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Discourses by natural sciences trainers on the BNCC implementation process in the Ceará region covered by CREDE 10[1]

Discursos de formadores de Ciências da Natureza sobre o processo de implementação da BNCC na região cearense abrangida pela CREDE 10

Discursos de formadores en Ciencias Naturales sobre el process de implementation del BNCC en la region de Ceará cubiertos por CREDE 10

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Abstract: This work presents a discourse analysis of 13 Natural Sciences trainers about the process of implementing the National Common Curriculum Base in the Ceará region covered by the Regional Coordination of Education Development (CREDE 10), comparing them with those of other researchers, and exposing the articulations and oppositions between them. French and critical discourse analysis were used as the method to categorize understandings about Science teaching, continuing education for school organization and educational management, collected through semi-structured interviews. Contrapositions and articulations emerged between the discourses of trainers and researchers. The former concerns the non-standardization of Science teaching at school, and the latter refers to the implementation of curricular practices through different school agents. The educational reform in the region investigated is not homogeneous, but it provides parameters for the management of its municipal education networks.
Keywords*:* Discourse Analysis; Implementation of BNCC; Municipal Education Network; RCDE 10; Science Teaching.

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Resumo: Este trabalho traz a análise dos discursos de treze formadores de Ciências da Natureza sobre o processo de implementação da Base Nacional Comum Curricular na região cearense abrangida pela Coordenadoria Regional de Desenvolvimento da Educação (CREDE 10), comparando-o com os de outros pesquisadores, expondo as articulações e contraposições entre eles. Empregou-se a Análise do Discurso da linha francesa e crítica como o método para categorizar compreensões sobre ensino de Ciências, formação continuada para organização escolar e gestão educacional, coletadas por meio de entrevista semiestruturada. Surgiram contraposições e articulações entre os discursos dos formadores e pesquisadores. As primeiras dizem respeito à não padronização do ensino de Ciências na escola, e as últimas se referem à efetivação de práticas curriculares por meio de diferentes agentes escolares. A reforma educacional na região investigada não é homogênea, mas fornece parâmetros das gestões de suas redes municipais de educação.
Palavras-chave: Análise do Discurso; Implementação da BNCC; Rede Municipal de Educação; CREDE 10; Ensino de Ciências.

Resumen: Este trabajo presenta el análisis de los discursos de trece formadores de Ciencias de la Naturaleza sobre el proceso de implementación de la Base Curricular Común Nacional en la región de Ceará atendida por la Coordinación Regional de Desarrollo de la Educación (CREDE 10), comparándolos con los de otros investigadores, exponiendo las articulaciones y oposiciones entre ellos. Se utilizó el Análisis del Discurso de la línea francesa y crítica como el método para clasificar comprensiones sobre la enseñanza de las ciencias, la formación continua para la organización escolar y la gestión educativa, recopiladas a través de entrevistas semiestructuradas. Surgieron contraposiciones y articulaciones entre los discursos de los formadores e investigadores. Las primeras se refieren a la no estandarización de la enseñanza de las Ciencias en la escuela, y las últimas se refieren a la implementación de prácticas curriculares a través de diferentes agentes escolares. La reforma educacional en la región investigada no es homogénea, pero proporciona parámetros de las gestiones de sus redes municipales de educación.
Palabras clave: Análisis del Discurso; Implementación del BNCC; Red Municipal de Educación; CREDE 10; Enseñanza de las Ciencias.

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Introduction

In 2017, the bill Nº 13.415/2017 was published (BRASIL, 2017), which altered some important laws of basic education. Concurrently, the National Common Curriculum Base (BNCC) was approved, despite this normative document does not contain the discussions in public hearings between the National Council of Education (CNE) and civil society (BATISTA; BEZERRA, 2020; VERAS, 2022). In 2018, the Implementation Guide of BNCC was released; There was readjustment of municipal and state curricula in light of the BNCC; The resolution CNE/CEB Nº 3, of November 21, 2018, changed the National Curriculum Guidelines of High School (DCNEM) – new high school (BRASIL, 2018). In the context of these changes, the implementation process of the BNCC began in 2022, requiring adaptation of the entire educational system.

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It should be considered how the process occured in the public municipal education networks, given the existence of more than 5,569 cities in Brazil, according to the latest Census of the Brazilian Institute of Geography and Statistics (IBGE – 2022). It is important to investigate how an educational reform of large spectrum behaves across the national territory, divided by IBGE in different regions (macro and micro), which obviously shall have different social, economic and educational aspects that influence the implementation process of the BNCC.

Participating in the process of implementation, the state of Ceará has been presenting its specificities (CASTRO, 2020) in context, assumptions, integrating themes and teaching stages, some of which are provided in the Reference Curriculum Document of Ceará (DCRC), prepared based on the BNCC and serving as a model for the elaboration of school curricula (CEARÁ, 2019).

