



Socio-ecological sustainability and school garden in the early years of elementary school: a systematic literature review

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Abstract: Other transgressive learning about sustainability needs to be part of the lives of students in the early years of elementary school, as they are responsible for seeking and achieving a sustainable future. However, the focus on socio-ecological sustainability does not seem to be present at this level of education as the literature has addressed. Therefore, the objective is to review articles from journals that address the relationships on socio-ecological sustainability and school garden in the early years of elementary school, published from 2016 to 2021. Based on the ideas of Okoli and Schabram (2010), they used if, in the research, the SciELO and Google Scholar databases and 10 papers were chosen, which were read in full for analysis and discussion. The results show a limited focus on how the teaching of socio-ecological sustainability and school garden has been carried out in elementary school, that is, interdisciplinarity is not widespread and the approach to this sustainability, through the use of the school garden, is non-existent in classroom. It was noticed in the articles that the school garden is insufficiently used in teaching, despite its relevance in teaching-learning, as well as the sustainability addressed in schools involves only the economic dimension when it is essential to connect the social and ecological approach.

Keywords: sustainability; elementary school; school garden; systematic literature review.

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INTRODUCTION

The biggest sustainability challenges of this current period, locally and globally, are climate change, social inequalities and extreme poverty, resulting from human actions. Therefore, education has been considered an essential alternative for mitigating perverse human actions that cause sustainability crises for people and their living environment, as is the case with the crisis caused by the COVID-19 pandemic. With technological advances, there were several changes and challenges faced by humanity; given this specificity, educational requirements have increased, in view of its relevance in the construction of a responsible and aware society with civic action (Sachs, 2019; Tessari et al., 2021).

Education is an essential right for everyone, which enables the development of intellectual capacity and the generation of skills for people through a transformative and transgressive teaching-learning process (Brasil, 1988; Cury, 2008; UNESCO, 2021; Wals, 2021). Transgressive education and research can contribute to the construction of a more sustainable world, contrary to the thought of mere economic growth,



individualism, inequality and poverty that generates catastrophes (Wals, 2021). However, this type of education and research seem to have a limited focus on school teaching and learning, from early childhood education to higher education. There seems to be a hidden unsustainable curriculum in schools, from an early age, which has prioritized simple economic growth, individualism and environmentally perverse problems to the detriment of better lasting living conditions for people and their livelihood (Wals, 2015).

On the other hand, in the current period, the implementation of an action plan around the fulfillment of the 2030 Agenda is in progress, in which the approaches to socio-ecological or socio-environmental sustainability have become relevant, especially for the educational context, educational actions can contribute to achieving the 17 Sustainable Development Goals (SDGs). Among these SDGs, objective 4 stands out, through which the aim is to achieve quality, inclusive and equitable education for all (United Nations, 2015). SDG 4 includes 7 goals, among which is goal 4.7, which aims to

By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and of culture's contribution to sustainable development (United Nations, 2015).

In this scenario, education for socio-ecological sustainability in schools is essential, as it emerges as learning strategies with the application of active methodologies that enable educational, collaborative practices and experiences aimed at solving socio-ecological problems (Wals, 2015).

In this context, seeking publications of journal articles, this work sought to address how socio-ecological sustainability has been considered from the methodological use of the school garden in basic education, particularly in elementary school - early years. The school garden is understood as "a strategy to educate for the environment, for food and for life, as it provides opportunities for such principles to be put into practice and incorporated into the education of school-age citizens" (Barbosa, 2007). Thus, it is a pedagogical tool that brings the individual closer to nature, encourages teamwork, improves eating habits, provides opportunities for interdisciplinarity and promotes the advancement of teaching-learning (Souza et al., 2021). In addition, it is considered a pedagogical tool that enables the relationship between theory and practice, linking contents related to education, health and the environment (Doria et al., 2017). Elementary education – early years – is a teaching modality of basic education that encompasses the 1st to 5th grades, to which everyone has the right and the State has the obligation to grant it (Brasil, 1996, Brasil, 2017; Cury, 2008). The term adopted in this socio-ecological sustainability study takes the focus off the economic dimension and directs the society-nature relationship, thus emphasizing people and the planet, as highlighted by Wals (2015).

From this perspective, although there is research related to the topic in question, a literature review is lacking on how the approach to socio-ecological sustainability and the school garden have contributed to the change in teaching-learning in schools that offer elementary education, especially in the early years. Given

the above, the objective of this study is to review articles from journals that address the relationships on socio-ecological sustainability and school garden in the early years of elementary school published from 2016 to 2021, in order to reveal evidence and changes in teaching-learning.

METHOD

The literature review is indispensable research of published works, as it enables the identification of gaps and guides the researcher should follow towards the paths (Okoli, 2015). In addition, this type of research also allows the researcher to define the problem or new idea on a specific topic, its flaws, and the systematization of the research contribution (Galvão & Ricarte, 2020). It is possible to theoretically contribute to the academic community through a systematic literature review (SLR), in which the procedures followed by researchers until reaching the results are described (Okoli, 2012; Okoli, 2015).

