ARTICLES

Education, school and school mathematics: meanings of the basic education mathematics teachers*

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Abstract

The mathematics teacher initial training has been the subject of discussion in the governmental spheres and in the Brazilian Societies of Mathematical Education and of Mathematics. As a consequence of this, we notice advances in some critical points, among which stands out - the excess of academic mathematics disarticulated from the school mathematics; and - the approximation of the mathematics education theoretical-methodological trends with the mathematics undergraduate courses curricular organization. However, there are still absent the conversations involving the different and varied dimensions that interfere in the teaching and learning process of school mathematics; and the different curriculum theories. As a result, the neutrality of mathematical knowledge and the excessive concern with the normative dimension of the curriculum continue being protagonists in the mathematics teacher initial training. In this sense, this article aimed to investigate aspects related to the perception and understanding of basic education mathematics teachers about the school subjects, the school, the school education and about being a math teacher. Methodologically, it is included in a quali-quantitative research approach, in which, in order to achieve the project's objectives, a field research, through a questionnaire available in the "Google docs", was carried out with the public network mathematics teachers from São Paulo state. Theoretically, it was based on studies about curriculum theories. It was tangible that the collaborating teachers are still very attached to the normative dimension of the curriculum, always prioritizing what to teach, how to teach and how to evaluate, without worrying about other dimensions (cultural, social, political) that interfere in the curriculum organization.of the school mathematics.

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Introduction

In the last years, the mathematics teacher initial training has been the subject of discussion both by the governmental spheres and by the Brazilian Societies of Mathematical Education and Mathematics, consequently, if we do not have a model of initial training that is free from criticismo yet, then, at least, we have advanced in discussions involving, for example: a) the excess of academic mathematics without proper articulation with the school mathematics that will be practiced, in the classroom, by the future teacher; b) the approximation of the mathematics education theoretical-methodological trends with the undergraduate courses curricular organization.

Two points that, from our point of view, deserve more attention in the discussions and debates on the mathematics teacher initial training concern to the different and varied dimensions that interfere in the teaching and learning process of the mathematical school subject; and to the different theories of the curriculum.

Our first theoretical affiliation regarding to the curriculum theories was the classification given by Tomas Tadeu da Silva (2000, 2007) to the different curricular theories - traditional, critical and post-critical - that started from the discourse notion to build and classify them, that is how the curriculum has been defined and characterized at different times and in different theories, and what are the questions that these theories or curricular discourses seek to answer.

The different theories of the curriculum seek answers and arguments to discuss and justify the knowledge that must be taught so that the subjects can be modeled according to the prevailing ideological thinking of the time or to know and govern themselves and the society in which they live (SILVA, 2000, 2007).

Still on the discursive meanings produced regarding curriculum theories, the issue involving power relations contributes to the separation-distinction of the traditional theories - which wish to be neutral, scientific and disinterested - from the criticisms and post-criticisms of the curriculum - which deny the disinterested-scientific-neutrality of the traditional theories, saying that, inevitably, theories are involved in (by) power relations. The distinction between theories is also perceived by the different concepts used by each of them. Initially, the shift from the emphasis of didactic-pedagogical concepts in the teaching-learning processes to the concepts of ideology-hegemony-resistance-power caused a break with the traditional theory-critical theory; when the concepts of discourse-governance-mistrust were made visible and, mainly, the concepts of ideology-hegemony-resistance were blurred, the post-critical theories of the curriculum recontextualized the way of perceiving-conceiving the curriculum (SILVA, 2000, 2007).

At the presente-time, we incorporate Pinar (2007) to our interlocutors and we erase the curriculum theories term. In its place, the term curricular studies produces

other discursive registers, expanding the understanding of the centrality of this field to think on education-curriculum-discipline-knowledge as defined by the school. It is an interdisciplinary discursive practice of the educational experience (PINAR, 2007).

> The curriculum theory is a distinct field of study, with a unique history, a complex present, an uncertain future. The influences of subjects in the humanities and in the arts areas and, to a lesser extent, the social sciences (mainly the social theory) are discernible in this singular field. (PINAR, 2007, p. 18).

