



**THE UTILIZATION OF SCHOOLBOOKS: FROM THE TEACHER'S  
PERSPECTIVE**

*O USO DO LIVRO DIDÁTICO: SIGNIFICAÇÕES DOCENTES*

*EL USO DEL LIBRO DE TEXTO: SIGNIFICACIONES DOCENTES*



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**ABSTRACT:** This article aims to investigate the meanings generated by teachers regarding the science teaching materials organized by the SESI-SP school network through the methodology of Signification Nuclei. Studying these meanings made it possible to understand essential aspects of teachers in SESI-SP schools, their educational proposal, and, above all, the teaching materials. The participants in this research responded to a questionnaire with closed and open-ended questions. Based on the obtained responses and data analysis, tabulations of the closed-ended questions and the development of signification nuclei for the open-ended questions were conducted to ensure a clear understanding and enrichment of the issues brought by the literature. Finally, the results suggest that the SESI-SP network should provide opportunities for interaction between students and teachers through the activities proposed by the science teaching materials, using technological resources in a collaborative environment.

**KEYWORDS:** Schoolbook. Understanding. Teacher.

**RESUMO:** Este artigo tem como objetivo investigar as significações geradas pelos docentes em relação ao material didático de ciências, organizado pela rede escolar SESI-SP, por meio da metodologia dos Núcleos de Significação. Através do estudo das significações, foi possível conhecer aspectos importantes dos professores das escolas SESI-SP, de sua proposta educacional e, sobretudo, do material didático. Os sujeitos desta pesquisa responderam a um questionário com questões fechadas e abertas. A partir das respostas obtidas e da análise dos dados, foram efetuadas as tabulações das questões fechadas e elaboração de núcleos de significação das questões abertas, visando uma boa compreensão e enriquecimento das questões trazidas pela literatura. Os resultados sugerem que a rede SESI-SP deve propiciar momentos de interação entre alunos e professores por meio das atividades propostas pelo material didático de ciências, com a utilização de recursos tecnológicos em um ambiente colaborativo.

**PALAVRAS-CHAVE:** Livro didático. Compreensão. Professor.

**RESUMEN:** Este artículo tiene como propósito investigar los significados generados por los docentes en relación con el material didáctico de las ciencias, organizado por el sistema escolar SESI-SP, a través de la metodología de los Núcleos de Significado. A través del estudio de los significados, fue permitido conocer aspectos importantes de los profesores de las escuelas SESI-SP, de su propuesta educativa y, sobre todo, del material didáctico. Los sujetos de esta investigación respondieron un cuestionario con preguntas cerradas y abiertas. A partir de las respuestas obtenidas y el análisis de los datos, se realizaron las tabulaciones de las preguntas cerradas y la elaboración de núcleos de significado de las preguntas abiertas, con el objetivo de una buena comprensión y enriquecimiento de las preguntas auxiliadas por la literatura. Los resultados sugieren que la red SESI-SP debe proporcionar momentos de interacción entre estudiantes y profesores a través de las actividades propuestas por el material didáctico de ciencias, con el uso de recursos tecnológicos en un ambiente colaborativo.

**PALABRAS CLAVE:** Libro de texto. Comprensión. Profesor.

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## Introduction

In the current discussion regarding the formulation and implementation of curriculum proposals, significant progress has been observed since the Ministry of Education (MEC) introduced the National Curricular Parameters (PCNs), first for elementary education in 1996 and later for high school in 1998. Since then, an extensive field of studies has emerged, encouraging public, state, municipal, and private education systems to develop curriculum proposals. In 2018, the MEC released the final version of the National Common Curricular Base (BNCC) after intense debates that involved not only academics but also the participation of civil society, called upon to contribute. This fact highlights that this debate has transcended spheres and involved stakeholders beyond what was originally anticipated.

The developments of the São Paulo Curriculum, according to São Paulo (2019), represent a decisive step in the process of improving the quality of Basic Education in the state of São Paulo. These developments encompass student learning outcomes, such as the production of support materials, initial and ongoing teacher training, and evaluation frameworks.

Even though there are diverse and sometimes conflicting interests among curriculum proposals, they all share the development and use of textbooks, which should be considered an advancement in any case. Prior to the implementation of the National Textbook Program by the Ministry of Education (MEC), access to textbooks was often costly, resulting in the exclusion of students from low-income families. As a result, the use and democratization of this educational resource were limited in Brazil, contrasting with the current reality.

