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THE SHARED TRAINING SPACE: PERSPECTIVES FOR TEACHER TRAINING

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Abstract

This work, which is the result of a doctoral thesis, aims to understand how a shared training space can promote changes in the quality of teaching actions. For this, we constituted a training space shared with a teacher, in a state school, located in a peripheral neighborhood, to organize the teaching of natural sciences for the initial years of elementary school. The results pointed to actions guided by intentional and conscious objectives, carried out in a dynamic unit and in a shared way, as triggering learning and new actions for the teaching activity. The constitution of shared spaces, organized in this perspective, enables the psychic development of teachers and changes in the quality of teaching.

TEACHING ACTIVITY • TRAINING ACTIONS • CONTINUOUS TEACHER TRAINING • THEORY OF ACTIVITY

O ESPAÇO FORMATIVO COMPARTILHADO: PERSPECTIVAS PARA A FORMAÇÃO DE PROFESSORES

Resumo

Este trabalho, que é resultado de uma tese de doutorado, tem por objetivo compreender como um espaço formativo compartilhado pode promover mudanças de qualidade das ações de ensino. Para isso, constituímos um espaço formativo compartilhado com uma professora, em uma escola estadual, localizada em um bairro periférico, para organização do ensino de ciências da natureza para os anos iniciais do ensino fundamental. Os resultados apontaram ações orientadas por objetivos intencionais e conscientes, realizadas em uma unidade dinâmica e de modo compartilhado, como desencadeadoras de aprendizagens e de novas ações para a atividade de ensino. A constituição de espaços compartilhados, organizados nessa perspectiva, possibilita o desenvolvimento psíquico de docentes e mudanças na qualidade do ensino.

ATIVIDADE DE ENSINO • AÇÕES FORMADORAS • FORMAÇÃO CONTINUADA DE PROFESSORES • TEORIA DA ATIVIDADE

EL ESPACIO FORMATIVO COMPARTIDO: PERSPECTIVAS PARA LA FORMACIÓN DE PROFESORES

Resumen

Este trabajo, que es el resultado de una tesis doctoral, tiene como objetivo comprender cómo un espacio de formación compartido puede promover cambios en la calidad de las acciones docentes. Para ello, constituimos un espacio de formación compartido con una profesora, en una escuela del Estado, ubicada en un barrio periférico, para organizar la enseñanza de las ciencias naturales en los años iniciales de la escuela primaria. Los resultados apuntaron a acciones guiadas por objetivos intencionales y conscientes, realizadas en unidad dinámica y de forma compartida, como desencadenantes de aprendizajes y nuevas acciones para la actividad docente. La constitución de espacios compartidos, organizados en esta perspectiva, posibilita el desarrollo psíquico de los docentes y cambios en la calidad de la enseñanza.

ACTIVIDAD DOCENTE • ACCIONES FORMATIVAS • FORMACIÓN CONTINUA DE PROFESORES • TEORÍA DE LA ACTIVIDAD

ESPACE DE FORMATION PARTAGÉ: PERSPECTIVES POUR LA FORMATION DES ENSEIGNANTS

Résumé

Ce travail, issu d'une thèse de doctorat, vise à comprendre comment un espace de formation partagé peut promouvoir des modifications de qualité dans les actions d'enseignement. A ce fin, nous avons mis en place un espace de formation partagé avec une enseignante, dans une école publique d'un quartier périphérique, afin d'organiser l'enseignement des sciences naturelles pour les premières années d'école primaire. Les résultats ont montré que quand les actions sont guidées par des objectifs intentionnels conscients et s'inscrivent dans une unité dynamique de manière partagée, elles sont des déclencheurs d'apprentissage et de nouvelles actions pour l'activité d'enseignement. La mise en place d'espaces partagés, organisés dans cette perspective, favorise le développement psychique des enseignant.e.s et provoque des améliorations en termes de qualité de l'enseignement.

ACTIVITÉ D'ENSEIGNEMENT • ACTIONS DE FORMATION • FORMATION CONTINUE DES ENSEIGNANT.E.S • THÉORIE DE L'ACTIVITÉ

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THE PEDAGOGICAL ACTIVITY, WHICH IS UNDERSTOOD AS THE UNIT BETWEEN THE TEACHING activity and the learning activity, is the central object of school education, which contributes to the development of the maximum superior capacities of the subjects. When referring to school education, we cannot fail to reflect on teacher training, given the importance of these professionals' work for society and for the development of students. Both initial training and continuing training are configured as a basis for teaching activities, with a view to improving the actions of teachers.

It starts from the assumption that the teacher is responsible for organizing teaching in a way that enables the learning of cultural knowledge and the development of students. In this way, the organization of teaching performed intentionally is considered as the starting point of the pedagogical activity and is taken as the main part of the teacher training process. It is understood that the organization of teaching involves: studies, planning, research, interactions, production of teaching materials, in short, actions that may contribute to the teaching activity and the learning activity.

In this context, this work, which is the result of the doctoral research of the first author (Almeida, 2021) guided by the second, developed under the light of the cultural-historical theory (CHT), more specifically from the theory of activity (TA) based on Leontiev (1978, 1983), had as a perspective the constitution of a shared formative space (SFE), in the school environment, to organize the teaching of natural sciences for the initial years of elementary education (EE) intentionally. The STS is a space for interaction between subjects, which is based on the premise that the learning occurs in the act of sharing with subjects of different knowledge.