It is possible to notice how science teaching has been applied, including in Ceará, since the idea of constituting a common base for the Elementary Education, in the Federal Constitution of 1988 – section 210 (BRASIL, 2016), being reinforced and expanded to the entire basic education in LDB 9,934/96 (BRASIL, 1996). In the 1997-2013 period, different DCN of basic education were published, defining what is common to the curricula, by area of knowledge. The first three versions of the BNCC (2015, 2016 and 2017) accomplished a standardization system of what is common to the curricula contents in each area, allowing an opening for the elaboration of curricula among the Brazilian federative entities.

This work focus on the details of the curricula practices in the area of Nature Sciences, at the level of educational management. Some researchers have studied the implications of BNCC in science teaching, including in the Elementary Education, and are highlighted through the text, namely: a) Franco and Mumford (2018): need more time to implement the document; b) Brum (2020): challenge of putting into practice what was elaborated without extensive discussion with one of the main protagonists – the teacher; Rodrigues and Mohr (2021): need for deepening in concepts and ideals for a scientific education; Veras (2022): alignment of Ceará's curriculum with BNCC.

Must be noted that the region covered by the Regional Education Development Coordination (CREDE 10), which comprises of 13 cities in Ceará: four in the Aracati coast (Fortim, Aracati, Itaiçaba and Icapuí) and nine in the lower region of Jaguaribe (Palhano, Jaguaruana, Russas, Quixeré, Limoeiro do Norte, Morada Nova, São João do Jaguaribe, Tabuleiro do Norte, and Alto Santo).

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In Ceará, the Municipal Education Secretariats (SME) are education institutes responsible for collaborating with the BNCC implementation in the municipal education networks, to fulfill its roles to review, elaborate and implement their curricula aligned to the BNCC, together with the State and the Union. Among the responsibilities assigned to the SMEs for the execution of this process, integrating the training of distinct school agents for the curriculum elaboration and implement curricular practices, through the work of technicians and/or professionals who work on continued education (CEARÁ, 2019).

To investigate accurately the implementation process of BNCC in the 13 SMEs in the CREDE 10 region, 13 Natural Sciences trainers were interviewed, distributed among the cities, each one corresponding to the SME of the sample, based on the understanding of the role of the Secretariat and their trainers, as professed the BNCC Implementation Support Program – ProBNCC, available on the MEC website. It is important highlight that the professional profile of the management of those trainers were traced via the application of a form to the trainers, about personal data, academic education, professional experience and work with the education management (Authors, 2023). To deepen the questions made to the trainers, they were interviewed along the year of 2022 and allowed to freely speak about their experiences with the curricular reform.

The objective of this article is to analyze the discourses of the subjects mentioned about the implementation process of the BNCC in the Ceará region covered by CREDE 10, comparing them to that of other researchers and, so, exposing their articulations and contrapositions among them.

1. Considerations about the BNCC implementation in the municipal education networks

The BNCC document attest that each federative entity has autonomy to elaborate their curricula according to their regional specificities that surround them (BRASIL, 2018a). Equally, the schools, watching the BNCC guidelines, must elaborate their pedagogical proposals according to the demands that fit them. The document advocates a set of essential learning to the basic education students, aiming for equal education, and for that, assigning responsibilities to the systems, networks and institutions of education, regarding equity between different students.

The BNCC seeks to integrate principles and values contained in the National Curriculum Parameters (PCN) and the National Curriculum Guidelines (DCN), such as: a) contextualization and interdisciplinary organization of the curricular components; b) Use of different didactic-pedagogical methodologies; c) Encouraging the creation of learning

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situations; d) To work with didactic and technological resources; e) Continued orientations (training) to professors; f) learning measured by pedagogical and curricular management (BRASIL, 2018a).

To put it in practice in the curriculum of elementary education, as well as in others educational modalities, in 2019 was released the ProBNCC, aiming to: "[...] support the SMEs in the process of reviewing or elaboration and implementation of its curricula aligned to the BNCC, in a collaborative regime [...]" (BRASIL, 2019, p. 3). Castro (2020) highlights that the movement in favor of the federative pact was strong in the Ceará state, where there was a composition of only one curriculum for the state and municipal schools – DCRC, regionalizing this kind of document and also systematizing professor training for the implementation process.

It is necessary to look for the unfoldings of the BNCC in different curricula, arising from the implementation process (FREITAS; 2017), in the way it has impacting municipal education networks and their schools, as well as the professor's training (LIMA, BIERNASKI, 2022).