This access to textbooks has become a right of basic education students in Brazil, guaranteed by various legal provisions such as the Law of Guidelines and Bases of National Education (BRASIL, 1996), along with other decrees, resolutions, and ordinances from the Ministry of Education (Decree n.º 7,083/2010; Resolution n.º 38/2009; Ordinance n.º 971/2013). Its importance as a teaching and learning tool is due to its facilitating role throughout students' learning and development process. Furthermore, it is important to emphasize that the textbook plays a fundamental role as a guide for teachers, assisting in the development of teaching strategies and avoiding possible gaps that could hinder understanding of the content, particularly by providing a reliable source of reference for both educators and students and their families.

However, when analyzing the didactic material from the perspective of Socio-historical Psychology, it is important to remember that this approach is based on Historical and Dialectical

Materialism. It also incorporates contributions from contemporary authors, such as Clot (2006, 2010) and his group of researchers from the *Conservatoire National des Arts et Métiers*, who deliberately align themselves with Vygotskian thinking, contributing to the analysis of significations.

Therefore, the purpose of this study is to analyze the conceptions related to didactic material, considering its sociocultural and historical context. If our object is subjectivity, how can we investigate it, how can we grasp it? Drawing on Vygotsky's contributions, it is possible to affirm that words and signs constitute the starting points for understanding an individual's language. However, it is equally relevant to comprehend their underlying thinking and the inherent meaning in their verbal expression. Thus, through this research, the aim is to contribute to enhancing the quality and effectiveness of the use of didactic material.

One hypothesis is that the teacher may use the didactic material more as a workbook rather than as an important resource for creating didactic sequences due to the lack of continuous training sessions where the central didactic material theme is the discussion. Therefore, it is essential to demonstrate how the didactic material from SESI-SP was developed.

As established in the Curricular Guidelines of the SESI-SP school network (2003), all didactic material must adopt the following principles: a conception of education that encompasses teaching, learning, and research.

This new pedagogical approach needs to overcome, within each classroom, homogeneity, individualism, authoritarian relationships between students and between students and teachers, mechanical and fragmented activities, solely classificatory assessment, and tasks without planning and a teaching work plan. The student's error constitutes a guiding element in the teacher's practice, and teaching aimed at the continuity of conceived learning is seen from a socio-interactionist perspective. (SOCIAL SERVICE OF INDUSTRY EXECUTIVE MANAGEMENT OF EDUCATION - SESI, 2003, p. 23-69, our translation).

It is the responsibility of the teacher to create favorable conditions for interaction between the student, the object of knowledge, and the sociocultural environment, to achieve the following educational objectives:

1. Development of the ability to learn, with full mastery of reading and mathematics;
  2. Understanding the natural and social environment, the political system, technology, the arts, and the values on which society is based;
  3. Development of the learning capacity to acquire knowledge and skills and the formation of attitudes and values;
  4. The strengthening of family bonds, human solidarity, and reciprocal tolerance underpin social life. These are the educational objectives that different areas of knowledge should consider. [...]
- From Early Childhood Education to the end of Basic Education,

teaching/learning work and sustainability means starting from situations that promote experiencing and experimenting situations in which children and adolescents, individually and collectively, critically, with attitudes of rejection towards discrimination and injustice, develop attitudes of respect, solidarity, and cooperation, essential values for the construction of true citizenship (SOCIAL SERVICE OF INDUSTRY EXECUTIVE MANAGEMENT OF EDUCATION - SESI, 2003, p. 69-70, our translation).

Based on these guidelines, the didactic material of SESI-SP was created. Regarding the science content in Elementary Education, since 2010, it consists of the following textbooks: "Movimento do Aprender" (student book), "Fazer Pedagógico" (teacher book), and "Muitos Textos, Tantas Palavras" (a summary of texts for reading). Throughout the entire science education in the Elementary School of the SESI-SP school network, as established by SESI-SP (2003), it is essential for students to have the opportunity to develop and enhance the following skills: understanding that nature is a dynamic system in which human beings are embedded and exert influence upon, through positive attitudes towards the environment; recognizing the connections between science, technology, and transformations in living conditions; understanding that science and technological development go hand in hand and bring about changes in everyone's lives; comprehending technology as an essential resource for the survival of the human species and being able to distinguish the contexts in which it is used detrimentally or beneficially; formulating inquiries and suggesting solutions to real problems; applying basic scientific principles related to energy, matter, time, systems, transformation, space, equilibrium, and life; integrating readings, experiments, observations, and records for the collection, organization, and discussion of information; valuing teamwork; understanding health as an individual matter that must be ensured for the benefit of society as a whole.