According to Pinar (2007), the interdisciplinary structure of the curriculum field, greatly influenced by the humanities and arts, provides distinct specialization to the curriculum theories in the broad educational area.

> As a distinct interdisciplinary field [...], the Curricular Studies may be the only academic subject within the larger field of education. [...]. Only the curriculum theory has its origin and owes its loyalty to the subject and to the educational experience. (PINAR, 2007, p. 18-19).

In this sense, according to Pinar (2007), the curriculum theory is the criticism to the contemporary educational process and its reforms.

> In fact, the "educational experience" looks just like what politicians don't want when they persist on enhancing the tests scores, the "gross yield". By relating the curriculum to the behavior of students in standardized examinations, politicians have come, in fact, to control what has to be taught: the curriculum. The oriented curriculums demote teachers from academics and intellectuals to technicians in service for the State. The culture of self-reflection, of interdisciplinary knowledge and of intellectuality disappears. Rationalized as "accountability", political socialization replaces education. (PINAR, 2007, p. 19).

The external evaluations phenomenon seems to be universal and its naturalization tends to materialize. More and more these assessments become elements of the daily life of our classrooms and we have the impression that little or no "critical" reflection on them is carried out inside the schools. Teachers and students become just hostages to them.

We agree with Pinar (2007, p. 19) about the fact that the present time is "a nightmare for the public schools teachers".

> The school has become a competence and knowledge factory (or company); teachers are reduced to the supervisors statute. While in schools, millions live the nightmare every day, very few seem to realize that they are sleeping. (PINAR, 2007, p. 19).

From the considerations made, it is justified the need to make visible to teachers who will teach mathematics that the neutrality of the scientific knowledge, in particular the mathematical knowledge, and the excessive concern with the normative dimension of the curriculum need to be reframed, revisited and reconceptualized. "How to teach this or that?" is still a common question in the teachers training moments, mainly in the

continued training. Questions like “What do we aim for when teaching this or that?”, “Why these contents and not others?” rarely appear during the teachers training courses (either in the initial or continued phase). However, comments often made by teachers who occupy certain positions in the Education Departments (SEs), “oh, teachers don’t want theoretical courses”, “the teacher needs to know more mathematics”, are more common than you can imagine.

Against such speeches, Professor and Doctor Célia Maria Carolino Pires, in an interview given to Britis (2017), at the end of 2016, considered that:

> [...] We neglected the theoretical training of the teacher. Sometimes, we thought like this, «the teacher does not need to know theory, he does not need to know the research that gave rise to this type of work with Algebra or Geometry, he just needs to be the reproducer». That was the big mistake of the training!
>
> The teacher needs to have theoretical knowledge, not that theory that he doesn›t know what to do with it, but a theory that dialogs with his practice, that explains that the student has this or that type of difficulty, indicating what teachers can do to favor learning and, consequently, to make it meaningful. The theoretical basis improves the teaching practice. [...].
>
> But, as usual, there is a lack of theoretical discussion at the University and in the graduation courses, even in the masters and doctorates. The lack of discussion let us vulnerable and, sometimes, superficial in debates about educational issues. (PIRES, 2017 *apud* BRITIS, 2017, p. 110 and 111).

We agree with Professor Célia M. C. Pires (2017 *apud* BRITIS, 2017) and add that the absence of discussions or of a subject that discusses curriculum theories let even more vulnerable the teachers, in this case, the basic education mathematics teachers. The discourses on external evaluations and the excessive concern with the normative dimension of the mathematics curriculum become more naturalized.

To reinforce and delineate a little more the scenario we are building, there is the fact that other dimensions, involving the curricular organization of the school mathematics, are denaturalized and often treated as allegory in mathematic classes. What is expected of the mathematics teacher is that he only teaches and discusses contents associated with the didactic transposition of the academic mathematics and nothing more. Such comment (often spoken in a less academic way) reflects an oblique view about the math teacher’s role. Discussions associated with the social, cultural, political dimensions are simply silenced from that.