Some studies point to the necessity to establish reliable partnerships to performance of school practices not limited only by the fulfillment of the BNCC, be it the work together with the SMEs and schools via training and service (BRUM, 2020), adjustment of the school training with the social demands (BATISTA; BEZERRA, 2020), review of the professor education and elaboration and adjustment of school curricula (FRANCO, MUNFORD, 2018) and the alignment between the curricular proposal and pedagogic of schools (VERAS, 2022).

It is still needed to consider that the curricula in nature science area are also being modified and demands care, as this is an area in which the processes of learning and teaching requires efforts of different agents (management, professors and students), that must be worked upon adequately along the implementation process of the BNCC.

2. Methodological procedures

To operate with complex educational phenomena and that requires subjective qualified treatment (VILELA, 2003), this research is a qualitative approach. Thus, in possession of what was described by the Authors (2023), it seeks to expand the understanding of what was manifested between the languages of the natural science trainers about how they perceived the implementation of the BNCC in the Ceará region of CREDE 10. This aims to unveil expressions of the subjects of research, in conformity to the principles and procedures proposed by Orlandi (2012), about what has meaning and materializes in what is symbolic and politic.

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It is emphasized that the discourse analysis in this text is understood as the technique of language analysis materialized in ideology, meaning the world and the things that exist in them (ORLANDI, 2012). Among the many approaches, the french of Pêcheux (FLÁVIO, 2023; MARINHO, 2019) and the critical (CDA) of Fairclough (SILVA *et al.*, 2019) were chosen due to the materiality of the social and economic contexts in which the interviewed are inserted and were educated, as well as who they train (management, professors, students, etc.), as there is a clear relation between these contexts and the education process (BENEVIDES; SOARES, 2014).

Therefore, the analyst was confronted with the language of the subjects, about their constitutive memories (ORLANDI, 2012) of the educational reform that took place in 2022. Furthermore, based on the attributed meanings and ideological formations (Branco et al., 2020), the argumentations of the were treated as constituents of their ways of doing and being (CARVALHO, DIMENSTEIN, 2017), promoting reflection of practices and challenges (SOUZA-SILVA; DAVEL, 2005).

The investigation was designed as a multiple case study, which, according to to Martins (2008), refers to the different realities of a case with the same focus. Thus, as it covers two distinct geographical regions (Aracati coast – four cities; lower region Jaguaribe – nine cities – Figure 1), the thirteen cities from them were sampled, each one corresponding to an investigative context.

In this logic, the technical procedures adopted can be tested and, therefore, replicated (YIN, 2015) in different Brazilian regions, subject to the same reform in analysis, whether the results found among them are similar or not. Ensuring scientific to the case-by-case study, Olsen (2015) explains about the necessity to collect data from multiple sources for the constitution of a case, deriving meanings and interpretations from the investigative actions.

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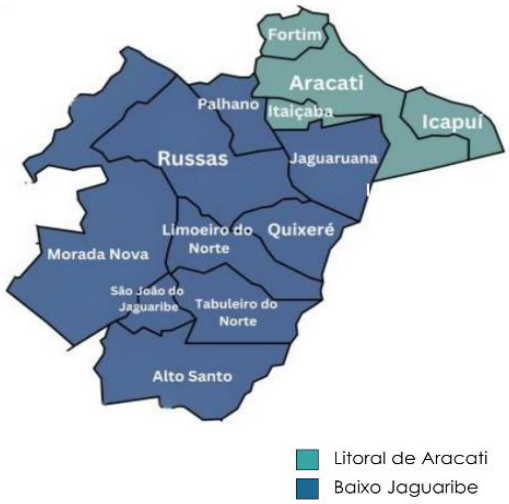
Figure 1 – Cities of CREDE 10.



Source: made based on the map of the region, 2023.

As a part of a larger research, involving a set of elucidating data of multiple cases, this research focused on operating with information collected through semi-structured interviews given by 13 subjects, among the months of June and September of 2022, with previously formulated open questions, allowing free and spontaneous reflection (MINAYO; COSTA, 2018). In short, the interview script was about the perception of the SME (natural sciences) trainers on the understanding of the reform, notably the changes made in the school documents, science content, organization of school work and training to exercise educational management.

With a mean duration of, approximately, 17 minutes, the interviews were transcribed and reviewed, resulting in a corpus of 28 pages, formatted in a .txt file, configured (review and textual correction) for analysis with using the IRaMuTeQ 0.7 alpha 2 software. This way, with attention to the precepts of Camargo and Justo (2013), was possible to accomplish analysis of textual statistics (quantitative of texts and textual segments, average frequency of words and grammatical classification), cloud of words (graphic of words in function of their frequency), specificities and correspondence factorial analysis (CFA) – (association of texts and variables) and descending hierarchical classification (DHC) – (grouping of textual segments as a function of their related vocabularies and frequency of the reduced forms).