After the educational conception and methodology for science teaching were developed, as previously reported, the instructional material was presented to the teachers. However, since then, not much information has been obtained regarding the use of this instructional material by the teachers, which has raised additional questions: How is this instructional material used in practice? How does the teacher attribute meaning to it? What are the difficulties encountered? Does the instructional material truly assist in educational practice?

Therefore, this research aims to ascertain how teachers attribute meaning to the science instructional material intended for students from 6th to 9th grade in the SESI-SP school network and to investigate whether there have been changes in the pedagogical approach when using this instructional material.

## Method

The objective of this research is to investigate how teachers attribute meaning to the science instructional material intended for students from 6th to 9th grade in the SESI-SP school network. To achieve this, information has been gathered regarding the region in which the teachers work, their academic background, whether they teach in other educational institutions and which ones, their weekly workload, their tenure at SESI-SP, the tools used for lesson planning, the evaluation of the instructional material, the school infrastructure in which they work, sentence completion, the justification of the usefulness of the instructional material based on their experience, and finally, whether there have been changes in the pedagogical approach when using the instructional material.

In addition, to obtain higher quality and diverse information, authorization was granted by the Director of the Division of Education and Culture of SESI-SP to conduct a survey in the institution's school units. This article constitutes a qualitative study, as this approach is most appropriate for gathering perspectives, explicit attitudes, and conscious observations observed through the meanings attributed to the instructional material in question. Therefore, it is important to emphasize that the objective of this article is to contribute both to the study of the meanings related to the instructional material and the study of the instructional material itself.

Regarding the meanings of the word, Vygotsky (2009, p. 398, our translation) explains that:

[...] In the meaning of the word, we find the unit that reflects, in the simplest way, the unity of thought and language. The word's meaning is an indivisible unit of both processes, and we cannot say that it is a phenomenon of language or a phenomenon of thought. A word devoid of meaning is not a word; it is an empty sound. Therefore, meaning is an indispensable constitutive feature of the word. The meaning of the word is the generalization of the concept. The generalization and meaning of the word are synonymous. Every generalization, and every formation of concepts, is the most specific, authentic, and indisputable act of thought.

It is understood, therefore, that the meaning of a word is simultaneously a discursive and intellectual phenomenon. However, the meaning of a word only becomes a phenomenon of thought when thought is associated with the word and is materializes in it, and vice versa. To better understand signification, it is necessary to consider that it is composed of two components that, although distinct, complement each other, known as meaning and sense.

According to Aguiar (2006, p. 14), meanings are historical and social productions. Through them, communication and socialization of our experiences take place. They also

transform over time, thus altering their relationship with thought. It is, therefore, a dynamic process. Meanings refer to established yet flexible contents shared and appropriated by individuals who shape them based on their subjectivities. On the other hand, the sense is something more subjective that expresses the subject with greater certainty, being the unit of all cognitive, affective, and biological processes.

Meaning and sense are stages of reality production and subject formation, just as objectivity and subjectivity are parts of the same process, the transformation of the world and human constitution. Therefore, they cannot be considered separately. Aguiar and Ozella (2013, p. 311-312, our translation) discuss:

Based on the assumption that analysis is constructive and interpretative, aiming to go beyond the phenomenon in its appearance and thus reach new zones of intelligibility, the procedure for organizing the cores of signification was as follows: after transcription, a floating reading of the interviews was conducted, followed by an identification of the themes/contents that stood out in Raquel's speech (pseudonym of the research participant). These themes are revealed/expressed through words. From these words, which are always given meaning within their context, the pre-indicators emerge, constituting the socio-historical reality of the subject.

