceives the phenomenon complexity when opposite concepts is united, taking on the inseparability among them. The dialogic enables to un-dissociate the antagonistic notions that tend to exclude each other.

Knowledge reintroduction in all knowledge principle: reforming the thought is the knowledge organization. The thought reform allows the absolute use of intelligence, effect of a "well-made head".

For Morin [25], the described principles above have the potential to engender the reform of thought, at any level of formation. It is not related simply to a content and curriculum organization change, but rather relates to a paradigm shift, because it refers to our ability to organize the thought that the current curriculum constructions logic difficult, or even precludes, to establish connections between knowledge.

The problems related to the current curricular design are, sometimes, restricted to quantitative issues: more content, more disciplines, more hours. Or the opposite: less content, less discipline, less hours.

As discussed previously, this issue involves many interest conflicts and resistance to reform, because many teachers already have crystallized habits in their disciplines considered as their territories that are defended as something sacred. [25].

The reform of knowledge imposes a reform of thought, which requires the ability to integrate knowledge, in a constant movement of back and forth among global and local levels. The ecological problems currently experienced are not solved only through education, nor to the curriculum reform. However, it is not possible to reform thoughts without the reform of education and vice versa [25,26,27,28].

Lastly, we need a profound change in thinking the relationship between nature and humanity. Therefore, change the teacher training curriculum is a small step towards a reform of thought, which can promote to the new generations a greater awareness that we are all children of the Earth, Life and Cosmos [28].

3.3. Teacher Training Courses of UNIOESTE – Cascavel

The UNIOESTE has 5 campi in the cities: Cascavel, Foz do Iguaçu, Francisco Beltrao, Marechal Candido Rondon, Toledo, besides the University Hospital. This research was outlined in the campus of Cascavel, Parana, Brazil. The campus offers 20 degree courses distributed in 5 centers: Biological and Health Sciences Center (CCBS); Medical and Pharmaceutical Sciences Center (CCMF); Exact and Technology Sciences Center (CCET); Applied Social Sciences Center(CCSA); Education, Communication and Arts Center (CECA), being part of this research the teacher training courses: Biological Sciences (CCBS), Literature and Linguistics (ECSC), Pedagogy (ECSC) and Mathematics (CCET).

This topic will show the results of the document and field research regarding the courses analyzed: Biological Sciences, Literature and Linguistics, Mathematics and Pedagogy, establishing relations with the theoretical foundation aiming to respond: the teacher training courses from UNIOESTE are in a curriculum environmentalization process?

3.3.1. Biological Science Course

With a curricular grating of 46 subjects distributed in five years of course, it was possible to highlight, within the subjects curriculum, 19 that effectively work with content related to environmental education, presenting all the categories relating to ACES Network, the DCNEAs and PNEA, they are: Physics; Educational Brazilian policy; Educational psychology; Anthropology / Sociology; General Ecology; Systematics Cryptograms and Mycology; Theory and Practice of Science Education and Biology I; Zoology of Invertebrates I; Zoology of Invertebrates II; Environmental education; Geology; Immunology and General and Environmental Microbiology; Ecosystem Ecology; Didactic and Instrumentation for science education; Methodology of biology teaching; Zoology of Chordates II; Didactic and Biology Teaching Instrumentation; Biology Supervised Stage; Population Genetics and Evolution.

The students of biological sciences were the ones who most showed knowledge on the subject, in which 7 students from 15 questionnaires that were delivered in class answered the questions.

The Biological Sciences course respondents' perception is consistent with the bibliographic research, once they expressed sustainability visions in pursuit for the ecosystems equilibrium. All the interviewees, of this course, expressed a concern with the anthropocentric vision of sustainability and environmental education, considering that this view would justify the supposed human supremacy over other beings.

The sustainability perception of one of the respondents is in line with the more accepted concept of sustainability by international organizations and registered in the Brundtland Report (1987), which we should move towards a development that supplies the current needs without jeopardizing the future generations' survival.

However, in the speech of two interviewees, we identified the pessimistic view of sustainability highlighted by SACHS [34] and VEIGA [39,40], in which humanity would suffer serious environmental problems leading to the extinction of the human species.