The curriculum studies also focus on the question of power, because when selecting and privileging a certain type of knowledge over another, as well as when highlighting a certain identity or subjectivity, power is exercised.

We believe that it is precisely the question of power that will allow establishing an important and necessary approximation with the different dimensions that act in the teaching and learning process of the mathematical school subject, because by placing the emphasis on the formative dimension it will be possible to inculcate in the minds of those

who are in the formation process that the school mathematical knowledge is neutral, ergo it does not articulate with the power relations present in contemporary society.

We consider that by privileging the formative dimension of the mathematics teaching and learning processes institutionalized by school education, it contributes to the mathematical knowledge to continue to be seen as decontextualized, depersonified and depersonalized. When privileging this dimension, there is, of course, the silencing of the dimensions that show mathematical knowledge as a social practice, full of meanings, therefore, a practice of discursive significance.

Thinking about the school curriculum from Pinar (2007, p. 290), it will be "what the older generations choose to say to the younger generations. Whatever the school subject, the curriculum is historical, political, racial, gendered, phenomenological, autobiographical, aesthetic, theological and institutional", in other words, the curriculum is a complicated conversation.

> Instead of using school knowledge to complicate the understanding of ourselves and of the society in which we live, teachers are forced to "instruct" students to imitate the conversations of others (that is, the authors of manuals), ensuring that immense classrooms are full of forms of ventriloquism, instead of intellectual exploration, admiration and fear. (HUEBNER, 1999 *apud* PINAR, 2007, p. 290).

The above quote allows us to reflect and question how much has been contributed to the comprehension of teachers in training regarding the understanding that the curriculum is not a list of mathematical contents, much less symbolized by the normative dimension. The curriculum as a complicated conversation is very distant from everyday school life and (we dare to say) from many classrooms of training courses (initial or continued) for teachers, in this case, for teachers who teach mathematics.

For this reason, we believe it is important to discuss curricular studies in undergraduate subjects (graduation and pedagogy, for example), as well as in master's, doctorate and specialization courses. Possibly, only then it will be possible to potentialize the complex conversation about the curriculum and present plausible ways to answer questions such as those formulated by Pinar (2007).

> Why aren't teachers authorized, really encouraged to show to the students that academic knowledge is not self-sufficient, that frequently it interacts in relation and back to life as human beings live? Why isn't the school curriculum provoking students to reflect on it and to think critically about themselves and the world they are going to inherit? (PINAR, 2007, p. 291).

Objectives, hypotheses and guiding questions

The proposal to bring together the curricular studies, the training of teachers who teach mathematics and the school knowledges, more specifically, mathematical school knowledge is dear to us, because we accept that the knowledge and making deep the different theories of the curriculum by the teachers can contribute to the teacher to perceive and

understand the role played by him and by the mathematical school knowledge regardless of the time. In this sense, the present article aimed to investigate what are the meanings attributed by a group of basic education mathematics teachers regarding: i) the school knowledge, school subjects, schools and education; ii) what it is like to be a mathematics teacher of basic education in Brazil; iii) the role played by the school mathematics in the contemporary society students formation.

Therefore, we worked with two hypotheses, which are: 1) the teacher, particularly in mathematics, knows little about what theories of the curriculum are and what they say. We believe that the teacher knows only the normative dimension of the curriculum, or rather that he considers the curriculum to be a formation plan constituted by objective, content to be taught, methodology and evaluation; 2) the neutrality myth, both in education and in school subjects, still survives in the basic education teachers minds.

From our objective and our hypotheses, we constructed the following guiding questions: 1. What are the beliefs and conceptions of the mathematics teachers, from basic education, about education, school and mathematical knowledge? 2. What does it mean to be a basic education mathmatics teacher in Brazil? 3. What role does the mathematical school subject play in the contemporary society students formation?

The methodological course of the study

In order to achieve the proposed objective, we carried out a field research with the practicing teachers from the public schools from São Paulo state, through a partnership with the Teachers Training and Improvement School - "Paulo Renato Costa Souza" (EFAP) of the Stadual Education Secretariat (SEESP). The questionnaire was made available to teachers by EFAP, at the address https://goo.gl/forms/SoBbsmeE0ise9xv2, and answered by 192 teachers (1% of the mathematics teachers population at the Stadual Education Department from São Paulo), in the period from 8/23/2017 to 11/23/2017[4].