This SLR followed, with methodological rigor, eight steps proposed by Okoli & Schabram (2010), such as: 1. Identification of the purpose; 2. Development of protocol and team training; 3. Practical screen application; 4. Literature search; 5. Data extraction; 6. Quality assessment; 7. Summary of studies; and 8. Review writing.

The search period was established from January 2016 to June 2021, starting with the validity of the 2030 Agenda. This time frame was defined due to the discussion of sustainability in the educational environment, which gained strength and importance from the 2030 Agenda, which emerged in 2015 by the United Nations, although before it the 8 millennium goals already existed. For this purpose, the Scientific Electronic Library Online (SciELO) databases and the academic search tool Google Scholar were used. The central keywords of this review were “sustainability” (understood as socio-ecological), school garden and elementary education, delimited to Brazil, where the study in question is concentrated.

The criteria defined for the investigation were divided into two groups: inclusion and exclusion. The inclusions were: research articles, published in journals between 2016 and June 2021, in Portuguese, Spanish or English, in relation to the study question and availability of the full text. The exclusion ones, in turn, encompassed course completion works (monographs, dissertations and theses). This process allowed for the refinement of information, discarding documents that did not present sufficient information regarding the objective of this research.

Searches in the databases (SciELO and Google Scholar) were performed with a combination of keywords, including the Boolean operator AND. In addition, we chose to use quotation marks (“”) to search for exact phrases specifically aimed at the topic under study. Therefore, the keywords were applied according to the search by string: "school garden" AND "sustainability" AND "elementary education". In SciELO, all indexes (year of publication, author, funder, journal, abstract and title) were used for the chosen type of literature, that is, the article, based on Portuguese, Spanish and English; however, the combinations found no results. In Google Scholar, in turn, advanced search was applied, using the criteria with all words, occurrence of my words (anywhere in the article), in Portuguese, Spanish and English. Thus, a total of 1,128

works were extracted, however, after reading the titles, 1068 were excluded for not fitting the research theme (school garden), as described in Fig. 1. Of the remaining 60 articles, they were abstracts and their keywords were read and 24 were excluded for not working specifically with elementary school – early years – and 1 for duplicity; the methodology, results and/or full text of the remaining 35 were read. As a result, other 25 articles were excluded as they did not fit the objective of the SLR. Thus, the selection universe was reduced to 10 articles, which were read in full, causing the analysis of the texts and the discussion of studies.

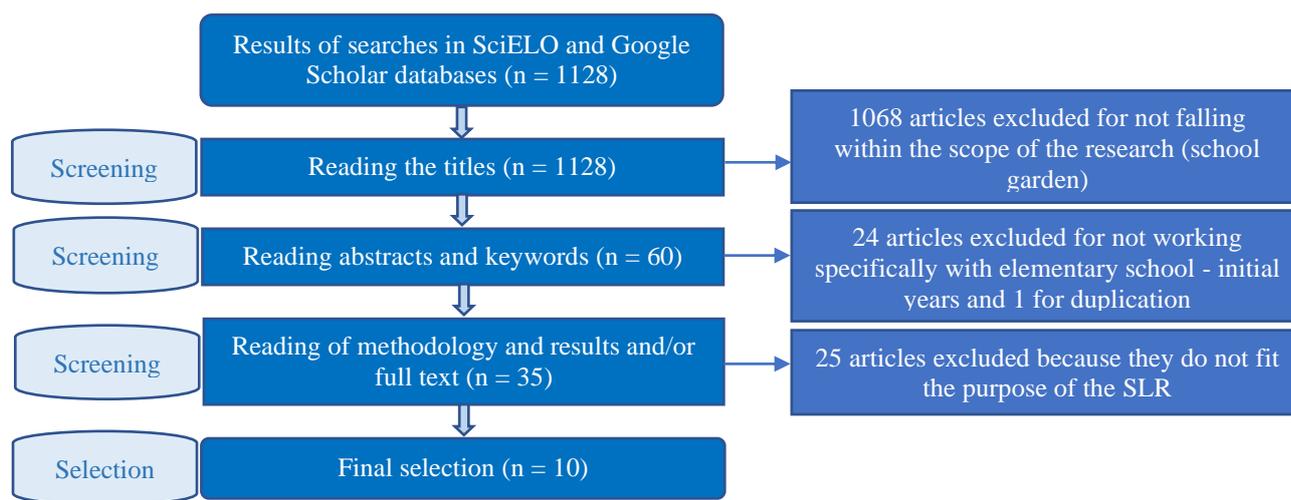


Fig. 1. Flowchart of the selection of SLR articles.

