

Teaching natural sciences: an interpretation of the possibilities of developing pedagogical practices through material culture

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ABSTRACT. The objective of this study is to analyze the organization and possibilities for developing pedagogical practices for teaching natural sciences in a private religious school founded in 1944 in the interior of Bahia. The study seeks to establish the connections between the materiality for teaching sciences that was described in Inspector Othoniel Almeida Moura's Verification Report, from 1951, and the teaching concepts proposed by both the intuitive method and the pragmatism proposed by the New School. In this sense, the research is based on the analyses of these teaching conceptions and on the possibilities offered by the material culture of the institution. The evidence obtained from the description of the collection and the images indicates that, although the Verification Report points out that the school was based on a modern pedagogy that, in that context, was associated with escolanovismo, the school institution did not move away from the intuitive method (education by looking) and did not develop pedagogical practices that promoted the students' manual activities. What may have motivated the inspector to consider that the school was guided by a modern pedagogy is the fact that the institution had a well-structured space for the teaching of science. All indications lead to the conclusion that the pedagogical practices of science teaching at the GSC in the early 50s favored education through observation to the detriment of the methodologies defended by the New School.

Keywords: documentary collections; natural sciences; Marist gymnasium; educational objects.

O ensino de ciências naturais: uma interpretação das possibilidades de desenvolvimento das práticas pedagógicas através da cultura material

RESUMO. O objetivo deste trabalho é analisar a organização e as possibilidades de desenvolvimento das práticas pedagógicas para o ensino das ciências naturais em uma escola confessional privada fundada em 1944, no interior da Bahia. O trabalho procura estabelecer os nexos entre a materialidade para o ensino de ciências que foi descrita no Relatório de Verificação do Inspetor Othoniel Almeida Moura, de 1951, e as concepções de ensino propostas tanto pelo método intuitivo como pelo pragmatismo da Escola Nova. Neste sentido, a pesquisa baseia-se nas análises sobre essas concepções de ensino e nas possibilidades oferecidas pela cultura material da instituição. Os indícios obtidos pela descrição do acervo e pelas imagens indicam que, embora o Relatório de Verificação aponte que a escola estava baseada em uma pedagogia moderna que, naquele contexto, era associada ao escolanovismo, a instituição escolar não se afastou do método intuitivo (educação por olhar) e não desenvolveu práticas pedagógicas que promovessem as atividades manuais dos estudantes. O que pode ter motivado o inspetor a considerar que a escola se orientava por uma pedagogia moderna é o fato de a instituição ter um espaço bem estruturado para o ensino das ciências. Todos os indícios levam à conclusão de que as práticas pedagógicas do ensino de ciências no Ginásio Sagrado Coração no início da década de 1950 favoreceram a educação pela observação em detrimento das metodologias defendidas pela Escola Nova.

Palavras chave: acervos documentais; ciências naturais; ginásio Marista; objetos de ensino.

La enseñanza de las ciencias naturales: una interpretación de las posibilidades de desarrollo de las prácticas pedagógicas a través de la cultura material

RESUMEN. El objetivo de este texto es analizar la organización y las posibilidades de desarrollo de las prácticas pedagógicas para la enseñanza de las ciencias naturales en una escuela confesional privada fundada en 1944, en el interior de Bahía. El trabajo busca establecer las conexiones entre la materialidad para la enseñanza de las ciencias descrita en el Informe de Verificación del Inspector Othoniel Almeida

Moura, de 1951, y las concepciones de la enseñanza propuestas tanto por el método intuitivo como por el pragmatismo de la Escuela Nueva. En este sentido, la investigación se basa en el análisis de estas concepciones de la enseñanza y las posibilidades que ofrece la cultura material de la institución. Las evidencias obtenidas de la descripción de la colección y de las imágenes indican que, si bien el Informe de Verificación señala que la escuela se basaba en una pedagogía moderna que, en ese contexto, se asociaba al escolanovismo, la institución escolar no se alejó del método intuitivo (educar mirando) y no desarrolló prácticas pedagógicas que promovieran las actividades manuales de los estudiantes. Lo que puede haber motivado al inspector a considerar que la escuela estaba guiada por una pedagogía moderna es el hecho de que la institución tenía un espacio bien estructurado para la enseñanza de la ciencia. Todo apunta a la conclusión de que las prácticas pedagógicas de la enseñanza de las ciencias en el GSC a principios de los años 50 favorecían la educación por observación en detrimento de las metodologías defendidas por la Escuela Nueva.

