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Recontextualizations from a Pedagogical Intervention Program for Mathematics Teaching

Recontextualizações de um Programa de Intervenção Pedagógica para o Ensino de Matemática

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Abstract

This article presents a study that sought to understand how teachers recontextualize texts from the Pedagogical Intervention Program for the Teaching of Mathematics in the early years, carried out by the Municipal Department of Education of Teresina (PI), in public-private partnership with Instituto Alfa and Beto. This is a qualitative study in which data were collected through observations, document analysis and interviews with two teachers who participate in the Program and teach mathematics in the 5th grade of elementary school. The data, analyzed in light of some concepts of the sociology of Basil Bernstein and Stephen Ball, suggest that the participating teachers recontextualize the texts recommended by the Program, by including activities elaborated by themselves to favor the preparation of students for the Brazil Exam and by carrying out textual transformations to meet the performance standards of these students.

Keywords: Pedagogical recontextualization, performativity, mathematics teaching.

Resumo

Este artigo apresenta um estudo que buscou compreender como professores recontextualizam textos do Programa de Intervenção Pedagógica para o Ensino de Matemática nos anos iniciais, realizado pela Secretaria Municipal de Educação de Teresina (PI), em parceria público-privada com Instituto Alfa e Beto. Trata-se de um estudo qualitativo em que os dados foram coletados por meio de observações, análise de documentos e entrevistas com dois professores que participam do referido Programa e ensinam matemática no 5.º ano do Ensino Fundamental. Os dados, analisados à luz de alguns conceitos da sociologia de Basil Bernstein e de Stephen Ball, sugerem que os professores participantes recontextualizam os textos preconizados pelo Programa, ao incluir atividades elaboradas por eles mesmos para favorecer a preparação de estudantes para a Prova Brasil e ao realizar transformações textuais para atender aos padrões de desempenho desses estudantes.

Palavras-chave: Recontextualização pedagógica, performatividade, ensino de matemática.

Introduction

This article focuses on activities related to the Teaching of Mathematics[3] in the context of the Pedagogical Intervention Program, developed by the Municipal Department of

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Education of Teresina, in a public-private partnership with *Instituto Alfa e Beto* (IAB). We employ the expression "Pedagogical Intervention Program" (PIP) in line with Gandin and Lima (2015), that is, as "interventions [of private law organizations in the public space] that offer services and products to schools" (p. 665).

The IAB is a private company that operates in several cities in the country, producing educational material, giving seminars and doing consulting for municipalities and states. In the case of the Program developed in Teresina - PIP -, the services provided involve the distribution of curricular material (books and activity books) to teachers and students, the holding of fortnightly training meetings for teachers who teach Mathematics and Portuguese Language in the 5th and 9th grades of elementary school, on a specific day for each group, and the monitoring of student performance.

This monitoring is carried out, on a regular and periodic basis, by means of standardized evaluations for the entire teaching network and elaborated in the form of the National Evaluation of School Performance, known as Prova Brasil. Singh (2014) signals that this emphasis on student performance in large-scale standardized evaluations has led state agents to expand their monitoring of teaching work. Alderton and Gifford (2018) and Page (2016), in turn, point out that policies resulting from this trend have held teachers accountable and encouraged the establishment of a surveillance system.

Gandin and Lima (2015) call attention to the fact that, when these Programs are implemented, they not only promote the surveillance of teachers' work, but also provide transformations in the very way they organize their work, which lead to the "disqualification" of these agents, since they cease to perform functions proper to their profession and start to act as executors of pre-established programs. The term "disqualification" is used by the authors in the context of a sociological approach, which indicates that the loss of skills, previously dominated by teachers, always occurs "when teaching work is controlled via curriculum" (p. 667).

Clapham (2014) goes further and signals that there is something more than just "disqualification". He denounces that a real process of "demoralization" of these agents is underway. Therefore, in this research, we follow the idea that programs focused on the regulation of teaching work correspond to the implementation of public policies resulting from the processes of transformation of the State's performance, which now plays the role of a supervisor (Lamosa & Macedo, 2015; Silva & Hypolito, 2018). In the case of this study, the state monitoring of teachers who teach mathematics aiming at improving the performance of students in external evaluations.

Studies in the field of mathematics education research (Alderton & Gifford, 2018; Kanes, Morgan, & Tsatsaroni, 2014; Povey, Adams, & Everley, 2017) signal the impact of the emphasis on student performance in standardized evaluations on teacher performance.

[3] We maintain here the expression "Mathematics Teaching" in reference to the name used by the Programme on which the study is focused.

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They consider the risk that faculty work is reduced to the mere preparation of students for such evaluations, whether national or international.

Other studies in this field of scientific research (Aguiar & Oliveira, 2014; Oliveira & Barbosa, 2013; Silva, Barbosa, & Oliveira, 2013) have analyzed how teachers who teach mathematics modify what is advocated in some curricular material. Although these studies have pointed out rules conditioning these transformations, they do not specifically address how they relate to the emphasis on performance and the regulation of teaching work.

In this research, we seek to understand how teachers who teach mathematics in the early years in Teresina's municipal school network move texts recommended by PIP/IAB into the classroom and thus shed light on how they deal with them. Thus, this article presents itself as a possibility to broaden the understanding of the changes that these teachers make in texts of a Program that focuses on student performance and the regulation of teaching work. For this, we use some concepts from Bernstein's sociology (1990) and the concept of performativity, taken in line with Ball (2000, 2003).

In the next section, we will present the theoretical contributions that underpin this research, as well as the objective in conceptual terms. Later, we will describe the context of data collection and the methodological path developed. Finally, we will present and discuss the data.

Theoretical background

The Pedagogical Intervention Programs, specialized in assisting public agents in the elaboration and/or execution of public policies for the immediate improvement of students' performance in external evaluations, have enabled the expansion of mechanisms for regulating teaching work (Lamosa & Macedo, 2015; Silva & Hypolito, 2018; Singh, 2014). Studies in Mathematics Education have warned about this emphasis given by governments to this type of policy and warned about the impacts on the teaching of mathematics and research in this specific area (Alderton & Gifford, 2018; Kanes et al., 2014; Povey et al., 2017).