Thus, our focus is on understanding the STS as a possible trigger for changing the quality of teaching actions. It holds as a premise that a shared space constitutes training for the teacher when, in the movement of organization and development of teaching actions, he performs them both as a teaching activity and as a learning activity. A shared space was defined as that which takes place in the interaction between the subjects who participate in it, in the sharing of teaching actions. According to Leontiev (1978), the activity provides the psychic development of the subjects and, in this perspective, shared activities can lead to new learning, enabling changes in the quality of teaching. Sharing implies that everyone involved is part of the interactive process, getting involved in the development of actions and making decisions in order to collaborate with the group.

Some discussions and reflections in relation to the research carried out were exposed in this work, which helped us to meet one of our objectives, that is, to understand how a STS can promote changes in the quality of teaching actions. It was sought, from the materials produced in the empirical research, along with the theory that underpins us, to make considerations about the teaching activity and the learning activity in a STS. For this, it started with a brief presentation of the theoretical assumptions that guided the research, followed by the methodological paths, the discussion of the results and some final notes.

Theory of activity and the shared training space

Works on TA were Alexei Nikolaevich Leontiev's (1903-1979) main contribution to CHT. The basis of this theory is the interdependence established between human activity and human development. For the author, the development of man takes place by the activity he performs actively. The subject in activity transforms objects and, at the same time, transforms himself in doing so. According to the author,

> . . . we do not call all processes an activity. By this term we designate only those processes which, by realizing man's relations with the world, satisfy a special need corresponding to it. By activity, we designate processes psychologically characterized by what the process, as a whole, is directed at, always coinciding with the object that stimulates the subject to perform this activity, that is, the motive. (Leontiev, 2014, p. 68, own translation).

Thus, work is assumed to be an activity when the object coincides with the motive for the activity. Leontiev (1978) states that not every action is an activity for the subject who performs it; because, in the author's perspective, the concept of activity has a different meaning in relation to action. This action constitutes an activity when the motive that leads the individual to act concerns the content of that action, that is, its object and what constitutes it. The object of the action can be understood as the purpose of the action. For example, the teacher's work does not always constitute an activity, as the motive needs to coincide with the object of the teaching activity, which is to enable the learning activity for their students. When it is constituted as an activity for the subject, his psychic development takes place.

Thus, when the motive for which the teacher performs his work does not coincide with the object that is the teaching activity, such as, for example, just to receive a salary, the action can constitute an alienated work. And, according to Leontiev's works, alienation does not generate psychic development of the subject, since he is not aware of his social role. But if the motive for the work changes, even partially, in the course of the process, it can develop. The interaction with the other can promote the change of motives and, thus, provide psychic development.

The activity structure, according to Leontiev (1978), consists of: need, object, motive, actions, objectives, operations and conditions. According to the author, a need is a requirement for any activity, but it cannot be realized, unless, in the object of action, when it is objectified in it. Leontiev thus referred to the need:

> The first condition of all activity is a need. However, in itself, necessity cannot determine the concrete orientation of an activity, since it is only in the object of the activity that it finds its determination: it must, so to speak, find itself there. Since the need finds its determination in the object (objectifies itself in it), the said object becomes the motive for activity, what stimulates it. (Leontiev, 1978, pp. 107-108, own translation).

Still according to the author, when the motive is driven by a need and this can be objectified in the object, the subject is active, that is, when the motive that impels him coincides with the objective, towards which his actions are directed (the object). Leontiev (1978) explains this process with the example of a student reading a book to take an exam: the student was informed that the exam had been canceled; in this case, if he stopped reading, and the motive why led him to reading the book was only to acquire a passing grade, configuring itself in memorization to take the exam, the student performed only one action (and not an activity) to prepare for the exam, because his need was to be passed the exam. The author clarifies that "the memorizing processes are not, properly speaking, an activity, as they do not, as a general rule, perform any autonomous relationship with the world and do not respond to any particular requirement" (p. 296, own translation). In other words, memorization does not generate the development of superior abilities, the subject who only performs a memorizing action, which can be reduced to an elementary psychological function, and does not appropriate knowledge, is unlikely to be able to establish relations between this content and his daily life, ends up leading to oblivion. In the same way, if the teacher performs his work motivated only by a financial need and not by the objective of the teaching activity (aiming for his student to appropriate knowledge), he will develop an action and not an activity.

But, if the student continues reading with the aim of appropriating knowledge of the content of the book the case will be constituted as an activity, since the content of the book itself stimulated the process, that is, the motive changed during the process. In other words, the appropriation of its content began to satisfy "directly a particular need of the student, the need to know, understand, to elucidate what the book was talking about" (Leontiev, 1978, p. 297, own translation). In this way, the student objectifies himself in the object (the content of the book), and the motive coincides with it, leading to higher psychic development, through more elaborate knowledge.

Motive is what directs activity, what stimulates and impels it. The object is what differentiates one activity from another, it gives the activity a certain direction. From this perspective, the concept of activity is necessarily related to the concept of motive (Leontiev, 1978).

The action, however, is independent of the activity, even if it is subordinated to the objective of the activity, "an action is a process whose motive does not coincide with its object" (Leontiev, 1978, p. 297), which is why the same action can do part of different activities. Action has its intentional aspect, the purpose, but it also has its operational aspect, related to conditions. The activity constitutes a set of actions, articulated by a need. But actions can turn into activity, because, according to the author (p. 69), "there is a particular relationship between activity and action. The motive of the activity, being replaced, can pass into the object (the target) of the action, with the result of an action transformed into an activity". What will determine the transformation of action into activity is the quality of the motives that involve the subject.

