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## *A Escola Primaria: Francisco Cabrita and the Algebra to the elementary education*

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### *A Escola Primaria: Francisco Cabrita e a Álgebra para o ensino elementar*

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#### **Abstract**

At the beginning of the 20th century there is in Brazil the circulation of ideas in favor of the institution of an Algebra in elementary education, with the collaboration of Francisco Cabrita according to his appropriations in the American and French ideals. We sought to understand the author's contributions to the process of systematization of this Algebra, examining elements that would highlight the holding of an expertise in the educational field, as well as its relationship to the circulation of the author's ideas. Based on references that discuss the expert and the expertise, as well as the circulation of ideas, under a historiographic bias, we sought to ascertain Cabrita's expertise and how it influenced the circulation of his ideas. Thus, the empirical material was formed by 5 articles by Cabrita published in *A Escola Primaria* magazine, between 1917 and 1922. The recognition of his expertise seems to allow the dissemination of his discourse in favor of an Algebra for elementary education.

**Keywords:** Algebra teaching; Circulation of ideas; History of mathematics education.

#### **Resumo**

No início do século XX há no Brasil a circulação de ideias a favor da instituição de uma Álgebra no ensino elementar, com a colaboração de Francisco Cabrita segundo suas apropriações nos ideários estadunidenses e francesas. Buscamos compreender as contribuições do autor para o processo de sistematização desta Álgebra, examinando elementos que ressaltassem a detenção de uma *expertise* no âmbito educacional, bem como a relação desta para a circulação das ideias do autor. A partir de referenciais que discutem o *expert* e a *expertise*, bem como a circulação de ideias, sob um viés historiográfico, procuramos averiguar a *expertise* de Cabrita e como esta influenciou a circulação de suas ideias. Deste modo o material empírico foi formado por 5 artigos de Cabrita publicados na revista *A Escola Primaria*, entre 1917 e 1922. O reconhecimento de sua *expertise* aparenta permitir a disseminação de seu discurso em favor de uma Álgebra para o ensino elementar.

**Palavras-chave:** Ensino de álgebra; Circulação de ideias; História da educação matemática.

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## Introduction

It is possible to find numbers of the magazine *A Escola Primária* between the years 1916 and 1938<sup>3</sup>, which was initially published by "Francisco Alves & C.", with addresses in the municipalities of Rio de Janeiro, São Paulo and Belo Horizonte<sup>4</sup>. In many editions it is announced that the magazine would be under the direction of the school inspectors of the Federal District<sup>5</sup> and, in part of the issues, members of the magazine's board of directors are presented, as directors: Francisco Alves; Alfredo Cesário de Faria Alvim; Regina de Sá Freire Alvim; Ruy Carneiro da Cunha. In addition, news from the newspapers "O Paiz"<sup>6</sup> and "Gazeta de Notícias"<sup>7</sup>, from Rio de Janeiro, point out, respectively, the purchase and circulation of the magazine in Rio de Janeiro and the largest circulation of the magazine in the States from the intervention of the federal government. We can also observe the effort to circulate the magazine beyond this state, which at the time was the Federal District, in the publications of "Jornal do Commercio"<sup>8</sup>, from Rio de Janeiro, and "A Reforma"<sup>9</sup>, from Acre, which in a reciprocal way highlight the request for subscriptions to the magazine for the Artisan Apprentice Schools, and other technical professional teaching establishments, as well as the sending of magazines to schools in Acre. It is worth pointing out, in favor of the circulation of this periodical in Brazil, that the Schools of Artisan Apprentices, during this period, were present in 19 states (Barbaresco, 2019).

Their publications show a diversity of themes directly or indirectly related to Brazilian elementary education, among them the teaching of Algebra in normal schools or elementary education<sup>10</sup>. In the journal it is possible to find works by authors such as Othello de Souza Reis and Francisco Cabrita, the former being highlighted for having brought to Brazil the discussion proposed by the Committee of Fifteen<sup>11</sup> in the United States for the institution of

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<sup>3</sup> Most of the issues of the journal are registered in the Hemeroteca Digital. Available at: <http://bndigital.bn.gov.br/hemeroteca-digital/>. Access on: 20 May 2020.

<sup>4</sup> In some issues of the 4th year of the magazine its printing is done by the bookstore and publisher "Leite Ribeiro & Murillo", from Rio de Janeiro, but from that the only information presented is that the writing of the magazine is done in Rio de Janeiro or the name of members of the board.

