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The Teaching of Arithmetic in the Teacher Training Course and the Constitution of an Expert in the Systematization of this Knowledge in Times of the New School (1950-1970)

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ABSTRACT

This text seeks to highlight the processes of production, systematisation and objectivation of mathematical knowledge practised by the teacher Rizza de Araújo Porto in her trajectory, seeking to identify the constitution of her expertise in teacher training courses in the Normal courses, in Nova Escola times. In order to base the research, evidence was collected on how an expert constitutes itself in the pedagogical field, given its representativeness in its field of activity, showing the transformations of this notion over time. The text is guided by the questions: how was its convocation by the State to solve a practical problem concerning the formation of teachers in times of the New School? What are the supporting contexts that enabled the systematisation of the professional knowledge produced by it? In what way did the objectification of this knowledge occur and how did they become part of the professional training of teachers? The sources examined show the occurrence of processes of constitution of knowledge by teacher Rizza Porto, its systematisation and objectification, and the importance of putting mathematics to teach arithmetic in the route of fundamental knowledge in the course of teacher training, thus evidencing her expertise.

Keywords: Expertise; Arithmetic; New School.

O Ensino de Aritmética no Curso de Formação de Professores e a Constituição de um *Expert* na Sistematização desse Saber em Tempos da Escola Nova (1950-1970)

RESUMO

Este texto procura evidenciar os processos de produção, sistematização e objetivação de saberes matemáticos praticados pela professora Rizza de Araújo Porto em sua trajetória, buscando identificar a constituição de sua *expertise* nos cursos de formação de professores nos cursos Normais, em tempos da Escola Nova. Para embasar a pesquisa, coletaram-se indícios de como se constitui

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um *expert* no campo pedagógico, dada a sua representatividade em sua área de atuação, mostrando as transformações dessa noção ao longo do tempo. O texto norteia-se pelas questões: como se sucedeu sua convocação pelo Estado para solucionar um problema prático referente à formação de professores em tempos da Escola Nova? Quais os contextos de sustentação que possibilitaram a sistematização dos saberes profissionais por ela produzidos? De que maneira ocorreu a objetivação desses saberes e como eles passaram a fazer parte da formação profissional dos professores? As fontes examinadas mostram a ocorrência de processos de constituição de saberes pela professora Rizza Porto, sua sistematização e objetivação, além da importância de colocar a matemática para ensinar aritmética na rota dos saberes fundamentais no curso de formação de professores, evidenciando, assim, a sua *expertise*.

Palavras-chave: *Expertise*. Aritmética. Escola Nova.

ASSUMPTION

Hofstetter and Schneuwly. (2017, pp.131-132) define two types of knowledge relevant to the teaching profession: the knowledge that is the objects of their work and the knowledge to teach that, in other words, is the tools of their work. For Valente (2015), the 'knowledge to be taught' is the knowledge that emanates from the disciplinary field and the 'knowledge to teach' composes a *corpus* of specific knowledge of the professional field. Although both pieces of knowledge form the training curriculum for the practice of teaching, it is the second that dictates professional expertise, that is, that characterises the profession of teacher. The author also considers that the knowledge produced must be objectified, that is, institutionalised over time, in terms of explicit knowledge, formalised, transmitted, and intentionally included in teacher training. In this sense, it can be said that the knowledge to teach, as a tool of the teaching profession, deals mainly with how to use the objects of this craft: the way of mobilising the object of teaching work, about teaching practices and about the Institution that defines its field of action.

As, according to Morais (2017), there are few research initiatives in Brazil that emphasize mathematical knowledge as a central theme of teacher education and teaching, this text seeks to highlight the processes of production, systematization and objectification of mathematical knowledge as practiced by Professor Rizza de Araújo Porto in her trajectory, seeking to identify the constitution of her expertise in teacher training courses.

To support the research, we sought evidence of how an expert in the pedagogical field is constituted, given its representativeness in its area of activity, showing the transformations of this notion over time.