The questionnaire consisted of 28 questions (opened and closed), 12 on a Likert scale, 2 opened, 8 metric and 6 categorical (2 nominal and 4 ordinary), was divided into four parts - Part 1: Teachers' conceptions (Q1 to Q12); Part 2: About being a teacher (Q13 and Q14); Part 3: Characterization of the teaching profile (Q15 to Q21); and Part 4: The Teacher work (Q22 to Q28).

Methodology of statistical analysis

The statistical analyzes were performed with the statistical software SPSS (IBM SPSS Statistics v.19) aid. From the statistical analysis carried out, in this article, we will look at the results associated with the descriptive analysis of the questions in Likert, Ordinal and Metric variables. The descriptive analysis allowed, mainly for the Likert questions,

4- We thank EFAP, more specifically Adriano José Marangoni, Melissa Resende Batistela and Silente Kuin for their valuable and essential collaboration. Without them, of course, the field research would not have reached the number of teachers who contributed to the study.

through the analysis of the position, dispersion and ways of their frequency distributions parameters, to verify the global behavior of answers to the questions.

The descriptive analysis

The characterization of the research participants teaching profile

The teaching profile characterization is associated with the Part 3 of the questionnaire. Question 15 refers to age; the 16th to the genre; the 17th to the Teaching Directorate; and the questions 18, 19, 20 and 21 to the academic training. Thus, the average age of the participating teachers was 44.9 years old, with a standard deviation of 8.9 years. Regarding the gender, 50% declared themselves to be female, 48.4% to be male and 1.6% to be from another gender. With regard to the Teaching Directorate, 19.3% are from the Big São Paulo, 54.2% from the Countryside, 2.6% from the Coast and 24% from São Paulo city. Finally, the questions associated with academic training indicated that 50.5% have just graduated, 41.7% specialization, 5.7% masters, 1.6% doctorate and 0.5% did not answer.

The teacher's work

The teacher's work is associated with the Part 4 of the questionnaire. Questions 22 and 23, associated with the teachers' weekly workload, indicated that the average weekly workload is 36 hours, with a standard deviation of 14 hours. Regarding the teachers' teaching time, at different levels of education, the teachers participating in the research have more experience in elementary and high school and less experience in Youth and Adults Education (EJA) and in Higher Education.

The analysis allowed us to conclude that regarding the gender there is a balance between male and female, as well as among the academic training, in other words, the percentage of graduated teachers is very close to the percentage of teachers who are postgraduate. Finally, in relation to the teacher's work there is little difference between the workload distribution involving elementary and high school. Teachers have little experience with EJA and Higher Education.

Analysis of questions on a Likert scale

Teacher's conceptions: the school knowledge

The Likert scale questions were built from five points, they are: 1 (I totally agree); 2 (I agree); 3 (I neither agree nor disagree); 4 (I disagree) and 5 (I strongly disagree), that is, for each of the questions (Q1 to Q12) the statement was presented and, next, the five descriptors.

Part 1 refers to the teachers' conceptions about school knowledges, school, education and school subjects. Initially, we will make a descriptive analysis of the questions Q1, Q2

and Q3 that are associated with school knowledges and that were built from the ideas of a set of theorists (CHEVALLARD, 1991; CHERVEL, 1990; VALENTE, 2003; PRESTE, 1996), as it is shown in Table 1.

Chart 1- Statements associated with the school knowledges

Question (Q1) [...] the teaching contents are within the school subjects and belong to the school, a sui generis entity and independent, somehow, from any and all cultural practices "outside the school walls [...]" *Sui generis* literally means "of its own genre", in other words, "unique in its genre ".
Question (Q2) [...] the knowledge taught at school originates from the scientific knowledge, however, it undergoes several transformations until it can be understood by the students. These transformations are called didactic transposition and the product of this transformation is a decontextualized and depersonalized knowledge.
Question (Q3) [The school knowledge] "is the result of a knowledge produced socially and appropriated by dominant layers of the capitalist society whose intention is not to transform the school into a social institution that could pose a threat to its hegemony".