<sup>5</sup> It is important to highlight that in this period the Federal District is the territory where the city of Rio de Janeiro is located today.

<sup>6</sup> Available at: [http://memoria.bn.br/DocReader/178691\\_05/6685](http://memoria.bn.br/DocReader/178691_05/6685). Access on: 15 Nov. 2020.

<sup>7</sup> Available at: [http://memoria.bn.br/DocReader/103730\\_05/3878](http://memoria.bn.br/DocReader/103730_05/3878). Access on: 15 Nov. 2020.

<sup>8</sup> Available at: [http://memoria.bn.br/DocReader/364568\\_11/12584](http://memoria.bn.br/DocReader/364568_11/12584). Access in: 15 Nov. 2020.

<sup>9</sup> Available at: <http://memoria.bn.br/DocReader/720640/1926>. Access in: 15 Nov. 2020.

<sup>10</sup> We consider as elementary education, in this period, all education that precedes high school. Sometimes this level of education is characterized as primary, in other moments it is composed of primary education and another complementary education, among other nomenclatures adopted.

<sup>11</sup> This committee was formed by the National Education Association of the United States in 1893, composed of 15 members involved with American education, with the objective of studying and proposing changes for elementary education in that country. The commission's report was published in 1895, being one of its many

an Algebra education in the last two years of primary education (Basei, 2017; Rocha, 2019; Rodrigues & Costa, 2019; Valente, 2017).

Knowing that the discussion about the institution of Algebra in elementary education was part of the journal, we searched for the terms "algebra" and "algebraic" during the period of publication of the journal. As a result, a total of nine articles were found, five of which were written by Francisco Cabrita. This result led us to question the relevance of this author for the discussions about the teaching of Algebra in the Brazilian context at the beginning of the 20th century. This concern is also supported by the fact that Othello de Souza Reis mentions Cabrita as a reference for the discussions presented in his conference on the teaching of Algebra and the Committee of Fifteen (Reis, 1918a; 1918b).

Table 1 - Articles from *A Escola Primaria* magazine that mention the term "algebra".

Author	Title	Year	Magazine Edition
Othello de S. Reis	The problems solved by equations	1917	Year 1, n. 9
Francisco Cabrita	The normalist algebra	1917	Year 1, n. 10
Francisco Cabrita	Algebra in primary education	1917	Year 1, n. 12
Francisco Cabrita	Normal school	1917	Year 2, n. 3
Henrique S. Jardim	Arithmetic problems in primary school: how to teach to solve them	1918	Year 2, n. 9 Year 2, n. 10
Othello de S. Reis	The last two years of arithmetic, in primary school, according to the Committee of Fifteen	1918	Year 3, n. 1 Year 3, n. 2 e 3
Francisco Cabrita	Memorable historical period of the National Instruction	1921	Year 5, n. 2
Francisco Cabrita	Undetermined Analyses	1922	Year 6, n. 4
Iracema T. Pereira	Mathematics teaching in elementary school	1928	Year 7, n. 7 Year 7, n. 8

Source: Prepared by the authors.

However, these are not the only works published by this author in the journal. When leafing through the issues of *A Escola Primaria*, we notice that Cabrita has published articles in several areas of knowledge: nine about the Portuguese Language; five about Arithmetic-Geometry; one about Drawing; nine in which he focuses on Education and Politics. Thus, there are 29 articles published in the magazine, considering the five about Algebra. In addition, it is important to mention that many of these publications occur in more than one edition of the magazine, since it contained only part of the text and its continuity would be presented in the following issues.

Francisco Carlos da Silva Cabrita was born in 1857, in Rio de Janeiro, and died in 1923. Cabrita was secretary of the "Imperial Lyceo de Artes e Officios"<sup>12</sup> and professor of Geometry and Algebra of the "Escola Normal do "município da côrte"<sup>13</sup>. In addition,

<sup>12</sup> Available at: <http://memoria.bn.br/DocReader/720968/15095>. Access on: 27 May 2020.

<sup>13</sup> Available at: <http://memoria.bn.br/DocReader/233048/1345>. Access on: 27 May 2020.