These analyses allowed to codify the messages contained in the speech of the trainers, processing information, such as words with greater frequency and their representativeness and influence of the interviewed formation and city on their answer. The process culminated in the production of four analytical categories, seen as units that

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allows the access to the subject discourses (ORLAND, 2012). The next section presents a comprehension of the way in which the discourses were analyzed in the light of theoretical references of this article, also exposing the process of accuracy of the discursiveness of the research subjects speeches.

3. Implementation of BNCC in the Ceará region of CREDE 10

The configuration of discusivity in the corpus, mainly in conformity to the precepts of Orlandi (2012), allowed the emergence of the discourse of the subjects, determining the limit between the linguistic external and the discursive object with previous interpretations. The initial analysis outlined the limits and possible profiles, for the construction of meaning that demanded interpretation and, thus, worked with ideology (BRANCO et al., 2020) permeated in the messages issued.

Searching for evidences of the case that allowed for accurate investigation of the implicit in the speeches of the trainers, textual statistics analysis and cloud of words were made, noting that the text of 28 pages present significative words (greater frequency), as *gente* (people) (f = 425), *professor* (f = 189), *BNCC* (f = 176), *conteúdo* (content) (f = 157), *trabalhar* (to work) (f = 150), *ano* (year) (f = 119), *ciência* (science) (f = 91), *formação* (formation) (f = 83), *escola* (school) (f = 82), *documento* (document) (f = 78) e *aluno* (student) (f = 78).

The word *gente* (greater frequency) function has a pronoun, being synonymous to we (in Portuguese), which can either indicate the speaker and the listener (we/including us) or it can indicate the speaker and one or more of a third person, depending on context. Based on the context of the questions about professors trainers in nature science and the fact that the professor was alone during the interview, it is understood that the term refers to the collective of the teaching agents (peers, professional colleagues), involved in the process of implementation of the BNCC. *Gente* was associated to *professor*, indicating that this professional is one of the agents responsible for implementing the ongoing educational reform in practice. Some of the words remaining in this group englobes the curriculum in movement in the current Brazilian basic education (*BNCC*, *conteúdo* and *documento*), revealing that the implementation of the BNCC has a decisive impact in the educational institutions, mainly at school.

These results prove the collective institutional work, involving people, documents and institutions constituents of the implementation of BNCC in the Ceará region of CREDE 10. Thus, it can be inferred that the labor actions are institutional (SME), mobilized both by the trainer in nature science as well as other agents, demonstrating that what is said can express what is practiced (CARVALHO; DIMENSTEIN, 2017).

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The specificities analysis and AFC exposed the non-overlap of any of the thirteen variables with each other on the cartesian plane. In view of this, it was noticed that each SME presents peculiar activities in the implementation process, although significant curricular changes are taking place, at a document and pragmatic level. In general, it was noted that this kind of work of management performed by the interviewed is influenced by its formation (With teacher graduation: sciences or other; no teacher graduation), with those in the science area being those who were able to report more naturally the way in which the implementation of the BNCC has been affecting the organization of the schools curricula scientific contents in the final years of elementary school. In some cases, the degree interfered in the discourses, has can be seen in some descriptions in this section.

These preliminary findings served as support for the detection of linguistic formation in the speech (ORLANDI, 2012) at the beginning of the analysis, giving rise to the path of deep comprehensions, found through work supported by the Descending Hierarchical Classification (DHC) analysis, supporting the promotion of four analytical categories, with the distinction of two groups being noticed: curricular organization of science content and systematization of this curriculum within the school context.

It important to highlight that the DHC produced 397 text segments (TS) in the corpus, treated as pieces of a larger text, allowing for reflections about the materiality of the sentences (SOUZA-SILVA; DAVEL, 2005), exposed in the following categories: 1) changes in science curriculum contents; 2) continued training for school reorganize; 3) search for teaching science by investigation; 4) work of educational management in the reorganization of the scientific contents.

3.1 Changes in sciences curricular content

Isolated from the other categories, the first category (27% of TS) expose, to a large extent, how the nature sciences curricular components are organized between the final years of elementary school, corresponding to the science subject, which addresses preliminary topics of the subjects of biology, physics and chemistry, taught in high school.

