SYSTEMATIZATION OF TEACHING EXPERIENCES IN THE EARLY YEARS OF ELEMENTARY SCHOOL IN LIGHT OF DISTRIBUTED COGNITION THEORY AND ACTIVITY THEORY

SISTEMATIZAÇÃO DE EXPERIÊNCIAS DIDÁTICAS NOS ANOS INICIAIS DO ENSINO FUNDAMENTAL À LUZ DA TEORIA DA COGNIÇÃO DISTRIBUÍDA E DA TEORIA DA ATIVIDADE

SISTEMATIZACIÓN DE EXPERIENCIAS DIDÁCTICAS EN LOS PRIMEROS AÑOS DE LA EDUCACIÓN BÁSICA A LA LUZ DE LA TEORÍA DE LA COGNICIÓN DISTRIBUIDA Y DE LA TEORÍA DE LA ACTIVIDAD

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ABSTRACT: This article examines how to organize teaching experiences grounded in Activity Theory (Leontiev, 2014; Vygotsky, 2021) and Distributed Cognition (Cole & Engeström, 1993; Pea, 1993) in the early years of elementary education. It adopts a theoretical research approach to analyze how the systematization of such experiences can support pedagogical practices based on multiple interactions and collective learning. The findings identified five central elements: learning environment organization (Pea, 1993), motive (Leontiev, 2014; Asbahr, 2014; Medeiros, 2021), teacher and student roles (Vygotsky, 1998, 2010; Moraes & Lima, 2017), interaction with mediating artifacts (Vygotsky, 1998; Moraes, 2017; Salomon, 1993), and activity dynamics (Cole & Engeström, 1993; Leontiev, 2014; Moraes, 2017). The results indicate that the intentional systematization of these elements fosters learning experiences that promote distributed cognition by valuing collective action, cultural diversity, and the interactions among individuals, artifacts, culture, and history, thereby expanding meaningful learning opportunities.

KEYWORDS: Educational experiences. Distributed cognition. Activity. Early years.

RESUMO: *Este artigo investiga como organizar experiências didáticas fundamentadas na Teoria da Atividade (Leontiev, 2014; Vigotsky, 2021) e na Cognição Distribuída (Cole & Engeström, 1993; Pea, 1993) nos Anos Iniciais do Ensino Fundamental. Trata-se de uma pesquisa teórica que analisa como a sistematização dessas experiências pode subsidiar práticas pedagógicas baseadas em múltiplas interações e na coletividade. Os resultados identificaram cinco elementos centrais: organização do ambiente (Pea, 1993), motivo (Leontiev, 2014; Asbahr, 2014; Medeiros, 2021), papéis docente e discente (Vigotsky, 1998, 2010; Moraes; Lima, 2017), inter-relação com artefatos mediadores (Vigotsky, 1998; Moraes, 2017; Salomon, 1993) e dinâmica da atividade (Cole & Engeström, 1993; Leontiev, 2014; Moraes, 2017). Conclui-se que a sistematização intencional desses elementos favorece experiências capazes de promover a distribuição da cognição, valorizando a coletividade, a diversidade cultural e as interações entre sujeitos, artefatos, cultura e história, ampliando as possibilidades de aprendizagem significativa.*

PALAVRAS-CHAVE: *Experiências didáticas. Cognição distribuída. Atividade. Anos iniciais.*

RESUMEN: *Este artículo analiza cómo organizar experiencias didácticas fundamentadas en la Teoría de la Actividad (Leontiev, 2014; Vigotsky, 2021) y en la Cognición Distribuida (Cole y Engeström, 1993; Pea, 1993) en los primeros años de la Educación Primaria. Se trata de una investigación teórica que examina cómo la sistematización de estas experiencias puede respaldar prácticas pedagógicas basadas en múltiples interacciones y en el aprendizaje colectivo. Los resultados identificaron cinco elementos centrales: organización del ambiente (Pea, 1993), motivo (Leontiev, 2014; Asbahr, 2014; Medeiros, 2021), roles del docente y del estudiante (Vigotsky, 1998, 2010; Moraes y Lima, 2017), interacción con artefactos mediadores (Vigotsky, 1998; Moraes, 2017; Salomon, 1993) y dinámica de la actividad (Cole y Engeström, 1993; Leontiev, 2014; Moraes, 2017). Se concluye que la sistematización intencional de estos elementos favorece experiencias que promueven la cognición distribuida, valorando la colectividad, la diversidad cultural y las interacciones entre sujetos, artefactos, cultura e historia, ampliando las oportunidades de aprendizaje significativo.*

PALABRAS CLAVE: *Experiencias didácticas. Cognición distribuida. Actividad. Primeros años.*

INTRODUCTION

The theme of didactic experiences has been a constant focus in educational research due to its importance in shaping pedagogical thinking and practice. Despite the numerous shifts in pedagogical perspectives throughout Brazil's educational history (Saviani, 2014), it is still possible to observe practices that have remained largely unchanged in didactic experiences during the twenty-first century. Individual desks, teacher-centered hierarchical structures, limited didactic diversity, restricted bodily movement, and constrained communication and mediating elements continue to characterize a significant portion of the experiences encountered in contemporary school settings.