Source: Elaborated by the authors (2019).

Table 1 presents the descriptive analysis of the questions associated with the school knowledges (SAE).

Table 1- Statistics of the school knowledges

	Sample	Average	Mean Standard Error	Median	Mode	Standard Deviation	Variance
SAE_Q1	192	3,12	0,086	3	4	1,189	1,415
SAE_Q2	192	2,95	0,086	3	2	1,186	1,406
SAE_Q3	192	3,01	0,086	3	4	1,219	1,487

Source: Elaborated by the authors (2019).

The analysis indicated that the teachers participating in the research do not agree or disagree with the statements associated with the school knowledges, in other words, the respondent neither agree nor disagree that the school knowledge is the didactic transposition of a reference knowledge, much less a knowledge produced at school and for school. Likewise, when replying that he does not agree or disagree, the teacher, the research subject, does not take a position on how he understands the knowledges institutionalized by the school mathematics.

Teacher's conceptions: the school subjects, the schools and the school education

The questions (Q4 to Q12) statements were built from the traditional (Q4, Q7 and Q10), critical (Q5, Q8 and Q11) and post-critical (Q6, Q9 and Q12) theories.

Descriptive analysis of the questions (Q4 to Q12)

Tables 2, 3 and 4 present the respective statements associated with the school subjects, (DIE), schools (ESC) and school education (EDE).

Chart 2- Statements associated with the school subjects

Question (Q4) The school subjects transmit the cultural heritage, assist in the proposed goals for education, serve for the cognitive maturation of the student, their purposes have strong per se objectives, and They have a neutral character. Per se: Latin phrase (an expression) that means 'by itself', 'in itself', 'intrinsically'.
Question (Q5) *The school subjects produce powerful knowledge, present in their mode the social interests of a small part of the society, they are responsible for the social and economic control practiced by school education, and they do not have a neutral character.*
Question (Q6) The school subjects are a powerful tool for social regulation, they are a type of disciplinary technology, their knowledges intertwines with the institutional world to produce power relations (social epistemology), and they do not have a neutral character.

Source: Elaborated by the authors (2019).

Chart 3- Statements associated with the schools

Question (Q7) The schools are increasingly recognized as social progress agencies - because when deficiencies are discovered in any aspect of the social life, they are called to eliminate such deficiencies - mainly by the businessmen who are the first to ask for help from schools when something is not going well in their professional field.
Question (Q8) The school is not a neutral institution, because although they serve, in fact, the interests of many individuals, they also act empirically as powerful agents in social and cultural reproduction.
Question (Q9) The school is not a neutral institution, since it is through it that the State educates and sanctions the knowledges that must be learned by students, so that they can have a vision of themselves and the world.

Source: Elaborated by the authors (2019).

Chart 4- Statements associated with the education

Question (Q10) School education must provide the necessary intelligence and aspirations for the development, promoting the results stability and consistency. Education must take a right path, not by itself, but by the social progress.
Question (Q11) School education is a way of maintaining the dominant hegemony. Thus, the school culture, translated by the school knowledges found in the school subjects and disseminated by scientific and humanities knowledges, is involved in power relations, translated through a key concept called "selective tradition". Selective tradition means that "from an entire universe of possible knowledge, only a limited part is recognized as official knowledge, as "worthy" knowledge to be passed on to the future generations".
Question (Q12) School education is a social construction company. It destroys common sense and, as a result, the homo becomes *educandus*: to learn he needs to be educated. The education is designed to fail; it produces needs and needy subjects, in order to justify its own need.

Source: Elaborated by the authors (2019).

Table 2 presents the descriptive statistics of the questions associated with the teachers' conceptions regarding the school subjects, schools and school education.