RESULTS AND DISCUSSION

In this section, a summary of the 10 selected articles is presented, not intended to give a detailed description of each one of them. To learn a little about the theme and information of each article, see Table 1. That is, according to the selection flowchart described in Figure 1, 10 articles were selected whose theme fits into the research, that is, which encompasses the theme of the school garden in elementary school – early years. The selected articles are listed in Table 1.

Table 1. Result of articles selected for analysis

| Data Base | N | Author(s) | Year of publication | Article title | Journal / Other information |
|-----------|---|--|---------------------|---|--|
| | 1 | Dandara Lima de Souza; Jonathan Dias Marques; Simon da Cunha Tenório; Italo Marlon Gomes Sampaio; Mário Lopes da Silva Júnior; Vânia Silva de Melo | 2021 | School garden as a strategy for environmental education in Itupanema, Barcarena, Pará, Brazil | Educação Ambiental em Ação V. 19, n. 74, 2021. https://www.revistaea.org/ |

| | | | | | |
|-----------------------|---|--|------|---|---|
| Google Scholar | 2 | Ananias Lima dos Santos, Ruandra Kaienne da Silva Laranjeira, Rodrigo Araújo Pereira, Maria Raquel de Carvalho Cota, Lionete Viana da Silva, Everton Ramos de Souza | 2020 | The creation of a school garden as a tool for teaching Environmental Education | Brazilian Journal of Development V. 6, n. 10, p. 78811-78827, 2020. DOI: https://doi.org/10.34117/bjdv6n10-349 . |
| | 3 | Rayane Reis Sousa; Samara Lorranny de Souza Garcia; Luciana Pinto Fernandes | 2017 | Contributions of environmental education and school court in promoting enhancements to teaching, health and the environment | Revista Ciência Agrícola V. 15, p. 1-5, 2017. https://www.seer.ufal.br/index.php/revistacienciaagricola/index |
| | 4 | Clayton dos Santos Silva, Romário Guimarães Verçosa de Araújo, Aleska Batista da Silva, Gessyca Thays dos Santos Silva, Erilvado James Rocha do Rego, Felipe dos Anjos Cardoso, Abel Washington de Albuquerque, Jessé Rafael Bento de Lima | 2017 | School garden: the extension dialoguing with the university, valuing the school, and developing the community | Revista Ciência Agrícola. V. 15, p. 23-26, 2017 https://www.seer.ufal.br/index.php/revistacienciaagricola/article/view/3724/2983 |
| | 5 | Marcelo Damiano, Rafaela Bruno Ichiba, Maria Olímpia de Oliveira Rezende | 2020 | School garden as a proposal for an Active Methodology in Environmental Education: An experience report in a state school in São Carlos (Brazil) | Educação Ambiental (Brasil) V. 1, n. 3, 2020. ISSN: 2675-3782 https://educacaoambientalbrasil.com.br/index.php/EABRA/issue/view/5 |
| | 6 | Denise Ana Augusta dos Santos Oliveira, Jorge Cardoso Messeder | 2018 | From the didactic sequences to the literary production: the context of the school garden | Revista Eletrônica Debates em Educação Científica e Tecnológica V. 8, n. 02, 2018. DOI: https://doi.org/10.36524/dect.v8i02.1089 |
| | 7 | Artur Araújo, Jonathan Vieira de Melo, Aline Aparecida Silva Cardoso, Ludmila Lorraine Pereira dos Santos, Rebeca Fernandes Teixeira da Rocha, Tami Helena Pestana Bogéa | 2017 | Project for the construction of organic gardens in school units (sus) of the public school system in Rio de Janeiro city, RJ | Revista Presença V. 3, n. 8, p. 25-36, 2017 ISSN 2447-1534 https://revistapresenca.celsolisboa.edu.br/index.php/numerohum/article/view/153 |
| | 8 | Rogério Sarkis Costa, Raquel da Silva Pereira, Esdras da Silva Costa | 2016 | Environmental education through a community garden: study in a public school in the city of São Paulo | Revista Científica Hermes V. 16, p. 246-270, 2016 ISSN: 2175-0556 http://www.fipen.edu.br/hermes1/index.php/hermes1 |

| | | | | | |
|--|----|---|------|--|---|
| | 9 | Natália Gebrim Doria, Denise Eugênia Pereira Coelho, Mariana Tarricone Garcia, Helena Akemi Wada Watanabe e Cláudia Maria Bógus | 2017 | The experience of an agroecological school garden as an interactive and creative health promotion strategy | Demetra: Alimentação, Nutrição & Saúde V. 12, n. 1, p. 69-90, 2017. DOI: 10.12957/demetra.2017.23788 |
| | 10 | A. V. Silva, J. F. Silva Filho, D. R. B. Wangen, M. L. C. Souza, E. L. Silva | 2020 | Horta and composting project: solid waste treatment in public school in Urutaf | Scientific Electronic Archives Vol. 13 (1), February 2020 DOI: http://dx.doi.org/10.36560/1312020929 |

Following the selected works as a parameter, Fig. 2 shows that, in 2016, only 1 article related to the school garden was published. However, there was an increase of a total of 4 articles published in 2017, a number which, in 2018, was reduced, as it fell to just 1. In 2020, there was another increase, rising, therefore, to 3 articles published, but, on the other hand, this number of publications was reduced to only 1 in 2021.