In some education networks, policies aimed at training students for standardized tests are often seen. For Singh (2014), this focus on student performance results from the fact that it is taken as a measure of productivity and therefore as a parameter for the quality of education systems.

Lerman and Adler (2016) problematize the emergence of the Organization for Economic Cooperation and Development (OECD), as an agency influencing educational policies in several countries, to help provide an indicator of "quality", the International Student Assessment Program (PISA). They understand that this indicator works as a measure for the flow of human capital, with competitive potential, in order to meet market needs. It has therefore become a fertile ground for the emergence of initiatives such as the Programs in partnership with private initiative to promote better student performance.

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In Brazil, we have the policies that gave rise to the Basic Education Evaluation System (SAEB), of which the National School Income Evaluation (ANRESC), better known as Prova Brasil, is a part. This test is carried out every two years and evaluates, through questions of multiple choices, skills in Portuguese Language and Mathematics for students of the 5th and 9th years. With the data from Prova Brasil, the Basic Education Development Index (IDEB) was created precisely to "dimension" the quality of education in the country (Silva & Hypolito, 2018).

Another example comes from the United States, with the No Child Left Behind Program, sanctioned by President Georg W. Bush and in force from 2002 to 2016. According to Barrett, (2009) in a study conducted at the time, the program established annual tests from the 3rd to the 8th years to evaluate proficiency in Mathematics and Reading. The author pointed out that this public policy had negative consequences both for the work of veteran teachers and for those at the beginning of their careers, as both categories of teachers felt uncomfortable with the change to the performance model and. pressured to abandon their own individual beliefs to meet external demands.

These large-scale external evaluation regimes are within the context of changing state action that has brought about transformations in the way policies with implications for the management of public institutions are designed/implemented (Ball, 2000, 2003), because market logic is introduced in the way they are managed. As a result, the State began to monitor the performance of agents at a distance, leading to the installation of a work system based on surveillance, rewards, sanctions.

This system, called performativity (Ball, 2003), is defined as "a technology, a culture and a mode of regulation that employs judgments, comparisons and displays as means of incentive, control, friction and change based on rewards and sanctions" (p. 216). The author stresses that this type of technology corresponds to the purposeful use of means for the control of human forces. Performativity, therefore, is taken as a set of techniques and artifacts that impose on the right agents to do in the light of a given performance.

The work, in this way, leads to the emergence of a new form of "being a teacher", based precisely on the search for improved performance to be presented by students (Ball, 2003). This leads us to agree that performativity operates in agents both from the outside in and from the inside out. From outside to inside, generating fear and anxiety because of comparisons, evaluations and competitions, what the author has called the "terror of performativity", because of the constant vigilance that this work regime establishes. For Ball (2003), this fear, however, is not justified only by the agent knowing he is being watched, but by the uncertainty of when and by whom and under which criteria he will be evaluated. Reports of the impact from the outside in can be found in Souza e Silva (2015), in which researchers report narratives of teachers who teach mathematics, describing how they deal with the pressure for results in their daily work.

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The way performativity acts from the inside out refers to the pride of the agent in the performance presented. Therefore, this form of regulation is anchored in the publication of information and indicators of the performance of agents as a mechanism to stimulate competition and comparison among them (Ball, 2003). An example of this is the dissemination of the ranking of schools, according to the performance of students in large-scale external evaluations.

The literature converges to indicate that, as this situation can provide fear and anxiety, teachers often see themselves as responsible (Hennessy & McNamara, 2013) for it and impelled to think that they could have done something more to get "better" results from students. In our approach, we assume that this kind of control over the teaching work operates at the communicational level and, therefore, we suggest that there is a set of communicational rules that regulate what Ball (2000) calls "performativity texts" (in the sense of performative behaviors).

We propose, in this article, to take performativity in terms of communicational rules from a "pedagogical device" (Bernstein, 1990). Thus, we use Basil Bernstein's sociological theory, which provides us with a set of concepts that can help us understand how teachers who teach mathematics, in contexts that promote performative action, operate textual transformations in their classes. We start by explaining that, for the theoretician, the term "text" encompasses, besides oral and written verbal productions, non-verbal expressions, such as gestures, the way one dresses and even one's own behavior (Bernstein, 1990).

To explain the process of production, recontextualization and reproduction of "pedagogical texts" (texts produced "in" and "for" pedagogical interaction), Bernstein (1990) developed the concept of "pedagogical device". He defines it as a set of "principles" that regulate and make possible pedagogical communication. These principles, in turn, are taken as hierarchically related communication rules that control such communication.

The "rules of distribution" regulate the "rules of recontextualization" which, in turn, regulate the "rules of evaluation". Distribution rules organize knowledge (content, skills, competencies) differently for different agents. This means that these rules indicate who can learn what in order to specialize knowledge. The rules of recontextualization indicate the selection of what and how it will be taught. The rules of evaluation indicate how the interaction between agents who are in the condition of teaching and those who are in the condition of learning (parents - children, doctors - patients, teachers - students) should occur.

These rules form the internal grammar of the pedagogical device and produce specialization of time, text and space. Time is related to the age of the agents who are in condition to learn, and the text is always transformed into a content that takes into account the age of this [agent]. Space, in turn, concerns the context of communication interactions between these two categories of agents. Figure 1 presents a scheme of these rules.