Palabras clave: colecciones documentales; ciencias naturales; Gimnasio Marista; objetos didácticos.

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Introduction

This study aims to examine the organization and the possibilities for developing pedagogical practices for the teaching of natural sciences in a Marist school institution known as Ginásio Sagrado Coração (GSC), founded in the 1940s in the municipality of Senhor do Bonfim, located in the north-central region of Bahia. Owned by the Marist Brothers, it operated as a boarding and semi-boarding school exclusively for boys. The Marist Order was founded in France by Father Marcelino Champagnat with the purpose of educating good Christians and virtuous citizens. The Marists spread across several countries, including Brazil, where they began their educational activities in Congonhas do Campo, Minas Gerais, in 1897. They arrived in Bahia in 1904, and in 1905 began working in Salvador with six teachers. Later, they founded Ginásio Sagrado Coração in Senhor do Bonfim, an inland city in Bahia (Medeiros and Ávila, 2020).

In 1950 the school underwent a transformation, marked by the construction of a new building and its adaptation to a modern pedagogical model. These changes were recorded by inspector Othoniel Almeida Moura in the preliminary inspection of the establishment, in the Report of Verification of the new facilities of Ginásio Sagrado Coração. The GSC offered primary and secondary education in accordance with the official curricula of Colégio Pedro II in Rio de Janeiro (Ávila et al., 2020).

The foundation of this institution and the conditions for teaching natural sciences in this school took place amid debates between republican liberals and humanists concerning the nature of education. While the New School movement argued that educational policy should “[...] break with excessively literary training and instill in our culture an eminently scientific and technical character [...]” (Saviani, 2007, p. 247), the humanists, represented mainly by Catholics, opposed the “[...] secularization of education [...]” (Saviani, 2007, p. 257), giving precedence to the formation of values.

According to Hilsdorf (2007), as specialists in education and traditional adversaries of Catholics, the proponents of the New School began to develop political and administrative initiatives that put their ideas into practice. Their goals included overcoming the dual school system and the high rate of illiteracy and introducing a modernizing project in the country. In the view of Xavier (2002), they stood out for defending a public, free and secular school system and for proposing new teaching methods that would reshape the organization of time, space and content. The humanists, on the other hand, believed that the education of young people should be guided by the acquisition of humanist culture, patriotic awareness and what was termed “[...] adolescent personality” (Decree-Law No. 4,244, 1942). The New School movement sought to transform the passive, intellectualist and verbalist education of the traditional school in order to form an active subject suited to the demands of modern times (Ministry of Education, 2010). The place of natural sciences in the curriculum and the teaching methodology were points of divergence between the two perspectives (Souza, 2009). Advocates of the New School intended education to move away from memorization and repetition of lessons and to be grounded in hands-on activities which, in the context of science education, would involve practical activities conducted in specific settings with appropriate materials.

Amid this debate, Minister Gustavo Capanema signed the education reform in the early 1940s. Decree-Law No. 4,244 (1942) marked the reform of secondary education, which defined in its first article the purposes of education:

1. To develop, in continuity with the educational work of basic schooling, the full personality of adolescents.
2. To emphasize and strengthen, in the spiritual formation of adolescents, both patriotic awareness and humanist awareness.
3. To provide general intellectual preparation that may serve as the foundation for more advanced studies in specialized education (Decree-Law No. 4,244, 1942, Art. 1º).

Although the text of the law emphasizes spiritual formation and humanist awareness, in the statement of reasons Minister Capanema assigned other purposes to the teaching of sciences:

In both cases, the study of the sciences shall always be guided by the principle that it is not the role of secondary education to develop extensive knowledge, to fill adolescents' minds with problems and demonstrations, with laws and hypotheses, with nomenclatures and classifications, nor to remain at a superficial level based on the mere memorization of rules, theories and terms. Its essential task is to cultivate a scientific mindset, meaning curiosity and the desire for truth, an understanding of the usefulness of scientific knowledge and the capacity to acquire such knowledge (Decree-Law No. 4,244, 1942).