For Leontiev (1978), motives may appear to the subject as: "understood motives" and "efficient motives" (p. 299). The action can become an activity for the subject when the motive that was initially understood becomes an efficient motive, which leads the subject to the objective of the activity. We can consider a reason that is only understood, for example, if a teacher participates in a continuing education process just to obtain a certificate. But if, during the process, the teacher realizes the importance of training for his teaching activity, starts to interact, wants to know more about the proposed content, appropriates knowledge, in this way, the reason changes, the needs they move to a higher level of understanding, changing the quality of the reason from understood to efficient, as it is a process of psychic development.

Therefore, when the reason does not coincide with the object, the process is called action, as previously explained. The actions are fundamental components in the activity, they are subordinated to the representation of the result that must be achieved, that is, the objective. The same action can be part of different activities or pass from one activity to another, with a relative independence. The action that the subject performs responds to a task, the objective given under certain conditions, and that is why the action has its own qualities, which are the forms and methods by which they are performed. The ways of performing the action are called operations.

> By operation, we mean how an action is performed. Operation is the indispensable content of every action and can be performed by means of different operations, and, inversely, different actions can be performed by the same operations. This is explained by the fact that, while an action is determined by its end, an operation depends on the conditions in which this end is given. (Leontiev, 1978, pp. 303-304).

Operations are ways in which a certain action is performed, and the same action can be performed by different operations, which depend on the conditions. The conditions are the set of situations in which the subject performs the activity. Leontiev (1978) uses the calculator as an example, because in it there are calculation operations already known, crystallized, thus, most operations within human activity are the result of teaching and mastery of forms and means of socially elaborated actions.

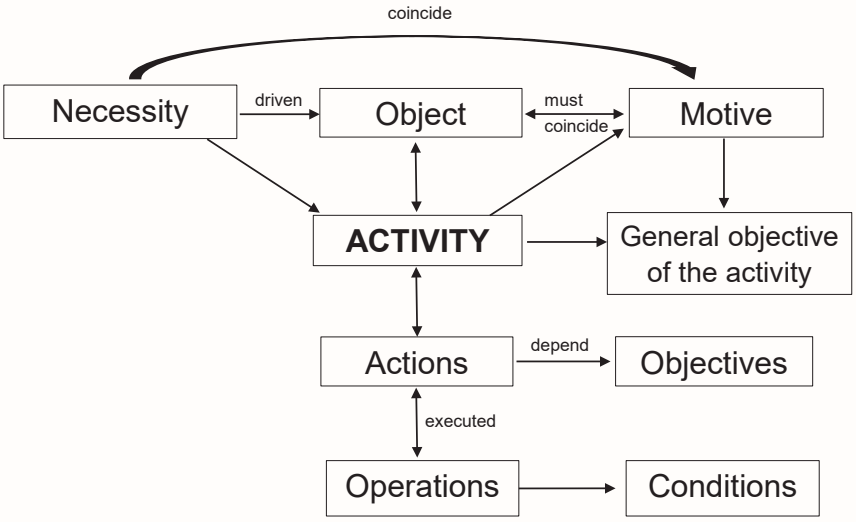
Longarezi and Franco (2013, p. 92) describe, in a summarized way, the activity structure based on Leontiev:

> The activity, originating from a need, is directed towards a certain object (which consists of its content); it depends on the motives – what moves the subject –; and it is made up of actions – which, in turn, depend on objectives –; and they are driven by operations – which are the means or procedures for performing the action.

Leontiev (1978) defines that the needs and motives comprise the orientation of the activity, while the actions and operations define its execution. That is, the activity materializes in the subject's active relationship with the object, through actions and operations, originated by needs and directed by motives. Thus, activity depends on motive, actions on objectives, and operations on conditions.

Based on what has been exposed so far about the structure of the activity, we present it in a scheme (Figure 1), in an attempt to synthesize the understanding of the dynamics that structure the elements that compose it.

Figure 1
Structure of the activity



Source: Authors' elaboration based on Leontiev (1978).

In Leontiev's conception (1978), the activity is not static, it can change function in the structure of the activity; when the motive changes, the activity can be transformed into actions and the actions, into activities, according to the example already mentioned about the process of continuing education of teachers. The structural components of the activity can modify its function, the quality of the activity also depends on them.

Bringing this discussion to education, corroborating Araujo and Moraes (2017), school education is understood as the most developed educational form in society and, in it, pedagogical activity is the central object of research in education. According to the authors, "the study of Pedagogical Activity takes place through the analysis of its different manifestations or themes", for example: "didactic teaching models, teacher training, learning situations, curricular contents" (p. 54, own translation), which contain its objective relationships and the causal links that organize and guide its existence. According to Rigon et al. (2010, p. 24, own translation),