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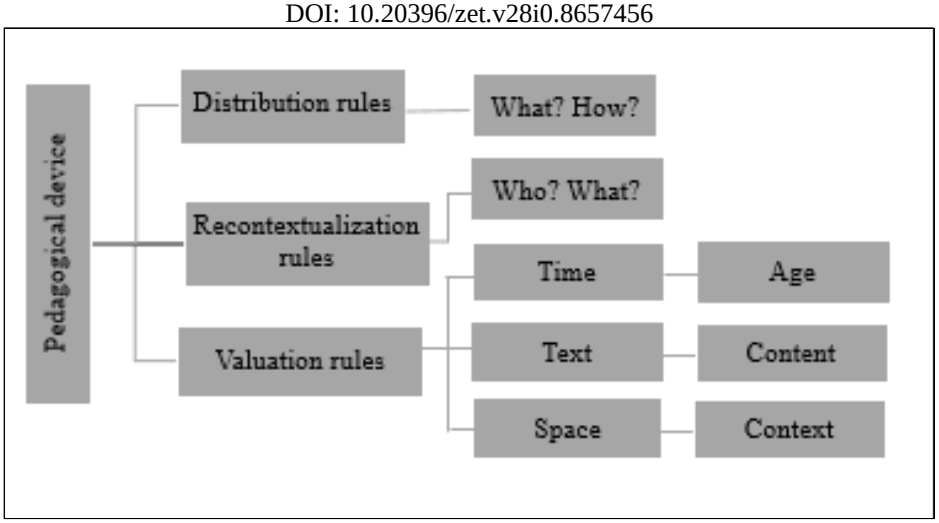

Figure 1 - Schematic representation of the internal rules of the pedagogical device
Source: the authors

As we have already stated, from the Bernsteinian perspective, textual elaboration is regulated by the internal rules of the pedagogical device, which are related and act in different contexts, from the macro-level to the micro-level. The contexts or fields correspond to three hierarchical levels: primary context (distribution rules), recontextualizing context (recontextualization rules) and secondary context (evaluation rules).

The primary context or field of production creates the intellectual field and is associated with the production of scientific knowledge and pedagogical theories, which can be moved to the recontextualizing context. For example, in our case, knowledge from the scientific disciplines of Mathematics, Education, Mathematics Education, etc., are part of the primary context. The texts moved to the second context are selected and transformed by a group of agents and agencies specialized in this task. This context is subdivided into an official recontextualizing context, in which official recontextualizing agents and official agencies such as, for example, education secretariats, agencies and government departments act. In the pedagogical recontextualizing context, agents and non-state agencies operate, such as non-governmental organizations active in political issues related to education, teacher training centers, publishing houses, etc. Texts that undergo transformations in the recontextualizing context are moved to the secondary context or reproduction field (classrooms, for example), where they also undergo further transformations (Figure 2).

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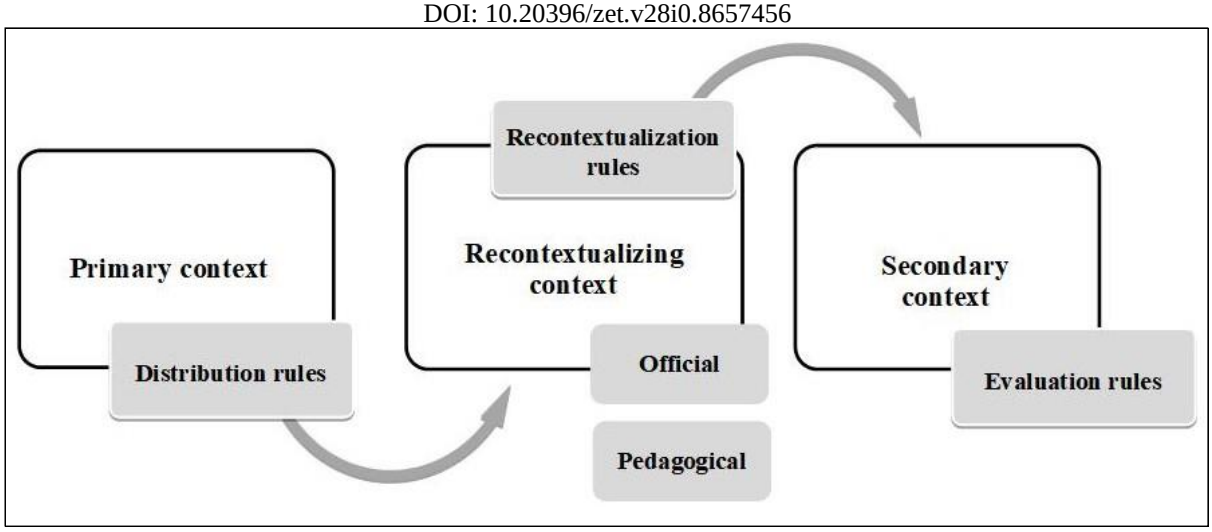

Figure 2 - Schematic representation of production, recontextualization and textual reproduction

Source: the authors

Singh (2014), in addressing the issue of international external evaluations, based on the concept of a pedagogical device, draws attention to the growing control that the State has exercised over educational evaluation. For the author, the State "has redefined what is within its competence and what is not, what needs to be outsourced, privatized and what is kept public" (p.369, our translation).

Kanes et al. (2014) have also treated, from a Bernsteinian perspective, the theme of large-scale evaluation in mathematics, indicating an impact of regulation and a possibility of resisting it. For the authors, there is a contradiction between the apparent autonomy of response attributed to students in the statements of standardized test questions, such as PISA, and the existence of a single possible correct answer. While this contradiction "may be confusing and intimidating for some students, depending on their social characteristics and school experiences" (p.15, our translation), there are those who will be able to produce the text considered valid and therefore identify themselves and be identified as "successful" students in mathematics.

The existence of valid texts is related to the fact that the principles of the pedagogical device are embedded in a code, understood as a tacitly acquired regulating principle of pedagogical communication (Bernstein, 1990). For the theoretician, it is the code that indicates what and how something can be said in a given context. In view of this, the code generates principles that allow the elaboration and recognition of what counts as valid pedagogical textual production, or as "privileged" pedagogical text. Consequently, the code, through the production of the aforementioned pedagogical text, positions the agents differently.

The production of this text is associated with the criteria and sequential rules. The criteria rules presuppose the recognition of the underlying principles of the code so that the agent has the necessary skills to elaborate it. The sequential rules indicate the sequencing to which the valid order of what will be taught refers and signal the compass. This, in turn, means establishing the necessary rhythm for appropriation of the sequencing rules, that is, a

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recommended time for the agent, on condition that he learns (in this case, the students), to appropriate it.

In this perspective, the agents who manage to recognize the principles of the pedagogical device and produce privileged texts receive an award such as the attribution of the qualitative "successful" to which we referred previously. In the opposite situation, there is a sanction such as the attribution of the adjective "unsuccessful student", "bad school" and "uncommitted teacher". For this reason, we can consider that "rewards and sanctions make up the meritocratic character of the system" (Freitas, 2012, p. 383).