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Engineer graduated from the Polytechnic School, in Rio de Janeiro, Cabrita was professor and author of textbooks. He has held several positions in the republican public administration. In 1890, he was appointed by Benjamin Constant director of the Normal School of the Federal District, of which he was until then a geography teacher. He was the director of the Pedro II School, then National Gymnasium, from 1898 to 1903, replacing José Veríssimo. He also taught at the Polytechnic School and was general director of the Municipal Public Instruction of the Federal District. He has collaborated in several magazines, preface books and published several studies on geography and geometry (Assis, 2011, p. 551, translated by the authors).

According to Valente (2000, p. 208) Francisco Cabrita was also a member of the Board of Directors of Primary and Secondary Education of the Federal District. This trajectory gives Cabrita a wide range of knowledge and highlights the recognition of his work in the educational field.



Figure 1: Portrait of Francisco Cabrita as director of the Normal School of the Court.

Source: Obtained from the website<sup>14</sup> of the Institutional Memory Center of the Superior Institute of Education of Rio de Janeiro.

Why then look at the magazine *A Escola Primária*? Many periodicals related to education are, in this period, written by teachers or agents of the State at the service of education. In this sense, the publications present in these journals can reveal thoughts and conceptions that their various authors put into circulation. According to Catani (1996), pedagogical journals are very important for historical studies:

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<sup>14</sup> Available at: <http://cemiiserj.blogspot.com/2008/04/discutindo-sobre-reforma-do-ensino.html>. Access on: 20 May 2020.

The fact that teaching magazines circulate information on teaching work, the organization of teaching systems, the struggles of the professional category of teaching, as well as the debates and polemics that focus on aspects of knowledge or pedagogical practices, make them a privileged instance for the investigation of the ways in which the educational field operates (p. 116, translated by the authors).

In periods when the presence of magazines was fulfilling the evident need due to the scarcity of books in society, whether academic or didactic, magazines assumed a relevant role in the educational field. Thus, these journals served as "[...] a strategic tool of the ruling elite to reach teachers, transmitting them technical information of professional performance" and, due to these, teachers had greater "security in dealing with technical and/or pedagogical issues, which can also be understood as a strategy of this kind before students" (Oliveira Filho, 2015, p. 157-156, translated by the authors). Thus, "following the appearance and life cycle of these magazines allows to know the struggles for legitimacy, which are taking place in the educational field" (Catani, 1996, p. 117, translated by the authors) of the period.

Thus, in this work, we present as main objective to study Cabrita's publications in the magazine *A Escola Primaria*, trying to understand his contributions to the institution of an Algebra focused on elementary education and the circulation of ideas in favor of this movement in the Brazilian context. In the midst of this, we seek evidence of the recognition of this author's expertise in the educational field, as well as his possible production of new knowledge at the service of the State during the elaboration of solutions to problems experienced. For this reason, the questioning that directed this research is then formulated: based on the discussions posted by Francisco Cabrita about an Algebra teaching, in the magazine *A Escola Primaria*, which contributions of the author stand out for the circulation and systematization process of an Algebra for elementary education?

Thus, this text is structured as follows: initially, in the introduction, we detail general aspects about the work, about the author and his productions; in the theoretical-methodological reference, we present and discuss the perspectives on which this research is based; later, we focus on the speeches and ideas disseminated by Cabrita in the magazine *A Escola Primaria* about Algebra; finally, we bring the conclusions of this study.

## **Research benchmarks: expertise and the circulation of ideas**

Several types of specialists are involved with the history of knowledge, one of which, according to Burke (2016), is the intellectual, a term used by the author "in the sense of the writer or scholar who positions himself on public issues" (p. 51). Another perspective for education specialists is presented by Hofstetter, Schneuwly and Freymond (2017), the expert. According to Almeida and Valente (2019), an expert can be characterized by two requirements,

The first concerns the need for this professional to stand out in his or her job, due to the knowledge that is proper to him or her to conduct his or her work, such as scientific knowledge and the knowledge of experience. The second requirement is that, in addition to needing to possess this knowledge, this professional must hold a

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position, position, chair, etc. and is allowed, through this position, to systematize specific knowledge for school operations, such as the development of programs for teaching, courses for teachers, and other activities that are linked to their expertise (Almeida & Valente, 2019, p. 324, translated by the authors).