In order to analyse the production of Porto in the formation of teachers focused on an arithmetic to teach, we examined the systematization of specific knowledge for the profession of teaching in a period of transformations, a moment between the ideas arising from the Modern Pedagogy and the flourishing of the New School movement and, thus, the questions arose: How was her convocation by the State to solve a practical problem regarding the formation of teachers in times of the New School? What supporting contexts have enabled the systematisation of the professional knowledge produced by her? In what

way did the objectification of this knowledge occur and how did they become part of the teacher's professional training?

Based on these factors, we investigated the process of constitution of Porto's expertise, dialoguing with considerations about the growth of education systems in Brazil, the need to solve problems in the course of teacher training and the trajectory of institutionalisation of the knowledge produced for Arithmetic. We also approached the objectification of this knowledge through the trajectory of Porto; for this, the State calls were revisited to elaborate the proposals for the implementation of reorganisation and reformulation of the course of teacher training for the teaching of arithmetic in the period and the circulation of the new proposals through Magazines and Didactic Manuals. To answer the questions formulated, we used the information found in works by Rizza Porto, such as textbooks (1965, 1967), Pedagogical Journals (1961, 1962), Minas Gerais Programs (1961, 1965), newspaper News (2017), and the PABAEE Program, among others.

KNOWLEDGE OF THE PROFESSION

The Historical study on the relationship of expertise with the production of professional knowledge can elucidate the discussions that deal with teacher education, revealing how some knowledge for teaching was institutionalised and the relationship of this institutionalisation with the expertise of professionals working in the field.

Valente (2017, p.1) states that new bases have been mobilised on professional knowledge:

> These recent studies have highlighted that, if the admission that the knowledge for teaching has a subjective character, it seems that, over time, many of these researches conducted in the last decades demonstrate the need for the objectification of knowledge that can be systematised and, therefore, should be part of the new vocational training of teachers. In short, it would be the transformation of the subjects' knowledge into objectified knowledge.

Thus, the theoretical framework that supports our research is part of the studies of the Research Team in the History of Education Sciences (ERHISE) of the University of Geneva.[1]

The studies of Swiss researchers indicated that the production of knowledge in the pedagogical field, in the centuries XIX and XX, "can be described in the form of

[1] The Chapter titled *Pénétrer dans la vérité de l'école pour la juger pièces en main – L'irrésistible institucionnalisation de l'expertise dans le champ pédagogique (XIXe. – XXe. siècles)* Compose the book Knowledges in (trans) formation: central theme of teacher training (Hofstetter, Schneuwly & Frymond, 2017), Organized by Rita Hofstetter and Wagner Rodrigues Valente and translated by the authors of this text together with one of its organizers, Professor Wagner Rodrigues Valente.

their stratified succession, where each one renews the landscape of the structures and knowledge that one wants to analyse" (Hofstetter, Schneuwly, & Frymond, 2017, p.55-56). The fact occurs due to the emergence of "new actors who act individually or collectively have produced knowledge to teach" from their professional functions and attributions conferred upon them.

For Hofstetter, Schneuwly and Frymond (2017, p.57), it is considered as a notion of expertise that recognised as legitimate, attributed to one or several specialists. These specialists are distinguished by their knowledge, attitudes, experiences in the analysis of a situation, in the evaluation of a phenomenon, in the finding of facts. It can be said that they are experts because they know their craft well and stand out, combining knowledge of the profession with those of the discipline. In addition, they are generally called upon to solve practical problems by a public institution.

Thus, anchored in this conception, we can say that the work of expertise is requested for different purposes, always, however, in order to solve a problem, using the specialist's expertise. Thus, the information mobilised is distinguished by the knowledge, attitudes and experiences of those who produce it in view of the theoretical and/or experimental knowledge of their own field of activity and, consequently, in the realisation of this work there is the production of new knowledge. Therefore, the expertise requested by the teaching authorities because of a demand from society for decision-making can lead to the production of new professional knowledge.

Hofstetter, Schneuwly, and Frymond (2017, p.66) emphasize that, in the Geneva of the century XIX, the Republican ideas brought new demands in relation to education, causing transformations in the school system: new organisation in its structure and functioning, teaching methods, knowledge about students, etc.

Thus, the State, being responsible for public education, needed to ensure its functioning and, for this, it develops instruments to analyse the efficiency of the implemented systems. Hence, the existence of a group of professionals, increasingly numerous, was indispensable: "A committee to examine the state of the school and the means to improve it" (Hofstetter, Schneuwly & Frymond, 2017, p.59).