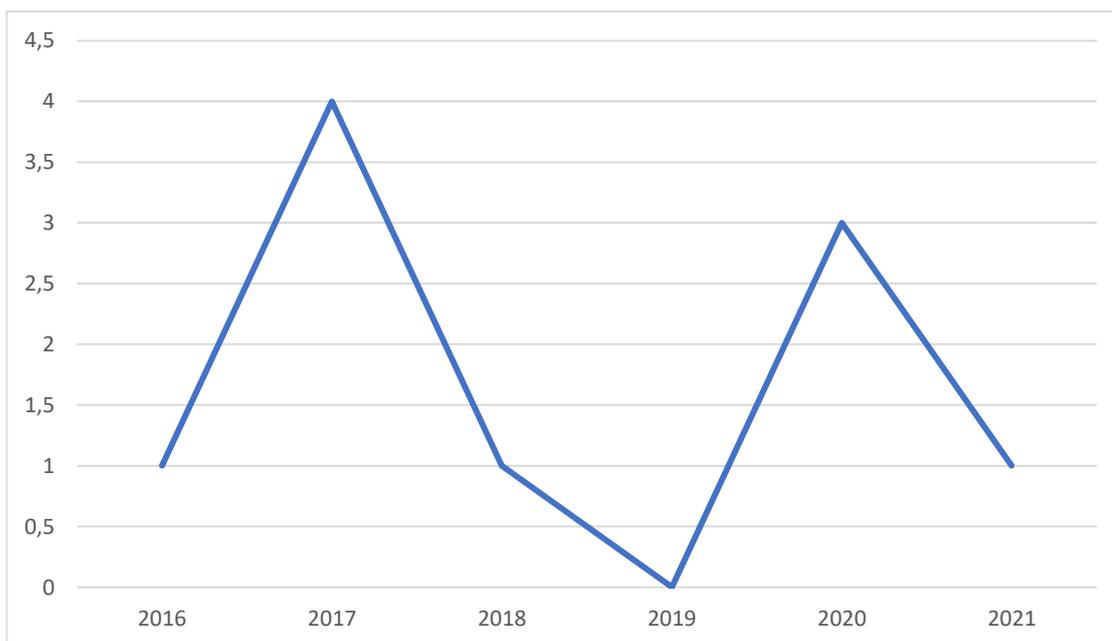


Fig. 2 Number of selected articles per year

The 10 selected works are aimed at the use and relevance of vegetable gardens in the school environment. Therefore, the results analyzed and summarized in relation to the approach to socio-ecological sustainability with the implementation of school gardens will be presented below.

The research by Souza et al. (2021) addresses the theme “School Garden as a strategy for environmental education in Itupanema, Barcarena-Pará, Brazil”. The work discusses the implementation of a school garden

of the organic type and mentions society, environment, sustainability and interdisciplinarity in the subjects of mathematics and science. Through the implementation of the school garden project and the holding of lectures, the authors highlight issues on the historical context of agriculture, food security, citizenship, and health. The project allowed the students to have greater contact with the soil, who learned to respect the land and the production process of organic vegetables. The authors were able to see a greater performance in the teaching-learning of students who attended the vegetable garden. They emphasize, in the study, the importance of the school garden, which contributed to "promoting environmental education, as it raises awareness, socializes, brings the individual closer to nature, improves eating habits, encourages collective work, generally transforms people's way of life, provides interdisciplinarity, improves teaching and learning" (Souza et al., 2021). As negative points, it was observed that the work failed to encompass all subjects of the school curriculum instead of having only two, as well as the activities in the garden that took place only once a week and the absence of an approach on socio-ecological sustainability.

Santos et al. (2020) addresses the theme "The creation of a school garden as a tool for teaching Environmental Education" in a public school located in the city of Coari-AM. The study presents the work, in an interdisciplinary way, in the subject's science, mathematics, geography, history and Portuguese language. Although most students understand planting vegetables and recycling materials, they had difficulties when performing the practice. The initiative addresses the themes of environmental education using recycled objects to create the school garden, as well as food education by encouraging students to consume healthy foods. The research highlights that, through the garden, it was possible to demonstrate the cultivation of vegetables and understand the importance of teamwork. Thus, "the activities in the garden arouse citizen and environmental attitudes, of environmental conservation, leading to paths to achieve sustainable development" (Santos et al., 2020). The authors emphasize that the project's objective was achieved, as it generated a change in eating habits, as well as an improvement in the students' teaching-learning process. However, it was noticed that they did not adhere to the organic garden, considering that it provides a diet with healthier products and improved soil quality than in traditional cultivation.