By arguing that science education should aim at the desire for truth and the understanding of the usefulness of knowledge, the minister aligned himself with some of the guidelines proposed by the liberals. It is therefore evident that the reform reflected both the value-formation proposals supported by the humanists and the emphasis on useful knowledge advocated by the proponents of the New School movement, revealing a balance between traditional pedagogy and the new pedagogy (Saviani, 2007, p. 271). It was within this context that the GSC was founded and the entire structure for science teaching at the institution was organized.

This study analyzes the possibilities for science teaching offered by the records of material culture contained in the Verification Report prepared by Othoniel Almeida Moura in 1951 (Ginásio Sagrado Coração, 1952). The aim is to understand, based on the material evidence, whether science teaching remained aligned with humanist conceptions or whether it was more deeply influenced by New School thought.

Methodological Aspects: the choices of the school and of science teaching as objects of analysis

The GSC began operating in 1944 in a building located at 4 Cônego Hugo Street (Secretariat of Education and Health of the State of Bahia, 1947). The school was maintained by the União Norte Brasileira de Educação e Cultura do Brasil, and its inauguration ceremony made the front page of the local newspaper O Imparcial in the edition of October 8, 1944 (Ávila et al., 2020). It was the first institution in the region to be organized according to the curricula of Colégio Pedro II in Rio de Janeiro.

In 1951 the school administration requested official recognition of its new facilities in order to obtain equivalency or the privileges granted to similar federal institutions (Decree No. 3,890, 1901, Art. 361; 362). The Verification Report was prepared by inspector Otoniel Almeida Moura in accordance with the parameters established by Ordinance No. 375 of August 16, 1949, and described in detail the facilities and the conditions required for maintaining both the day school and the boarding school. With an imposing structure, the GSC operated for 26 years and, in 1970, was incorporated into the state system after being sold to the Government of the State of Bahia, becoming Colégio Estadual Senhor do Bonfim (Ávila et al., 2020).

In addition to classrooms, there were specialized rooms such as an auditorium, a library, a geography room, a language room, a visitors' room, a manual work room, a teachers' room, an administrative room and a science room. In the report, the science room, together with the visitors' room, received 63 points and ranked among the best facilities, indicating that the institution offered favorable conditions for teaching scientific knowledge.

The decision to analyze the teaching of sciences in this school is justified for two reasons. First, because it was a pioneering institution in its region and was founded during a period marked by debates on the nature of education in Brazil. Second, because the institution possesses a rich and well-organized documentary collection that allowed for a closer examination of past pedagogical practices.

Although most school institutions possess documentary collections, researchers almost always face two major challenges: organizing these collections so that they may be used as sources and interpreting this materiality, understood as "[...]sources of school culture that preserve secrets that affect the silences of the history of education and the grammar that codified schooling" (Escolano Benito, 2017, p. 223).

School archives used as sources make it possible to understand how educational institutions function, to investigate educational phenomena and to examine the processes of socialization of younger generations (Mogarro, 2006), since through these sources “[...] schools present themselves as spaces that carry and generate essential information for the formulation of research, interpretations and analyses about their own functioning” (Furtado, 2011, p. 150).

In the specific case of this study, one of the many documents available in the GSC Digital Collection was used. This collection contains sixty-seven inspection reports produced between 1945 and 1970. The 1951 report was selected because it provides an extensive set of records related to the material culture of science teaching, including inventories of objects, photographs of instructional spaces and lists of instructional manuals, among other specific types of information.

The Teaching of Natural Sciences at Ginásio Sagrado Coração

The GSC Verification Report presents two statements regarding the purposes of school education that, at first glance, appear contradictory. At the beginning, the inspector stated that teaching at the school was provided “[...] in accordance with modern pedagogy [...]”, and later argued that this modern pedagogy consisted of thea “[...] formation of adolescent personality” (Ginásio Sagrado Coração, 1952, p. 4). As previously described, science teaching was one of the points of divergence between humanists and proponents of the New School movement. Therefore, the aim of this section is to identify how the school understood the notion of modern pedagogy, that is, whether it followed the guidelines advocating the implementation of technical and practical activities as proposed by the New School movement, or whether it opted for a more erudite education based on a passive and verbalist methodology, in line with the humanist proposals.

The GSC offered the subject of science in the third and fourth grades (Ginásio Sagrado Coração, 1952), as prescribed in Law No. 4,244 (1942) (Art. 11). For the third grade, the official curriculum prescribed the following themes: human beings, the environment and hygiene. For the fourth grade, the topics included content from the areas of chemistry, physics and biology (Lorenz and Vechia, 1998). To teach this subject, the school organized a science room, classified as one of the special rooms, that is, rooms intended for very specific purposes both in terms of space and material structure.