Table 2- Statistic of the questions (Q4 to Q12)

	DIE_Q4	DIE_Q5	DIE_Q6	DIE_Q7	DIE_Q8	DIE_Q9	DIE_Q10	DIE_Q11	DIE_Q12
Sample	192	192	192	192	192	192	192	192	192
Average	2,46	2,93	2,85	3,22	2,15	2,22	2,24	2,81	3,31
Mean Standard Error	0,067	0,080	0,078	0,086	0,060	0,060	0,062	0,073	0,078
Median	2,00	3,00	3,00	3,00	2,00	2,00	2,00	3,00	4,00
Mode	2	4	2	4	2	2	2	2	4
Standard Deviation	0,932	1,107	1,080	1,196	0,833	0,836	0,859	1,018	1,076
Variance	0,868	1,226	1,166	1,431	0,694	0,698	0,738	1,036	1,158

Source: Elaborated by the authors (2019).

Table 2 indicated, roughly, that in relation to the school subjects the teachers agree with the fact that they transmit cultural heritage, assist in the proposed goals for education, serve for the cognitive maturation of the student, their purposes have strong *per se* objectives and they have a neutral character. With regard to schools, the teachers agree that the school is not a neutral institution because: i) although they serve, in fact, the interests of many individuals, they also act empirically as powerful agents in social and cultural reproduction; ii) it is through it that the State educates and sanctions the knowledges that must be learned by the students, so that they can have a vision of themselves and of the world. Finally, regarding school education, teachers agree with the fact that the school education must provide the necessary intelligence and aspirations for the development, promoting the results stability and consistency. Education must take a right path, not by itself, but by the social progress.

The analysis of the opened questions (Q13 and Q14)

Regarding the analysis of the opened questions (Q13 and Q14) of the questionnaire answered by the teachers, it is worth noting that we are not affiliated with any analysis methodology, however the analysis process was constituted from the keywords identification which appeared more frequently and, in this sense, the registration unit used was the theme.

Question 13. What does it mean to be a basic education teacher in Brazil, especially in mathematics?

After some readings of the answers, we performed a first categorization, as shown in Table 3. Considering that the themes presented in Table 3 had similarities by groups, we constructed a second categorization, according to Table 4.

Table 3- Themes associated with being a basic education mathematics teacher: 1st categorization

Theme	Percent
Transforming agent / preparing for the citizenship	13,1%
Challenger	11,5%
Mediator of the teaching-learning process	11%
Arduous and difficult task	8,1%
Battler, hero	7,7%
Knowledges Communicator	7,5%
Frustrated and suffered	6,5%
Be prepared and able	5,5%
Educator	4,6%
To build competences and develop skills (reasoning)	4,6%
Persistent, dreamy and optimistic	4%
Be responsible and committed	3,6%
Artist, performer	3,1%
Vocation, gift	2%
Other answers	7,2%
TOTAL	100%

Source: Elaborated by the authors (2019).

The question (Q13) analysis revealed to us, from the interviewed teachers point of view, that being a basic education mathematics teacher is still perceived, for 23.3% of the interviewees, "[...] as a profession/vocation, because it is frustrating and often suffered. You have to be persistent, a dreamer, optimistic, but also a fighter and a hero". The transition category shows that 27.1% of the research participants perceive that being a math teacher is more than a profession, however they still do not value the teacher work as a professionalization, because for them being a math teacher is challenging, an arduous-difficult task, it is to be a knowledge communicator. Finally, 42.4% of the interviewed teachers place the teacher work in the professionalization category, since to be a math teacher is necessary to have responsibility and commitment, preparation and capacity, to mediate the teaching-learning process, to be a social transformation agent and to prepare for citizenship, being an educator, as well as to build competences and develop skills.

Table 4- Categories associated with the question (Q13): 2nd categorization

Categories	Percent
Profession/Vocation	23,3%
Transition	27,1%
Professionalization	42,4%
Other answers	7,2%
TOTAL	100%

Source: Elaborated by the authors (2019).

Question 14- What role does the mathematical school subject play in the contemporary society students training?

Different from the previous question (Q13), in which the categories were built a posteriori, in this question we decided to build them a priori and inspired by researches produced by Godoy (2010, 2015) and Godoy and Santos (2012). The categories initially constructed were: interaction between knowledges (mathematical and daily); objective (*per se* and not *per se*); purpose (propaedeutic, for the work and citizenship); and others.