These elements that permeate formal education are particularly contradictory to the conception of the cognitive process adopted in this study, as cognition is understood to be directly related to the social, environmental, historical, and cultural experiences that shape individuals. From this socio-historical perspective, human cognition develops through multiple interactions among individuals, environments, and artifacts within different cultural contexts (Cole & Engeström, 1993; Moraes, 2017; Silva, 2025).

Accordingly, this study is grounded in the central hypothesis that didactic experiences, as essential components of students' cognitive development and learning, should be systematically organized based on an understanding of collective activity and distributed cognition.

However, important contradictions can be observed between the need for such interactions and the foundations upon which didactic experiences are currently organized in twenty-first-century school contexts. Given the persistence of the dynamics previously described, it is necessary to critically examine their limitations in relation to the collective, cultural, and social nature of human cognitive development.

Therefore, this study seeks to analyze whether there is evidence of the potential benefits of fostering collective participation and expanding mediating interactions within didactic experiences and, consequently, within cognitive development.

To address this issue, the study adopts Activity Theory as its theoretical framework for understanding the process of human cognitive development, together with the Theory of Distributed Cognition as an expanded approach to understanding the collective and interactive dimensions of cognition within didactic experiences in the early years of elementary education.

The main objective of this study is to investigate how the systematization of didactic experiences, grounded in Activity Theory and the Theory of Distributed Cognition in the early

years of elementary education, provides a foundation for pedagogical practices based on multiple interactions and collective engagement. To achieve this objective, the study adopts a theoretical research approach based on a literature review of the theoretical foundations of Activity Theory and Distributed Cognition in order to identify and understand their shared elements.

The article begins by examining the theoretical convergences between Activity Theory and the Theory of Distributed Cognition, with the aim of exploring the possibilities and potential of systematically organized didactic experiences informed by these theoretical perspectives. It then presents a discussion of the five key elements underlying the systematization of didactic experiences, which constitute the subsequent sections of the article: the organization of the school environment (Pea, 1993); the motive of the activity (Asbahr, 2014; Leontiev, 2014; Medeiros, 2021); the roles of teachers and students (Vygotsky, 2010; Moraes & Lima, 2017); the interaction with mediating artifacts (Moraes, 2017; Salomon, 1993); and the dynamics of the activity (Cole & Engeström, 1993; Leontiev, 2014; Moraes, 2017).

ACTIVITY AND THE DISTRIBUTION OF COGNITION: APPROACHES

Issues and questions regarding the planning and development of teaching methods and related practices are a constant feature of the field of education. Many authors in recent history have reinforced various structures and concepts that limit our perception and teaching practices with regard to pedagogical practice, ranging from contemporary classics such as Saviani (2014, 2021), Gasparin (2012), and Libâneo (2018), to more recent works such as those by Marestone and Franco (2024), Moraes (2017), Santos (2024), and Costa Júnior et al. (2023).

Based on these frameworks, it becomes clear that issues in pedagogy involve multiple variables. However, these theoretical foundations converge on a fundamental understanding: pedagogy is not limited to the practical aspects of educational practice, but is constituted by the social, historical, and economic relationships that permeate education. From this perspective, educational practice develops in close relation to society, highlighting the fact that education is not neutral with regard to social, economic, political, and cultural dimensions. Thus, the view of education as a phenomenon restricted to the school setting is overcome, and it is recognized that educational problems cannot be analyzed in isolation from their broader contextual factors (Rays, 2011).

In this sense, it is important to consider that teaching experiences cannot be conceived of in isolation from the reality of a given society's socio-historical context. Therefore, while it is essential to recognize the school's importance in social formation, it is even more important to understand its limitations in the face of the challenges arising from that social context.

It is important to emphasize that, in this study, the term *didactic experience* refers not merely to a lesson in its conventional sense, but to an intentional and mediated activity designed to promote meaningful learning experiences grounded in scientific knowledge for the development of students' consciousness. This conception takes into account the meanings that permeate students' lives and socio-historical realities, thereby empowering them to act upon their social contexts (Leontiev, 2014; Vygotsky, 2021).

Schools and their educational experiences do not exist in isolation but are embedded in a social context marked by the contradictions of the capitalist system. From this perspective, Mészáros (2008) argues that institutionalized education has contributed to the reproduction of this system by training workers and disseminating values aligned with the interests of the ruling classes, thereby fostering conformity and consensus within institutionally established boundaries. Thus, the school is not merely the result of the actions of the school community, but also of broader social determinants, the implications of which particularly affect working-class students.