Regarding the materiality of science teaching, the inspector reported that the institution possessed “[...] demonstration materials [...]” and “[...] experimental materials” (Ginásio Sagrado Coração, 1952, pp. 82–83). The distinction between these two categories suggests, at first, that the pedagogical practices developed at the school involved both demonstrations and hands-on activities that could be carried out by students.

This distinction is significant because the tradition that prevailed in science education since the nineteenth century was that of the intuitive method, which relied on stimulation through observation (Braghini, 2017). In these science classes, students were encouraged to observe elements of nature or physical phenomena that generally took place in museums, cabinets of physics and school laboratories.

The New School movement proposed an innovation in this process by suggesting that students themselves carry out scientific activities in schools in order to prepare them as active subjects suited to the modern world. Thus, the analysis of the educational process should not be limited to conceptual content but should also include methodological aspects, since these are closely related to the specific purposes of youth education. This issue can be further explored by analyzing the characteristics of the objects and spaces of school institutions according to the practices of that period.

Science education in Brazil began to rely on objects in the nineteenth century as an alternative to the method of memorizing and repeating textbook content. In addition to the methodological orientation, there was also a legal requirement, since part of the process for obtaining equivalence with the Ginásio Nacional (Colégio Pedro II) involved building physics cabinets, chemistry laboratories and natural history museums equipped with specific objects for each area, generally imported from European manufacturers (Meloni, 2017; Zancul, 2018; Barboza and Meloni, 2020).

In general, these objects were intended to demonstrate physical or chemical phenomena or to display elements of fauna, flora and minerals.

In the teaching proposals that emerged in the twentieth century, these objects gained new purposes. Based on John Dewey's theories and the ideas defended by the New School movement, it was proposed that objects should no longer be used solely for the education of the senses but should instead structure an educational process centered on problem formulation and the development of an active subject.

Whereas the intuitive method shifted students from being mere memorizers of lessons to observers of experiments and phenomena, the New School movement argued that education should also make use of “[...] bodily activity, which feeds the activity of thought and is expressed in a solution that must be tested in practice” (Valdemarin, 2004, p. 182).

The formation of the active subject was reflected in science education proposals that encouraged student engagement in school laboratories. In this case, instructional objects needed to be selected and used with these purposes in mind. If, according to the intuitive method, the selection and use of objects aimed at demonstrating specific conceptual content, under the New School perspective objects should facilitate hands-on activities and promote the understanding of everyday life. Thus, as stated by Souza (2013, p. 108), “[...] in the new pedagogy, the objects of instruction lose the centrality acquired in the renewal promoted by the lessons on things”. Consequently, the characteristics of the objects also had to be transformed.

In the instructional manuals that remained in use in Brazil until the 1930s, the proposed practical activities were developed with more complex objects, commonly supplied by foreign producers of didactic materials. However, from that period onward, many teaching proposals in natural sciences began to rely on objects that were easier for students to handle in simpler activities that did not require previous experience to be carried out.

It is worth noting that for the proponents of the New School movement, the promotion of active education did not necessarily imply an emphasis on manual work but rather a focus on valuing the learner's interest and energy. In the *Manifesto of the Pioneers*, this issue was defended in the following terms:

What distinguishes the New School from the traditional school is not, in fact, the predominance of activities based on manual or physical work, but the presence, in all its activities, of the psychobiological factor of interest, which is the primary condition for spontaneous activity and a constant source of stimulation for the learner [...] (Ministry of Education, 2010, p. 49-50).

However, in the context of science teaching, these principles translated into proposals that shifted the student's role from that of an observer to that of someone able to manipulate objects in order to produce, themselves, the phenomena or transformations found in nature. In the statement of reasons for Decree-Law No. 4,244 (1942), Minister Gustavo Capanema argued that in the teaching of sciences,

[...] the process of scholarly teacher monologue will always fail irreparably, as will the stance of the teacher who performs an experiment before inexperienced students as if staging a demonstration, or the method of inscribing in memory the science found in books. In classes of scientific subjects, students must discuss and verify, they must see and do. A regime of cooperation in the work must be established between them and the teacher, work that must be full of vitality and must always be, according to the Deweyan precept, a 'reconstruction of experience' (Decree-Law No. 4,244, 1942, emphasis in the original).