The interaction between knowledges category aimed to investigate whether the teacher, the subject of the research, explained the relationship between the school mathematical knowledge and non-school knowledges. However, such explanation appeared in a single answer, that is, even when the participant declared that the role played by the school mathematics had a purpose for the student everyday life, for example, he did not mention any other knowledge than the school mathematical knowledge itself.

The objective category was intended to analyze whether the teacher, the research subject, considered that school mathematics had 'an itself function (per se)' or if it was 'a manner (not *per se*)' to achieve other objectives. In this category, 27% of respondents consider that the school mathematics role has a function in itself, while 73% consider it, the school mathematics, to be a manner (tool) for raise other flights. In this case, some answers indicated that the mathematical knowledge was a manner to build competences and develop skills, as mentioned in the High School National Curriculum Parameters - PCNEM (BRASIL, 1999).

The purpose category, through the themes 'everyday life', 'practical application', 'propaedeutic', 'labor market' 'citizenship' was built to give more input to the objective category. In 100% of the answers associated with the '*per se*' objective category, the purpose was related to the studies continuation ('propaedeutic' purpose), however, the 'propaedeutic' purpose also appeared in the 'not *per se*' objective category, as shown in Table 5. The themes used for the purpose category construction are expressions commonly found in the official curricular documents (Curricular Proposals, National Curriculum Parameters, among others).

Table 5- Purpose Category (not *per se* objectives)

Theme	Percent
Everyday Life	31%
Practical Application	22,5%
Propaedeutics	9%
Labor market	13%
Citizenship	24,5%
TOTAL	100%

Source: Elaborated by the authors (2019).

For the teachers participating in the research, mathematical knowledge alone (since in the interaction between knowledges category 99.9% made no mention of any other knowledge than the mathematical) is able to prepare for everyday life and for the citizenship parctice.

Finally, regarding the category others, which represented 18% of the total answers given, the associated themes were: 'important/fundamental', 'Not interesting, Obsolete and Useless (DOI[5])', 'liberating knowledge' and 'does not apply '. They are organized in Table 6.

Table 6- Category others

Theme	Percent
Important/fundamental	31,5%
DOI	29%
Liberating Knowledge	8%
Does not apply	31,5%
TOTAL	100%

Source: Elaborated by the authors (2019).

It should be noted that the theme "does not apply" was used for blank answers or answers that had no relation to the question. Despite 'mathematical school subject has an obsolete, not interesting and useless role in the contemporary society students formation' represents only 5% of the total answers given by the interviewed teachers, it is something that should concern us, especially if we think about the students who are being formed by these teachers who consider the school mathematics role as DOI.

Some final considerations

In the final considerations, based on the analyzes carried out, we will resume our objectives, hypotheses and guiding questions with the intention not of presenting closed, definitive answers, but rather of pointing out waus that can contribute to the debate broadening involving the mathematics teacher training (initial or continued), the curriculum theories and school mathematical knowledge.

Therefore, we will highlight some results found in the analysis of the questions associated with school knowledges, with the school subjects, the schools, the school education, being a mathematics teacher and the role played by the school mathematics.

Regarding the teachers knowledge

The analysis of the statements associated with school knowledges indicated that the collaborating teachers (the research participants) neither agree nor disagree that school

5- D'AMBRÓSIO, U. Society, culture, mathematics and its teaching. **Education and Research**, São Paulo, v. 31, n. 1, p. 99-120, jan./apr. 2005.

knowledge is the didactic transposition of a reference knowledge, much less a knowledge produced at school and for the school. In the same way, when replying that they do not agree or disagree, the collaborating teachers did not take a position on how they understand the knowledge institutionalized by the school mathematics. In this sense, it becomes tangible to consider that the mathematics teacher, during his training (initial and/or continued), rarely discussed about the history and didactics of the school subjects, however it would fit, in another stage, to interview the teachers to to have more elements about their perceptions and understandings about the school mathematical knowledges.