According to Mazzotti (2010), it is understood that meanings carry with them the modes, outcomes, and objective conditions of actions, regardless of the subjective motivation that influences the human activity in which they are formed. Thus, socially elaborated meanings transform their existence when they enter the consciousness of individuals, resulting in a duplicated "existence." This duplicity arises from another internal relationship, which causes an additional movement of meanings within the system of individual consciousness, and manifests in the most common psychological events. From this new relationship, the need arises to distinguish the meaning of the comprehensible object from the meaning that the element in question holds for the individual, namely, the sense.

According to Gray (2012, p. 282, our translation), the order of the questions proposes: "using a funnel approach, where the questionnaire begins with a broad set of questions and narrows down to specific target areas." For this purpose, closed-ended questions are essential, as they provide the research participant/respondent with pre-elaborated answers and facilitate comparison. Similarly, it is also necessary to include open-ended questions in which the respondent is required to elaborate freely, thereby increasing the quality of the responses. According to "[...] the use of different formats contributes to response rates in the questionnaire (open-ended questions, closed-ended questions)" (GRAY, 2012, p. 282, our translation).

In the analyzed dissertation, the responses were obtained through the administration of questionnaires using the Likert scale, a method based on a series of statements that express a favorable or unfavorable attitude towards the concept under study. According to Uebersax (2006), the scale should initially present several items, with the responses arranged horizontally on a continuous scale. The verbal values should be bipolar and proportionally opposite, with a neutral midpoint. The scale evaluates the attitudes of the interviewed subjects in terms of agreement and disagreement. Using only four options intends to force the respondent to take a position on a statement. According to Hill and Hill (2005), there is no specific rule regarding the number of options to be used; however, a scale with four options allows for a more precise assessment of more delicate questions, where the participant is asked to express their position.

During the analysis, the aim is to comprehend the meanings (sense and significance) in a general sense, to advance and approach certain sectors of the subject's sense and, consequently, their subjective dimension. This entails recovering the needs that shaped them and considering their historicity and how they relate to others, work, and culture.

## Results

The main objective of this research was to understand the meanings attributed to the science instructional material used in the SESI-SP school network. This material adopts a science teaching approach proposed by the mentioned network to promote active student participation in the learning process. To achieve this objective, strategies are employed that involve observation, hypothesis formulation, experimentation, discussion, and analysis, always with the intervention and mediation of the teacher, to ensure that the student understands the object of study and learns about it. The proposed activities aim to develop scientific skills and address the three fundamental axes of scientific literacy: learning science, learning to do science, and learning about science.

For this purpose, 220 questionnaires from Laôr Fernandes de Oliveira's master's dissertation, presented in 2013, were analyzed using the methodology of Socio-Historical Psychology focusing on Meanings and Significances. The analysis included closed-ended questions grouped by proximity without a specific numerical order to facilitate the analysis and open-ended questions. The justifications for the closed-ended questions were organized into cores, indicators, and pre-indicators for a more in-depth analysis. According to Lüdke and André (2012, p. 45, our translation):



The task of analysis involves organizing all the material by dividing it into parts, relating these parts, and seeking to identify relevant trends and patterns within it. In the second stage, these trends and patterns are reassessed, aiming to identify relationships and interferences at a higher level of abstraction.

In the conducted research, the questionnaires highlight the written justifications in questions numbered 17 ("Do the activities presented in the Science Learning Movement of Elementary School enable collaborative learning?") to 35 ("Does the pedagogical conception embodied in the Science Didactic Material collection for Elementary School arouse students' interest and curiosity?"). Therefore, an analysis using Aguiar's (2006) Nuclei of Signification was conducted to elucidate the dialectical process of understanding the produced meanings.

Thus, the study aims to explain how this procedure operates in research, emphasizing that "signification" is used to express the dialectical articulation between senses and meanings. This reveals that the individual and society, thought and language, affect, and cognition constitute relationships that configure themselves as units.

Therefore, we also emphasize the fundamental need to use the theoretical and methodological assumptions of historical-dialectical materialism and its implications in socio-historical psychology to achieve its full development, as shown in the following table.