Although Bernstein (1990) addresses the mechanisms that promote symbolic control, he does not go into detail about the political techniques employed by state agents to effect regulation. Therefore, we mobilize the concept of performativity, previously presented as a management regime based on surveillance, comparison and fear. Since we understand that the fear inherent to this regime operates on a symbolic level and that there is a pedagogical device whose principles make performative practice possible, we suggest, therefore, that it can be called a "performativity device".

Bernstein (1990) indicates that the pedagogical device functions as a kind of symbolic governor of consciousness, since it regulates pedagogical communication. This means that it favors the monitoring of the actions of agents and their ways of "being" (in this case, the "being-teacher-teacher-mathematics"). This being said, we can consider that the performativity device makes possible this type of regulation of teaching work, established by public policies focused on student performance.

Given that we seek to understand how teachers, who teach mathematics in the initial years in the municipal network of Teresina, move texts recommended by the PIP/IAB into the classroom, we now approach the concept of pedagogical recontextualization (Bernstein, 1990), which corresponds to the displacement of texts from their original contexts, to new contexts. For the theoretician, when a text is moved between different contexts, it is submitted to the process of selection, simplification, condensation or elaboration, in such a way that only virtually or imaginably the new text is linked to the original.

Silva, Barbosa and Oliveira (2013), as well as Aguiar and Oliveira (2014) sought to analyze how teachers who teach mathematics operated the pedagogical recontextualization of curriculum materials. Aguiar and Oliveira (2014) noted that the activities proposed to teachers were not always implemented according to the initial intention, as they tried to adapt them to meet the principles of the pedagogical device in operation in that context. Silva et al. (2013), in turn, indicate that although the pedagogical recontextualization is operated by teachers, it suffers some control by students, which means that these agents also act in the transformation of these texts.

Crecci and Fiorentini (2014) and Fanizzi and Santos (2017), using other theoretical lenses, analyzed how teachers transform texts from the support materials produced by the Municipal and State Education Departments of São Paulo, for the teaching of mathematics. The authors point out that when teachers use these texts in the classroom, they transform

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them, and also that teachers' reactions varied, ranging from an attempt at simplification to complete rejection of using them.

After this discussion, we are now able to state our objective in theoretical terms: "to understand how teachers recontextualize texts from the Pedagogical Intervention Program for the Teaching of Mathematics, in the initial years, carried out by the Municipal Department of Education of Teresina (PI), in partnership with Instituto Alfa and Beto". In this way, we intend to find clues as to how teachers select, simplify and articulate texts from this Program, by moving them into the classroom.

Data collection context

Among the specificities of Teresina's PIP/IAB, we can indicate: the compulsory use of support materials produced by the IAB itself, the fulfilment of a certain sequence of curricular contents and the establishment of a rhythm to be obeyed by teachers. In addition, other aspects can be pointed out, such as fortnightly meetings, structured around the guidance to teachers on how to execute what is advocated by the Program and the existence of a policy of student leveling, by performance pattern, adopted by the Municipal Department of Education (Figure 3).

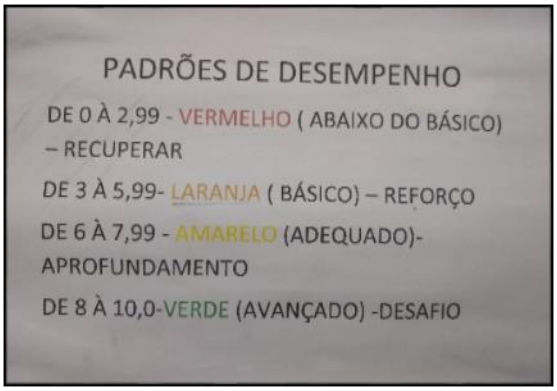

Figure 3- Poster with standards of academic performance of students found at "A" School

Source: the authors

The schools group specific classes, formed by classified students, considering the standard of performance presented, which is: advanced, adequate, basic and below basic. For example, in class "A" are the students with "best" performance; class "B" groups the "medians"; and class "C" groups the students with a performance standard indicated as "below basic".

In order to understand how teachers recontextualize texts from the Pedagogical Intervention Program for the teaching of mathematics in the initial years carried out by the Municipal Department of Education of Teresina (PI), in partnership with Instituto Alfa and Beto, the data were collected in two municipal schools that participate in this Program. We

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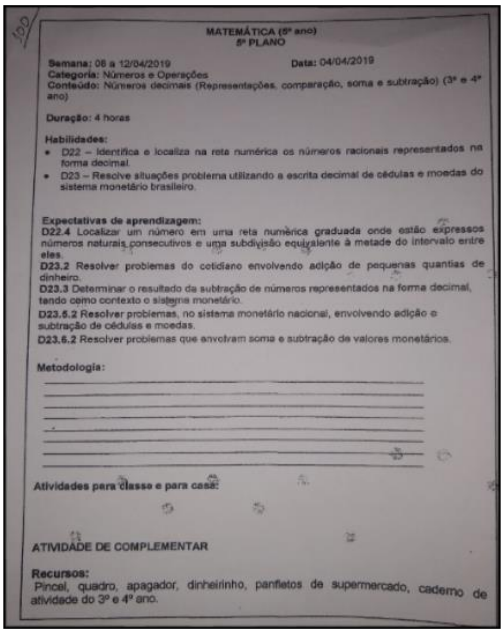
recognize that the context where pedagogical interaction between teachers and students develops is a privileged place for us to understand how this process occurs (Flick, 2014).

Aiming at the heterogeneity of data, we selected schools that obtained discrepant performances in the 2017 Basic Education Development Index (BEDI). In each school, a teacher was chosen who teaches mathematics in the 5th grade of elementary school. In order to maintain confidentiality about the identity of the participants, the schools were designated by the letters "A" and "B".

The "A" school obtained a grade between 7 - 8, and the "B" school between 5 - 6. The "B" school operates full time and is among the schools in the network with the lowest score in the aforementioned index (in the Teresina municipal network, there are no schools with grades below 5). Both schools are located in peripheral regions of Teresina, characterized by socioeconomic vulnerability.