The official statement of the Minister of Education who led the reform process is quite clear regarding the teaching of sciences. Some approaches were consolidated, but there was also resistance aimed at preserving humanist education. Although research on pedagogical practices remains incipient and highly concentrated on normative prescriptions, some studies suggest that, in the teaching proposals that prevailed until the 1930s, science objects were used to educate through observation, in accordance with the intuitive method, rather than being manipulated by students. In such cases, science teaching practices would have been structured around demonstrations performed by teachers or laboratory assistants, which students were merely expected to observe. The characteristics of the material culture of the GSC provide indications of which conception prevailed at the institution.

In the case of the GSC, the inspector listed sixty-five types of materials classified as demonstration materials, which were essentially instruments used to demonstrate physical phenomena and materials identified as part of what he called the Natural Museum (Ginásio Sagrado Coração, 1952). These materials included objects for the study of phenomena in the fields of mechanics, acoustics, optics and electromagnetism, as well as materials that could be used to teach natural history, such as wall charts, models, skeletons, mounted animals and a herbarium. The characteristics of this materiality resemble those of the objects introduced into secondary education under the influence of the intuitive method. In general, these materials were either designed to be observed, as in the case of taxidermied animals, or were instruments that produced a physical phenomenon to be observed, such as coils. Among the demonstration materials listed in the Verification Report were objects of considerable complexity. Their characteristics suggest that they were likely handled only by experienced individuals. Additionally, there were objects used to illustrate the characteristics of the human body or other animals. Overall, the characteristics of these materials indicate

that they were used to illustrate aspects of the theory presented to a passive, observing student, and that they were not aligned with the ideals of the New School movement concerning active, scientific and technical education, as described by Saviani (2007).

On pages 86 and 87 of the report, there are two photographs (Figures 1 and 2) showing some of these materials. Since this was designated as one of the special rooms, it is assumed that the photographs included in the inspector's report were the best and most representative images available of that space. The evidence offered by these images is highly relevant for understanding the school's pedagogical intentions.

Figure 1 shows two images of human skeletons, two additional wall charts of animals, a human body model, a model of an ear and a model of an eye, a human skull, a rock collection, a whiteboard with illustrations and a taxidermied animal. The materials are not organized, and none of the objects are labeled.



Figure 1. Science room.

Source: Report (Ginásio Sagrado Coração, 1952, p. 86).

The fact that the materials were not labeled suggests that the objects in the science room were used by individuals who already knew their purposes and how to operate them. Moreover, these materials did not require manipulation to be used in science lessons. Rather, they required attentive and passive observation, which was likely accompanied by explanations provided by the teacher or laboratory assistant.

The topics prescribed for the third grade, such as divisions, development and growth, the senses and the nervous system in the human body, and the composition and use of soil, were probably taught using the objects from the school's natural museum, including fossils, skeletons, models and wall charts. In these cases, the objects were indeed demonstration materials, since they were designed to be observed in accordance with the principles of the intuitive method.

In the fourth grade, the prescribed topics concerned the differences between animals and plants, and the curriculum included the general characteristics of vertebrates and invertebrates, which could be taught using wall charts, models, fossils and preserved animals (Ginásio Sagrado Coração, 1952). The characteristics of the objects and the way they were organized suggest that they were used in a verbalist and passive form of instruction, far removed from the principles advocated by the New School movement. The notion of modernity that prevailed in the educational process was possibly limited to the use of objects in science teaching, rather than to the formation of active learners.

The same applies to some of the objects used in physics instruction, such as dynamometers, levers, hydrometers, thermometers, Magdeburg hemispheres, Torricelli tubes, calibration weights, bells, prisms, mirrors, spectrosopes, Newton disks and Ruhmkorff coils (Ginásio Sagrado Coração, 1952). These objects were listed under demonstration materials and were suitable for teaching topics related to motion, sound, light, heat, electricity and magnetism, which were prescribed for the fourth grade (Lorenz and Vechia, 1998). Due to their characteristics, these objects were likely handled only by the teacher or the laboratory assistant, which suggests that, in these cases as well, they were used for education through observation, consistent with the intuitive method.

