


TRAINING OF NATURAL SCIENCES TEACHERS IN THE NORTHERN REGION OF BRAZIL: AN ANALYSIS OF THE PERIOD FROM 2018 TO 2024

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ABSTRACT

The training of natural sciences teachers plays a fundamental role in the quality of teaching, being essential for educational development, especially in the northern region of Brazil, where structural and sociocultural challenges impact teacher qualification. The objective of this study is to analyze the training of natural sciences teachers in the northern region of Brazil between 2018 and 2024, considering the educational policies, regional challenges and pedagogical practices implemented. For this, a qualitative research was carried out, of bibliographic and documentary character, based on the analysis of scientific articles, government reports and institutional documents. The results indicate that, despite the expansion of higher education and the implementation of educational policies such as the National Common Curriculum Base (BNCC) and the National Education Plan (PNE), there are still difficulties in the infrastructure of the institutions, in the continuing education and in the professional valorization of teachers. It is noteworthy that the lack of technological resources and the difficulty in retaining teachers in remote areas compromise the effectiveness of public policies in the region. It is concluded that, despite the progress observed, in order to overcome these challenges, structural investments, expansion of

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continuing education programs and more effective professional development policies are necessary, thus ensuring a more qualified and equitable teaching of natural sciences.

Keywords: Teacher Training. Natural Sciences. North Region. Educational Policies. Regional Challenges.

INTRODUCTION

This study is part of the construction of a doctoral thesis in Education, which has as its main focus to discuss the impacts of the continuing education of teachers of Natural Sciences in the city of Manaus, specifically those who work in the state education network. The research seeks to understand how the public policies and pedagogical practices developed in this period influenced the teaching performance and the quality of the teaching of Natural Sciences in the region. In addition, the article contributes to the academic debate on teacher training in the Amazon, highlighting the challenges and perspectives for professional valorization and the improvement of teachers' working conditions.

Teacher training is one of the fundamental pillars for improving the quality of education, especially in areas such as Natural Sciences, which demand specific knowledge and innovative pedagogical practices. In the Northern Region of Brazil, this training faces particular challenges, such as territorial extension, cultural diversity, and socioeconomic inequalities. This article seeks to analyze studies that address the training of Natural Sciences teachers in the region between 2018 and 2024, a period marked by changes in educational policies and technological advances that impacted teaching.

METHODOLOGY

This study is characterized as a bibliographic and documentary research, with a qualitative approach. Scientific articles, government reports, data from the National Institute of Educational Studies and Research Anísio Teixeira (INEP) and official documents related to teacher training were analyzed. The time frame from 2018 to 2024 was chosen because it covers recent policies, such as the National Common Curriculum Base (BNCC) and the National Education Plan (PNE).

CONTEXT OF TEACHER TRAINING IN THE NORTH REGION

The Northern Region of Brazil is composed of seven states (Acre, Amapá, Amazonas, Pará, Rondônia, Roraima and Tocantins), with a diverse population distributed in urban and rural areas. Teacher training in the region is influenced by factors such as the distance between communities, the lack of infrastructure, and the lack of qualified human resources. Contemporary authors have discussed these challenges, highlighting the need for specific public policies for the region.

According to Santos (2020), the training of Natural Sciences teachers in the Amazon faces unique challenges, such as the need to integrate traditional and scientific knowledge, especially in indigenous and riverine communities. The author points out that teacher training needs to be contextualized, considering the local reality and the cultural specificities of the region.

According to Silva and Oliveira (2021), they point out that the expansion of higher education in the North Region, especially through public universities and federal institutes, has brought significant advances in teacher training. However, the authors point out that the quality of undergraduate courses is still affected by the lack of adequate infrastructure, such as laboratories and libraries, and by the difficulty of access to technological resources.

In addition, Almeida (2022) emphasizes the importance of continuing education for Natural Sciences teachers, arguing that constant updating is essential to deal with curricular changes, such as the implementation of the National Common Curricular Base (BNCC). The author also draws attention to the need for policies that encourage teachers to stay in remote areas, such as offering better salaries and working conditions.

Another relevant aspect is the cultural diversity of the region, which requires teacher training sensitive to local particularities. As discussed by Costa and Souza (2023), teacher training in the Amazon needs to incorporate pedagogical practices that value traditional knowledge and promote interculturality. The authors argue that scientific education in the region should be inclusive and dialogue with the different forms of knowledge present in the communities.

Between 2018 and 2024, there was an increase in the number of higher education institutions in the region, including public and private universities, offering bachelor's degrees in Natural Sciences. However, the quality of these courses is still uneven, with challenges such as the lack of laboratories, the scarcity of teaching materials, and the difficulty of accessing the internet in remote areas. These issues are widely discussed by authors such as Pereira (2023), who argues that teacher training in the North Region needs to be strengthened through investments in infrastructure and professional development policies.

PUBLIC POLICIES AND TEACHER TRAINING

The period from 2015 to 2024 was marked by advances and challenges in public policies aimed at the training of Natural Sciences teachers in the Northern Region of Brazil. Contemporary Brazilian authors have discussed the impact of these policies, highlighting both the progress achieved and the gaps that persist.

According to Carvalho and Lima (2018), the implementation of the National Common Curricular Base (BNCC) represented an important milestone for teacher training, by establishing clear guidelines for the teaching of Natural Sciences. However, the authors point out that the application of the BNCC in the North Region faces specific challenges, such as the need to adapt to local realities and the lack of resources for teacher training.