Concerning the question about the issue inclusion in the curricular organization of the course, in a transdisciplinary or disciplinary way, one interviewee was against putting on charge just one area or a specific discipline because of the risk of other course teachers to undertake responsibilities to address the issue in their disciplines, bearing in mind that the DCN's guide that the issue should be worked in an inter- and transdisciplinary way.

It is pertinent to consider that, both in literature and in the interviews, the focal issue appears as a complex subject, which requires from the individuals in formation process the ability to connect knowledge. Following the reasoning of Edgar Morin [25,26,27,28], our current context impels us to think in complex ways for dealing with complex problems.

3.3.2. Literature and Linguistics Course

In the initial analysis in literature and linguistics curriculum using the previously established categories, it was concluded that the course is not in a curricular environmentalization process because, even identifying five of the ten categories of ACES Network - disciplinary (flexibility and permeability); to consider the subject in the construction of knowledge; to consider cognitive, affective, aesthetic and ethical aspects of people; coherence and reconstruction of theory and practice; create reflection and democratic participation spaces - it does not meet any of the categories relating to DCNEAs and PNEA because it presents no environmental content in any of the disciplines during the four-year course. We emphasize the subjects that meet the categories of ACES Network and enable to educate for sustainability: Reading and Production Text; text and discourse Linguistic; Teaching Practice and Supervised Internship of Portuguese in Elementary School (early years to 6th year); Teaching Practice and Supervised Internship of Portuguese in Elementary School (1st to 6th grade); Teaching Practice and Supervised Internship of Portuguese and Children's and Youth Literature in Elementary Education; Children's and Youth Literature; Teaching Practice and Supervised Internship of Portuguese and Literature in Primary and Secondary Education.

Although the course does not make any reference to the environmental education in its curriculum, it is the one that presented more possibilities to permeate sustainability content by its nature that enables to work with varied content, since the practice of reading activities and text production are present in a large part of the disciplines. If the teacher is interested in working with this theme, the subject allows it by not specifying which the issues of the texts worked in class are.

The triangulation of data held in the literature and linguistics shows that the course, although it has great flexibility to work with any theme, is in a very recent process of curricular environmentalization, started in 2015, according to information provided by 2 of 3 interviewees, and this speech does not appear in the other interviewee by the fact that the interview was conducted in 2014.

Although all the interviewees are clear that the issue relates to all areas and to all citizens, they believe that the issue can be enriched in the course of literature and linguistics through conjunction work with other courses that already have this deeper knowledge and/or events and lectures by experts in the environmental area, which regards the transdisciplinary that appears as orientation of DCN's, PNEA and the ACES Network for Higher Education courses.

In this course it was possible to extract data from only one questionnaire because, although it was given to a total of 17 students, only 3 answered back, but only one with the Consent and Informed (IC) signed.

It is important to note that the amount of delivered questionnaires/answered questionnaires may indicate some level of interest/disinterest in relation to the theme. More interesting is to realize the relation between the document analysis, questionnaires answered by students and interviews with coordinators and teachers, it is clear that it is even possible to trace a profile of each area, if it were one of the research objectives.

As mentioned earlier in this paper [24], the transversality and interdisciplinary do not separate, but complement themselves. However, they differ in relation to interdisciplinary that questions the fragmentation of knowledge between different areas systematized in disciplines that were constituted throughout history. Differently, the transversality criticizes the alienation and the compartmentalization of knowledge.

From the perspective of Edgar Morin, the curricular structure, with a knowledge disciplinary format, which has been questioned in studies about curriculum, impedes the complex thought. Thus, new organizations with interdisciplinary and transdisciplinary areas, knowledge networks and problem-based learning can be used in literature and linguistics courses, since they have great flexibility with the themes to be worked on in class.

The proposals for curricular changes in higher education, focused on curricular environmentalization, are guided on the understanding that the complexity and multiplicity of knowledge relations involving the theme of sustainability manifest that there are no boundaries between knowledge.