The above mentioned authors allow us to understand the reason and the relevance of studies about experts in education within the history of mathematics education, which is mainly the production and systematization of knowledge (Hofstetter & Schneuwly, 2017). In this way, the concept of expert differs from the idea of intellectual presented by Burke (2016), since public positioning is not enough to characterize the expert. In this sense, Morais (2019) indicates that if

[...] the intellectual is the person who positions herself/himself on political issues, they are professionals in the production of symbolic goods, [...] the "experts in education" are, [...] those whose political positioning is legitimated through the production of knowledge in response to a practical demand from the one who recognized her/him as such, the State. Such knowledge, elaborated taking into account the initial expertise, experiences and knowledge of the expert or group of experts, results in new knowledge in response to their call (Morais, 2019, p. 10-11, translated by the authors).

The expert is then seen as a recognized professional in her/his field, called by the government to solve a problem and which, because of this, leads to the institutionalization of new knowledge for the pedagogical field. The expertise, pointed out by Morais, is that which Hofstetter et al. (2017, p. 57, translated by the authors) present as "[...] an instance, in principle recognized as legitimate, attributed to one or several specialists - supposedly distinguished by their knowledge, attitudes, experiences - in order to examine a situation, to evaluate a phenomenon, to verify facts".

Thus, "the request for expertise [...] participates decisively in the production of new knowledge in the pedagogical field" (Hofstetter et al., 2017, p. 57, translated by the authors). In this way, the need to solve a problem induces the State to call someone it considers qualified, someone who has the recognition for the task, this person holds the expertise that qualifies her/him to seek the solution and if, in this process, it is possible to identify the systematization of knowledge by this subject, he can be considered an expert. A direct relationship between educational development and the growth of expertise in education can then be expected. In this sense, Hofstetter et al. (2017, p. 58, translated by the authors) indicate that "[...] the strengthening and growing institutionalization of expertise that irresistibly accompanies the development of the school system, dynamize the production of knowledge in the pedagogical field immediately in the heteronomous form, at the service of the State".

The participation of the expert and expertise in education has great relevance in the field of historical research in education, since the studies linked to their presence help to better observe the process of knowledge constitution. Studies on experts also allow us to observe whether certain historical figures are recognized, or not, in this category. For this, analyses are necessary to characterize a subject as an expert, so that we believe that the

simple determination of the expert is not the central point of research involving such perspective, but the trajectory of this character, his contributions to education and his production of knowledge. Thus, we consider that we should not start from the premise that a historical figure can be considered an expert in education, since this characterization constitutes the final point of the research that focuses on his productions and his involvement with the education of a given time and place. For the construction of an historiographic narrative, we sought elements that would allow us to verify aspects such as, for example, the relevance and recognition of the subject in her/his craft, the call of the latter by the State to solve a "problem" in education, due to his or her expertise, and the systematization of knowledge due to her/his call.

We also argue that, as presented by Hofstetter et al. (2017), to become an expert, one must have an expertise related to education, but, however, we believe it is possible to observe that someone holds a given expertise without being characterized as an expert, either because their work was not requested by the State, or even because the systematization of knowledge is not verified due to the function performed on behalf of the State. Thus, the study of expertise, and the possible characterization of the expert determine us not only a theoretical contribution to research, but also the directions of analysis aimed at the aspects of characterization of the expert, constituting therefore a methodological path to follow in this historiographic study.

We are convinced that characterization and notoriety of an author's expertise, primordial elements in this process of analysis, interfere deeply in the movement of circulation of his ideas. As stated by Souza and Garnica (2016),

Some ideas, however, having or not been imposed, are received and appropriated and start to frequent certain practices and fields of knowledge. In the case of Mathematics Education there are historically important foreign ideals that, among us, have played a significant role [...] This theme can easily be linked to the theme of importing models, as is easily seen when we consider, for example, the discussions on national curricula that, in Brazil, sometimes take as a parameter the indications of one country or another (p. 414, translated by the authors).