**Table 1 - Core Meaning of Question 17**

<b>The positive and negative aspects of science educational material</b>
<b>Indicators</b>
Negative aspects of the Educational Material
Positive aspects of the Educational Material

Source: Research data (2022)

**Table 2 - Core Meaning of Question 18**

<b>Educational Material and the necessary structure for its implementation: a challenge to be faced.</b>
<b>Indicators</b>
Resources and structure to carry out the activities.
The structure does not allow the proper utilization of educational materials in experimental activities and school research.
According to the structure, physical space, and materials we have, we utilize what is feasible.
The lack of internet access and slow internet speeds hinder the work with educational materials, and due to limited access, some websites do not load.

Source: Research data (2022)

## Analysis of Signification Units

This research involved the participation of 220 Science teachers from the SESI-SP network. Thus, the objective is not to explore the interviewees' individual meanings and interpretations but to understand the collective elements in line with the nature of the selected study. However, the unique perspectives of those who stand out or differ are also taken into consideration.

To continue the constructive and interpretative analysis from a socio-historical perspective, the questions were examined within the intra-nucleus sense (FREITAS, 2002) and in relation to each other and to the reality of the SESI-SP network. Initially, the routine of Science teachers in using instructional materials encounters difficulties and seeks ways to overcome them, perceives possibilities, and may contradict itself, among other things. These events generate motivation, leading to changes and discoveries in various aspects of teaching activity.

### Module 1: The positive and negative aspects of science educational materials.

This analysis is important as it reflects the teacher's opinion on the SESI-SP Science educational materials and the significance they attribute to it in the classroom. This module's indicators are the educational material's positive and negative aspects. To better understand how teachers perceive and utilize this material in practice, it is assumed that their role is situated in the context of innovative materials linked to a specific educational approach within the school network, thus assisting in a better understanding of the quality of the material in question.

As justifications for the positive aspect indicator, it is observed that teachers are familiar with and understand the nature of the SESI-SP Science educational materials, as indicated by Aguiar (2006), which incorporate participants' statements. However, the proposed "*cores of meaning*" framework here aim to dialectically incorporate the social and historical conditions that foster an analytical movement capable of understanding the constitutive processes of individuals and, thus, the genesis of the produced meanings.

(...) enables investigation

(...) guides the actions of the teacher

(...) provides meaningful activities that prompt students to seek solutions

These pre-indicators align with the PCNs (BRASIL, 1998), affirming that educational materials should be seen as a reference rather than a rigid manual. As Lajolo (1996) states, "The worst book can become good in the classroom of a good teacher, while the best book can lose its effectiveness in the classroom of an inadequate teacher". This means that the book is merely a tool that assists in the learning process.

Regarding the negative aspects mentioned in the survey, the following justifications have been identified: the workbook exclusively provides exercises and presents excessive theoretical content; the instructional material has limited theoretical content, as it primarily relies on individual research on each topic from other sources.

Based on these justifications, it is evident that perhaps the teachers have misunderstood the instructional material from SESI-SP, considering it as an unquestionable manual. This may indicate that they are unable to see other possibilities for working with this material, revealing a communication failure on the part of the SESI-SP network regarding the guidelines for using the science instructional material. In this case, the teachers have limited autonomy to adapt the activities proposed by the material to the needs of their students. This could be imposed by the school administration, which requests that the teacher use the textbook in its completely or sequentially, contradicting the instructions provided during the material delivery.

## **Core Two: Educational Material and the Necessary Structure for Its Implementation**

At this core, it is imperative to highlight that the analysis rests upon the premise that the subject in question is a historical entity. This implies that individuals invariably apprehend and construe the world through their subjective lens (external). Moreover, as posited by Saviani (2004), one can only attain genuine humanity by assimilating into their subjectivity the patterns of conduct and ideas engendered by preceding generations, subsequently modified by both themselves and the individuals they engage with, thus appropriating them within the context of their historically constructed perspective.

Therefore, the social context, previous experiences, their meanings, and the organizational structure of the SESI-SP network are elements that influence how teachers appropriate the use of science instructional material. Through the meanings attributed by teachers, the SESI-SP network has the opportunity to review its instructional material and implement actions that modify the methodological approach to science and, consequently, its instructional material.

In this core, it is also possible to perceive the importance that some teachers attribute to the school structure of SESI-SP, which may be the result of investments made in recent years to adapt to the school environment and provide a good learning experience. However, other teachers expressed different opinions, stating that: the structure does not allow for the proper use of instructional material in experimental activities and school research; the lack of internet access or slow connection hinders working with the activities in the instructional material, and due to limited access, some websites cannot be accessed; the lack of physical space and adequate materials makes it impossible to carry out the activities proposed by the instructional material.