3.3.3. Mathematic Course

Throughout the entire course, only some of the disciplines present flexibility for a methodological adequacy that can explore sustainability content and, even, although covering eight of the ten categories of ACES Network – not contemplating "commitment to the transformation of society-nature relations" and "complexity" - during the four years of the course, it was not found in the curriculum disciplines any mention of words that refer to sustainability or environmental education.

It was also identified that the course promotes 3 optional disciplines opened to be specified in accordance with the proposal of the course pedagogical project, and that could be exploited for the inclusion of environmental education. Among the disciplines that present the Network indicators are mentioned: Didactic Applied to Mathematics Teaching; Psychology Education Applied to Mathematics Education; Mathematics Education Tendencies; Problem Solving and Mathematical Modeling; Mathematic Methodology and Teaching Practice - Supervised Internship I; Mathematics Methodology and Teaching Practice - Supervised Internship II.

The Didactic applied for Teaching Mathematics points as one of its objectives "To present and discuss possibilities of methodological approaches to Mathematics structuring contents of Basic Education", which refers to the item flexibility and permeability.

With a "behaviorist, humanistic, cognitive, historical cultural approaches and implications for teaching practice", the curriculum of psychology education applied to mathematics education presents the indicator "to consider the cognitive, affective, ethical and aesthetic aspects of people" and considers the subject of the knowledge production, making connection to two indicators of ACES Network.

In the discipline Mathematics Education Tendencies is mentioned the coherence and reconstruction between theory and practice when considering the hours of discipline equally distributed between theory and practical activity as a curricular component, besides presenting the theoretical and practical analysis of presuppositions and the development and exploitation in educational practice in the discipline objectives.

The Problem Solving and Mathematical Modeling, by having a "Problem solving Troubleshooting and modeling as a methodological option of educational practice" and as one of the goals to "Apply mathematical modeling to problem solving and to mathematical modeling as a methodological option for structuring content in Basic Education and as application of mathematics" on its curriculum, it can be related to the item Methodological Adequacy.

When considering Spaces for reflection and Democratic Participation in the subject Methodology and Mathematics Teaching Practice - Supervised Internship I and II, it is related to the fact that the discipline I works with the "Elaboration and development of educational projects" and the II works with "Analysis and discussion of the dynamics of school space, its planning and evaluation of the pedagogical process", as well as when it presents in the objectives of the discipline I the words: discuss; recognize; develop and implement; experience, and of the II: recognize; elaborate; experience.

Regarding the categories that mention the DCNEAs and PNEA, the course does not have any of them and, due to the lack of any mention to the nature, environment, sustainability or any other word that refers to environmental education, it can be considered that the course is not in a curricular environmentalization process, despite presenting some disciplines with opportunities to explore this theme permeating by mathematical content based on the theme in question.

Although the course of Mathematics does not present sustainability content in the disciplines curriculum, it appear in the speeches of the three interviewees, that these contents are inserted in some subjects, and that it has already been discussed in meetings between coordinator and teachers the question that this issue, legally, must be considered in the pedagogical policy project of the course and, thus, it was adequate in 2008. Nevertheless, it is possible to realize, by the detached fragments in the analysis, that these adequacies arose more by regulation than by the commitment on addressing sustainability issues on the course.

The mathematics course was the one that had less students in the classroom, giving a total of 10 delivered questionnaires where 3 students answered, in which they showed interest to the theme.

An observation in this research is that the teacher training courses of UNIOESTE from Cascavel, PR, Brazil, seem to objectify a training in an knowledge accumulation perspective, widely criticized by Edgar Morin [25,26], and which may be in disparity with the society environmental problems context and that requires the commitment of teacher educators in any field of knowledge.

In Edgar Morin [25,26] reasoning line, it is more convenient to objectify training with capability to interconnect knowledge rather than a formation that targets, only, the mathematics specialty and the knowledge accumulation.

The current curricular organization of all analyzed courses in this research promotes the training of teachers specialized in their respective knowledge areas, however, as well as pointed by Morin [25,26], better would be to

provide a training that aims to develop the "general intelligence", to face the current problems related to sustainability.