For Oliveira (2018), it would not be possible to present a definition, or categorization of the circulation of ideas, that contemplates all its nuances, that is, a simple and short explanation of "what is the circulation of ideas" would never be able to reflect all the aspects of this process. In this way, we rely on various authors and nomenclatures that allow us to understand aspects of the circulation of ideas and how this process is developed. Therefore, it is important to highlight that the movement of circulation of ideas is made up of several fronts that act as the gears of a mechanism and that, according to Souza and Garnica (2016, p. 426, translated by the authors) "do not necessarily work in the same way, but keep, among themselves, the defense of certain principles". This means that the presence of distinct perspectives in the circulation of an ideology does not go against the movement, since, in general, a set of principles is respected by all. In this sense, another principle would be

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[...] repeated and common use of terms and expressions and specific references, fundamental to the characterization of what is the object of appropriation and circulation in terms of the theory/approach: it is the maintenance of a common language, unifying, identity, which must necessarily be preserved so that the dynamics of recognition, circulation and expansion of the network of interlocutors can occur from it (Souza & Garnica, 2016, p. 427-428, translated by the authors).

Burke (2016) calls the dissemination of knowledge what we understand here as part of the circulation of ideas. For Burke (2016) knowledge, or information, can be disseminated in various ways and by various actors, be they human beings or objects, and these play an almost main role in Burke's play. Thus, from the perspective of the dissemination of knowledge there is a great emphasis on the one who seeks the development of this process. However, this does not mean that Burke (2016) ignores, in the midst of this, the one who "receives" the knowledge, after all according to the author "we need to remember that the knowledge received is not equal to the knowledge emitted, because of misunderstandings [...] and deliberate adaptations or cultural translations" (p. 113, translated by the authors).

Chartier (1990) suggests observing the circulation of ideas with a different point of view from that of Burke (2016), that of the subject who "receives" the ideas. Called by the author appropriation of ideas (Chartier, 1990), the process understands that a person's contact with a set of ideas gives meaning to it, almost as an interpretation. According to Bourdieu (2002), these interpretations have a great influence on the meaning of what is appropriated, and such meaning may distance itself from that originally proposed. Thus, appropriation can be understood from the following example: by coming into contact with a work it is possible to move away from the meaning thought by the author and, from our experiences, knowledge and insights, stipulate our own judgment on the content presented.

According to Oliveira (2018), it is not possible to circulate ideas without an object to circulate. Here we seek to go beyond the author's statement, we also defend that the circulation of ideas approaches, from a certain point of view, a play. This happens since, at one end, there is no play without the existence of the subjects involved in it, as actors and producers, and, at the other end, without a target audience for what is to be exposed. Bringing this perspective to the scope of this work, we can understand that there is no circulation of a set of ideas without their existence, without a vector of dissemination or without an audience to appropriate/make sense of what is circulating.

In this work we had as a secondary objective to associate the category of expertise, of Hofstetter et al. (2017) with the circulation of ideas. As Souza and Garnica (2016) point out, the process of circulation of ideas "demands an effective publication, i.e., a movement to make public what is intended to become recognizable to - and recognized by - a community" (p. 436, translated by the authors). Thus,

It is necessary that the agents involved in the process of appropriation and circulation of the ideology guarantee, in some way, the continuity of this circulation - at first by direct action and, later and/or in case of need, by indirect action that promotes the gathering of other individuals acting (Souza & Garnica, 2016, p. 425, translated by the authors).



In this way, even in a superficial way, it is easy to perceive two aspects relevant to the process of circulation of ideas: the manifestation of these in printed matter, which allows not only their registration, but also that people who would not have contact with them, can be part of this movement; that the subject who holds not only an expertise in the field of the subject in circulation, but also recognized by it, can contribute to the process of circulation of an idea and, by disseminating it, would be approving it and recognizing it as relevant. Here is observed a first role of the subject who holds the expertise, its recognition allows him to validate, or not, something in circulation. However, this subject sometimes also takes on the role of public, since we can observe that dissemination movements may be the result of appropriations made on ideas circulating in other places or countries.

### **Cabrita's contributions to the teaching of Algebra in *A Escola Primaria* magazine**

Cabrita's first publication in the magazine *A Escola Primaria*, about the teaching of Algebra, is found in number 10 of the first year of its edition, in an article entitled "A algebra do normalista" (Cabrita, 1917a). Cabrita begins the article by pointing out that in 1915 the director of the normal school, Afranio Peixoto, would have consulted him, questioning what Cabrita "thought to be enough for an algebra course in that school" (Cabrita, 1917a, p. 299, translated by the authors). According to the author, his indication for the Algebra course was:

1st Year: - Study of a well graduated series of problems, by means of algebraic language, that lead to the notion of equation (of 1st degree with a single unknown) and to the necessary transformations to this resolution. Previous resolution of some of these problems by simple reasoning and only with the resources of Arithmetic, to show the usefulness of algebraic language and how it facilitates the resolution of problems, often guiding the march of reasoning and guiding the arithmetic process of resolution.