The concern of 61% of the trainers, especially those of Quixeré-CE and Limoeiro do Norte-CE, refers to the reorganization of the scientific subjects in science. The discourses, in especial those of trainers who do not have degree in sciences, reveals the changes that occurred in the current educational system, comparing them with the reality experienced before. If previously the contentes had a outlined sequence based on the cognitive development level of the students, actually, with the proposal of three thematic units: 1) matter and energy; 2) life and evolution and 3) earth and universe (BRASIL, 2018a), there was considerable curricular

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disruption. This is evidenced by the chi-square test (X^2), that is, measuring the following most significant words in the class: *ano* (grade) ($X^2 = 54{,}11$), *livro* (book) ($X^2 = 48{,}39$), *conteúdo de Física* (physics content) ($X^2 = 34{,}89$), *conteúdo de Química* (chemistry content) ($X^2 = 34{,}89$) e *conteúdo de Biologia* (biology content) ($X^2 = 19{,}31$).

The quantitative reduction of scientific content, proven by the trainers speeches, was already present in the discussions of Rodrigues and Mohr (2021) about the implications of the implementation of the BNCC. The authors assert that the discourse of the creators of the BNCC justifies the removal of some science contents with the necessity to provide favorable conditions for the acquisition of competences in punctual scientific themes, aiming to overcome the accumulation of diverse bookish information. The BNCC document itself defines essential learnings of the students (BRASIL, 2018a) and, therefore, establishes the essential contents to be taught. In this logic, Batista and Bezerra (2020) clears that the Curriculum Theories defines the curricula matrices, also, as selective and organizers of the contents to be worked.

In the wake of the changes brought by the educational reform in course, it is possible to infer, from the language of the interviewed, that the pedagogical practices of science teaching were easier when education focused in the approach by biology content for the classes of the final years of elementary school. However, with the early inclusion of chemistry and physics content in this educational modality, the science teaching must be (re)thought, including the logical arrangement for each grade. The dissatisfaction of the trainers about the irregular relation between content and grade was captured, as observed in the speech of one of them:

> [...], however what I found uninteresting, when you take a book for example, from the 6º grade to the 9º grade, the content is so fragmented, a little bit from each year, that I think it gets lost in terms of identifying how the student understood. If I were to take a book to study, I think that the contents are very fragmented. **Trainer from SME of Quixeré-CE**.

This problem also affected the main didactical resource to support teaching, the textbook, causing teachers, according to the interviewed, to carefully choose this type of resource in the area of science, through the National Textbook Program (PNLD). Inevitably, this choice was linked with the implantation of the BNCC and, consequently, with the school capacity and the teaching practices of the teachers of sciences from the municipal networks under analysis. In general, the trainers said that teachers feel a little confused and dissatisfied with the new books layout available, having to be careful with how the textbook should be used in the classroom.

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> The books that we use, which are from PNLD, comes from MEC, from FNDE, that uses as reference the BNCC. They undergo a selection and na analysis. So, in practice, it already comes with all the issues that are there, which must be seen in accordance to the BNCC. So, as we try to comply the program that is in the book that was adopted, we end up complying with the entire BNCC proposal. Our concern is, by complying this, we achieve to develop skills in the boys. **Trainers from SME of Limoeiro do Norte-CE**.

The trainers were also apprehensive about the change in the layout of the contents of sciences, reporting that this problem has reverberated the daily teaching exercise of the teachers from the municipal networks, even though they are aware of the orientations of the BNCC for the science teaching which "boxes" it between learning objectives set in the normative document. Therefore, it was possible to note that new teaching actions in sciences are arising from the disharmonious flow of curricular contents between the 6º grade and the 9º grade, which are fragmented and with discrepant levels of complexity between the textbooks adopted.

3.2 Continued training for school reorganization

Linked to the third and fourth categories, the second, with more TS (29,2%), exposes the intentions of the municipal SMEs to concede continued training about the ongoing educational restructuring, giving support to school dynamics (meeting, class, support, teaching, management, etc.) and new roles to school agents (principal, coordinator and teacher). The statements that allude to this event come from subjects trained in the area of nature sciences, linked to the findings of Lima and Biernaski (2022) about the implementation of the BNCC through the continued training, developing didactical material and school documents.

Except for what was said about the experiences in the city of Itaiçaba–CE, the experiences in management experienced in the other cities (92,30%) converges for the productivity of continued formation in the area of nature sciences, integrating school management (Principal and Coordination) and teaching staff, to support and enhance the teaching and learning in sciences. Between the lines of the textual corpus referring to the permanent training of the teaching staff to deal with the BNCC, it is noted that this kind of activity occurs as a capacitation in-service, in a continuous and constant way, which can facilitate the work of school management, and also cooperate with the organization of pedagogical work, daily promoted by the school.

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In similar context of the BNCC implementation in a municipal network of education (SME), Veras (2022) clarifies that the movement of collective training between agents of the ProBNCC/CE team, trainers in the area of nature sciences and professors of science from the final years of elementary school collaborated with curricular innovations in the aforementioned area, including the inclusion of DCRC principles in the classes.