Participants were given the freedom to choose a pseudonym that would identify them in the survey, namely: professor Marcos (school A) and professor Julia (school B). Professor Marcos has a degree in higher education and works in science and mathematics. He has been working in the municipal public-school system for 13 years. Julia, a teacher with a degree in Pedagogy, has also worked in the network for 21 years, always in the same school.

Below, we characterize some of the texts of PIP/IAB, moved by teachers to the classroom. In the biweekly meetings, the teachers are given the lesson plans (Figure 4).



MATEMÁTICA (5º ano)
5º PLANO

Semana: 08 a 12/04/2019 **Data:** 04/04/2019
Categoria: Números e Operações
Conteúdo: Números decimais (Representações, comparação, soma e subtração) (3º e 4º ano)

Duração: 4 horas

Habilidades:
- D22 – Identifica e localiza na reta numérica os números racionais representados na forma decimal.
- D23 – Resolve situações problema utilizando a escrita decimal de cédulas e moedas do sistema monetário brasileiro.

Expectativas de aprendizagem:
D22.4 Localizar um número em uma reta numérica graduada onde estão expressos números naturais consecutivos e uma subdivisão equivalente à metade do intervalo entre eles.
D23.2 Resolver problemas do cotidiano envolvendo adição de pequenas quantias de dinheiro.
D23.3 Determinar o resultado da subtração de números representados na forma decimal, tendo como contexto o sistema monetário.
D23.6.2 Resolver problemas, no sistema monetário nacional, envolvendo adição e subtração de cédulas e moedas.
D23.6.2 Resolver problemas que envolvam soma e subtração de valores monetários.

Metodologia:

Atividades para classe e para casa:

ATIVIDADE DE COMPLEMENTAR

Recursos:
Pincel, quadro, apagador, dinheirinho, panfletos de supermercado, caderno de atividade do 3º e 4º ano.

Figure 4 - Teresina's PIP/IAB recommended class schedule

Source: Teresina PIP/IAB trainers

These documents are prepared by the trainers and basically consist of a list of descriptors from the reference matrix of Brazil Test (Prova Brasil) (we consider that such plans do not constitute class plans per se, so we refer to them as class scripts). In them, we find the indication of resources to be used by the teachers, which in most cases were: brush, board, eraser, IAB activity book of the 3rd and 4th years. There is also a space for the teacher

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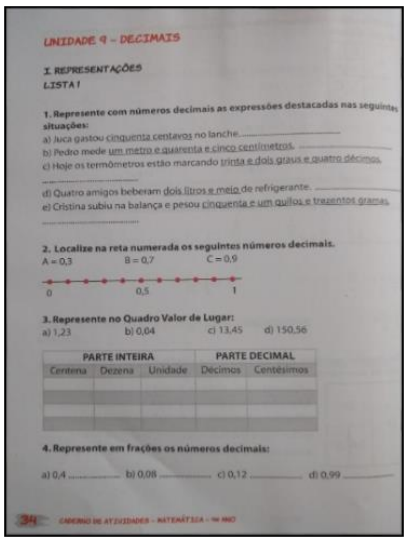
to detail the methodological approach to be adopted. In practice, this is the only participation of teachers in the elaboration of these documents.

Teachers have a total of four hours per week (eight hours per fortnight) to execute the class schedule. At the "A" school, the workload is spread over two-hour classes. Therefore, students have math classes only once a week. The other school, as it is full-time, has a greater workload.

To ensure that teachers execute the scripts in the recommended time, there is a group of public agents (principals, supervisors and technicians) who directly supervise the work of the teachers. They even carry out classroom observations and check that teachers are up to date with the proposed curriculum content, thus setting up a true monitoring structure.

Teachers also receive suggestions for extra activities to fix the curricular contents and guidance on how to carry them out in the classroom and even the indication of the IAB material pages (Figure 5) with the exercises the students should do.



UNIDADE 9 – DECIMAIS

I. REPRESENTAÇÕES

LISTA I

1. Represente com números decimais as expressões destacadas nas seguintes situações:
a) Juca gastou cinquenta centavos no lanche. .....
b) Pedro mede um metro e quarenta e cinco centímetros. .....
c) Hoje os termômetros estão marcando trinta e dois graus e quatro décimos. .....
d) Quatro amigos beberam dois litros e meio de refrigerante. .....
e) Cristina subiu na balança e pesou cinquenta e um quilos e trezentos gramas. .....

2. Localize na reta numerada os seguintes números decimais.
A = 0,3 B = 0,7 C = 0,9
0 0,5 1

3. Represente no Quadro Valor de Lugar:
a) 1,23 b) 0,04 c) 13,45 d) 150,56

PARTE INTEIRA			PARTE DECIMAL	
Centena	Dezena	Unidade	Décimos	Centésimos

4. Represente em frações os números decimais:
a) 0,4 ..... b) 0,08 ..... c) 0,12 ..... d) 0,99 .....

34 CADERNO DE ATIVIDADES – MATEMÁTICA – 4º ANO

Figure 5 - Page 34 of the 4th year IAB Activity Booklet
Source: Garcia Neto (2010)

The use of this material follows a pattern: initial explanation (exhibition), then the students perform (individually) the exercises in the notebook itself, and finally the teachers make the collective correction, using the blackboard. Both the books and activity books, as well as the extra activities (Figure 6) (also pre-established) are composed of exercises that favor the memorization of the contents, the development and consolidation of the skills and abilities evaluated in Prova Brasil. However, the exercises do not have an investigative or

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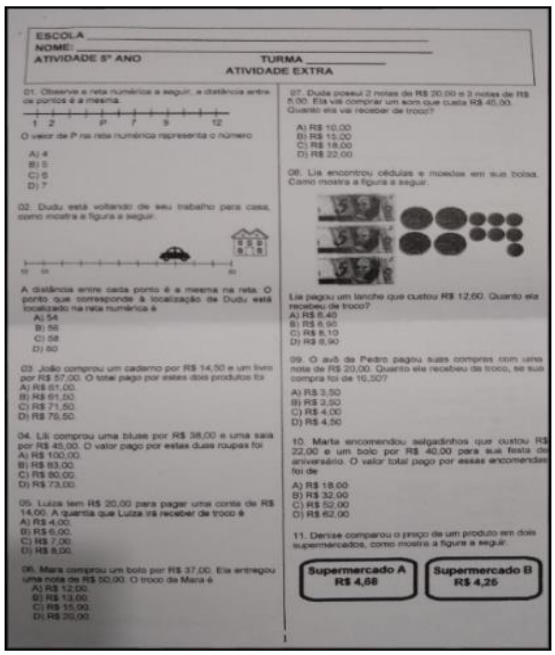
participatory character. In particular, the extra activities are lists of multiple choice questions, similar to those of the referred standardized assessment.