2nd Year: - Continuation of the study of the series of problems initiated in the 1st year and extension of the algebraic method to problems with more than one unknown, which leads to the notion of the system of equations and the methods of elimination by addition or subtraction, by substitution and by comparison, with the previous resolution of some of these problems by simple reasoning (Cabrita, 1917a, p. 299, translated by the authors).

Cabrita also points out that the program was presented in the 1916 regulation and that, in 1917, it was still in use. According to the author, with the program "the normalists will have the necessary and sufficient preparation to put into practice, [...], what John Walsh thinks about problem solving in elementary school [...]" (Cabrita, 1917a, p. 299, translated by the authors). Walsh's thinking, to which Cabrita refers, concerns the algebraic resolution of problems that would normally be solved with the use of arithmetic knowledge. In his book, Walsh (1911) dedicates an appendix, entitled "Equational Arithmetic", to this subject. In it Walsh (1911, p. 349-350) points out a growing movement towards the introduction of

equations in the last two years of the arithmetic course<sup>15</sup>, in which one should not have, as a starting point, definitions or unknowns, but resolutions of questions like " $2 + = 4$ " or " $5 ? = 30$ ". In this sense, "After the equations has been taught, the students should not be required to use them to solve a problem but use whichever (algebraic or arithmetic) method they wanted" (Rodriguês & Costa, 2019, p. 166). The Algebra proposed by Cabrita apparently reflects Walsh's thought, since it proposes to the future teacher the learning of contents aimed at solving equations and linear systems, which would make him have more in-depth knowledge than that proposed to the students by Walsh. In this sense, Cabrita points out:

That algebraic resolution is easier and much safer than arithmetic, there is no doubt. That the first one often serves the second, pointing the thread of reasoning to it, there is no doubt either.

Neither Arithmetic nor Algebra teach us how to investigate the relationships of dependence in which one finds the given magnitudes and the requests of a problem. However, Algebra has the advantage of investigating with the help of images provided by the graphic language that is peculiar to it, while Arithmetic investigates, infusing judgments, formulating reasoning, with no other help than the common language; therefore, many times the so-called arithmetic resolution either follows a tortuous path and arrives painfully at the solution, or takes the path and uselessly stabs the calculist (Cabrita, 1917a, p. 299, translated by the authors).

In another article, entitled "Algebra in primary education", number 12 of the first year of the magazine, Cabrita (1917b) takes up the movement of "introduction of equations in the course of Arithmetic as an advantageous aid to problem solving" (p. 360, translated by the authors), again mentioning Walsh, but this time also indicating his book. Cabrita (1917b) also points out that this discussion is already old, presenting the contribution of some French authors to the subject:

For many people the word Algebra is a synonym of complication; they ignore that, in Arithmetic, when it comes to the solution of certain questions, one is forced to resort to much more abstract processes of reasoning, much more algebraic to speak the usual language, and much more difficult to catch than those of Algebra itself. To avoid this general prejudice some authors only use Arithmetic to solve all problems and give solutions that are often true tours de force, good as exercises, but inadmissible in practice (Garner, 1861, p. 333, apud Cabrita, 1917b, p. 360, translated by the authors).

The author goes on to say, making use of Leysse's words, that

We are aware that the introduction of Algebra's processes into primary education arouses fears and encounters oppositions; but we could in no way participate in these fears and associate ourselves with similar oppositions. It is incontestable that in a large number of issues, in which the intelligences of children follow painfully long and embarrassing reasoning, the application of Algebra would immediately sustain all the difficulty. If the members of the examination commissions and the most experienced masters are consulted, they confess without hesitation that, in the presence of any problem of Arithmetic to be corrected or verified, the natural

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<sup>15</sup> The subject is further discussed in the article "The Fifteen Commission and the First Movements on Teaching Algebra in the Brazilian Primary School" (Rodriguês & Costa, 2019).

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tendency is to solve it first by Algebra. The arithmetic solution is even often indicated to them by the algebraic solution, and it is common for the former to be the exact reproduction of the latter, with the exception of the signs and simplicity of language (Leysenne, 1901, p. 507, apud Cabrita, 1917b, p. 360, translated by the authors).