In the same way that the Swiss, in Brazil, after the Proclamation of the Republic, the process of expansion of Primary Education occurs concomitantly with social and political transformations, in a scenario marked by changes related to demographic growth, to development of industry and internal urbanisation. It can be said that the period of transformation lived by society at the beginning of the century XX coincided with the agglutination of educators around themes related to education in a period marked by several changes in the Brazilian educational system. At the national level, the then Minister of Education, Clemente Mariani, constituted a committee to propose a bill[2] for the general reformulation of Brazilian education and, thus, to enforce the right that the 1946 Constitution granted to the States, to organise their teaching systems. After 13

[2] On October 29, 1948 was forwarded to the Federal Chamber the draft Law of Guidelines and Bases of National Education (Ribeiro, 1986, p.129).

years of studies and discussions, the Law 4.024/61. Law of Guidelines and Bases of Education – LDB, was enacted.

Thus, the new demands in relation to the educational system, which has long been deficient, justified the various agreements of technical and financial collaboration by the Ministry of Education and Culture (MEC),[3] which were aimed at diagnosing and resolving such problems.

In this period (1950-1970), the hiring of teams of specialists in educational issues can be verified. The staff training and capacity building, offered by the Secretariat of Education at the end of the decade of 1950 and in the first years of the decade of 1960, were carried out in an unsystematic way, to implement the reforms in the education system as a result of the Deliberations of the Law 4.024/61 through different training strategies. The courses were organised and offered to the teaching staff by entities or services connected to the government (federal, state or municipal) and private entities.[4]

To ensure an effective learning experience and served many, in line with the agreements signed, in Brazil, many empirical investigations and international comparison were commissioned to monitor the development of the school system, which enabled the production of knowledge in the pedagogical field. It contributed significantly to this the entry into the scene of the State in charge of public education and the emergence of the disciplinary field "Education sciences" (Hofstetter, Schneuwly & Frymond, 2017).

Paiva and Paixão (2002, p.43) confirm that, in this time of transformations, the State has proposed to form a central nucleus of specialists in order to circulate the proposals for innovation of teaching methods and techniques:

> In the ideas that fed the project of technical assistance of elementary education, there is, at its core, a central target – the primary teacher, to whom one intends to equip an instrumental considered efficient and necessary for the exercise of its activities: the domain of new methods and teaching techniques. Modernising primary education is, from the perspective of the Program, to bring to Brazil innovations in the field of the methodology of the existing teaching areas in the United States and seek to adapt them to the specificities of our country. The multipliers considered appropriate to disseminate the innovations would be the teachers who worked in the schools entrusted with the formation of the primary teacher: the Normal Schools.

We can infer that, thus, it was allowed the hiring of experts, who were able to create instruments to implement the new ideals. According to Hofstetter, Schneuwly,

[3] Among them, the agreement established between the Brazilian Government and the United States Operation Mission to Brazil – USOM/B, which proposed the improvement of Primary Education. Initially, this agreement was established on June 22, 1956, with an end scheduled for July 1961, but was extended until August 1, 1964. Its headquarters was at the Institute of Education of Minas Gerais and had as an organ responsible for its realization the INEP, whose director at the time was Anísio Teixeira (Lima, 2001).

[4] For more details, see France (2012).

and Frymond (2017, p.67): “They are experts in the fact that they know the teaching profession perfectly and stand out in it.” As the authors point out, the development of the educational systems provided the production of knowledge in the pedagogical field, considering the increase in the production directed to the formation of teachers. In this scenario, the pedagogical expert emerges with the function of “examining a situation, evaluating a phenomenon, and verifying facts” about the school system.

The distinction of his work in the professional field – individual or collectively – occurs “by his knowledge, attitudes and experiences”, thus resulting in modes of expertise that have been differentiated over time. The expertise is therefore carried out by people from the school environment, that is, by the teaching profession. In the clearly defined institutional conditions, the work of expertise is perfected and it strongly develops the knowledge that relates to it.

