

# **THE INFLUENCE OF THE FAMILY IN THE LEARNING OF MATHEMATICS**

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## **ABSTRACT**

I analysed the issue of mathematical learning focusing on the relations, which involve the school and the family ideological apparatus. The political and economic consequences that we recognise in these relations are due to the work of signification that transforms an unskilled into qualified labour-force, through the incorporation of sign-value to labour force commodity. Pedagogical mathematical practice is based on scientific practice and represents a standard for the entire school system, therefore acquiring a higher standing. The coherence that permeates the family judgement practices may be absent from pedagogical mathematical practice; therefore, judging the students' performance means to extract plus-value from those who do not get the sign-value (get failing grades) but have contributed with their working hours.

## Introduction

With the theme “the influence of the family in the learning of mathematics” as a starting point, I raised two questions to guide the research. One of them deals with the superior status of formal mathematical speech<sup>1</sup>. Exercising formal mathematical speech signifies “being specialised labour”, and therefore being part of a group of people that has a higher economic status (with different levels within the profession) than that of groups of people that do not have the qualification. In this way, I understand that the hierarchical positions of work are also determined as a function of this status, which produced the differentiation between social positions and income. The other question is whether or not the family participates in the qualification of the workforce.

As a foundation for the work, I base the theoretical standpoint of Ubiratan D’Ambrosio, Louis Althusser, Jean Baudrillard, Roberto R. Baldino, and Tania C. Cabral.

With respect to the methodological procedures, I used Michel J.M. Thoillent (1987) as a reference.

To analyse the influence of the family in the process of qualification of the workforce, I considered it sufficient<sup>2</sup> to analyse one of the school years in primary school. I collected data related to three students in the fifth grade<sup>3</sup> in a public school in the city of Rio Claro<sup>4</sup>. Since I was interested in the influence of the family in the constitution of codes of prestige and discredit in the process of students’ academic performance, I selected students who were classified by the school as *excellent*, *good*, and *poor*, respectively.

I adopted the following methodological procedures to obtain the data: indirect observations and semi-structured interviews (Thoillent, 1987). Keeping in mind that these students were inserted in the ideological apparatuses of the family and the school and that their practices would be consonant with the ideology that permeates these apparatuses (Althusser, 1980), I considered that the students would express these practices, in which speaking is the form of expression that underpins the “subjectification” of the social order.

I understand speech in the realms of the enunciated and the enunciation (Vallejo and Magalhaes, 1991). The enunciated is limited by what is expressed in the manifest discourse. In the enunciation, the subject positions himself beyond what he intentionally means. According to Vallejo and Magalhaes (1991), “There is a subject who enunciates the message, and there is an enunciating subject that diverges from the first” (p.42). When the subject<sup>5</sup> submits her/himself to formal evaluation<sup>6</sup>, to the extent to which s/he speaks or writes, s/he pronounces her/himself and commits her/himself in relation to the other (a commitment in relation to the structure of the message and an implacable, inexorable code). The subject, when s/he makes use of the written or the spoken word, makes recognition possible. Thus, “...every discourse that is carried out has as a

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<sup>1</sup> Formal mathematical speech is that which is exercised in educational or bureaucraticized scientific instances with the objective of increasing the exchange value and/or use-value of the labour force by way of the sign-value.

<sup>2</sup> During the period the study was carried out (1993-94), each school year was a necessary (bureaucratic) condition for the qualification of the labour force. Elementary school completed, currently Basic Education (*Ensino Fundamental* - Federal Law n. 9.394, Dec.20, 1996, Title V, Cap.II, Section III, Article 32 - Lei de Diretrizes e Bases da Educação Nacional) signifies one of the degrees for the qualification, since it addresses one of the attributes required in the field of labour, and is a necessary condition for secondary school, currently *Ensino Médio* (Federal Law n. 9.394, Dec.20, 1996, Title V, Cap.II, Section IV, Article 35 - Lei de Diretrizes e Bases da Educação Nacional).

<sup>3</sup> Children in this grade range from 10 to 12 years of age.