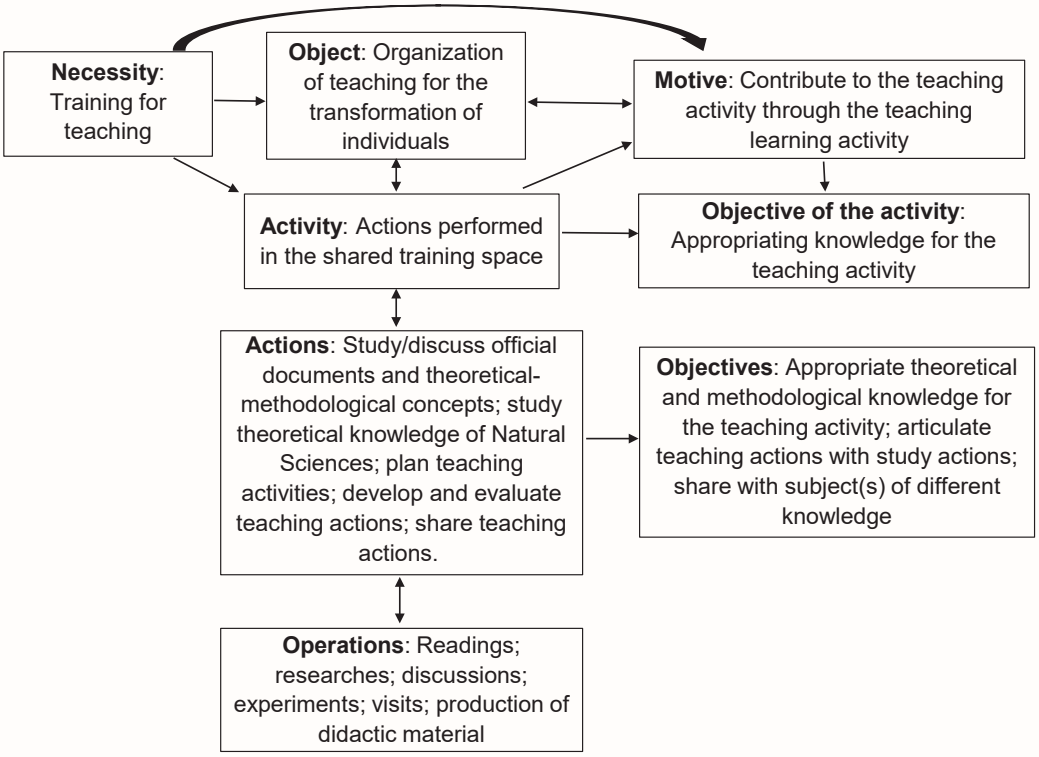
> . . . the object of the pedagogical activity is the transformation of individuals in the process of appropriating knowledge and expertise; It is through this theoretical and practical

activity that the human need to appropriate cultural goods as a form of human constitution materializes.

The authors also point out that one of the teacher's functions is the organization of teaching, which is part of the pedagogical activity, that is, it is part of the teacher's main activity: the teaching activity. In the context of the present investigation, the constitution of a STS aimed to attend to the organization of teaching, in the perspective that it was structured as an activity for the subjects that participate in it and was related to the teaching activity. In this way, teachers act as active subjects of their own learning process.

In Figure 2, it is presented a scheme that represents our understanding of how an activity is structured in a STS. Teacher learning with a view to teaching activity was apprehended as the social meaning of a STS.

Figure 2
Structure of Activity in a shared training space



Source: Authors' elaboration.

It is understood that the STS, from the TA perspective, should compose a movement that is structured as an activity for the teacher(s). It should be noted that this is not a physical or geographic space, but a space for interaction between subjects, which is based on the premise that one learns in the act of sharing with subject(s) of different knowledge. In general, the movement of the activity in a STS starts from a need of the subject and has as its motive to contribute to the teaching activity through the teaching learning activity, with the objet as the organization of teaching. The actions of studying, planning, sharing, etc., developed in the organization of teaching, are fundamental premises to carry out activities that are oriented by objectives. In this perspective, the STS is considered as training for the teacher(s), because, through the intentional organization of teaching, the teacher, when developing actions, performs them both as a teaching activity and as a learning activity.

The assumption of being shared materializes in the joint production of teaching actions, based on relations between scientific knowledge and the means to organize this teaching. According to Lopes (2009, p. 15, own translation),

> . . . sharing is to share with the other, in the sense of exchanging and, also, of appropriating both the actions and the senses and meanings they assume, we believe that this condition generates a movement of interdependence between the diversity of knowledge of the subjects involved and the teaching actions, which change qualitatively from this interaction.

The sharing that involves discussions, studies and action planning with more experienced subjects in the area of knowledge studied, enables important interactions for teacher training, allowing them to develop their psyche. This perspective guides this research, whose methodological referrals are presented below.

Methodological paths

In order to contribute to the understanding of the study phenomenon and, thus, help in the executing dimension of the research, the CHT was adopted as a guiding dimension, more specifically the TA. CHT and TA understand the individual as a historical and social being, who changes according to the relationships, with other subjects and work, that he establishes in life, allowing his personal and professional development.

This theoretical contribution allows looking at teacher training and understanding that this process happens gradually, in interaction with others and in the appropriation of new knowledge. In Vygotski's perspective (1994, 2008), the subject learns in the relationship with more experienced subjects, this being a continuous process that needs to be always in motion.

Aiming to meet the training needs of a Teacher[1] to one of our research questions – How can a Shared Training Space trigger changes in the quality of teaching actions? –, we set up the STS with a teacher from the initial years of the ES, in the school environment in which she worked, to organize the teaching of Natural Sciences, with a special emphasis on content related to Chemistry (referring to the researcher's training), for the classes in which the Pedagogue Teacher was regent (first and fourth years of ES).