In the development of this general intelligence, we seek to excite students to doubt, instead of teaching them the prospect of incontestable truths, referral required for the formation of critical thinking.

For Morin [25,26,27,28], the knowledge fragmentation forms experts devoid of humanistic perspective and to change the current perspective of training is necessary and urgent to build curriculum proposals that aim an integration of knowledge. This connection proposes the integration of the sciences of nature and culture.

3.3.4. Pedagogy Course

Analyzing the course subject's curriculum, it was found that there is a curricular environmentalization process, since, during the 4 years of training, it attends to six of the 10 categories of ACES Network.

Over the four years of course, it is possible to identify indicators of ACES Network in 7 of the 31 disciplines that make up the Pedagogical Policy Project of the course: Education History I; Research Methodology; Education Psychology I; Supervised Internship in the form of Teaching Practice; Education Sociology; Natural Science Education Theory and Practice; Work and Education.

Concerning the DCNEA, it was found that the subjects "Natural Sciences Education Theory and Practice" and "Work and Education" contemplate the three established criteria to identify environmental education on the course curriculum, presenting transversality through environment and social and environmental sustainability related topics in content already included in the curriculum; by the transversal articulation of Curricula components.

Featuring up of the categories, established in this work, to identify basic principles of the National Policy for Environmental Education (PNEA) in the Pedagogy Course PPP, it was found that it does not include any of the categories set for this item. Although the course subjects curriculum contemplate the minimum content defined by the National Curriculum Guidelines for Environmental Education, the course does not meet the basic principles that were established in PNEA.

In this analysis plan was perceived a fragile integration of environmental issues and the concept of sustainability in terms of national policies, constituting it in a gap in a curriculum that aims to educate citizens committed to social transformation.

It was verified, after analysis of Pedagogy course disciplines curriculum from UNIOESTE Cascavel campus, that the course meets the minimum standards established by ACES Network and the DCNEA, but does not include the basic principles of PNEA.

It can be said that the course curricula superficially meet the current sustainable demand. I.e., the course, according to the disciplines curricula - and if they are followed -, is in a curricular environmentalization process, but needs updates and additions.

Although it has a curricular environmentalization process that meets six of the 10 categories of ACES Network, it manifests a contradiction in the appropriation of issues inclined to the theme sustainability, once the sustainability perceptions are at a level based, predominantly, in common sense. This observation parts, first of all, of the teachers during the interviews process.

The course professional profile is that the teacher will be the professional qualified for teaching activity in early childhood education and early years of elementary school, and that in the set of all interviews, of the 4 degrees, it was agreed that this training should begin in early childhood education, but this issue has not been discussed in the course. This observation is reinforced by the questionnaires where most of the students declared that they do not feel prepared to work with this theme.

The curricular organization of the various disciplines has a feature that makes it possible to address this issue in a thorough, if it is the political commitment in the course pedagogical project. However, both this course as the other teacher training courses, the teachers do not feel encouraged by UNIOESTE, because, according to the interviewees, it is not constituted as a sustainable educator space.

Despite the students' interest in contributing to the research by providing data, it was observed, among most of the answers, a shallow knowledge and even unfamiliarity on the subject.

Of the four respondents, only 1 appeared to have a reasonable knowledge of the theme of sustainability but not focused on teacher training, because all of them replied that this issue is not discussed in the course, although they recognize its importance.

4. Discussion

This study aimed to contribute to the teacher education in relation to the theme of sustainability. One of the questions we seek to demonstrate was the need to insert the environmental education in higher education institutions. We sought to identify the integration of sustainability content in teacher training courses of UNIOESTE with the challenge of answering the following question: "the UNIOESTE teacher training courses on Cascavel campus are in a curricular environmentalization process?"

Therefore, there were primarily bibliographic studies on the subject and its various aspects in order to grasp the concepts and definitions of sustainability, used as a parameter to identify the perceptions of students, teachers and coordinators during the analysis of questionnaires and interviews with them.