In the article by Sousa et al. (2017), an explanation is given on the "Contributions of environmental education and school garden in promoting improvements in education, health and the environment". The research was applied to elementary school students at the Vanor da Costa Parreão Municipal School, an urban area in the municipality of Araguatins-TO. At the time, students and teachers were trained to set up an organic vegetable garden. In practical activities, it was demonstrated the "demarcation and construction of beds – following the modeling of standard beds –, composting, organic fertilization, preparation of seedlings, planting time, transplanting, weeding, irrigation, recognition of useful insects, pests and diseases, harvest and post-harvest" (Sousa et al., 2017). It is also noteworthy that the cultivated vegetables were intended for school lunches, as well as for students to consume at home with their families. Even though the students initially rejected the proposed consumption of vegetables in school lunches, they realized the great

importance of healthy eating and most ended up adhering to the cultivation of vegetables in their homes. The authors highlighted that there was an improvement in the teaching-learning process with the implementation of the vegetable garden, considering that the activities carried out contributed to make students aware of environmental problems and the importance of healthy eating and to understand the relevance of sustainability. On the other hand, the research does not address the interdisciplinarity of subjects taught at school, considering the great importance of integrating contents in the teaching-learning process.

The discussion presented by [Silva et al. \(2017\)](#) deals with the theme of “School Garden: extension dialoguing with the university, valuing the school and developing the community”. The research was carried out at the Elementary School Dr. Gastão Oiticica, located in the municipality of Rio Largo, in the state of Alagoas. The study points to the holding of lectures on school conservation, environmental preservation, the importance of healthy eating and the non-use of chemical products in food production. One of the positive points of the work was the holding of a fair to sample the vegetables collected in the garden, which involved students, parents, and the population. On the occasion, the students presented the relevance and stages of organic production. Thus, "the insertion of the vegetable garden is of paramount importance for the school community, acting in the learning of everyone involved and forming future citizens with applications of various educational activities that contribute to training in the social, economic and environmental aspects" ([Silva et al., 2017](#)). It is noteworthy that all vegetables were intended for school lunches. The authors emphasize that the school garden project contributed to the change in eating habits, improvement in school performance, awareness of environmental sustainability, that is, evolution in the teaching-learning process. However, the research was not developed in an interdisciplinary way, as it did not exercise this practice in the subjects offered by the school.

The work by [Damiano, Ichiba, & Rezende \(2020\)](#) presents the theme “School Garden as a proposal for an active methodology in Environmental Education: an experience report in a state school in São Carlos-SP. The planted garden was organic with the specific planting of 2 varieties of peppers. A compost was built with waste from the lunch and leaves detached from the school's green area. The authors highlight the carrying out of activities through pedagogical workshops that addressed issues aimed at students' understanding of agroecological agriculture, aiming at the sustainable consumption of resources, and learning about social and environmental responsibility. “Working with organic agriculture transcends the simplistic idea of applying school content; it goes much further – it provides students with knowledge experiences, enabling them to have direct contact with nature” ([Damiano et al., 2020](#)). The authors even emphasize the importance of using the vegetable garden as an active methodology, which provided the experience of students and awakened in them critical thinking related to the waste of school lunches and the proper treatment of organic waste, in the same way as the school community accepted this instrument very well. Therefore, even though the research brings several positive points, it failed as the interdisciplinarity of the contents of the disciplines stopped working.

The article by [Oliveira & Messeder \(2018\)](#) refers to the theme “From teaching sequences to literary production in the context of the school garden” with the aim of investigating how thematic approaches in the context of the school garden contribute from socio-scientific discussions to literary production. The research was developed in a municipal school in Duque de Caxias-RJ and has a difference in relation to the other 9 works analyzed, since the school garden was used in a contextualized way. In other words, based on the students' narratives and drawings, a children's book entitled “Play Sementes” was created. The authors point out that conversation circles were held from which information and experiences were exchanged that contributed to the creation of the book. Furthermore, the work in question addressed issues related to the environment so that the book's narratives can help readers in solving environmental problems. Thus, “the child was the protagonist of the entire process, recognized as a socio-historical being, a thinking person, an observer, critic and participant in the reflective and decision-making processes” ([Oliveira & Messeder, 2018](#)). It is clear that the research has great relevance, considering that it resulted in the construction of a children's book that will serve as support material for students and teachers in the teaching-learning process. However, it was noticed that at work he is specifying only the science subject to work on the book when, in fact, it is possible to cover the content to other subjects in the school curriculum. Another point observed in the article was that the term “sustainability” appears only once, and its definition and importance for the environment is not evidenced.