ESCOLA
NOME:
ATIVIDADE 5º ANO TURMA
ATIVIDADE EXTRA

01. Observe a reta numérica a seguir, a distância entre os pontos é a mesma.

1 2 P 7 9 12

O valor de P na reta numérica representa o número

A) 4
B) 5
C) 6
D) 7

02. Dudu está voltando de seu trabalho para casa, como mostra a figura a seguir.

A distância entre cada ponto é a mesma na reta. O ponto que corresponde à localização de Dudu está localizado na reta numérica é

A) 54
B) 56
C) 58
D) 60

03. João comprou um caderno por R$ 14,50 e um livro por R$ 57,00. O total pago por estes dois produtos foi

A) R$ 61,00.
B) R$ 61,50.
C) R$ 71,50.
D) R$ 76,50.

04. Lili comprou uma blusa por R$ 38,00 e uma saia por R$ 45,00. O valor pago por estas duas roupas foi

A) R$ 100,00.
B) R$ 83,00.
C) R$ 80,00.
D) R$ 73,00.

05. Luiza tem R$ 20,00 para pagar uma conta de R$ 14,00. A quantia que Luiza irá receber de troco é

A) R$ 4,00.
B) R$ 6,00.
C) R$ 7,00.
D) R$ 8,00.

06. Mara comprou um bolo por R$ 37,00. Ela entregou uma nota de R$ 50,00. O troco de Mara é

A) R$ 12,00.
B) R$ 13,00.
C) R$ 15,00.
D) R$ 20,00.

07. Dudu possui 2 notas de R$ 20,00 e 3 notas de R$ 5,00. Ela vai comprar um som que custa R$ 45,00. Quanto ela vai receber de troco?

A) R$ 10,00
B) R$ 15,00
C) R$ 18,00
D) R$ 22,00

08. Lia encontrou cédulas e moedas em sua bolsa. Como mostra a figura a seguir.

Lia pagou um lanche que custou R$ 12,60. Quanto ela recebeu de troco?

A) R$ 8,40
B) R$ 8,90
C) R$ 8,10
D) R$ 8,90

09. O avô de Pedro pagou suas compras com uma nota de R$ 20,00. Quanto ele recebeu de troco, se sua compra foi de 16,50?

A) R$ 3,50
B) R$ 3,50
C) R$ 4,00
D) R$ 4,50

10. Marta encomendou salgadinhos que custou R$ 22,00 e um bolo por R$ 40,00 para sua festa de aniversário. O valor total pago por essas encomendas foi de

A) R$ 18,00
B) R$ 32,00
C) R$ 52,00
D) R$ 62,00

11. Denise comparou o preço de um produto em dois supermercados, como mostra a figura a seguir.

Supermercado A R$ 4,68 | Supermercado B R$ 4,25

Figure 6 - Extra activity, recommended by the Program
Source: PIP/IAB trainers

In the next section, we will present the methodological path developed to understand how teachers recontextualize texts from the Pedagogical Intervention Program for the Teaching of Mathematics, in the initial years, carried out by the Municipal Department of Education of Teresina (PI), in partnership with Instituto Alfa and Beto.

Methodological route

As we intend to understand how teachers who teach mathematics move texts from one context to another, this has led us to a qualitative approach (Creswell, 2012; Flick, 2014), as we look for the qualitative aspects of the action of these agents in relation to these texts. To achieve this objective, we made observations in four classes in the classroom of each of the participating teachers. Each class lasted 4 hours, thus totaling 32 hours of observation. We agreed with them that the recording of the observations of the classes would be done only with the help of a voice recorder and a field notebook. It should be noted that we did not interfere in the observed activities and did not follow a pre-established observational guide.

The insights obtained through the access to practices guided us in conducting semi-structured interviews at the end of each observed class. With the interviews, we sought to capture, through texts produced by the teachers, some clues on how they operate the pedagogical recontextualization of the texts recommended by Teresina's PIP/IAB. After being collected, the data were transcribed, systematized, categorized and analyzed in the light of the theoretical contributions that support the research.

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Presentation of data

The data were organized into two categories: "inclusion of activities developed by the teachers themselves" and "textual transformations to meet student performance standards". The first category sets out how teachers plan and develop activities that were not foreseen in the lesson plans or instructions given at teacher meetings. In the second category, we describe how the leveling policy adopted by the Municipal Department of Education, which groups children by classes, taking into account student performance standards, leads teachers to operate transformations in the activities recommended to adapt them to the specificities of each class of students.

Inclusion of activities developed by the teachers themselves

The structuring of the class itineraries, around the explanation of descriptors in the reference matrix of Prova Brasil, listed to be worked on in a fortnight, signals that the teaching path is organized according to the development and consolidation of skills required in this standardized assessment. In this category, we will show the inclusion of activities developed by the teachers themselves, in addition to those recommended by PIP/IAB.