<sup>4</sup> Rio Claro is a city of 150 thousand inhabitants located in the central region of the state of São Paulo, Brazil.

<sup>5</sup> The category of subject for Althusser (1980): “...is constitutive of all ideology, but at the same time, is immediate - we add that the category of subject is constitutive of all ideology, to the extent to which all ideology has as its function (is what defines it) to ‘constitute’ concrete individuals into subjects. It is in this game of double constitution that the functioning of all ideology is located, the ideology not being greater than its functioning in the material forms of existence of this same functioning” (p.87).

<sup>6</sup> The evaluations I refer to are means of judgement. It does not matter to me if they can be considered arbitrary, since both evaluation x and evaluation y have the same proposal: to differentiate.

result a determined position of the subject that is relative to the discourse and which cannot be disassociated from the structure of the message”<sup>7</sup> (Vallejo and Magalhaes, 1991, p.42).

Thus, the subject is always at the mercy of what s/he is able to articulate when facing the other, at the moment s/he speaks. If the speech denounces a lack of knowledge of the basic rules of passing through the academic/school hierarchy, then the subject is a strong candidate for not belonging to this order. Therefore, the speech pronounced stipulates the privilege that the labour force commodity assumes.

I understand that the family is responsible for the introduction of the codes of ideological recognition, which may or may not coincide with the codes adopted for bureaucratised instances, instances of the production of knowledge, such as the School. The recognition of these signs (culture) is going to say what can be learned as codes that can be deciphered. However, the production of meanings that occurs in the family makes the differentiation in the labour force commodities<sup>8</sup>, once their qualification depends on access to texts that can or cannot be read deciphered, dialogues that can or cannot be experienced. Thus, such commodities assume use-value<sup>9</sup> and exchange-value<sup>10</sup> beginning with the attribution of sign-value<sup>11</sup>, which is exactly what guides differentiation in academic evaluation, and which depends on the insertion of the “subjectification” proposed by the family. Thus, the subjects who share in the informal speech, which coincides with the formal in the diverse fields of valid knowledge, will have greater advantage over those who do not share it.

It cannot be denied, however, that mathematical speech forms part of the practice of any subject, but it is perfectly possible to affirm that there is a difference between that which has to do with academic content and that which does not. If it is absolutely natural to discuss mathematical problems proposed in the classroom with one’s brother or sister, with one’s mother or father and learning to utilise the necessary resources to deal with them efficiently, in this case it would naturally be easier to achieve the documentation needed for qualification of the labour force. I am not saying that constituting use-value is a necessary condition for qualification, but it almost always signifies advantage in the approval process. What I want to emphasise is that the family provides the subject with social survival, leaving it to the learner to “communicate his/herself”, exercising the speech as s/he learned it. If the grammar used was that which is considered formal, s/he will possess privilege, effortlessly. If the environment in which he was raised had a library and people considered to be “cultured”, the subject will function in this way; he had no choice; it constitutes, without the slightest effort, possessing privilege. The same can be said with respect to mathematics.

Thus, the usurpation regarding formally-instituted mathematics lies in the superior status that this field assumes over others, once academic programmes have been based<sup>12</sup> on it. However, the subject whose speech is in agreement with the formal has an advantage in the process of qualification of the labour force, and in this way, the family participates in the attribution of the sign-value to the qualified labour force.

The study I propose could certainly be developed in any area of formal knowledge<sup>13</sup>. I chose mathematics because my field of study is mathematics education, and therefore I am also able to analyse data is related to mathematics.

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<sup>7</sup> Translation by myself.

<sup>8</sup> “The labour force value is determined, like that of all other commodities, by the labour time needed for production, and consequently, also for reproduction of this specific article” (*Das Capital*, I, Cap.VI, 1982). “The individual is an ideological structure, a correlative form to the commodity/form (exchange value) and to the object/form (use value). The individual is not more than the subject thought of in terms of economy, re-thought, simplified, abstracted by the economy” (Baudrillard, 1972, p.165).

<sup>9</sup> Ibid.