> Thanks to its institutionalisation, the work of expertise produces in this way an increasingly coded and standardised knowledge. It takes more form of a pragmatic knowledge of the profession, elaborated by it, in a particular context, which reflects its work to a high degree of standardisation and objectification. (Hofstetter, Schneuwly, & Frymond, 2017, p.68)

RIZZA PORTO E SUA CONSTITUIÇÃO COMO EXPERT EM TEMPOS DE ESCOLA NOVA

To a large extent, the Brazilian movement of the New School was marked by the Manifesto of the Pioneers of the New School of 1932. The proposed model was already being tested in several Brazilian states, but it was in 1932 that the manifesto gave a body to the initiative of some education thinkers in Brazil.

According to Villela et al. (2016), the historical moment called the New School arose due to the new demands of the world society and particularly of the Brazilian one in the first decades of the twentieth century. The transformations of society demanded a new formation in harmony with the social mobility that was being constituted. This pedagogical movement was based on the assumption that the best program would be the one that would align the needs of Child Psychology with those of the school organisation, “being up to the teacher to shape the program in the middle and the group of students (Souza, 2009, p.184). It was believed that education would bring progress and modernisation. The school should assume the educational experiences that develop the students’ capacities and teachers should stimulate and mediate the students’ interests. The idea was to organise knowledge according to cognitive development, as defended by the studies of Psychology and Pedagogy. Acting this way, it was thought that the school would not be unaware of social transformations.

As in Switzerland and much of the world, the State needs to organise public instruction linked to public authorities and in a certain way has to atone to the

effectiveness of this system, guaranteeing access to the basic knowledge and know-how; therefore, knowledge is produced for this purpose. Thus "it will still be necessary an institution that is able to take care of this new form of expertise that combines the knowledge of the profession with those of the discipline" (Hofstetter, Schneuwly, & Frymond, 2017, p.74).

Being the Brazilian State responsible for public education, it had, during this period, a practical problem to solve: how to adapt the new directives to its teaching system? It was necessary, then, to hire specialists to produce knowledge consistent with the deliberations of Law 4,024 and the New School's ideals. There appears the figure of Professor Rizza de Araújo Porto.

Born on August 20, 1926, in the district of the municipality of Besides Paraíba – Minas Gerais, in 1942, she graduated as a normalist[5] and, in 1949, in Educational Administration at the Institute of Education of Minas Gerais; still, in 1968, graduated in Pedagogy from the Faculty of Philosophy and Letters of Belo Horizonte. She began his career as a primary teacher in 1944 and since then held different positions at the school. In 1956 was recruited by the State as an expert to integrate the Department of Arithmetic of the Brazilian-American Assistance Program to Elementary School –PABAEE,[6] that proposed the improvement of Primary Education, focused on teacher education, in the actions of how to do, that is, disseminating the importance of the teacher knowing the structure of composition of the curriculum, its elaboration, execution and its evaluation (Lima, 2001).

However, what was the specialised knowledge of Rizza Porto, what were the activities performed by her and in which she stood out in the profession of faculty, or how did the operationalisation of her expertise?

In a brief biography conveyed by the newspaper "The Voice of the People", their professional qualities, points of interest to this work, are praised.

> She was always distinguished by his intelligence and knowledge, was approved in the Public Tender to enrol in the Educational Administration Course, in December 1947, also, in the Public Tender of sufficiency tests for the chair of Methodology and Teaching Practice of Institute of Education of Minas Gerais, was approved, having obtained the 1st classification, with final average of 9.736, in the year 1960 and in the Qualification Exam of the Superior Magisterium, at Universidade Federal de Minas Gerais. Her professional experience began with the activities of magisterium, as a primary teacher, in Volta Grande, from 1944 to 1947. After 1950 to 1951, she was Technical Advisor, in Leopoldina, and in 1952, was Director

[5] The historical term for trained teachers for primary schools

[6] The PABAEE resulted from an agreement established between the Brazilian Government and the United States Operation Mission to Brazil – USOM/B, which proposed the improvement of Primary Education. Initially, this agreement was established on June 22, 1956, with an end scheduled for July 1961, but was extended until August 1, 1964. Its headquarters was at the Institute of Education of Minas Gerais and had as an organ responsible for its realization the INEP, whose director at the time was Anísio Teixeira (Lima, 2001).