As mentioned above, sustainability, generally, is defined as something that supports itself, is preserved and remains in equilibrium. A sustainable society uses the benefits of the environment they live in, always seeking a balance. In ecological dialect "[...] it represents procedures that we take to allow the earth and its biomass to remain alive, protected, fed of nutrients in a way to be always well preserved" ([5], p.32).

In studies of sustainability and inclusion of this issue in higher education institutions, national legislation that deals with environmental education was identified, as well as ACES Network, which was created in order to contribute to the training practices proposing changes to the Higher education curricula. This network, whose propositions walked toward a committed training to the needs of our time, aimed to instigate the future professionals

acting in their activities, taking into account the need for changes in the environmental aspects.

After these studies, it was possible to set parameters for document analysis from DCNEA, PNEA and ACES Network, held in the second stage of this work, which established categories for the analysis in the courses curricula, seeking to investigate whether they were in a process of curricular environmentalization. At this stage of document analysis, it was found that teacher training courses of Cascavel campus are in a very incipient and fragile environmentalization process.

This observation was reinforced by the triangulation data, through field research, conducted interviewing the teachers and coordinators of the courses and questionnaires to students. The perception of teachers, coordinators and students has demonstrated a training perspective more focused to the specialty of each course without cover issues that cut across all courses, such as sustainability. Although it has been explained by the interviewees the need to insert this issue in a transversal manner, it also showed a contradiction when they emphasized the need for this issue to be approached by experts.

The perception of some coordinators, teachers and students that the issue has to be addressed by experts is opposed to the perspective of Edgar Morin (2000a; 2000b; 2005; 2015), which points to the urgent need for a training that aim the integration of knowledge.

5. Conclusion

Although one cannot dispense the expertise, because there is no way to imagine an everyday without a doctor, dentist, teacher, among others, the criticism of Edgar Morin in relation to hyperspecialization, is facing the problem of loss of ability to connect knowledge. This lack of ability to link knowledge was identified in this survey, in which respondents in this study demonstrated a difficulty to locate and integrate the disciplines and their knowledge in relation to the theme of sustainability.

The choice of content for the training of teachers is a problematic issue, since it is necessary to identify which are the priorities of our time, considering that the construction of curricula suffers the historical, political and social conditions which establish a hierarchy of knowledge.

The teacher education problematic should be constantly made questioning the validity of predetermined prescriptions in a constant changing world with advances in scientific and technological field that requires a teacher training guided by epistemologies and methodologies of complexity and transdisciplinary.

The curricular organization with disciplinary format, has been addressed in education literature highlighting the fragmentation of knowledge in teacher education, questioning the epistemological design of university curricula. Thus, new interdisciplinary and transdisciplinary organizations are being experienced due the comprehension that the complexity and multiplicity relations of knowledge reveal that the borders only exist in a disciplinary way.

This research verified that changes are taking place in the teacher training curricula of UNIOESTE. However, as pointed out by Pereira [29], curricula continue to be reformulated with disciplinary structure and hierarchical knowledge, which are not integrated. Considering that scientific development has been expanding in all fields of knowledge and entering rapidly in everyday activities, it is necessary that the issue of sustainability is integrated in curricula in a transversal manner, in line with the needs of our historical time.

References

[1] APPLE, M. Ideologia e Currículo. Traslation of Vinicius Figueira. 3. ed. Porto Alegre: Artmed, 2006.

[2] ARROYO, M. Currículo, território em disputa. 5th Edition. Petrópolis: Vozes, 2013.

[3] BARDIN, L. Análise de conteúdo. Translation of Luís Antero Reto e Augusto Pinheiro. São Paulo: Editions 70, 2011.

[4] BÍBLIA SAGRADA. Livro Gênesis. Verses 4-9. Translation of João Ferreira de Almeida L.C.C. Publicações Eletrônicas / e-Book version: eBooksBrasil.com, s/d. Available in: http://www.culturabrasil.pro.br Access: 31/10/2015.

[5] BOFF, L. Sustentabilidade: o que é - o que não é. 3th Edition. Petrópolis: Vozes, 2014.

[6] BRASIL. Conselho Nacional de Educação. Parecer nº. 1.301/2001. Diretrizes Curriculares Nacionais para os cursos de Ciências Biológicas. Diário Oficial da União, Brasília, DF, 2001.