Despite some favorable opinions about the school structure, some participants consider it insufficient for carrying out the activities proposed by the instructional material. Once again, the meanings demonstrate the diverse experiences of each participant, with their ways of feeling, living, and acting. This becomes more evident in qualitative research, even if the number of unfavorable opinions is small.

The Social Service of Industry of São Paulo (SESI-SP) has one of the largest private education networks, consisting of 142 schools located in 112 municipalities of the state. It offers Early Childhood Education, Elementary Education, Secondary Education, Technical Vocational Education, and Youth and Adult Education.

The network serves more than 90,000 students who use exclusive instructional material developed by the institution's professionals. This material is characterized by presenting challenging and diversified didactic sequences organized to encourage dialogue, reflection, and debate. The main objective is to stimulate students to seek creative solutions for the proposed activities and everyday situations.

It is important to emphasize that each school in the SESI-SP network is embedded in its reality across different regions of the state of São Paulo. In other words, there are multiple realities, and the teachers' opinions are linked to the specific context of each school unit. For example, while some schools are located in Activity Centers and have well-equipped infrastructure such as theaters, social centers, and sports centers, others are housed in recently constructed buildings with amenities like sports courts, computer labs, laboratories, and amphitheaters. However, the school network also includes some schools whose infrastructure presents deficiencies in various aspects. Typically, these units are situated in municipalities, churches, or SESI-SP properties.

The students have the knowledge and demonstrate a great interest in everything related to the Internet and digital technologies. Despite facing difficulties accessing computers at school, the majority already have a certain level of understanding, as a significant portion of these students have direct contact with the digital world through mobile phones, video games, and other devices.

For this very reason, the SESI-SP network is responsible for providing moments of interaction between students and teachers through the activities proposed by the SESI-SP science instructional material, using technological resources in a collaborative environment. This way, it avoids disinterest and distance between these individuals, as Rosini (2007) suggested.

## Discussion

Considering the historical relevance of the textbook in the Brazilian school reality, existing for at least two centuries, it becomes of utmost importance, as pointed out by Bittencourt (2004), to fully understand its entirety and complexity so that it can play a more effective role in the educational process, functioning as a working tool.

Regarding the collected data, understanding the region of the interviewees work is important, as there are distinct realities that impact the development of lessons according to each context and situation in each of the 175 SESI-SP schools in 2023 (142 schools spread across the state of São Paulo) (SESI, 2020). It is also essential to know the professional background of the teachers, acquired throughout their classroom experiences and through various continuing education meetings. Additionally, this indicates that the SESI-SP network has a team of teachers who work in their field of expertise, often differing from the reality of the public school system.

Based on the research findings, it is observed that the majority of teachers are women. This predominance can be mainly attributed to the traditionally assigned role of women in the domestic sphere, as Araújo (1990) pointed out. In this context, the relationships established between mothers and children are often used as a model to be followed by female teachers in the classroom, contributing to the construction of the representation of teaching as feminine.

The teaching experience of the majority of teachers is significant, and as indicated by Biasi (2009), teachers with more time in the classroom have a greater positive influence on student performance. Additionally, it contributes to greater professional confidence in carrying

out their duties, leading to increased focus and proficiency, according to data from the SAEB 2003.

By examining the teachers' responses, one can discern the significance of discussions, projects, and reflections concerning Full-time Education, a subject that has been in the spotlight since the final decades of the 20th century, as documented by Lobato, Mendonça, and Pereira (2012). This study reveals that in schools where teachers are not employed on a full-time basis, it is probable for them to seek additional positions within other educational networks, consequently impeding their allocated time for planning and ongoing professional development. Ideally, teachers would dedicate one period to teaching and another to engaging in continuing education courses.

The initial hurdle lies in the preparation of teachers for the execution of a comprehensive education agenda within an extended school day. The significance attributed to this conjunction is warranted by the recognition that it is conceivable to have an extended school day devoid of genuine comprehensive education, just as it is feasible to invest substantial endeavors in comprehensive education without extending the school day (MOLL, 2010, p. 2).