Some instruments do not appear to have been particularly useful for implementing the curriculum, as in the case of the “[...] small spectroscope [...]” or the “[...] communicating vessels [...]” listed in the report (Ginásio Sagrado Coração, 1952, p. 82). The presence of these materials in the collection can likely be explained by the fact that suppliers did not sell individual items but rather complete sets, which required the institution to acquire instruments that did not align with the teaching programs along with others that did correspond to the prescribed curriculum.



Figure 2. Science room.

Source: Report (Ginásio Sagrado Coração, 1952, p. 87).

However, in addition to the “[...] demonstration materials [...]” thirty-three types of objects classified as “[...] experimental materials [...]” were also listed (Ginásio Sagrado Coração, 1952, p. 83). In this case, the classification suggests the possibility that these objects could be used by students not only to observe phenomena but also to engage in some practical laboratory activities. Some of these objects appear in Figure 2.

In the image, in addition to the eleven wall charts, which were typical objects used for demonstrations, there is a cabinet containing, on the three upper shelves, crucibles, beakers, graduated cylinders, flasks and a balance, and on the lower part, several reagents. On the stand to the left, one can see flasks, retorts and the ‘30 cm condenser’ described in the report. These objects could be used by students in simple laboratory

operations such as mixing, maceration, heating, crystallization, distillation and chemical transformation, and could engage students in a process of active learning consistent with the principles of the New School movement.

Despite the objects being classified into two categories, there is no separation in the room between demonstration materials and experimental materials, and the report offers no explanation for these classifications.

As noted earlier, the third-grade curriculum (Lorenz and Vechia, 1998) did not include topics that would require the use of this materiality. However, the fourth-grade curriculum prescribed the following topics in the field of chemistry: "1. Physical states of matter. Change of state; 2. Types of matter. Mixtures. Their separation; 3. Simple and compound substances. Metals and metalloids; 4. Physical and chemical phenomena. Types of chemical phenomena. Law of conservation of mass and law of definite proportions" (Lorenz and Vechia, 1998, p. 399).

To address these topics, the inspector noted that the school possessed fifty types of chemical reagents and the following objects: crucibles, desiccators, stirring rods, test tubes, beakers, funnels, flasks, retorts, pipettes, alcohol lamps, spatulas and others, some of which appear in Figure 2. These objects were classified as experimental materials (Ginásio Sagrado Coração, 1952, p. 83).

Since these objects could be used to manipulate substances in simple operations such as mixing, separating mixtures, heating and maceration, this may have been why the inspector classified them as experimental materials. If they had been used for this purpose, it could be said that the school promoted an active and modern form of instruction, in line with the proposals of the New School movement. However, although they were not classified as demonstration materials like the natural history or physics objects, the evidence suggests that they were also used by the teacher or laboratory assistant to conduct demonstrations.

This argument can be supported by three clues found in the 1952 report. The first is that, in the inventory, the objects used to manipulate substances were assigned low numerical ratings: for example, glass stirring rods, test tubes and asbestos wire gauze were given a rating of 1; graduated beakers, funnels and distillation flasks a rating of 2; and porcelain crucibles and graduated pipettes a rating of 3. Although the report does not clarify the meaning of these ratings, they may indicate that only a small number of each item was available. In any case, there is no information about the quantity of materials, but it is reasonable to assume that there were not enough supplies for all students to engage in hands-on science activities, especially considering that in 1951 the school had 141 enrolled students (Ginásio Sagrado Coração, 1952) distributed across four grades, which corresponds to an average of 35 students per class.

The second clue relates to the first and concerns the inspector's observation that the science room contained a "[...] laboratory table with a marble top" (Ginásio Sagrado Coração, 1952, p. 82). Since the inspector referred to the table in the singular, the report suggests that the room contained only one table. As there is no information about the classroom dynamics, one may assume either that all students shared the single table or that the teacher performed the demonstrations while the students observed.

The third indication of the pedagogical dynamics is that the images of the science room included in the report (Figures 1 and 2) show a space containing mixed and unlabeled materials. This suggests that third- and fourth-grade students would have had considerable difficulty identifying the correct objects for pedagogical activities and that the practices were likely carried out by teachers, with students limited to observation.

Thus, although the report was produced nearly twenty years after the publication of the Manifesto of the Pioneers, the information suggests that the practical lessons conducted in the science room were demonstrative in nature. Everything indicates that the method practiced in science classes was the intuitive method and education through observation, rather than the active practices advocated by the educational reformers.