> of the Captain State School, where she was replaced by her sister Yedda in 1956 when she travelled to the U.S. to take the Specialization Course in Elementary Education. 1960 to 1964, she was a Professor of Introduction to Administration and, for the entire decade of 60, she was Professor of mathematics didactics in teacher improvement courses at the Human Resources Centre of Minas Gerais, in Belo Horizonte, Minas Gerais. She also taught in Venezuela, in the course for teaching superiors at the teaching Training Centre in El Mácoro, in Maracay, in 1963. ("Conheça a trajetória", 2017)

One of the factors for the prestige of Porto can be explained by the affirmation of Gurgel (2016, p.77) that the teachers of the Normal Schools, between 1940 and 1970, were considered as intellectuals, seen the networks of sociability in which these teachers passed through. The set of situations/experiences experienced by the social actors, in which are directly involved the spaces frequented – professionally or personally –, the people with whom they relate, about what they were in dialogue, what they produced, as well as other situations where contact with other social actors was present, it was essential for these teachers to acquire the prestige with other teachers and governmental institutions, leading them to occupy positions of leadership in public institutions.

Porto, then, held many positions of power, being called to opine and make decisions in her field of action, a fact verified in his biography. Another point to highlight refers to her influence on teacher training courses, which may be due to the positions occupied by her, in addition to her professional experience acquired in practice, since she was a teacher of the Institute of Education of Minas Gerais, acting in various instances, in different places of power, even called by authorities for consultancy, therefore, in principle recognized as legitimate by their peers. Besides, she always cared about her academic background.[7]

As the study elaborated by the MEC and USOM/B indicated that the "failure" of the Brazilian primary school was attributed to the low qualification of the faculty and the most appropriate strategy for the improvement of primary schooling indexes would be the investment in the formation of primary teachers (Paiva & Paixão, 2002), in the operationalization of this agreement, initially, the State contracted specialists who performed a study internship at the University of Indiana. The actions of this program included, during its existence, the submission of groups of teachers to the United States for the performance of training for one year.[8] Porto then participated in these training sessions in the period of 1956-1957 (Villela et al., 2016).

[7] Internship in the preparation of teachers and experimental methods in the teaching of mathematics, held at the Institut Pédagogique National in France, in 1968; Educational Technology Center at Florida State University, Tallahassee (USA), in 1973; Specialization Course in Elementary Education "Indiana University" (USA), in the years 1956 and 1957; "Design and Managament II" Program at The Washington Training Center in Washington DC.

[8] To 1964, 142 scholarships had been granted in the United States, most of which were distributed among the states of Minas Gerais (64), São Paulo (20), Guanabara/Rio de Janeiro (13) and Rio Grande do Sul. After 1959, the courses were offered to teachers from other states, and 864 scholarships were granted; the participation of Paraná professors covered 22 of these scholarships (Paiva & Paixão, 2002).

The courses offered by PABAEE, quite publicised, emphasised the methods and techniques of teaching, that is, mathematics to teach. Circulating the activities and materials produced was part of their attributions, presenting concrete didactic materials used in the course of Methodology of Arithmetic. In addition to the dissemination of information by the press, the teachers Rizza Porto and Evelyn Bull, in order to disseminate the Program, through the work that was being done in the Department of Arithmetic, visited several schools in the state of Minas Gerais and other States (Paiva & Paixão, 2002).

We consider that some factors may have contributed to the circulation of the knowledge produced by Porto, one of them being the fact that she was part of the technical staff of the PABAEE, as responsible for the Department of Arithmetic of such program. According to the PABAEE Report, until 1961, the Program had published publications with the new norms for the teaching of arithmetic through the manual *View, Feel, Discover the Arithmetic* of Rizza Araújo Porto:

> Between 1958 and 1964, 113,500 copies of 30 books and 38000 copies of 15 leaflets were produced. The titles of these publications indicate that their content contemplates the teaching methodologies of the Native Language, Arithmetics, Social Studies, Sciences, Pre-Primary and the teaching of Psychology. According to the PABAEE report, twenty thousand pages were produced annually. (Paiva & Paixão, 2002, p.151)