The teacher Júlia started one of the classes, approaching the decimal numbers, associating the writing of a fraction (1/2) with its representation in percentage (50%), in order to then present the possibility of writing in the decimal representation (0.5). She constructed a table in which she arranged these numerical representations so that the children could realize that there were three distinct ways of representing the same number (Figure 7). At the end of this lesson, the teacher Julia informed us of the following:

> *It is a descriptor [from Brazil Test (Prova Brasil)] to be worked on this week. I brought this activity because it is a complementary source and a form that I found more practical for me. I presented the golden material, the concrete. Then I left for the painting ... It was my [emphasis] idea.*

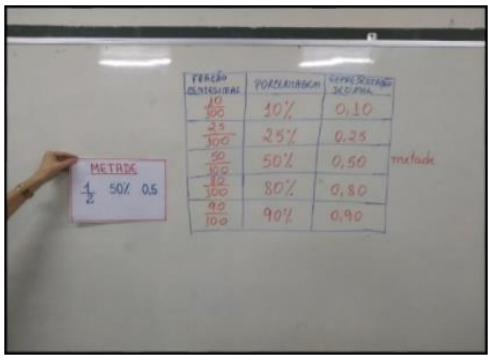

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Figure 7 - Registration on the blackboard made by teacher Julia
Source: the authors

The teacher did not limit herself to following the class schedule, as she expanded what was proposed, including an activity, elaborated by herself, that met the same descriptor indicated in the class schedule: (D21) "identify different representations of the same rational number".

Professor Marcos also stated that he performed, in a particular way, what was recommended.

> *What has to be worked, I work, but the way I work is mine. It's the teacher's [emphasis], because if I'm going to work multiplication [of natural numbers], for example, there [training meeting] they say how it should be done, but I'm not going to do structured only what they say.*

This statement matches what we have seen in your classes. For example, when working the decimal numbers, he did so from an activity that dealt with their uses outside the school. He started the class by showing the children situations in which they intuitively use them in their daily life, such as their weight/mass, height, temperature, the grades they receive in evaluations and when they use the money (Figure 8).

Figure 8: Students performing activity on decimal numbers
Source: the authors

The teacher then carried out an activity with pamphlets from the supermarket for students to simulate the purchase of products: payment, receipt of change or the verification of insufficient value for the purchase. Regarding this activity, Professor Marcos expressed himself in the following way:

> *We worked on the monetary system, from an advertising leaflet from a supermarket that was to make this exchange, that is, to make the purchase of two products and see if the [toy] money that I gave them could buy and how much I was going to get in change and if not, how much was missing. How much more or less they would need.*

According to Professor Marcos, he had heard at the teachers' meeting about the possibility of working with these resources, but he had to adapt the idea to develop the activity. He created the rules himself: the division of the class into pairs, the amount destined to each participant and the quantity of products that each one could buy with the money.

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However, this activity also did not deviate from the objective of meeting the descriptor (D23) "to solve the problem by using the decimal writing of banknotes and coins of the Brazilian monetary system", foreseen in the script.

These two episodes described are illustrative of a certain pattern of recontextualization of the activities recommended by the IAB operated by teachers. Even guided by the "learning expectations" foreseen in the class scripts, the teachers created activities that, according to them, would help the students to better achieve the recommended "learning expectations".

Textual transformations to meet student performance standards

We could notice that one of the factors that influences the recontextualizations operated by the teachers is the adoption of the system of classification of students by performance pattern, the "leveling". In the school where Julia works, there is only one 5th grade class, as it is a full-time school. At the school where the teacher Marcos works, there are three 5th grade classes, two advanced students (class "A") and one class of students classified as basic and below basic (class "C"). Professor Marcos works in one class "A" and one class "C".

For Marcos, the specificities of each of his classes lead him to approach the curricular contents in a different way:

> *In class "A" I work one way and the other way differently, but the program itself .... So, I'm looking for an activity that I know they [students in class "C"] will get and yet they'll take a little while.... Of course, I give challenges, but sometimes the return is below expectations. The materials are the same, but I do it that way. ... I have to adapt to reality, so I need to modify some things in class "C".*
>
> One of the adaptations he made is to slow down the pace in "class C":
>
> *Because there [class "C"] I have to go slower and with another language. There I have to go through the most concrete and real part possible, with simpler examples.*

Marcos indicated that in order to get the "C" class students to follow the Program, it slows down the established pace and calls for a more "concrete" language, starting with the students' lived experiences. He said that, even making these adaptations in the plans to adapt them to the different level of their classes, he continues applying the Program and using IAB materials in both classes:

> *Some students can't learn by multiplying, but when it becomes an addition, which he already dominates, he can ... If he can do it his way and he did it, that's good for me. ... The program will always be applied, because it has a charge in that sense.*

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In affirming that, even seeking to adapt teaching to the specificities of the "less advanced" class, he performs all the tasks stipulated by the Program, because he must be accountable to the teacher and to his school management, Marcos implicitly refers to the existence of a structure for monitoring the work that directly supervises the work of the teachers, including observing them in class and checking whether they are up to date with the prescribed curricular contents.

In the previous speech, Marcos pointed out that one of the guidelines of his practice has been the result obtained by the students in Prova Brasil. With this objective, he uses strategies that facilitate the learning of what is charged. When asked how he deals with the tasks proposed in the formation meetings (IAB activity books and the extra tasks), when these are at a level of complexity above the already consolidated skills of the students, he answered:

> *We take those items [issues] that they missed and review them to see if they can with similar examples, to see if we can teach them how to solve them. Then at the time of the test, the test and the simulation some succeed and others will not succeed at all. ... So, we take that theme again and do an activity not only with those [who did not perform satisfactorily], ... That's the way to deal with it.*

As we see, the teacher describes repetition as a teaching strategy in order to help students who are unsuccessful in evaluations. This practice reproduces the emphasis that PIP/IAB places on this teaching tactic. For example, the teacher informed us in informal conversations, during the period of coexistence in the field, that in the 4th grade, students used the 2nd grade activity book, as well as the 3rd grade activity book, which had already been used in the previous year, and finally the 4th grade book and activity book.

Faced with the same question made to Professor Marcos, Professor Júlia answered:

> *I prioritize those questions that they are able to answer, but if more complex questions come up I have to answer with them. Of course, some assimilate better than others, but I don't stop answering, not [emphasis]. Even because, they would get used to those easier questions.*

Both participating teachers showed to have adhered very much to the Program and were emphatic in stating that they do not fail to perform all the tasks recommended by the PIP/IAB, even in the class classified as below basic, in the case of Professor Marcos. But they recognize that they need to make adaptations in the planning, using strategies, so that the less advanced students can carry out the proposed activities.