Drawing from the examination of this data and taking into account the teachers' anticipations pertaining to instructional resources, it becomes imperative for the SESI-SP network to acknowledge the workload of its teachers. Given the insistence on a teacher/researcher profile characterized by continuous planning and utilizing instructional materials to foster an investigative approach to science education, it becomes indispensable to reevaluate the prescribed workload imposed upon teachers within SESI-SP.

According to Castaldi (2012), teachers must enhance their knowledge, skills, and expertise to control their educational practices better. Therefore, teachers need to have dedicated time for studying the science instructional material offered by SESI-SP within their work schedule. With an increased workload, it will be possible to create better conditions for lesson planning, following pedagogical practices (teacher's guide). Additionally, teachers will be able to choose the curricular units, decide in which pedagogical environments they will develop the activities proposed by the instructional material, and select appropriate strategies, becoming managers of their classes. In order for this to be achievable, it is crucial for the teacher to possess an exclusive commitment to the SESI-SP network. By doing so, with the requirement for continuing professional development, ongoing planning, and assessment, among other responsibilities, the teacher will have the essential dedicated time. However, the prevailing

reality for teachers within the SESI-SP network and across Brazil is one of accumulating multiple positions, shifts, and schools.

Furthermore, it is apparent that teachers rely on the materials devised and supplied by SESI-SP in their lesson preparation, alongside their personal reference materials as supplementary planning resources. It is notable that teachers predominantly utilize the “Fazer Pedagógico” (teacher's book) and the “Movimento do Aprender” (student's book) as their primary tools for meticulous planning. Nonetheless, they also incorporate other materials to complement their instructional sessions. As a result, the importance of the textbook in lesson planning and during classes can be observed, as it is the main printed tool used by teachers, supporting the findings of Siganski, Frison, and Boff (2008). At this point in the research, it becomes clear that the textbook often provides teachers with relevant information that contributes to pedagogical planning and assists in developing students' abilities.

Regarding the use of instructional materials by students, according to teachers, it is something that should be further investigated, as reported by the respondents, 48% of students do not utilize the entire instructional material, although the majority use the material in its entirety, as reported by the teachers (OLIVEIRA, 2013). However, those who do not use the complete material do not necessarily do so out of disinterest but rather because the science instructional material serves more as a stimulus for investigations than as a textbook with a base text to consult and answer. This makes sense, as Carvalho *et al.* (2005) affirm that an investigative activity goes beyond data manipulation and observation, as it should lead the student to reflect and subsequently promote discussion, reporting, and explaining their point of view to their peers.

The importance of Internet access and laboratory environments is crucial for the work of teachers, and considering that the use of instructional materials helps facilitate students' interaction with these spaces in the construction of knowledge in science, it is possible to combine learning with new technologies. Over the past years, the SESI-SP network has been investing in structural improvements and internet access, as reported by the media (SESI, 2020).

To a certain extent, the science instructional material implemented within the SESI-SP school network is in accordance with the guidelines outlined by the curriculum framework of SESI-SP. It embraces a methodological approach to science education that fosters collaborative student engagement in investigative methodologies. This approach aligns with Mercado's (2008) assertion that a collaborative environment facilitates the exchange and dissemination of

experiences and knowledge, thereby fostering meaningful learning that is replete with concepts and enabling the cultivation of reflective habits.

### **Final considerations**

The analysis of the science teacher's meanings brings contributions to a better understanding of the teacher and reflections on the instructional material, specifically in the field of science.

Regarding the instructional material used by SESI-SP, it is essential to conduct periodic evaluations to review and improve it to ensure its quality and recognition by teachers in the SESI-SP school network and teachers from municipal schools that have agreements with the SESI-SP Education System. The decision to focus on the textbook is also due to the fact that science classes in Brazil have historically been conducted through textbooks, raising profound reflection on the quality of the available publishing material.

In this sense, SESI-SP needs to pay attention to the difficulties and needs of teachers regarding the use of this instructional material. To achieve this, a good example is to meet the criteria used by PNLD (National Program for Textbook Distribution) for the approval of textbooks.

In light of this context, it is extremely important for SESI-SP to be committed to providing ongoing training that promotes effective dialogue with teachers regarding the adopted instructional material proposal.

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