It is perceived, by the volume of publications directed to teachers, that the State was fulfilling its role in the agreements with the USOM/B, that is, hiring specialists, in order to solve problems related to teacher training, as they determined the objectives of PABAEE:

> Create and adapt didactic material and equipment based on the analysis of resources available in Brazil and other countries;
>
> Select teachers of professional competence and efficacy at work [...] for advanced courses in the field of primary education. (Nogueira, 2005, p.37)

Another factor that contributed to the circulation of Porto's production refers to the dissemination and distribution of her didactic manuals by the Technical Book and Textbook Commission (COLTED),[9] according to Batista, Santos and Souza (2016, p.6-7):

[9] The Technical and Didactic Book Committee (COLTED) was located in Rio de Janeiro. It was created in 1966 and extinguished in 1971. Its objective was to coordinate the actions related to the production, edition and distribution of the textbook. This commission was the result of an agreement between the Ministry of Education and Culture (MEC), the National Union of Book Publishers (SNEL) and the United States Agency for International Development (USAID) (Batista, Santos & Souza, 2016, p.3).

> "Each COLTED library" [...] consisted of 400 books that were mostly intended for teachers, that is, the books that integrated the "COLTED libraries" were: reference works (encyclopaedias, dictionaries, atlases); consultation books for the teacher; textbooks for teachers; informative books for students; textbooks for students and guides for teachers; books on elementary school teaching and textbooks in the field of Education (Psychology, curriculum, methodology, supervision, children's literature). (BRASIL, 1968c). In the first phase of distribution, which occurred between January and June 1967, 2.5 million volumes were acquired to compose 7975 sample libraries. The second step, between July and October 1967, selected 3000 titles for other 14100 sample libraries. Seven million books were distributed by COLTED.

The book *View, Feel, Discover Arithmetic* of Porto was part of this Library, as shown in Figure 1, which shows the stamp of the Library of COLTED in this book, dated 1967, Year of the 5th edition.

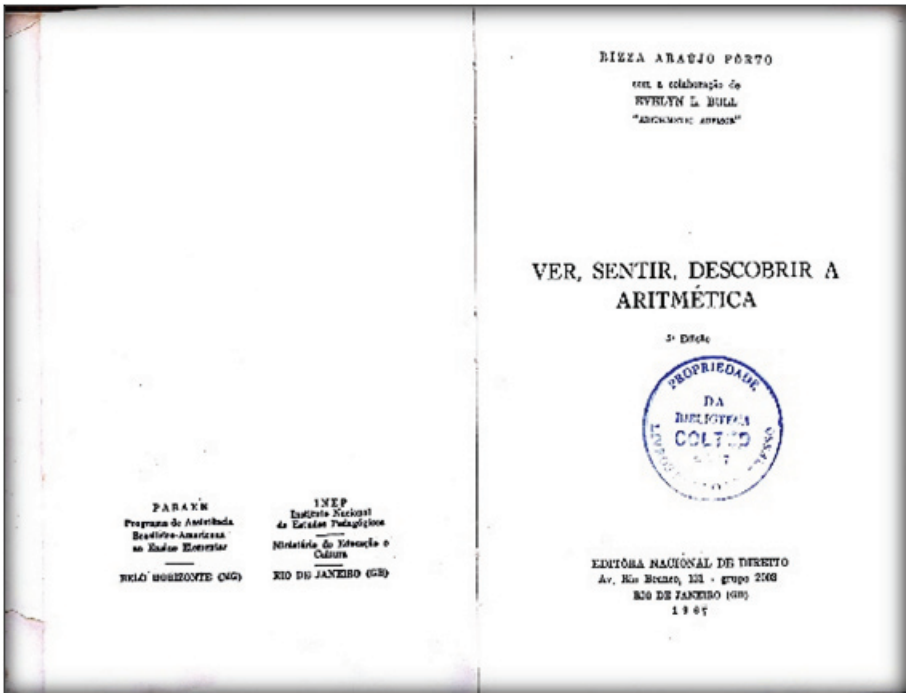

Figure 1. Book with COLTED Library stamp (Author's Personal Archive).