The data indicate, therefore, that the differentiated positioning of the students in terms of skill performance standards led the teachers to operate pedagogical recontextualizations to select the aspects they considered most relevant, simplify the support materials and slow down the pace established by the IPP/IAB, when executing the lesson plans.

Discussion of data

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In the first category presented in the previous section, we describe how the participants of the research recontextualize texts of Teresina's PIP/IAB, that is, how they add to the activities recommended others elaborated by themselves. By adopting a Bernsteinian approach, we can say that teachers, as recontextualizing agents, appropriated the texts advocated by the IPP/IAB and repositioned them, that is, they changed their position in relation to the other texts circulating in the secondary context, in the case of the activities produced by the teachers themselves.

Bernstein (1990) ensures that the recontextualizations, in a given context, are controlled by principles of the pedagogical device in operation. Therefore, we can consider that the activities elaborated by the teachers, based on the descriptors of Brazil Test (Prova Brasil) already listed in the class scripts, correspond to a textual repositioning regulated by the performativity device. Thus, the "meeting the descriptors of Brazil Test (Prova Brasil)" operates as a principle of the aforementioned device, i.e., as the guiding rule for these transformations.

Although the study conducted by Barrett (2009) about the No Child Left Behind Program, developed in the United States, was published still in the last decade, we refer to it in this discussion, since its results converge with those of our research. The author showed that teachers have made adaptations in the approaches, support materials and planning proposed by the program to be executed in the classroom to meet the established performance standards. He also pointed out that in their classes, they sought to emphasize what would be most recurrently charged on standardized tests.

The data collected by us highlights teachers' adherence to the IPP/IAB, as the two participants demonstrated an effort to execute the class scripts as established there. However, as explained above, they have recontextualized these texts, associating them with others not foreseen. The statement of these teachers is in line with studies (Crecci & Fiorentini, 2014; Aguiar & Oliveira, 2014; Silva, Barbosa, & Oliveira, 2013) that warn that teachers who teach mathematics cannot be taken as uncritical executors of texts coming from higher levels.

We can see, however, that by accepting the Program, the textual transformations operated by teachers are directed towards improving the results obtained by students in external evaluations. Besides the regulation of the teaching work promoted by the Program already described, another factor that can be pointed out as a possible condition of the adhesion of these teachers is the system of awarding, established by the municipal public power. As in other municipalities (Araújo & Leite, 2019; Melo& Pinto Braidi, 2018), the Municipal Education Network of Teresina has implemented a bonus policy, called the Program for the Appreciation of Merit, which financially rewards teaching professionals (educational managers and teachers). This bonus is linked to and proportional to the grade achieved by students in Brazil Test (Prova Brasil).

As we have seen, for Ball (2003), the regulation of teaching work, provided by educational management in a performative way, enables the emergence of a new way of

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"being a teacher". Performativity thus indicates that the agent's understanding of himself and his own value becomes "encapsulated" by the result he obtains, since the result of the evaluation "expresses" his value and therefore becomes the guide of performative action. The principle of "meeting the descriptors of Prova Brasil" is linked to the rules of evaluation of the pedagogical device in operation. For Singh (2014), external evaluations are a visible aspect of the evaluation rules, since the most intense interests and disputes have been concentrated where these rules operate, agglutinating state and non-state interests so that education is at the service of financial capital.

In the second category, we describe how teachers operate recontextualizations, by virtue of the policy of leveling students by the standard of academic performance. In this case, the texts were repositioned in relation to a specific situation existing in the secondary context (Bernstein, 1990). We believe that this "differentiated positioning of students in terms of performance standards" acts as a principle of the performativity device, which also regulates the pedagogical recontextualization operated by teachers in the studied context.

We know that a text can be, among other ways, recontextualized by selection and simplification (Bernstein, 1990). Professors Marcos and Júlia operated recontextualizations both by selection, by adapting the recommended activities to the specificities of each class, since they selected aspects that they considered relevant, as well as by simplification, by diminishing the rhythm established in "classes C", in the case of Professor Marcos.

Freitas (2012) points out that programs similar to Teresina's PIP/IAB promote what he called the "race to the center". Teachers under pressure to achieve the goals set now focus on the learning of "average" students as a strategy to ensure the desired rates. Thus, the author considers that students with "high" and "low" performance may suffer, since all attention is given to the average student to ensure the average.

The reality of classes formed by students with lower performance has imposed on the participating teachers the need for adaptations in the execution of class scripts, -the operation of simplification of texts and the reduction of pace. Therefore, the principle "differentiated positioning of students in terms of standard of performance" is related to sequential rules, which according to Bernstein (1990), are those that regulate how the teacher establishes the sequencing, that is, the selection or simplification of what is relevant to be communicated in pedagogical interaction.

For the theoretician, the existence of a sequencing presupposes a compass or rhythm. In the case under study, although both teachers decreased the established rhythm, they did not neglect the preparation of students in the "less advanced" classes either. This fact corroborates the thesis of Silva et al. (2013), that the pedagogical recontextualization operated by teachers is somewhat controlled by students.

Final considerations

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Bernsteinian sociology has provided us with a language of theoretical description that has helped us understand how teachers who teach mathematics operate pedagogical recontextualizations of PIP/IAB texts worked in class in Teresina. The analysis undertaken here points out that these texts were recontextualized through the inclusion of activities developed by the teachers themselves, through selection and simplification.

The data suggest that these textual transformations were regulated by the device of performativity, which is: to meet the preparation of students and their differentiated positioning in terms of performance standards. We assume that these principles are associated with the monitoring (supervision) of what teachers do in the classroom, with the obligatory use of specific materials, with the meetings of teachers structured around the orientation of execution of activities recommended by the Program. Therefore, we believe that one of the possible contributions of this article is to point out as principles, related to the search for improvement in student performance and the regulation of teaching work resulting from this process as described in this article, control the recontextualization operated by teachers who teach mathematics.

This sociological approach, which seeks to identify how underlying principles regulate pedagogical interactions and textual displacements, opens up possibilities for research, such as characterizing principles that establish the adherence or resistance of teachers who teach mathematics to programs similar to Teresina's PIP/IAB.

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