Cabrita sought, from these quotations, to present to the reader that there should be no fear as to the teaching of Algebra in elementary instruction, since it ends up facilitating the resolution of several problems in Arithmetic and, thus, the student's own learning. The author also seeks to show that his proposition is not unprecedented, that this movement has already been taking place around the world, in the search for a better acceptance of his discourse that would be based on the ideas of the countries that Brazil was seeking to reflect on (Warde, 2000). Cabrita (1917b) then ends his article recalling that Algebra "which is intended to inculcate the primary teacher," pointed out by the above-mentioned French authors, has as its objective the elementary study of equations, so that this knowledge may serve as a subsidy for the teaching of Arithmetic.

In two of his other articles, in which Cabrita mentions the term "algebra", the author discusses general themes of education, such as the critique of the normal school program with fifteen subjects in the same year (Cabrita, 1917c) or when he addresses the "Memorable historical period of the National Education", in which he talks about the creation of several subjects, including one with the presence of Algebra in secondary school in 1809<sup>16</sup>, as well as about the "method of mutual teaching" (Cabrita, 1921).

A highlight should be given to his last article that mentions the search term in the magazine. From the title "Analyses undetermined", Cabrita (1922) proposes a process to determine the whole and positive solutions of a first degree equation with two unknowns. The article, besides highlighting Cabrita's knowledge, also presents other relevant elements, since before starting the body of the article there is an essay note of the magazine in which one talks about the article and the author: "We believe that we do not err in affirming that this is the unanimous judgment of our teachers, who rightly considers our eminent collaborator [**Francisco Cabrita**] as one of the highest and most significant exponents of Brazilian teaching" (Cabrita, 1922, p. 99, translated by the authors).

The presence of the article, apparently out of focus, is justified at the very beginning of the note, by pointing out that the magazine is aimed at elementary school teachers, that is, indicating a possible characterization of the discussion as part of the area of teacher training.

To those who seem to be outside the moulds of this magazine the article, which we then publish, we remind you that "The Primary School" is intended for teachers and

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<sup>16</sup> The author of the document "N. 29.- BRAZIL. - RESOLUTION OF CONSULTATION OF THE DESEMBERING TABLE OF THE PACE OF 14 JULY 1809" (BRAZIL, 1809, p. 28-30), in which the chair of "Arithmetic, Algebra and Geometry" is established, in which the contents of "resolution of the algebraic equations of the 1<sup>o</sup>, and 2<sup>nd</sup> grade" would be addressed. It is important to point out that a little more than a hundred years later, as we have seen before, Cabrita (1917a) proposes a teaching of Algebra without the 2<sup>nd</sup> degree equations.

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not primary school students and that the study of Algebra is one of the subjects that the primary teacher needs in order to rise to the level of the high social mission that is reserved for him, having for this reason the indeterminate analysis of the first child always figured in the program of our Normal School.

As a matter of fact, the following article would not have Francisco Cabrita's attribution, in itself enough to affirm his high merit and his perfect suitability in the pedagogical magazine to which his author destined him (Cabrita, 1922, p. 99, translated by the authors).

Besides the prestige given to the author, the magazine also points out the process approached by Cabrita (1922) as unpublished, since the note ends by indicating that "we know of no process that could legitimately be mistaken for it, it is careful to research, [...], it confirmed the appreciation, which we had immediately done, considering it original" (p. 99). This makes it possible to perceive not only Cabrita's participation in discussions about elementary education or teacher training, but here also his production of possible new knowledge for teacher training.

In general, Cabrita (1917a) demonstrates one of the points raised by Hofstetter, Schneuwly and Freymond (2017a) for the characterization of an expert, the convening of the author by the government, an element that also highlights the relevance and recognition of the author for the education of the time. In this sense, Valente (2000, p. 208) points out that Francisco Cabrita "was part of the group that analyzed the old education programs (of the Empire) with a view to reformulating for the new times of the Republic", being this "responsible for mathematics". Salvador (2017) also mentions that Cabrita's appointment to the board of directors of Normal School, in Rio de Janeiro, would have proposed a reform for the institution's normal education<sup>17</sup>, which could lead to the reorganization of primary education<sup>18</sup>. The author (Salvador, 2017) implicitly links Cabrita to the elaboration of decrees n. 407, of May 17, 1890, which approves the regulation for the Normal School of the Federal Capital, and n. 981, of November 8, 1890, which approves the Regulation of Primary and Secondary Instruction of the Federal District.