<sup>10</sup> Ibid.

<sup>11</sup> Ibid.

<sup>12</sup> For more on didactic transposition, consult CHEVALLARD, Y. *Aspects d’un travail de théorisation de la didactiques des mathématiques*. Fac. Des Sci. de Luminy, Univ. d’Aix-Marseille II, 1989.

<sup>13</sup> The extension to any area of knowledge can be made as it is a legitimate area in the school or university spheres.

## Data collection procedure

1. I worked during 36 classroom hours with fourth grade students<sup>14</sup> in the “Marcelo Schmidt” public school, located in downtown Rio Claro in the state of Sao Paulo, Brazil. The theme being addressed was fractions. I evaluated each student individually. Based on this work, and with analysis of the official academic evaluations, I selected the students who would take part in the study from among those who presented the conditions as suggested by the school’s own classification<sup>15</sup>: *Excellent* (the student plainly achieved all the objectives); *Satisfactory* (the student achieved the essential objectives); and *Poor* (the student achieved only a small number of the objectives). We will call the students who were selected Patricia, considered excellent, Juca, considered satisfactory, and Marcos, considered poor. (Period: December, 1993)

2. I observed the children who were now enrolled in the fifth grade<sup>16</sup> in the same school. (Period: 1994)

3. I carried out analysis of the school documents related to them: the school notebook<sup>17</sup> and the folder (use was not mandatory), which we will call the student’s dossier. (Period: 1994)

4. I interviewed the students, their mothers, their teachers, and the “Inspector”<sup>18</sup>. The fourth grade teacher, who I will call D.Marta, had worked for ten years in the school and had taught the students for three years (second, third, and fourth grade); the fifth grade maths teacher, D.Isabel (pseudonym), and the Inspector had been working in the school for five years. (Period: 1994)

The students mentioned above were considered middle and low middle class according to the 1992 School Plan<sup>19</sup>.

The observation of the class was focussed on one student at a time, taking into consideration mainly their involvement in the activities related to the program, as well as those not related to the program, which I called parallel activities<sup>20</sup>. The attitude of the teacher and classmates in relation to the subject observed were considered relevant.

The objective of the student’s folder (dossier) was to record the participation of the parents in meetings, the problems presented by the students, and the warnings they received. The school notebook was a document that was kept by the student whose objective was to record examination grade and test, attendance, and has a bi-monthly signature from the parents.

The interview with the children made it possible to evaluate the interview with the mothers, and also gave the students’ opinions of the school, the evaluation processes, the learning of mathematics, and their judgement of themselves and their classmates with respect to their position in the classroom.

With the interviews with the fourth and fifth grade teachers, it was possible to establish their views of the ability and achievement of each student.

The interview with the Inspector was important in that she provided information about the relation of the parents with the school, of the teachers with the students, and among the students themselves. She had worked in that institution since the students initial enrolment up until the time of the study.

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<sup>14</sup> Children in this grade range from 10 to 12 years of age.

<sup>15</sup> *Caderneta Escolar* of the Marcelo Schmidt public elementary school, 1994.

<sup>16</sup> Children in this grade range from 11 to 13 years of age.

<sup>17</sup> SAO PAULO, *Caderneta Escolar* of the Marcelo Schmidt public elementary and secondary school, 1994.

<sup>18</sup> According to the Common Guide Rule of the State Elementary and Secondary Schools (1998), Section III - Administrative Support, Article 41, the function of the Inspectors is to monitor and attend to students.

<sup>19</sup> Document produced by the administration of the teaching staff of the school. The most recent school plan was from 1992.

<sup>20</sup> Parallel activities was a term used to designate the conversations and joking that occurred during the class, which had nothing to do with the subject being studied.

## Results of the fieldwork:

Ideology operates in the sudden of individuals as subjects, producing students, mothers, teachers, and inspectors. The family apparatus plays a fundamental role in the constitution of the subject as student, since it attributes to her/him habits, behaviours, appearances, and knowledge, enabling the school apparatus to judge and classify him.