[Araújo et al. \(2017\)](#) has as the theme of its work the “Organic vegetable garden project for a school unit of the public education system in the city of Rio de Janeiro-RJ”. The authors chose to work with the organic garden, using recyclable and low-cost materials. In the composter, the organic compost was produced, consisting of school lunch residues for fertilizing vegetables. The authors emphasize, in their writings, the benefits that the organic garden project brought, among them, an activity called "salad", which allows students to put into practice what they have learned: harvesting and cleaning vegetables, asepsis of hands and material that are used. Teachers take the opportunity to analyze and evaluate the knowledge absorbed by students. The lunch ladies were responsible for preparing the green salad and serving it to the school community. For the authors, "the development of the project enabled the practice of pedagogical activities in Health Education, assisting in the teaching-learning process and allowing the collective work action between students and teachers" ([Araújo et al. \(2017\)](#)) The highlights of the research were the application of permaculture, aiming at sustainable agricultural practices and the creation of a guide of interdisciplinary pedagogical activities developed by the authors. On the other hand, the research does not address the importance of interdisciplinarity in the construction of knowledge and the integration of content across disciplines.

The research by [Costa, Pereira, & Costa \(2016\)](#) works on the theme “Environmental Education through a Community Garden: a study in a public school in the city of São Paulo” with the objective directed towards the application of the Green and Healthy Environments Program, which aims to promote health and actions

related to the preservation and conservation of the environment. The work discusses the National Environmental Education Policy, which aims to encourage the adoption of sustainable practices for environmental preservation. The authors emphasize the lack of resources and financial support for the implementation of the project, however, they obtained help from students, teachers, employees, the community, the parent-teacher association, and Non-Governmental Organizations. With that, it was possible to implement the vegetable garden. The authors also emphasize that the students were participative and learned about environmental awareness and acquired healthy habits with the cultivation and consumption of vegetables; likewise, they emphasize that the vegetable garden has brought several benefits, including “financial transfer through the Money Direct at School Program to sustainable schools” (Costa et al., 2016). It was noticed that the research did not adhere to the organic garden, nor did it mention interdisciplinarity in education.

Doria, Coelho, Garcia, Watanabe, & Bógus (2017) work, in their production, on the theme “The experience of an agroecological school garden as an interactive and creative strategy for health promotion” in the municipality of Embu das Artes-SP. The study highlights the importance of school gardens as an innovative pedagogical strategy that promotes work with education in health, nutrition, and the environment. The article highlights the School Health Program of the Ministry of Education and Culture, which aims to contribute to the education of students through promotion, prevention, and health care actions. In addition, emphasis is also given to the Educating with the School Garden Project of the National Education Development Fund, which helps to create healthy eating habits through nutrition in schools and to promote environmental awareness among students and the teachers when using the school garden as a pedagogical and playful space.

The work in question points out that the consumption of vegetables by children increased due to direct contact with these foods. In other words, "the garden brought benefits to the health of children, such as changes in eating habits – an increase in the intake of fruits and vegetables, an increase in the variety of fruits and vegetables that are consumed and there was a decrease in childhood obesity rates" (Doria et al., 2017). Students also cited learning in science and math classes with practice in the garden. The authors emphasize that school gardens are pedagogical strategies aimed at promoting health, enabling the development of environmental education actions, skills and contributing to the empowerment of students and equality. In the article, several excerpts from the students' statements are presented, among them, more learning was mentioned in taking good care of plants (selecting, planting, fertilizing, watering, and harvesting), composting, the importance of insects, teamwork, social inclusion (a strategy was created for students with disabilities to participate) and family involvement in creating a vegetable garden in their own home. The highlight of the research was the form of data collection carried out through drawings that the students produced about their participation in the school garden. However, there was a lack of work on interdisciplinarity covering all disciplines.

Silva, Silva Filho, Wangen, Souza & Silva (2020) present a project named “Garden and composting project: solid waste treatment in a public school in Urutai’”. The development of the project included an educational lecture addressing the importance of growing and consuming vegetables, the practice of composting organic waste, as well as their recycling and reuse. For the establishment of the vegetable garden, legumes were used (potatoes, beets, carrots, tomatoes, scarlet eggplant (jiló), pumpkin, leaf onions and parsley). The planting, maintenance and harvesting of the garden were carried out by students and teachers. The authors emphasize that students acquired interest in relevant topics, including,

environmental problems, the proper use of water sources, the importance of recycling through the composting of organic solid waste produced in the school itself, the relevance of vegetables for human consumption, quality of life, which are formidable factors to promote sustainable development (Silva *et al.*, 2020).

However, even with the implementation of the vegetable garden, it was necessary to approach and relate the contents of different subjects with the students, bearing in mind their relevance to the teaching-learning process.

The 10 articles analyzed were developed in Brazilian public schools. In summary, through the analysis of the works, it was evidenced that the school garden is the main theme of these studies, which can significantly contribute to the teaching-learning process, considering that it enables the practice of activities, encouraging healthy eating habits, health promotion, teamwork, interpersonal relationships, social inclusion, and student empowerment, that is, it provides students with autonomy and prominence of their own knowledge. However, based on the 10 surveys, it is concluded that the school garden is insufficiently discussed, as well as little used in educational institutions.