Regarding the school subjects, the schools and the school education

The analysis of the statements associated with the school subjects indicated that the teachers interviewed agreed with the fact that school subjects transmit cultural heritage, assist in the proposed goals for education, serve for the cognitive maturation of the student, their purposes have strong per se objectives and they have a neutral character.

The analysis of the statements associated with the schools, on the other hand, indicated that the interviewed teachers agree that the school is not a neutral institution because: i) although they serve, in fact, the interests of many individuals, they also act empirically as powerful agents in social and cultural reproduction "; and ii) it is through it that the State educates and sanctions the knowledge that must be learned by the students, so that they can have a vision of themselves and of the world.

Finally, the analysis of the statements associated with school education showed that the interviewed teachers agreed with the fact that the school education must provide the necessary intelligence and aspirations for the development, promoting the results stability and consistency. Education must take a right path, not by itself, but by the social progress.

In summary, the perception-understanding of the research collaborating teachers regarding the school subject and the education is close to the curriculum traditional theories, while their perception-understanding about the school is close to the critical and post-critical curriculum theories.

The curricular studies make it possible to know how the school subjects, the school and the school education are understood in different time-spaces, so what we can notice is that little has been discussed about the curriculum studies thematic in the math teachers (initial and continued) training spaces. Among the elements that corroborate this, we have that the collaborating teachers agree with the fact that the school subjects are neutral, but the schools are not. Schools are just institutions that promote school education that, regardless of the curriculum theory, considers the school subject as central (GODOY, 2015).

Another point to be highlighted and that corroborates the first of the hypotheses of this article, that the teacher, particularly in mathematics, knows little about what theories of the curriculum are and about what they say, concerns the fact that, teachers, the research participants, agree that schools are powerful agents in social and cultural reproduction while the school education acts for the social progress.

There is a long way to be explored about the teachers knowledge associated with both the curriculum field and the dimensions which interfere in the school mathematics

curriculum organization, our investigation object. However, we conjecture that the teachers, particularly mathematics ones, are very attached to the normative dimension of the curriculum, always prioritizing what to teach, how to teach and how to evaluate, without worrying about other dimensions, components (cultural, social, political, etc.) that directly interfere in the school mathematics curricular organization.

Regarding being a mathematics teacher

The perception-understanding of the research collaborating teachers about what it means to be a basic education teacher in Brazil, especially in mathematics, still indicates that the teacher work is seen as a profession/vocation by 23% of the interviewees, however more than 69% of the interviewed teachers considered that teacher work is no longer a profession/vocation. Such finding can contribute for the present and future times teachers to realize the real need to invest in their training, aiming to form subjects who can govern themselves, who participate in the construction of a society where they can include instead of exclude, and that respect and don't just tolerate the differences.

The formation, whether initial or continued, of the mathematics teacher should, from our point of view, in addition to dealing with the mathematical content, enculturate and empower the teacher and the future teacher, aiming, precisely, to inculcate in his mind the importance of , when entering and closing the door of his mathematics classroom, socializing the different pulsating knowledges from the students' and teacher's experiences (whether they are mathematicians or not), with the objective of forming an individual who is less subordinate and govern himself more.

Regarding the role played by the school mathematics

Finally, regarding the analysis of the statement associated with the role played by school mathematics in the students training in the contemporary world, we will highlight only the purposes category. For the research collaborating teachers, mathematical knowledge alone (since in the interaction between knowledges category, 99.9% made no mention to any other knowledge than the mathematical) is able to prepare the students for the everyday life and for the citizenship exercise. We conjecture, with this, that a significant portion of these teachers, when answering the questionnaire, tried to give the answers that the researcher "expected", however, this strategy, from our point of view, "makes up" the data and also indicates that the relations are transfered. In other words, in the classroom the student tries to give the answer that the mathematics teacher expects; and in a survey, in which the teacher answers questions, he also seeks to give the answers that the researcher expects. It is a vicious circle and does not contribute positively to the teaching and learning processes, much less to a research. These are conjectures that, to be refuted or not, we would need to interview the teachers involved, however, from our point of view, few would assume that they seek to give the answers that the researcher expects.

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