[7] BRASIL. Conselho Nacional de Educação. Parecer nº. 492/2001. Diretrizes Curriculares Nacionais para os cursos de Letras. Diário Oficial da União, Brasília, DF, 2001.

[8] BRASIL. Conselho Nacional de Educação. Parecer nº. 1.302/2001. Diretrizes Curriculares Nacionais para os cursos de Matemática. Diário Oficial da União, Brasília, DF, 2001.

[9] BRASIL. Conselho Nacional de Educação. Resolução CNE/CP nº 1. Diretrizes Curriculares Nacionais para os cursos de Pedagogia. Diário Oficial da União, Brasília, DF, 2006.

[10] BRASIL. Conselho Nacional de Educação. Resolução CNE/CP nº 1. Diretrizes Curriculares Nacionais para a Educação Ambiental. Diário Oficial da União, Brasília, DF, 2012.

[11] BRASIL. Ministério da Educação. Lei nº. 9.795. Política Nacional para Educação Ambiental. Diário Oficial da União, Brasília, DF, 1999.

[12] CAPRA, F. Alfabetização ecológica: a educação das crianças para um mundo sustentável. STONE, M. K.; BARLOW, Z. (orgs.); prólogo de David W. Orr; prefácio de Fritjof Capra; prefácio à edição brasileira de Mirian Duailibi. Tradução de Carmen Fischer. São Paulo: Cultrix, 2006.

[13] FERNANDES, V. Inercia social e educação ambiental. In: XI Congresso Nacional de Educação - Educere. Curitiba – PR, September, 2013, p. 30399-30401.

[14] FEYERABEND, P. Contra o método. Translation of Octanny S. da Mota e Leonidas Hegenberg. Rio de Janeiro: F. Alves, 1977.

[15] GOODSON, I. Currículo, narrativa e o futuro social. Translation of Eurize Caldas Pessanha e Marta Banducci Rahe. In: Revista Brasileira de Educação. v. 12. n. 35. may/aug. 2007, p. 241-251.

[16] GOODSON, I. Currículo: teoria e história. Tradução de Attílio Brunetta. 14th Edition. Petrópolis: Vozes, 2013.

[17] GORE, A. Uma verdade inconveniente. São Paulo: Manole, 2006.

[18] GUIMARÃES, M. A Formação de Educadores Ambientais em tempo de crise. In: XI Congresso Nacional de Educação - Educere. Curitiba – PR, september, 2013.

[19] GUERRA, A. F. S. Ambientalização curricular e sustentabilidade na Universidade: concepções de professores e coordenadores de cursos de graduação da UNIVALI. In: XI Congresso Nacional de Educação - Educere. Curitiba: Educere, 2013.

[20] HOBSBAWN, E. The invention of Tradition. London: Cambrigde University Press, 1983.

[21] JUNYENT, M., GELI, AM., ARBAT, E. Características de la Ambientalización Curricular: Modelo ACES. In: Ambientalización Curricular de los Estudios Superiores: Proceso de la caracterización de la Ambientalización Curricular de los Estudios Superiores. Girona: Universitat de Girona- Red ACES, 2003, p. 14-32. Available in: http://insma.udg.es/ambientalitzacio/web_alfastinas/publicacio/Aces2/02Capitol1.pdf. Access: 13/10/2015.

[22] MÉSZAROS, I. O Século XXI: socialismo ou barbárie?. Translation of Paulo Cézar Castanheira. São Paulo: Boitempo editorial, 2003.

[23] MORAES, L. Sistematização de procedimentos do design para a sustentabilidade ambiental para aplicação no ensino de metodologia de projeto. Universidade Federal do Rio Grande do Sul Escola de Engenharia; Faculdade de Arquitetura; Programa de Pós-Graduação em Design. Porto Alegre, 2011.

[24] MORAES, S. Currículo, transversalidade e pós-modernidade. In: Escola e universidade na pós-modernidade. SANTOS FILHO, J. e MORAES, S. (orgs.). Campinas: Mercado das Letras; São Paulo: Fapesp, 2000, p. 201-244.