Another important factor is that the authors emphasize only geography, science, mathematics, and Portuguese in the development of activities in the garden. However, the garden's strategy is interdisciplinary. In addition to the aforementioned subjects, it covers several others, including history, arts, foreign languages, literature and information technology. Thus, the vegetable garden is a didactic resource that allows teachers to relate the contents of different subjects to expand students' knowledge and develop skills. However, it was noticed that interdisciplinarity is not widespread in schools.

It is noteworthy that among the 10 articles read, 7 chose to implement the organic garden and the remaining 3 adhered to traditional planting. However, none specified the importance of organic planting (without the use of pesticides) with a view to preserving and conserving the environment, as well as promoting health.

It is also extremely important to highlight that, among the 10 articles analyzed, none talks about the 2030 Agenda; consequently, they do not cite SDG 4, which is intended to ensure quality, inclusive and equitable education for all. Therefore, it is alarming to identify that, from the date of the 2030 Agenda, in

2016, until the present moment, the population is not aware of or is not engaged in fulfilling the 17 SDGs and its 169 goals.

With the SLR, it was possible to verify that all articles cover sustainability, however, none talks about socio-ecological sustainability. Furthermore, it was noticed that interdisciplinarity is not widespread in schools. Thus, socio-ecological sustainability, through the methodological use of the school garden, was not addressed in the 10 articles read. Thus, through the analysis of the selected literature, it was noted that socio-ecological sustainability is not part of everyday life in the classroom.

CONCLUSION

This systematic review showed that the topic of socio-ecological sustainability and the use of a school garden in elementary school is relatively understudied. Through the analyzed articles, it was noticed that the teaching resource "school garden" is insufficiently used in the teaching-learning of the early years of this level of basic education, in the same way that the discussion on the approach to socio-ecological sustainability is non-existent or little known by the opinions and understandings of the students.

As for the limitations of this research, the following are presented: delimitation of the sample field, as only two databases were used; the inclusion criterion is selecting exclusively publications of articles, not considering books, monographs, dissertations, and theses. It is noteworthy that any limitation may lead to opportunities for the development of future research of great relevance to society, for example, preparing a literature review including other databases, languages and course conclusion works (monographs, dissertations, and theses) on the applicability of SDG 4 and its goals in basic education.

It can also be said that this systematic literature review is a careful and essential method and can contribute with information already published on school garden and socio-ecological sustainability in the early years of elementary education of basic education and enable the construction of new knowledge and more relevant and meaningful learning for students from an early age, for the construction of a more serene, user-friendly, and sustainable world for everyone throughout their lives.

REFERENCES

- Araújo, A., de Melo, J. V., Cardoso, A. A. S., Santos, L. L. P., Rocha, R. F. T., & Bogéa, T. H. P. (2017). Projeto de horta orgânica para uma unidade escolar da rede pública de ensino do município do Rio de Janeiro, RJ. *Revista Presença*, 3(8), 25-36. <https://revistapresenca.celsolisboa.edu.br/index.php/numerohum/article/view/106>
- Barbosa, N. V. S. (2007). *A horta escolar dinamizando o currículo da escola*. http://www.educacao.go.gov.br/documentos/nucleomeioambiente/Caderno_horta.pdf
- Brasil. (1988). *Constituição da República Federativa do Brasil de 1988*. Brasília. http://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm
- Brasil. *Lei n. 9.394, de 20 de dezembro de 1996*. Estabelece as diretrizes e bases da educação nacional. Diário Oficial da República Federativa do Brasil: Brasília, DF, 20 dez. (1996). http://www.planalto.gov.br/ccivil_03/leis/19394.htm