It was explicitly and implicitly said that the integration between the working hours of management (from the SME and schools) and teachers in the scope of the implementation process, guided the teaching work in the area of nature sciences, including the redefinition of management actions and teaching. In this sene, some striking speeches are exposed:

> [...] We really need to take careful look at this, because this change is not just happening for the science component, and then the coordinators monitors all the components. Each trainer here from our city, he seeks, really, to direct the work, mainly for those coordinators (school management) that area new, who are entering the role, as they don't really know where to go or feel very lost, even in relation there is how to be able to accompany a teacher. **Trainer from SME of Russas-CE**.

> So, I think the relation becomes much beet when we began, in a certain way, the teahing and school management, having a more permanent and democratic dialogue. One situation that can be achieve is... is to guarantee the conditions and structure so that the teacher can give what is rightful to the student. I think that this relation between teacher and management, and, mainly, the principal issue, not mentioning to what we have in Fortim, but they said that this communication is strict even with the Basic Education Secretariat; the conversation and dialogue are narrower. **Trainer from SME of Fortim-CE**.

Encouraging meetings or the "permanent dialogue" between teachers and school coordinators as configured in another action emanating from the training in-service provided by the SME to the school institutions. This kind of meeting seeks for the pedagogical planning and organization of the teacher work, in the subject of science, with skills and competences provided in the school pedagogical politic project, elaborated in conformity to DCRC and BNCC. By the exposed speeches to this point, were identified the three most recurrent competences in science, in conformity to what the BNCC brings (BRASIL, 2018a): 1) Understanding the fundamental concepts and explanatory structures in sciences; 2) Understanding and explaining the scientific phenomena; 3) Use of different languages and information technology of communication.

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Among the discourses of the thirteen interviewed about providing continuous training from SME for the school, the trainer from Tabuleiro do Norte–CE stood out, as it gives understanding of the systematization of the pedagogical coordination work to use the BNCC and DCRC in the pedagogical planning in nature sciences area. As verified in the previous category, the other discourses of the trainers highlight the restructuration of the textbook, from 6º grade to the 9º grade. The triplet textbook, pedagogical planning and teaching practices brings the diagnostic, in the interfaces of the speeches of the trainers, about the quality of the feedbacks provided to the teachers on the alignment or not of their teaching actions with the BNCC, which impacts on the level of complexity of the scientific contents, and as a result, the learning of the students.

A behavior similar to the reorganization of the pedagogical planning in sciences in elementary education, in the Ceará context, was observed in the work of Veras (2022), in which the trainings from SME induced new practices during the classes of sciences. In contrast to the findings of the author aforementioned and the discourses of the interviewed exposed, Franco and Munford (2018) argue that the layout of science contents, restricted to the three thematic units present in the BNCC, limits the articulation between scientific education and contextualization of the contents, something that has been long pursued since the National Curricular Parameters (PCN), in the last years of the 90's.

The discourse about the need to make time available to the teachers, so that they can appropriate the scientific knowledges coming from the BNCC and, thus, give a new meaning to their teaching practices in science, echoed during the interviews carried out. These meanings led to the improvement in the classroom, dealing, unprecedently, with scientific content, including topics such as literacy and time management. The analysis of these discourses enters in consonance to what Ceará (2019) comprehends as classroom:

> It is not just a physical space, but a place of interactions where experiences are shared and the people learn to learn, learn to do, learn to live, learn to be, become human. It is the activity carried out in the classroom that creates its specificity, effectively making it a classroom (p. 46).

3.3 Search for teaching scientific investigation

Imbued in the fourth category, the third category (20,9% TS) also exposes the need to continue the formal education with the sciences teaching, despite the difficulty to provide education in times of the COVID-19 pandemic. Despite being a challenge inherent to the

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pandemic period, as proposed by some interviewed, the use of technologies made viable the emergency remote teaching was supported by educational legislation instituted due to the public calamity that occurred during that time. It is worth noting that the provision of the basic education working hours via distance learning had already been decreed in the current DCNEM, as brought by Rodrigues and Mohr (2021).

Some of the discourses of the interviewed allowed to infer that some trainings of CREDE 10 occurred remotely, due to the aforementioned pandemic, which made difficult the acquisition of novel teaching strategies, something that was also found out by Veras (2022), which interviewed trainers in nature sciences in a Ceará's city. However, there was understanding that the teaching of scientific content prevails through investigation teaching, considering the regional specificities of Ceará state, described in DCRC, the socioeconomic aspects of the students and the recomposition of learning.