The students that the Teacher assisted were children of lower-class families and a precarious economic situation. The state school where this work was developed was located in a peripheral neighborhood of the municipality of Santa Maria-RS. It consisted of 32 teachers and 340 students. It had, in addition to classrooms, a cafeteria, library, video room, teachers' room, gym and leisure area. It did not have a science laboratory, computer room with internet, updated magazines for research and study room for teachers. The physical conditions of the school – which are directly related to public investments – were not very favorable: the electrical installation had problems and, many times, the electrical connections did not work; the rooms did not have air conditioning or fans, which made them very stuffy in the summer; the locks were out of order; the paint on the walls was worn; internet connection was not good; internal security was fragile, which worried managers and teachers because it was a neighborhood where many occurrences of violence took place.

Regarding the work carried out with the Teacher in the school environment, it is highlighted that, although in a STS that involves more subjects there are greater possibilities of interactions, the

1 Throughout the text, whenever the word "Teacher" appears with an initial capital letter, it is referring to the subject who participated in this research.

sharing between two subjects with different knowledge, one of them being more experienced in the content/topic of study also provides effective learning, that is, we are not disregarding possibilities with the involvement of more subjects, but we reiterate that sharing teaching actions, from a formative perspective, can happen between two or more people.

When we think about the STS for teachers in the initial years of ES, considering generalist teaching teachers, graduated in Pedagogy, it is understood, based on research carried out on the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (Capes) portal of doctoral theses in the area of Nature Sciences in the initial years do ES (Almeida, 2021), the limits these educators face in working with scientific knowledge in the five areas of knowledge contained in the National Common Curricular Base (Ministério da Educação, 2017). In this way, the STS will be able to contribute to solving the difficulties that permeate the organization of teaching and to improve the quality of teaching actions.

To apprehend the studied reality, we used some instruments that allowed the production of our empirical materials, which consisted of: a) construction of a researcher's record diary; b) reports written by the Teacher – which took place in two stages: the first at the beginning of the research (initial written report) and the second at the end of the research (final written report); c) meetings at school between the Teacher and the Researcher recorded in audio – the recordings took place during the STS, in a total of 22 meetings.

When thinking about the STS as an activity for the Teacher, it is understood that it took place through different actions performed to meet her needs, with a view to her students' learning. However, this movement did not happen quickly and through "ready-made recipes", but as a shared construction between Researcher and Teacher of knowledge and ways of organizing teaching.

To meet the objectives proposed in the research, the empirical materials produced were organized into episodes and scenes. According to Moura (2000), the analysis by episodes allows not only the organization of the materials produced, but, above all, a mode of exposition that recomposes the phenomenon in its entirety, in a new synthesis, explaining the logical-historical movement of the research and the modes of action for the theoretical understanding of the object, in order to understand the phenomenon in its process of change.

Episodes can be organized through scenes that seek to reveal essential determinations for understanding the phenomenon beyond appearance. According to Moura (2000, p. 60, own translation), "the episodes are revealing about the nature and quality of actions. As for nature, we can highlight: it is a concept, modes of action, values, strategic knowledge. . . or if it is just practical knowledge". Still according to the author, the episodes can be written or spoken phrases which constitute scenes that define them. In the described scenes, to preserve the identity of the research subject, the name "Teacher" was assigned, also used throughout the text to mention the research subject.

It is noteworthy that, in the context of our investigation, the constitution of the STS contributed to the organization of the teaching of natural sciences for the initial years of ES, but it can also be constituted in other areas of knowledge and for all basic education.

The organization of teaching is part of the teacher's teaching activity. It is the teacher who chooses the way to work with the contents and the instruments to be used; these actions/decisions are decisive for triggering the students' learning activity. The organization of teaching can provide awareness in relation to what to teach and how to teach, when it intends that students take ownership of human culture, studying scientific knowledge in order to contribute to establishing relationships with everyday life and, thus, being able to transform it.

Teacher's perceptions about the shared training space

Considering the organization of teaching, four scenes of our investigation are presented that helped to meet the objective of this work. They are part of what is called "The Shared Training Space as a promoter of change in the quality of actions" (Almeida, 2021, p. 207), and involve discussions and reflections in relation to the organization of the teaching of Natural Sciences that occurred in the STS.

Scene 1 refers to a reflection by the Teacher, recorded in audio, in the STS on the importance of shared study actions. The Professor approaches scientific studies of Natural Sciences articulated to the planning of teaching actions.

> Scene 1. Teacher: *Much more time is needed for training in this area so that we, pedagogues, can also develop this teaching of Natural Sciences with quality . . . . Once I had already participated in a project with students of Natural Sciences at the university, they came to the classroom to work with the students, but unlike our work, because we have a space to study and plan, it became evident that I had this disability in working with the Natural Sciences with the initial years of ES. And if you don't have this support with a professor in the area, it becomes more difficult for us to seek this knowledge on our own.* (Teacher: recording of the 21st meeting at the STS).

In this context, the Teacher attributes importance to study, but is referring to a specific way of studying, in which there is the possibility of interaction between subjects with different knowledge, involving studies of scientific knowledge in the field of Natural Sciences. Although the Teacher has a degree in Pedagogy, with a master's degree and a broad domain of knowledge related to Education, as well as the classroom, she feels the need for training in this area, as there is a lack of scientific knowledge to teach her. As our studies were more specifically about the area of Natural Sciences, the Researcher was the one who assumed the role of the most experienced subject in the study area (for being the Researcher's training area). Since, in the perspective of Vigotski (2008), the subject learns in the relationship with more experienced subjects. Scene 1 reveals evidence of the Teacher's learning in relation to teaching Natural Sciences to the initial years, demonstrating the personal meaning attributed to shared study, that of teaching with quality, but not referring to any study, as already highlighted. Thus, it can be considered that the teacher develops in the act of sharing knowledge. But the sharing in the adopted perspective needs to involve studies of scientific knowledge.