- Brasil. *Resolução CNE/CP nº 2, de 22 de dezembro de 2017*. Institui e orienta a implantação da Base Nacional Comum Curricular, a ser respeitada obrigatoriamente ao longo das etapas e respectivas modalidades no âmbito da Educação Básica. http://basenacionalcomum.mec.gov.br/images/BNCC_EI_EF_110518_versaofinal_site.pdf
- Costa, R. S., Pereira, R. S., & Costa, E. S. (2016). Educação ambiental por meio de horta comunitária: estudo em uma escola pública da cidade de São Paulo. *Revista Científica Hermes*, Suppl. (16), 246-270. <https://www.sumarios.org/artigo/educa%C3%A7%C3%A3o-ambiental-por-meio-de-horta-comunit%C3%A1ria-estudo-em-uma-escola-p%C3%BAblica-da-cidade-de>
- Cury, C. R. J. (2008). A educação básica como direito. *Cadernos de Pesquisa*, 38(134) 293-303. <https://www.scielo.br/j/cp/a/QBBB9RrmKBx7MngxzBfWgcF/?format=pdf&lang=pt>
- Damiano, M., Ichiba, R. B., & Rezende, M. O. O. (2020). Horta escolar como proposta de metodologia ativa na educação ambiental: um relato de experiência em uma escola estadual de São Carlos, São Paulo. *Educação Ambiental (Brasil)*, 1(3), 43-52. <https://educacaoambientalbrasil.com.br/index.php/EABRA/article/view/25>
- Doria, N. G., Coelho, D. E. P., Garcia, M. T., Watanabe, H. A. W., & Bógus, C. M. (2017). A experiência de uma horta escolar agroecológica como estratégia interativa e criativa de promoção da saúde. *Demetra: Alimentação, Nutrição & Saúde*, 12(1), 69-90. <https://www.e-publicacoes.uerj.br/index.php/demetra/article/view/23788>
- Galvão, M. C. B., & Ricarte, I. L. M. (2019). Revisão sistemática da literatura: conceituação, produção e publicação. *Logeion: Filosofia da informação*, 6(1), 57-73. <http://revista.ibict.br/fiinf/article/view/4835>
- Okoli, C., & Schabram, K. (2010). A guide to conducting a systematic literature review of information systems research. *Sprouts: Working Papers on Information Systems*, 10(26). <http://sprouts.aisnet.org/10-26>
- Okoli, C. (2012). *A critical realist guide to developing theory with systematic literature reviews*. doi: <http://dx.doi.org/10.2139/ssrn.2115818>
- Okoli, C. (2015). A guide to conducting a standalone systematic literature review. *Communications of the Association for Information Systems*, 37(1), 43. <https://aisel.aisnet.org/cais/vol37/iss1/43/>
- Oliveira, D. A. A. S., & Messeder, J. C. (2018). Das sequências didáticas à produção literária: o contexto da horta escolar. *Revista Eletrônica Debates em Educação Científica e Tecnológica*, 8(02), 84-115. <https://ojs.ifes.edu.br/index.php/dect/article/view/1089>
- Sachs, J.D., Schmidt-Traub, G., Mazzucato, M. et al. (2019). Six transformations to achieve the sustainable development goals. *Nature Sustainability* 2, 805–814. <https://doi.org/10.1038/s41893-019-0352-9>
- Santos, A. L., Laranjeira, R. K. S., Pereira, R. A., Cota, M. R. C., Silva, L. V., & de Souza, E. R. (2020). A criação de uma horta escolar como ferramenta ao ensino de educação ambiental. *Brazilian Journal of Development*, 6(10), 78811-78827. <https://www.brazilianjournals.com/index.php/BRJD/article/view/18353>
- Silva, C. S., Araújo, R. G. V., Silva, A. B., Silva, G. T. S. Rego, E. J. R., Cardoso, F. A. ... de Lima, J. R. B. (2017) Horta escolar: a extensão dialogando com a universidade, valorizando a escola e desenvolvendo a comunidade. *Ciência Agrícola*, Rio Largo, 15(Supl.), 23-26. <https://www.seer.ufal.br/index.php/revistacienciaagricola/article/view/3724>
- Silva, A. V., Silva Filho, J. F., Wangen, D. R. B., Souza, M. L. C., & Silva, E. L. (2020). Projeto horta e compostagem: tratamento de resíduos sólidos em escola. *Scientific Electronic Archives*, 13(1), 36-41. <https://sea.ufr.edu.br/SEA/article/view/929>

- Sousa, R. R., Garcia, S. L. de S., & Fernandes L. P. (2017). Contribuições da educação ambiental e horta escolar na promoção de melhorias ao ensino, à saúde e ao ambiente. *Ciência Agrícola*, Rio Largo, 15 (Supl.), 1-5. <https://periodicos.uff.br/ensinosaudeambiente/article/view/21103>
- Souza, D. L., Marques, J. D., Tenório, S. C., Sampaio, I. M. G., Silva Júnior, M. L., & Melo, V. S. (2021). Horta escolar como estratégia para educação ambiental em Itupanema, Barcarena, Pará, Brasil. *Educação Ambiental em Ação*, 20(76), 1-18. <https://revistaea.org/artigo.php?idartigo=4107>
- Tessari, R. M., Fernandes, C. T., & Campos, M. G. (2021). Prática pedagógica e mídias digitais: Um diálogo necessário na educação contemporânea. *Revista de Ensino, Educação e Ciências Humanas*, 22(1), 02-10. <https://revistaensinoeducacao.pgskroton.com.br/article/view/8128>
- UNESCO. (2021). *Education transforms lives*. <https://en.unesco.org/themes/education>
- United Nations. (2015). *Transforming our world: the 2030 agenda for sustainable development*. https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E
- Wals, A. E. (2015). *Beyond unreasonable doubt. Education and learning for socio-ecological sustainability in the Anthropocene*. Wageningen: Wageningen University. <https://edepot.wur.nl/365312>
- Wals, A. E. (2021). *The power of transgressive learning*. Great Transition Initiative. <https://greattransition.org/gti-forum/pedagogy-transition-wals>