In addition, Silveira and Alves (2019) analyze the role of the National Education Plan (PNE) 2014-2024 in teacher training, emphasizing that the goals related to teacher appreciation and training have not yet been fully achieved in the North Region. The authors argue that the lack of investment in infrastructure and the difficulty of access to continuing education programs are significant obstacles to the effectiveness of public policies.

The Institutional Teaching Initiation Scholarship Program (PIBID) and the Pedagogical Residency were also topics of discussion among Brazilian researchers. For Mendes and Rocha (2020), these programs contributed to the improvement of initial teacher training, especially by promoting the integration between theory and practice. However, the authors point out that the unequal distribution of scholarships and the concentration of opportunities in urban areas limit the reach of these initiatives in the North Region.

Continuing education is another axis discussed by authors such as Fernandes (2021), who highlights the importance of policies that ensure the constant updating of Natural Sciences teachers. The author argues that continuing education is essential for the implementation of new educational methodologies and technologies, but that its effectiveness in the North Region is compromised by the lack of access to specialized courses and the lack of technological resources.

In addition, Souza and Barros (2022) discuss the need for public policies that consider the cultural diversity of the Northern Region, especially with regard to the training of teachers who work in indigenous and riverside communities. The authors argue that teacher training should be intercultural, integrating traditional and scientific knowledge to promote a more inclusive and contextualized education.

Finally, Oliveira (2023) analyzes the impact of professional appreciation policies on attracting and retaining teachers in the North Region. The author argues that, although progress has been made, such as the creation of career plans and the offer of scholarships, there is still a long way to go to ensure decent working conditions and competitive wages.

CRITICAL ANALYSIS OF THE AUTHORS DISCUSSED

The analysis of the authors cited throughout this article allows a comprehensive and critical understanding of the challenges and advances in the training of Natural Sciences teachers in the Northern Region of Brazil between 2015 and 2024. Each author contributes with specific perspectives, but also reveals gaps and points that deserve further study.

Santos (2020) highlights the need to integrate traditional and scientific knowledge into teacher training, especially in indigenous and riverine communities. Their approach is relevant to the Amazonian reality, but there is a lack of further discussion on how this integration can be operationalized in practice, considering the lack of resources and infrastructure in schools in the region. In addition, the author does not sufficiently explore the role of public policies in this process.

Similarly, Silva and Oliveira (2021) address the expansion of higher education in the North Region, recognizing advances, but pointing to the persistence of problems such as the lack of laboratories and technological resources. Although their analysis is pertinent, the authors do not discuss in detail how the quality of undergraduate courses can be improved, nor do they propose concrete solutions to overcome the identified limitations.

Almeida (2022) also emphasizes the importance of continuing education, arguing that it is essential for updating teachers in the face of curricular changes, such as the BNCC. However, his analysis does not critically address the structural obstacles that prevent the effectiveness of this continuing education, such as the lack of access to specialized courses and the lack of financial resources for training.

Costa and Souza (2023), bring an intercultural perspective to teacher training, advocating the valorization of traditional knowledge in science education. Their contribution is valuable, but there is a lack of further discussion on how higher education institutions can incorporate this interculturality into their curricula in a systematic and not just one-off way.

Carvalho and Lima (2018), discuss the implementation of the BNCC in the North Region, highlighting the challenges of adapting to local realities. However, his analysis could be more critical in relation to the failures in the training of teachers to apply the BNCC, especially in remote areas where access to teaching materials and training is limited.

Silveira and Alves (2019), analyze the PNE and its goals for teacher training, pointing to the lack of investments in infrastructure and continuing education. While their critique is pertinent, the authors do not explore concrete alternatives to overcome these challenges, such as partnerships with non-governmental organizations or the use of digital technologies for capacity building.

Mendes and Rocha (2020), evaluate the impact of PIBID and Pedagogical Residency on initial teacher training, recognizing advances, but criticizing the unequal distribution of scholarships. His analysis could be more critical in relation to the effectiveness of these programs in rural and remote areas, where the need for teacher training is even more urgent.

Fernandes (2021) highlights the importance of continuing education, but does not critically address the limitations imposed by the lack of technological resources and the lack of specific public policies for the North Region. Its analysis could propose more concrete solutions, such as the creation of distance learning programs adapted to local realities.

Souza and Barros (2022), bring an intercultural perspective to teacher training, advocating the integration of traditional and scientific knowledge. However, his analysis could be more critical in relation to the institutional and cultural barriers that prevent this integration from taking place, such as the resistance of some sectors of academia to valuing non-scientific knowledge.

Oliveira (2023), analyzes professional valorization policies, recognizing advances, but pointing to the persistence of low wages and poor working conditions. His criticism is relevant, but he could propose more concrete solutions, such as the creation of tax incentives for teachers who work in remote areas or the implementation of more attractive career plans.

FINAL CONSIDERATIONS

The critical analysis of the authors discussed reveals that, although there is consensus on the challenges faced in the training of Natural Sciences teachers in the Northern Region, there are still gaps in the discussions on how to overcome these challenges in a practical and effective way. Most authors recognize the importance of public policies, but few propose concrete solutions adapted to local realities. In addition, there is a need for greater integration between theoretical discussions and pedagogical practices, especially with regard to interculturality and continuing education.

To move forward, it is essential that future research addresses these gaps, proposing innovative and contextualized strategies for teacher training in the North Region. This includes creating specific public policies, strengthening partnerships between educational institutions and local communities, and investing in educational technologies that can overcome the region's geographical and structural barriers.

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