However, this was not the only way to circulate Porto's ideas among teachers. The new way of teaching, involving then ambiguous concepts, demanded deeper knowledge about the different materials and, because they considered them difficult to operationalise, the teachers requested guidance. Porto, like many of the PABAEE team, used the

publication of articles to disseminate their ideas on how to teach arithmetic, that is, their productions also circulated through magazines. Comparing the articles produced by her in the Teaching Magazine[10] (1961, 1962a, 1962b), we can verify possible institutionalised knowledge about the new approach to Arithmetics in primary school.

Porto was also invited to elaborate the programs for Primary Education in Minas Gerais in 1965, as pointed out by the researchers Duarte and Borges (2014, p.8):

> After the official speeches, all the programs cover the organising committees responsible for the reform of Primary Education, in accordance with the areas contemned in it: Language; Social Studies; Math Natural Sciences and Health Education; Art, Work and Life; Physical Education and Music Education. The consultant of the part devoted to mathematics was Rizza de Araújo Porto, then professor of "Introduction to Didactic Education, Theory and Practice".

Another point to highlight refers to the circulation of this knowledge through official Teaching Programs. We can see the diffusion and circulation of her ideas in the Repository of the Federal University of Santa Catarina (UFSC, 2018). There are several works that deal with Rizza Porto, including documents certifying its official production in Minas Gerais, due to its expertise in teacher training: Program for the first Preliminary Series of the Secretariat of Education of the State of Mines, published in 1961 and the Experimental Program for the Preliminary Classes, of 1959.

We can then consider the production of Programs for Primary Education of Minas Gerais (1959, 1961, 1965), published and distributed by the State, as part of the process of constitution of her expertise in the formation of teachers for the systematization of arithmetic knowledge in the Normal courses, in times of the New School, since the team of developers was hired mainly to organize and standardize the teaching work, prescribing practices to teach.

Her books can also be found as a reference in the elaboration or reorganization of some curricula of Brazilian primary education, as is the case of the mathematics curriculum of 1981 of the Federal District, in which it appears, in the bibliographic reference, the book *Let's Learn Mathematics: Teacher's Guide – Preliminary* (Souza et al., 2016). Another point that draws attention refers to the distribution of this book by the MEC, attributing an official character to the proposals.

[10] According to Biccas (2002, p.1): "The Journal of Education is an official educational form of education directed to teachers, directors and technicians of the public education network of the state of Minas Gerais and was certainly the most representative of the history of mining education Because it had a long life cycle. Created in 1892 and interrupted in the same year, it was reactivated in 1925 and again interrupted in 1940, because of the Second World War. In 1946 it returned to circulate irregularly, until 1971, when it was extinguished after reaching 239 numbers".

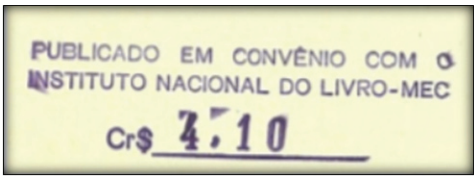

Figure 2. Stamp of the National Book Institute (Souza et al., 2016, p.86).

This book was published in 1967, but still today, we find suggestions for the use of materials in the arithmetic activities influenced by the ideas proposed by Porto, for example, value box (p.49), scale (p.133), and fractions table (p.116), among others.

The author, in the preface of the book *See, Feel, Discover Arithmetic,* notes the need for publications on the new teaching materials:

> [...] the growing number of teachers, supervisors, student-master directors, who visit the Department of Arithmetic of PABAEE at the Institute of Education to inform themselves of the teaching material, encouraged us in the publication of the brochure. (Porto, 1965, p.11)

It is worth noting that, in the guidelines of this book, the author's significant concern with the use of concrete material in the proposed activities is verified; it is also possible to observe the importance given by the author to the materials and activities of experimentation and discoveries, therefore, immersed in the "New School" ideas.