Cabrita's participation in these activities may or may not have led to the institutionalization of new knowledge for the pedagogical field, however the impossibility of access and, therefore, an analysis of the materiality of his contributions does not allow the proof of this production according to the service provided. However, these elements allow us to perceive the recognition of Francisco Cabrita in the school environment and in the training of teachers, highlighting not only his capacity for the development of the attributions granted to him, but also the possession of the knowledge necessary for this.

Moreover, Cabrita's effort (1917b, 1917c) to make an international movement circulate in Brazil, from the U.S. and French levels, for the institutionalization of algebraic

<sup>17</sup> From the newspaper *Gazeta da Tarde* (RJ), 1889. Available at: <http://memoria.bn.br/DocReader/226688/10397>.

<sup>18</sup> From the newspaper *Gazeta da Tarde* (RJ), 1890. Available at: <http://memoria.bn.br/DocReader/226688/10620>.

knowledge in elementary education, especially in the resolution of complex problems of Arithmetic. From these articles we understand Cabrita's relevance not only in relation to the systematization movement of an Algebra for elementary education, but also to the magazine *A Escola Primaria*, or even, in relation to the Brazilian education itself at the beginning of the 20th century. The call of Afranio Peixoto and the words in the magazine's note emphasize Cabrita's recognition as a professional in education. This does not mean, however, that the author becomes more or less relevant due to the impossibility of characterizing him as an expert. On the contrary, the analyses show that even if Cabrita does not adhere to the category presented by Hofstetter et al. (2017), based on the sources used, his relevance to the educational field cannot be questioned. Thus, we believe that characterization as an expert does not become more relevant than the process of analysis of the author's production and work, as well as the recognition of his expertise.

Cabrita's knowledge and recognition indicates that he had an expertise in education confirmed by the government, by the magazine and even, through the magazine's note, by the teachers. This expertise, as well as its legitimization, allows Cabrita's speech to reach several educators, since it could be printed in an educational journal. Thus, by appropriating foreign movements about an Algebra focused on elementary education, with a focus on solving equation and its application in solving Arithmetic problems, Cabrita makes them circulate throughout Brazil as one<sup>19</sup> of his dissemination agents, validating the movement through his expertise.

### **In guise of a conclusion?!**

From the publications in the journal, mainly through Cabrita (1917a, 1917b), it is possible to perceive the effort of the author to circulate in Brazil the international movement of an Algebra for elementary education. The author apparently makes use of his expertise in order to validate these discourses and tries to overcome the rejection to this teaching, since the contents of Algebra would contribute to the formation of the student.

Cabrita's contributions are directed towards the movement of circulation of ideas in favor of an Algebra that would be made up of knowledge aimed at solving equations, and the teaching of the normalists and the high school is a little more in-depth in this sense. Thus, the author's proposal for an Algebra for elementary education highlights that it would not be the same as secondary education, as well as its objectives would be others, since such knowledge could be used as tools for the resolution of some complex problems of Arithmetic. This proposal is in line with the reformulation of US elementary education proposed by the Committee of Fifteen (Rodriguês & Costa, 2019).

Thus, Cabrita's ideas regarding the Algebra approach in elementary education do not point out enough elements for its systematization and institutionalization as a subject in the

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<sup>19</sup> As pointed out by (Basei, 2017; Rocha, 2019; Rodriguês & Costa, 2019; Valente, 2017), Othello Reis is another author who circulates this movement in Brazil.

teaching program. The perspectives raised by the author denote the use of knowledge concerning Algebra as tools for teaching Arithmetic and for solving problems that, without the use of equations, would have exhaustive solutions and would be unacceptable in practice.

Finally, although it is not possible to characterize Cabrita as an expert, we believe it is more relevant to observe, here, elements that enhance his expertise, in what concerns his involvement with education and his search to disseminate the discussion about the relevance of Algebra in elementary education. These aspects allow us to observe that Cabrita not only circulated such movement in the Brazilian context, but that the author also held an expertise to do so and to validate the relevance of this movement, elements that perhaps make his actions key pieces for a later institutionalization and systematization of an Algebra for the Brazilian elementary education.

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