It is through the establishment of sign-value (Baudrillard, 1972) for the student that approval becomes possible, and, conversely, disapproval through the establishment of codes of discredit and failure. We were able to verify the recognition by all those who were interviewed of the superior status of academic maths, thus creating passivity on the part of the parents and the students regarding the possible classifications (approved or failed). This is not because parents believe mathematical knowledge is above all others, but because the guarantee of prestige resides in the degree to which they accept its superiority, which guarantees, in the final instance, greater exchange value, or in other words, a superior position.

Juca, Marcos and Patricia were recognised in the opinion of their teachers, the inspector, their classmates, their mothers, and their own voices, based on the code of prestige that establishes sign-value in order to differentiate the qualified from the non-qualified. The truth of the equivalence between approval in maths and learning the essential concepts is found in the testimony of approval of Juca and Patricia and the failure of Marcos, which can be seen in the written assessment of the bureaucratic authorities that assist in the control of academic documents.

In the case of Marcos, the codes of failure were established by the Labour Force Agent; that is, by the teacher (who also imposed her domination by way of the bureaucracy), by the inspector, by his classmates and by his own family.

With respect to Patricia, the Labour Force Agent established the sign-value. The practices carried out by Patricia's family provided her with the possibility of being judged as a student able to articulate pedagogical mathematical speech, resulting in the establishment of sign-value on her labour force, with is in the process of qualifying.

In the case of Juca, the Labour Force Agent also established sign-value. He was not considered as good a student as Patricia, but he fulfilled all the conditions for approval.

Thus, according to the testimonies obtained, there is no way to deny that the objective of the school is to increase the purchase value by establishing the sign-value for the labour force. As Baldino and Cabral (1991) said, the students seek to decrease study time, and in this sense, act as workers, and when they are approved, value their labour force, going on then to act as capitalists, which increases their capital; and in this sense that some extract a plus-value from the approval, resulting from the failure of the others. At what point does the family enter into this movement? It is exactly in the possibility of the student being the one who is exploited or the one who exploits. It is in the family that the subject learns to survive socially, and it is in this survival that the signs exist that delimit the way, the possible choices, and hence, the possible social and economic positions. In this sense, the students experience participation in the educational practice in completely different ways, and this depends very much on the families they are part of. In this respect, some are historically exploited, and others exploiters<sup>21</sup>.

## Conclusion

The family, as an instance of the determinations of rules of social survival, guarantees the difference in students' effort in school. Through educational practice, the subject learns the signs of the culture of which

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<sup>21</sup> This statement does not eliminate the possibility of alternation between exploiters and exploited. We are not dealing with individuals but with positions.

the daily rituals form a part, in which she plays a role, which is demanded of her daily. The educational practice can produce meanings that are similar or are very different from those spoken in the school, and the disparity is made precisely in this aspect. I believe that family practices perform the trimming, the first order that situates the subject, which makes her/him feel the reason (discursive order). In this way, the pedagogical mathematical practice can be significant in different ways. Based on the empirical part, it is possible to say that some tactics for performing the pedagogical mathematical speech can be reading the text proposed by the teacher, several times, until one is able to repeat it for the test, or it could be to understand it enough to get an adequate grade (approval) even on a surprise test, or the tactic could even be unsuccessful, that is, the grade could be insufficient for approval.

For the reasons explained here, in the theoretical realm as well as in the analysis based on the empirical research, I attribute to the family the meaning of these possible articulations in such a way that the qualification (or lack thereof) of the labour force of the student of mathematics can remain subject to the conditions that sustain the familial order. This being so, the new members of the family integrate themselves to the other social practices, having the family practices as a first option. After the forced choice<sup>22</sup>, they will go on, certainly, to be exposed to new ideological postures, but there will be no way for their judgement to lose its first reference. Human transformation is peculiar to the apprehension of this choice, of which ideology is intrinsic from the first moment, and which is only possible in the presence of language.

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<sup>22</sup> It is always forced for everyone, since the search is in the other; thus, the choice is sought in the other, in the other from whom they learned the language that submits them as a subject.