Other materials that indicate the likely methodology applied in the classes are the textbooks that the school held in its collection. In the list of books described in the inspector's report, there are eleven works classified as natural sciences by the following authors: Miguel Tenório, Paulo Decourt, V. Oliveira, Francisco Pinto, J. Pecegueiro, W. Oliveira, Carlos Costa, Álvaro Brandão, Venâncio Filho, S. Gomes and M. Faccini. The school also possessed books on biology, embryology, natural history, physics and chemistry, which were more suitable for the second cycle of secondary education (Ginásio Sagrado Coração, 1952).

There are no records of the complete titles of these works, but one of the authors listed, Venâncio Filho, published together with Edgar Süsskind de Mendonça the book *Ciências físicas e naturais. Introdução geral às*

ciências experimentais (Venâncio Filho and Mendonça, 1933), which was aligned with New School ideas, and both authors were signatories of the 1932 *Manifesto of the Pioneers of New Education*.

In that work, the authors argue that science teaching should occur “[...] through student observation and through the student's own execution” (Venâncio Filho and Mendonça, 1933, p. 16), distinguishing it from the intuitive method and from the so-called Lessons on Things. Citing Roquette-Pinto, they state that “Lessons on Things are useless” (Venâncio Filho and Mendonça, 1933, p. 1). For them, the sciences should be taught through “[...] direct contact with nature, showing the interdependence of phenomena and living beings, things and events” (Venâncio Filho and Mendonça, 1933, p. 15).

In this sense, the authors argued that practices should be developed with everyday objects rather than with sophisticated materials designed for instructional purposes. The objects should be those present in the students' environment or built by the students themselves. Regarding manufactured materials, the authors refer to another scholar (H. Bouasse) to make the following statement:

If I had the strength, I would destroy the foolish instruments contained in these collections, instruments that are convenient for the teachers' laziness and harmful to the students' education. If they see special, polished, obviously purchased instruments, your pupils imagine that such devices are necessary for the demonstration, and science appears to them as an insoluble problem without the aid of complex and costly apparatuses [...] (Venâncio Filho & Mendonça, 1933, p. 17).

However, the list of experimental materials in the Verification Report does not contain any mention of everyday objects. Moreover, in the images available in the report there are no common glassware items nor other materials that might be considered familiar to students. The displacement of the centrality of objects, as described by Souza (2013) in relation to the method practiced in the early twentieth century, was not observed in the analysis of either the objects or the school spaces. Based on the information provided in the Inspector's Report and the images of the Science Room, the institution relied exclusively on standard, industrialized materials sold by manufacturers of didactic equipment.

It is possible that these everyday objects were not recognized as science teaching materials and therefore were not included in the inventory. However, given that the 1951 report contains a highly detailed description of everything present in the school, it is quite likely that such objects were indeed not part of the collection.

Thus, there is no indication that science teaching at the school developed in accordance with the guidelines of the New School movement. On the contrary, there is strong evidence that the teaching of natural sciences was carried out solely through activities inspired by the intuitive method.

Final considerations

In this study, the aim was to understand how the pedagogical proposals for the teaching of natural sciences were appropriated at Ginásio Sagrado Coração. The analysis was carried out primarily based on data regarding the school's material culture as described in the Verification Report written by inspector Othoniel Almeida Moura in 1951.

Using material culture as a documentary source makes it possible to approach the subject through the characteristics of the objects and the pedagogical possibilities they offer. Although details of the educational process are not available, it is possible to infer what the pedagogical practices and educational purposes may have been by examining the collections and spaces designated for teaching.

The evidence provided by the description of the collection and by the images indicates that, although the Verification Report states that the school was grounded in a modern pedagogy which, in that context, was associated with the New School movement, the institution did not move away from the intuitive method, or education through observation, and did not adopt pedagogical practices that promoted students' manual activities. What may have led the inspector to consider the school guided by a modern pedagogy was the fact that the institution had a well-structured space for science teaching.

Despite the substantial investment in science education, which can be inferred from the characteristics of the special science room and the large quantity of science materials the school possessed, all evidence indicates that the pedagogical practices of science teaching at the GSC in the early 1950s favored education through observation rather than the methodologies advocated by the New School movement.

Data availability

Not applicable.

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