In general, it is interpreted that the trainers understand the BNCC as a guiding document that induces modification of the teaching and learning processes, in an attempt to break with the traditional science teaching, based exclusively on the system of transmission and reception of information. The speeches are linked to the BNCC, regarding the production of scientific knowledge, observing the process, practices and procedures of scientific investigation, resulting from the dialogue between learners (teacher and student). Although, in face of the current curricular implementation process, must be considered the opinions of teachers based in their school practices, as argued Brum (2020) and Castro (2020) about the collaboration between education network management and basic education school.

The intention to promote alternative methodologies to the traditional teaching in sciences, especially the teaching by investigation (recommended by the BNCC for the nature science area) was configured, both orally and in the discourse of the interviews, as stronger purpose among the municipal networks of education of Itaiçaba–CE, Morada Nova–CE and Tabuleiro do Norte–CE. At this point of the analysis, these three discourses converges for the need to provide trainings and qualifications to schools in their networks to give a new look to sciences teaching, that is, corroborating with the BNCC, that the approach of the scientific content occurs through investigation processes, something intrinsic to the evolution of science in society. It is noted that the expressions of the trainers are linked to the first two competences specifics to the BNCC, in the area of nature science (BRASIL, 2018a), which are understandings: 1) Science as a human enterprise; 2) Fundamental concepts and explanatory structures of science.

Other situation to be highlighted in this category is the movement for the curricular adaptation of some municipal networks under investigation, as in the case of Itaiçaba–CE and Tabuleiro do Norte–CE. The changes in the curriculum was made by the guiding documents

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BNCC and DCRC, seeking the organization of the school work with student protagonism, teaching technologies and forms of learning assessment.

It was clear that the year 2020 was challenging for the education, so much that the response to the demands of the pandemic context, especially social isolation, was quick, resulting, among other measures, in the emergency remote teaching and the document Curricular Priorities Orientation of Ceará (OCPC). It is possible to exemplify the occurred illustrating the realitys of Itaiçaba–CE and Tabuleiro do Norte–CE, whose educational management is consistent with adopting incentives for an emphatic teaching priority, such as Portuguese and mathematics, in accordance to the federal and state level regulations.

> As the name suggest, this guiding document was made to serve as a national normative and establish a common curriculum to all the students of Brazil, with the states being responsible for establishing, based on the BNCC, their own normative documents, including characteristics of each state, as in the case of the DCRC of Ceará. The process of implementation of the BNCC in the schools of the Itaiçaba city has already begun. **Trainer from SME of Itaiçaba-CE**.

> I participated in the public consultation at the time of the BNCC elaboration. Until then, what I understand, would be a kind of national base, of content composition so nothing was lost, in relation to the entire school at the Brazilian level, at municipal level, at state level. This served to provide a guide to content skills, so that the student could advance in their studies. **Trainer from SME of Tabuleiro do Norte-CE**.

In relation to the context of Morada Nova–CE, there is a defense for a investigative science teaching, with the use of experimentation with equal importance to the theoric study. The trainer from that city deepens this idea saying that the initial formation of the teacher allows for the use of active methodologies in the classroom, which is provided by the BNCC.

> [...] We need to read, debate and reflect more about what we want for education of our city, our school, and this document allowed to have this perspective, to review how we are working our classes, our competences and skills that should be worked. So, this document allowed that, to have this integrating relation and the reflection about our education. **Trainer from SME of Morada Nova-CE**.

Opposing the optimism about the promotion of science teaching by investigation in the municipal networks in analysis, Branco e Zanatta (2021) and Rodrigues and Mohr (2021) warn, in turn, that the document of BNCC has been the target of many critics in relation to its efficiency to form critical citizens, who can act in society and supported by the scientific knowledge acquired in the formal education, being able to argue, judge and take initiatives.

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3.4 Educational management work in the (re)organization of the scientific contents

The last category (22,9% TS) is about the educational management work performed by the SMEs, for the curricular systematization in competences and skills, conditioning teaching contexts. The discourses are centered on exposing the way the teachers and management staff received training to perform, respectively, didactical and pedagogical planning for the organization of school classes, around the BNCC and DCRC.

Municipal realities in the CREDE 10 region, in which the kind of degree the trainer (with or without degree in teacher of sciences) did not have a decisive influence on the management of the implementation of the BNCC, as this process was endorsed in the ProBNCC document (BRASIL, 2019). Therefore, it appears that the process of implementation of the BNCC emerged with different intensity among the municipal education networks under analysis.

The discourses emphasize the duty of the teachers to elaborate teaching plans and class plans based on the competences and skills provided by the BNCC, including the codification of each one of them in specific descriptors. For example, in São João do Jaguaribe–CE, there has been allocation of competences and skills specifics to determined scientific contents, contained in online class plans. It was found that, in Quixeré–CE, care was taken to address certain skills and specifics objects of study in classroom on a daily basis.