It is important to emphasize that we cannot arbitrarily attribute the lack of scientific knowledge in the area to the negligence of the professor. Often the objective conditions[2] are not favorable to the search for new knowledge, which was evidenced when the Teacher points out that it is difficult to seek scientific knowledge of Natural Sciences on her own, due to lack of resources. It corroborates with the words of Maldaner (2000, p. 395, own translation), when it is stated that,

> . . . teachers need to receive concrete support typical of a professional practice: allocation of time, new organization of schedules, organization of room-environments, teaching material, participation in congresses, subscription to magazines and access to new bibliographies, interaction with other educational researchers.

Therefore, without these resources mentioned by the author and others resources, such as the possibility of participating in a STS, the search for new knowledge in the areas is really difficult,

2 We refer to the teacher's working conditions (time for lesson planning, teaching materials, participation in the organization of school planning, remuneration, school structure), based on Basso (1998).

especially when talking about a teacher who is a generalist teacher. That is, the objective conditions and the subjective conditions[3] influence the change in the quality of teaching, which is directly related to the appropriation of knowledge.

Scene 2 is related to the shared studies and planning as a training process for the Teacher. It is an excerpt from the Teacher's final written report, which refers to the reflection on some actions performed in the STS.

> Scene 2. Teacher: *Carrying out studies individually often raises doubts that remain latent and that can only be clarified by sharing with those involved with the content in question. . . . Having a link with the academy brings the security to deepen the studies. . . .*
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> *Participating in the teaching organization with a researcher/doctoral student was a great opportunity for my training as a teacher of the initial years. The studies involved the organization of classes that would be developed with the group. . .* (Teacher: final written report).

The Professor highlights in such scene how relevant it was for her training to have a link with the university. This is an important means of continuing education for teachers, which enables shared actions and monitoring, since, in most training courses, teachers do not have support, not knowing who to turn to in case of doubts and not always their training needs are met, according to research carried out on the Capes portal of doctoral theses involving the area of Natural Sciences in the initial years (Almeida, 2021). According to Lopes (2019, p. 114, own translation), "many courses, programs, projects or actions, brilliantly organized by great experts in the field of education, did not make progress when presented to teachers as something imposed", and it is important to consider the context of work and the training needs of teachers.

The link between school-university, as a social practice, makes it possible to improve the quality of teaching, since, as the Teacher highlights, it provides learning for the teaching activity and safety. These reasons are also attributed by her to participate in the STS, according to the scene 3, an audio-recorded reflection.

> Scene 3. Teacher: *This study of ours is important for me to feel safer in the classroom to work on Natural Sciences and better plan my classes. I think the validity of being with you in this research is knowing that I am expanding my knowledge, that I will know where to look for this information to also be able to work in the classroom in a calmer, more clarifying way for myself and for the students.* (Teacher: recording of the 11th meeting at the STS).

It should be noted that the link between school and university is important, but we are not referring to any link, since traditionally the presence of the university in the school, especially in academic research, is done only through data collection to identify problems that lead to the culpability of the teacher or the school. As presented, the Professor attributed the presence of the university in the school related to the contribution in teacher training. In addition, we clarify that, by bringing the relevance of the link between the school and the university to basic education, we do not disregard the need for the State to fulfill its responsibility to offer continuing education to its teachers and, above all, objective conditions for them to be able to to pick it up.

Actions carried out in a shared way are more likely to enable effective learning for teaching, as the Teacher also highlighted in scene 2. This is because, in addition to allowing teachers to meet the training needs, both the gaps in Initial Training and the current ones, it gives freedom to build their knowledge with autonomy. As discussed by Nóvoa (1992, p. 25, own translation), "training should

3 We refer to teacher training (initial training and continuing training), based on Basso (1998).

encourage a critical-reflexive perspective, which provides teachers with the means of autonomous thinking and which facilitates dynamics and participatory self-training". Thus, we defend that university and school integration should be established as long as professors have autonomy, actively participating in their training process.

It was considered important, to guide the organization of teaching, the theoretical-methodological assumptions, being related to the intentionality in the organization of teaching, as shown in scene 4. This scene is an excerpt from the final report written by the Teacher, which refers to the reflection on the organization of teaching in the STS.

> Scene 4. Teacher: . . . *the meetings were very debated and we exchanged many ideas . . . . The subject we chose to develop was one that was part of the students' experience in that community. Classes were also organized based on the theoretical references of CHT, TA and TGA. Thus, we had many ludic proposals for teaching moments, seeking to bring the students' reality as close as possible, creating teaching activities that would allow them to understand and explain reality, aiming at solving the problem presented . . .* (Teacher: Final written report).

In Scene 4, the Professor talks about the theoretical-methodological bases of CHT, TA and TGA that guided the actions, contributing to the studies and lesson planning. In each action, elements that form part of these theoretical bases were taken into account, which came to provide an organization of teaching focused on the appropriation of knowledge through ludic activities and activities related to the students' experience. Another issue raised by the Teacher, in scene 4, concerns the moments of reflection on teaching actions, which enabled new ideas and the creation of new actions. Thus, it can be inferred that the theoretical-methodological assumptions contribute to the evaluation of teaching actions. Thus, one of the meanings that the Teacher attributed to the theoretical-methodological assumptions can be guiding indications for reflections and evaluation. In this way, the intentionally structured organization of teaching with shared actions offers conditions that can promote the learning of the subjects who participate in it.