[25] MORIN, E. A cabeça bem-feita: repensar a reforma, reformar o pensamento. Translation of Eloá Jacobina. Rio de Janeiro: Bertrand Brasil, 2000a.

[26] MORIN, E. Os sete saberes necessários à educação do futuro. Tradução de Catarina Eleonora F. da Silva e Jeanne Sawaya; rev. Técnica de Edgar de Assis Carvalho. São Paulo: Cortez; Brasília, DF: UNESCO, 2000b.

[27] MORIN, E. Ciência com consciência. Tradução de Maria D. Alexandre e Maria Alice Sampaio Dória. 9th Edition. Rio de Janeiro: Bertrand Brasil, 2005.

[28] MORIN, E. A via para o futuro da humanidade. Tradução de Edgard de Assis Carvalho e Mariza Perassi Bosco. 2th Edition. Rio de Janeiro: Bertrand Brasil, 2015.

[29] PEREIRA, E. Sobre universidade e currículo neste novo século. In: Universidade e Sociedade / Sindicato Nacional dos Docentes das Instituições de Ensino Superior, year XVII, n. 41. Brasília, january 2008, p. 95-103.

[30] PETRAGLIA, I. Edgar Morin: a educação e a complexidade do ser e do saber. Petrópolis: Vozes, 1995.

[31] RASKIN, M. The commom good: its politics, policies and philosophy. London: Routledge & Kegan Paul, 1986.

[32] RUPEA. Ministério do Meio Ambiente. Rede Universitária de programas de EA para sociedades sustentáveis (coord.). Mapeamento da Educação Ambiental em Instituições Brasileiras de Educação Superior: elementos para políticas públicas. Órgão gestor da Política Nacional de Educação Ambiental, Brasília, DF, 2007.

[33] SACHS, I. A Terceira Margem: em busca do ecodesenvolvimento. Tradução de Rosa Freire d'Aguiar. São Paulo: Companhia das Letras, 2009a.

[34] SACHS, I. Caminhos para o desenvolvimento sustentável. STROH, P. Y. (org.). Rio de Janeiro: Garamond, 2009b.

[35] SANTOS FILHO, J. Pesquisa Educacional: quantidade-qualidade. GAMBOA, S. (org.). 4th Edition. São Paulo: Cortez, 2001.

[36] SKALINSKI JÚNIOR, O. Técnicas de entrevista e sua aplicação em pesquisas científicas. In: TOLEDO, C. e GONZAGA, M. T. (orgs.) Metodologia e Técnicas de Pesquisa nas Áreas de Ciências Humanas. Maringá, PR: Eduem, 2011, p.173-202.

[37] UNESCO. Década das Nações Unidas da Educação para o Desenvolvimento Sustentável. Brasília: Unesco, 2005.

[38] UNIOESTE. Pedagogical Policy Project (PPP) of teacher training courses. Available in: www.cascavel.unioeste.br. Access in: 08/05/2014.

[39] VEIGA, J. Sustentabilidade: a legitimação de um novo valor. São Paulo: Editora Senac São Paulo, 2010a.

[40] VEIGA, J. Desenvolvimento Sustentável: o desafio do século XXI. Rio de Janeiro: Garamond, 2010b.

[41] VILELA, R. Os pressupostos antropocêntricos na crítica ao progresso segundo John Gray. Vol. 4, n. 1, 2011. Available in: www.marilia.unesp.br/filogenese. Access in: 12/05/2014.

[42] WWF-Brasil. ONG World Wide Fund for Nature– Brasil. Available in: http://www.wwf.org.br/wwf_brasil/organizacao/. Access in: 09/05/2014.

[43] ZUIN, V. G.; FREITAS, D. Considerações sobre a ambientalização curricular do ensino superior: o curso de licenciatura em química. In: Anais da 30th Reunião anual da ANPED. GT: Educação Ambiental. n. 22; Funding Agency: CAPES, 2007. Available in: http://30reuniao.anped.org.br/posteres/GT22-2994--Int.pdf. Access in: 16/05/2014.