Despite being 174 Km (driving), it was possible to verify complementarity in the educational realities experienced in São João do Jaguaribe–CE and Icapuí–CE. While the first city had concern to work the scientific contents provided in the textbook, based on the BNCC; in the second, the notion of science contents is expanded to curricular components constituted by specific competences and skills.

> Because when we see the object knowledge, it is… we assimilate it, making a direct relation with the content that is in the book, to the title of the content that is in the book. And when we work the relation (with) specific objects, we work with them so that they (students) understand the breakdown of these contents, what you will be within this content. **Trainer from SME of São João do Jaguaribe-CE**.

> Since 2019 we began, here in the city of Icapuí, with the guidance of work on this implementation of the BNCC. So, we started the study by the subject. So much we did that even at the beginning of the year of implementation, so that teachers knew the general skills and specific skills, by curricular component. **Trainer from SME of Icapuí-CE**.

Generalizing the discourse made between the speeches of all the trainers about the content and curricular matrix, it is possible to affirm that there are no strong negative critics,

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on the contrary, a close relation between contents, descriptors and skills. Therefore, there is a desire for the teacher not to restrict his teaching to the accumulation of superficial information, but for the teaching of each content of nature sciences collaborate with the qualified formation of the students, so that they can be active citizens in society, justifying their decisions based on scientific knowledges acquired in the formal education.

It can be concluded from what was said, inherent to the different periods of implementation of the BNCC, that: a) there are attempts to recover learning, lost during the COVID-19 pandemic; b) uniformity of the pedagogical work between the municipalities, due the integration between curriculum and the BNCC; c) manifestation of effective teaching work, supported by the DCRC; d) Training from the SME to work with what is priority, in each relevant period. There results are important manifestations to generating initiatives from public authorities, validating the premise of Branco and Zanatta (2021):

> This discussion is importante, as it is essential to comprehend, position oneself and debate the aspects that underlie the reform process and the implementation of the BNCC, given that the future of public schools, science teaching, the students and their professors is at stake. [...] the processes of reform, invariably, generate important implications about the school organization, teaching processes and teacher formation (p. 74).

Final considerations

The discourse analysis of the trainers allowed to congregate main arguments in the turmoil of voices evocated by them, comparing them to that of researchers that had studied the effects of BNCC in the science teaching. Referring to the first category the fact that teachers of the educational networks are somewhat dissatisfied with aspects of science contents (standardization, layout, quantity, complexity, etc.), changed with the advent of the BNCC. This fact tries to be mitigated by the recurrent presence of educational management (CREDE 10) in the school (second category), to train management and teaching staff, aiming to promote a new school dynamic in face of the new challenges (role of the teacher, pedagogical practices, new classes, etc.), including linking the contents of sciences and the curricular matrices with descriptors and specific skills (fourth category).

Via the arguments exposed, articulations and contrapositions were identified in the discourses of the trainers interviewed in relation to the discourses of the researchers of the BNCC document, seeking the curricular implementation, especially in the nature sciences area, namely:

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a) Contrapositions: benefits of the standardization of teaching seeking the learning of the students, pointed by the trainers interviewed; alignment of training actions in school with the national and international markets, based on curricular practices that aims at the quality of education; Guarantee of supply efficient and satisfactory education, in the formation of professors in service; major renovations and inovations in science, with initiatives pointed at BNCC; mastery of school scientific knowledge, achieved during the current educational reform;

b) Articulations: possibilities of collective work within the school, envolving different school agents; emphasis in training activities by investigation, renewing, therefore, the science teaching; overcoming of the traditional teaching method, in the teaching activity based on work by competences and skills; more time to safely implement curricular practices, after a period of verification and evaluation of the reform in course.

In relation to the (re)arrangement of scientific contents among the final years of elementary school, it was possible to more clearly compare the work developed in the Ceará's SMEs of Icapuí, Limoeiro do Norte, Quixeré and São João do Jaguaribe.

Unanimously, the speeches aim to promote science teaching by investigation (third category), which could benefit the students, as example of the socio-emotional competences and recomposition of learnings. However, it should be questioned the lack of incentive for the application of the practice of others science teaching methodologies in the classroom of schools from Vale Jaguaribano, resulting from satisfactory pedagogical interventions, expressed in scientific researches that have been published recently.

Except for the speech regarding Itaiçaba – CE, it is understood that the municipal education networks investigated regularly provided, in 2022, gradual continued training on the implementation of the BNCC.

Finally, the discourses of the trainers allowed to affirm that the educational reform in course, in the CREDE 10 region, is not homogeneous between the contexts in focus, but contributed to the delineation of a multiple case. Therefore, some dynamics inherent to the educational management of the 13 municipal education networks were parameterized.

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