In the productions related to the formation of the primary teacher, Porto also wrote other books: *Fractions in Elementary School; Mathematics at the Modern Elementary School (co-authorship); Let's Learn Mathematics (co-authorship) and Let's Learn Mathematics – teacher manual.*

> A modern program of Mathematics should be well planned and must be based on the general philosophy of the Curriculum to make the most of the continuity in the learning process of the child. It is through this sequence of development that the child systematically widens and deepens his/her learning. The program will have to meet the integration of learnings so that the child perceives, not only the interrelations of what he learns in Mathematics but also the relationship of Mathematics with the other branches of knowledge and with life outside the School. (Osório, Pôrto, & Almeida, 1967, p.VIII)

In this statement, we can observe the requirement of an expertise considered necessary to the mathematics teacher; that is, it requires an ability beyond arithmetic to teach. The teacher still needs to propose existing relationships between school contents

with daily life and other branches of knowledge, in addition to providing students with practical activities, so that they make use of the arithmetic knowledge in real life, work with problems related to situations of their interest, family and everyday ones, that is, using knowledge relating to the arithmetic to teach.

Revisiting some authors who in some way deal with the works of production of Porto (Carvalho & Duarte, 2017, Batista, Santos, & Souza, 2016, Souza et al., 2016, Costa, 2015, Villela et al., 2015), some considerations may be indicated about the author: she produced knowledge to teach arithmetic, using new methodologies in teacher training courses; emphasized the importance of the use of concrete material and guided the use of various materials suggesting that the resources could be from structured pedagogical materials, such as abacus, to materials constructed by the teacher with everyday objects; she cared about the adequacy of the activity by the teachers: "We want to prevent the teacher from allowing the child to penetrate these arithmetic truths, rather than to limit his quantitative thinking. Then, the teacher skilfully directs the child in the acquisition of the formal order" (Porto, 1965, p.21).

Thus, when analysing Porto's productions, we identify that they refer to professional knowledge related to teacher education and that this knowledge circulated in Brazil through leaflets, books e courses, causing the objectification of such knowledge.

FINAL CONSIDERATIONS

Our study presented some actions performed by the State to meet the new educational demands triggered by political and educational social transformations in Brazilian society, in the decades of 1950 and 1960, justifying the various agreements of technical and financial collaboration between the Ministry of Education and Culture (MEC) and foreign agencies such as USOM/B. Among the deliberations was the creation of PABAEE with the objective of improving primary teachers through courses and material production and, in this sense, the State calls on Brazilian specialists to compose the teams and to account for the demand. In such a scenario, Rizza Porto is designated to lead the Department of Arithmetic of PABAEE, because she was recognised as an expert in education and enjoyed great prestige among its peers, due to the positions of power she occupied.

Her formation and professional trajectory seem to be intimately linked to teaching. We consider that her productions, in general, had as centrality guide the actions of the teacher in the classroom, that is, a prescribed and instrumental knowledge.

As a member of PABAEE, specifically the Department of Arithmetic, Rizza Porto systematically and circled her ideas through the publication of several texts on the teaching of Mathematics and, by the fact of working in places of teacher training, the teacher circulated, in periodicals and their textbooks, the "New School" ideals with greater ease, often sustaining the elaboration of curricula and Programs.

From our analyses, we can infer that Rizza de Araújo Porto has been professionalizing herself in the context of its own history, constructing a specific formation that was socially recognized for her actions, contributing to the elaboration of knowledge to teaching, a knowledge that instrumentalised the practice according to the modern conceptions of mathematics teaching with technical indications in force in the period under study.

In summary, the study on these questions points to a knowledge objectified by Porto in the elaboration of guidelines for teaching arithmetic in the elementary school in times of the New School in Brazil, which contributed to the introduction and elaboration of didactic materials in the classroom, influencing the formation of primary teachers in that period. Also, from the PABAEE, their productions reverberated in the courses of teacher improvement in different places, since her books were distributed by programs such as COLTED and used as a reference for the elaboration of teaching programs of several Brazilian States.

Thus, Rizza Porto was an expert in arithmetic in the formation of teachers, in times of the New School, announcing her solid formation through study and in the practice of the profession, the elaboration of an objectified knowledge, a great circulation of its proposals contained in didactic manuals and texts that influenced a generation of educators, having starred in actions that permeated the elaboration of policies related to teacher training.

AUTHORS' CONTRIBUTION STATEMENTS

Both authors conceived the idea presented and collected and analysed the data, discussed the results and, through meetings, jointly elaborated the final version of the manuscript.

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