The analysis of the data presented through the scenes allowed some considerations to be made, specifically about the STS. In scene 1, it was identified that the actions of planning and studying with a more experienced subject in the area were considered as formative by the Teacher, as they provided learning in relation to teaching Natural Sciences in the initial years. In scene 2, the Teacher considered the link with the academy as a trainer when highlighting the possibility of deepening studies with shared actions. In scene 3, the Teacher highlighted that the STS contributed to improving the quality of teaching considering it as a trainer, as it provides learning focused on the teaching activity. Scene 4 highlights the importance of theoretical-methodological bases in the STS; the Teacher considered them as formative as they contribute to studies, planning and evaluation of the actions performed.

In this way, the STS, conducted as an activity, had as its motive to contribute to the teaching activity through the Teacher's learning activity, taking as its object the organization of the Natural Sciences teaching. Therefore, actions were carried out with objectives that would meet the teacher's training needs and reasons for participating in this research. According to Leontiev (1983), the activity is composed of actions subordinated to a motive. According to the author, actions are part of the structure of the activity, as a means of carrying it out and, consequently, of satisfying the motive that leads the subject to act. That is, what characterizes actions is the fact that they are always oriented towards a motive.

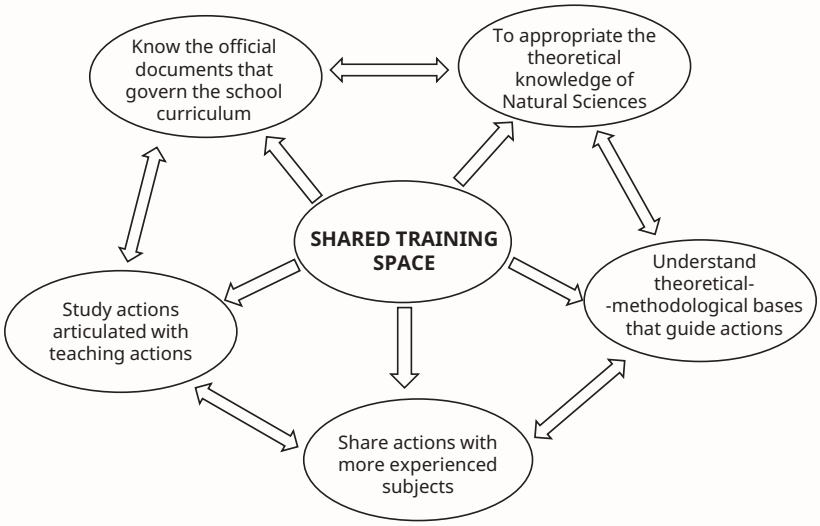
In this sense, the Teacher's reports reveal that she appropriated knowledge through the triggered actions. But what were the actions that made such learning possible? This is what the next item is about.

The actions of the shared training space

In the structure of the activity, according to Leontiev (1978), as we have discussed previously, actions are fundamental components to perform an activity. In this context, it is understood how much the actions developed in a STS can be revealing of the change in teaching actions, triggered by training actions.

Thus, it can be inferred that the actions developed in the STS were guided by objectives that made it possible to meet our research objective: "to understand how a STS can promote changes in the quality of teaching actions". But these are not just any type of actions, which is why they were considered training actions. We understand the objectives that guided our actions as a dynamic unit for teacher training, especially those who teach Natural Sciences. This dynamism is represented in Figure 3.

Figure 3
Guiding objectives of potentially formative actions in the shared training space



Source: Authors' elaboration.

The materials produced and organized in this study allow identifying that the potentially formative actions were guided by five objectives established by the activity. According to Figure 3, there are actions with the following objectives:

1. Know the official documents that govern the school's curriculum;
2. Understand theoretical-methodological bases that guide actions;
3. Appropriate scientific concepts of Natural Sciences;
4. Share actions with more experienced subjects;
5. Articulate study actions with teaching actions.

In view of this, for each objective there are actions that complement each other in the development of the activity. It should be noted that these actions were developed in the STS, which takes into account what Leontiev (1978) understands as activity structure, involving need, object, motive, actions, objectives and operations, represented in the structure of Figure 1. According to the author, the action is independent of the activity, so the same action can be part of different activities. And actions can turn into activities in the process, as they gain their own motive for the subject. The materials produced brought evidence that the actions constituted an activity by the Teacher, since they triggered new learning. Below, we present the actions performed for each of the five established objectives.

1. Know the official documents that govern the school's curriculum

Actions aimed at knowledge of the documents governing the school's curriculum were: studying school curriculum documents, identifying knowledge to be worked on with students in the BNCC and discussing its content. These were the first actions carried out in the STS because they are documents that are part of the school curriculum, therefore important for teachers' knowledge and for the organization of teaching.

The area of Natural Sciences covers a considerable amount of scientific content, so, to guide teachers, the BNCC (Ministério da Educação, 2017) contains a selection of objects of knowledge and their skills, distributed by period of schooling. We emphasize that not all the contents worked on are included in the BNCC, other documents that guide the school's curriculum were taken into account for our planning, as well as the context of the students, the culture, the level of development in which they were.

2. Understand theoretical-methodological bases that guide actions

The actions aimed at understanding the theoretical-methodological bases were: discussing and reading about CHT, TA and Teaching Guidance Activity[4] (TGA) and research work involving situations that trigger learning. These actions guided the planning of teaching actions and were justified by their significant contribution in the organization of the teaching of Natural Sciences and in the teacher's learning process.

Knowledge and work with theoretical-methodological proposals allow the teacher to establish the relationship between theory and practice, helping in the pedagogical work. It is important to point out that working with teaching methodologies makes it possible to take into account the socio-cultural context, as well as the level of development of the students. The methodological proposals are open to organize teaching according to the reality of the school and the subjects involved. Thus, knowledge of theoretical-methodological proposals allows the development of teaching actions that enable both student and teacher learning, through the paths taken in the planning and development of new teaching actions.

3. Appropriate scientific concepts of Natural Sciences

The actions oriented to the appropriation of scientific concepts of Natural Sciences were: studying and discussing articles and books related to scientific concepts of Natural Sciences; research on knowledge of Natural Sciences. These actions are developed by the need to understand the concepts of Natural Sciences to organize teaching actions in this area, so that they contribute to the psychic development of students and for teachers to master their work object and, with that, feel safer to teach.

4. Share actions with more experienced subjects

Actions aimed at sharing in the STS were: studying, reading, discussing – texts, articles and books on official documents, scientific concepts of Natural Sciences and other areas of knowledge, TGA, experiments in Natural Sciences; research – scientific articles on Natural Sciences, experiments on Natural Sciences, tasks for students, YouTube videos on the production of materials and didactic content on Natural Sciences for students; plan – produce didactic materials (stories, scenarios, posters, Natural Science experiments, videos), records; produce a scientific article for an event in the field of education; develop experiments in Natural Sciences for study and teaching purposes;

4 The Teaching Guidance Activity (TGA) is a teaching methodological proposal based on Moura (1997, 2000).

visit the students' living place; develop actions with students; evaluate previous and current experiences of the Teacher in relation to actions developed in the classroom.

The actions developed in a shared way are justified by believing, as well as Vigotski (2008), that the learning process takes place in interactions with other subject(s) of different knowledge(s). In this movement, sharing led to the creation of new needs and, thus, to the organization of new teaching actions.

5. Articulate study actions with teaching actions

The articulation between study actions and teaching actions involved: studying – reading texts on scientific concepts of Natural Sciences and discussing/planning actions to work with students based on studies; report on experiences lived in the classroom and relate them to scientific concepts of studies. We emphasize that these actions carried out in a shared way can contribute to the psychic development of the subjects involved.

The listed potentially formative actions, referenced by CHT, made it possible to meet some of the Teacher's formative needs, through learning scientific knowledge of Natural Sciences and ways of organizing teaching in this area. The five objectives that guided the actions, in a dynamic unit, resulted in a change in the quality of the teaching actions, driven by the meanings attributed by it when carrying out the actions, which coincided with the social meaning of the teaching activity – the students' learning.

The results also point out that a space dedicated to training, organized from the perspective of sharing, allows those involved to become active, providing new learning and changes in the quality of their actions regarding teaching, particularly in this case of Natural Sciences. Thus, the STS can be configured as continuing education for the subjects who participate in it.

Final considerations

At the end of this investigation, based on theoretical studies that support the empirical experience and on the reality experienced together with a teacher in the initial years in the STS, the thesis was proven that the constitution of an STS involving actions related to intentional and conscious objectives can: understand theoretical-methodological bases that guide actions; appropriating scientific concepts from Natural Sciences; sharing actions with more experienced subject(s); articulate study actions with teaching actions; in a dynamic unit, it allows learning in the act of sharing and the development of new actions for teaching, of new quality.

The signs of learning, revealed in this investigation, derive from the STS whose actions related to intentional and conscious objectives, which we consider as formative actions to organize teaching, included: studying, planning, discussing, developing and evaluating teaching actions. Thus, it can be inferred that the constitution of shared spaces, organized in this perspective, contributes to the formation of teachers, leading to new perceptions, which allows leading to new perspectives, creating new needs for pedagogical activity and enabling the psychic development of the subjects involved.

Despite the training of teachers, this research puts us in the movement of thinking about proposals related to the constitution of Shared Training Spaces in partnership between universities and basic education schools. This partnership can be organized both for the continuing training of in-service teachers and for teachers in Initial Training (in their relationship between theory and practice, important in the Initial Training process) in a continuous process that needs to be always in motion. It should be noted that, although this doctoral research has brought the specificity of teachers in the initial years, it must be considered that the aspects presented can support reflections

and training processes of teachers from the five areas of knowledge of the BNCC (Ministério da Educação, 2017) at other levels of education.

Among the questions that worry us is: how to think about the materiality of this research for the Brazilian public school? It is important that, at first, schools and educational institutions organize themselves in order to provide shared spaces for studies and planning among teachers, and as far as possible seek partnerships with universities. And that the school maintainer gives priority to the continuing training of teachers in the network, either through continuous pedagogical advice from a more experienced professional in shared spaces, or through long-term courses and possibilities for debate involving different subjects, that make it possible to contribute to the teaching activity and the continuity of the shared training process. It must also be considered that public policies should be aimed at these spaces of continuing education, meeting them as a need for teachers and, therefore, as part of their work, which implies having hours set aside for this.

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Note on authorship

This article is the result of the doctoral thesis by Cristiane de Almeida, who was responsible for carrying out the research and the first writing of this article. Anemari Roesler Luersen Vieira Lopes guided the research and participated in the review and contributions to this article.

Data availability statement

The data underlying the research text are informed in the article.

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