Understanding the school environment as part of a larger whole implies recognizing that specific changes within that environment alone cannot provide a definitive solution to the problems that plague it—since only an alternative that breaks with the current system would lead to a real change in the institutionalized educational structure—but, at the same time, this should not limit the need for analysis and exploration of changes aimed at bringing about improvements.

Given the limitations and objectives of this study, the focus will be on teaching experiences, while acknowledging the influences and manifestations of this broader context on the development of those experiences. To this end, it is important to highlight the existence of contemporary scholarship in the field of education addressing these manifestations.

Costa Júnior et al. (2023) point out that one-sidedness in the teaching process, the difficulty of creating a space for reflection, the lack of diverse forms of interaction, and the disconnect between content and students' reality are persistent dilemmas in the field of education, characterizing it solely as a tool for fulfilling curricular requirements and liberal objectives.

Santos (2024), in conducting a case study on disengagement and learning difficulties in the school setting, emphasizes the growing number of studies in this field. The author highlights the multifactorial nature of these issues but points to the lack of methodologies and practices that enable student engagement, the scarcity of mediating technologies, the lack of attention to students' emotional well-being, and content that is disconnected from students' realities as important factors to be analyzed.

In contrast, studies such as those by Vieira et al. (2023) and Ferreira and Moraes (2024) highlight examples of teaching experiences that enhance the learning process through elements that address the aforementioned symptoms. By taking student engagement, multiple interactions, the use of mediating artifacts, and a focus on the relationship between students' reality and what is being studied or experienced in the school context as their foundation, these approaches enable different forms of interaction—both in the social sphere and in the realm of knowledge—while simultaneously structuring new dynamics of activity.

In light of these studies, it can be argued that the elements—the symptoms mentioned earlier—commonly found in contemporary teaching practices are at odds with human beings' cognitive development needs. This study understands cognition as a cultural and socio-historical construct (Leontiev, 2014; Vigotsky, 2021), developed through collective activities (Leontiev, 2014) in processes of distributed cognition[4] involving other individuals, environments, and artifacts (Cole & Engeström, 1993; Pea, 1993; Moraes, 2017)—based on Activity Theory and Distributed Cognition Theory.

In this sense, the analysis begins with cognitive development as understood by authors from the Soviet school of psychology, specifically Vigotsky (2021) and Leontiev (2014), drawing on the works of Marx. Recognizing that the production of material life through labor shapes the individual's life (Marx & Engels, 2007) and understanding labor as a process of transforming nature through activity (Medeiros, 2021), Soviet authors proceed from the principle that activity is the primary means of human cognitive development, being a socio-historical product (Daniels, 2011).

At the same time, Distributed Cognition Theory (DCT)—based on Activity Theory—approaches the development of human cognition grounded in the idea of collective activity, in which cognition does not take place within the individual mind, but is distributed across a network through interactions with the environment, artifacts, time, sociocultural contexts, and

[4] It should be emphasized that the concept of distributed cognition is employed in this study as a potentiality (a becoming), since the present discussion is limited to the theoretical foundations of the systematization of didactic experiences, without intending to exhaust its immediate empirical application.

among individuals (Pea, 1993). Here, cognition develops in a distributed manner across all the structures that permeate the process of human activity. Thus, both theories view cognition as a collective product—intrinsically social and cultural—based on multiple interactions.

Given this context, it is necessary to consider that teaching experiences, as essential elements of students' cognitive development and learning, must be systematized based on an understanding of collective activities and the distribution of cognition. To this end, we will begin with the concepts of collective activity (Leontiev, 2014) and, subsequently, the activity system (Cole & Engeström, 1993) to understand the dynamics of teaching experiences in the field of the distribution of cognition.

Leontiev (2014) argues that the key to analyzing activity lies in its conditions of collective work, insofar as "an individual's relationships with society are always mediated by other individuals through a process of communication, and even when performing an individual task, that task is mediated by social relationships and communication" (Medeiros, 2021, p. 7). Thus, activity develops from the individual's communicational ties within their community and its historical and cultural foundations, thereby forming the concept of collective activity, which must be analyzed systemically (Leontiev, 2014).

It is therefore necessary to identify the components of an activity, which Daniels (2011) outlines in the following structure: Activity (Object/motive); Action (Goal); Operation (Conditions).

At the top of the hierarchy is the activity, which, according to Leontiev (2014), is directly related to an object and is constituted by a motive generated by a human need. What characterizes an activity is its necessity, expressed in the form of an object, given that "it is precisely the object of an activity that gives it a specific direction. … the object of an activity is its true motive" (Leontiev, 2014, p. 58). An activity can be structured in both the individual and collective spheres; however, even an individual activity is inextricably linked to the collective sphere—to its social nature, history, and culture.

An activity consists of various actions, which represent conscious and intentional acts aimed at achieving a result within the context of the activity. These actions are driven by objectives—or goals—that are essential for achieving the activity's purpose and, as such, become fundamental, since "if the actions that constitute the activity are mentally subtracted from it, then absolutely nothing will remain of the activity" (Leontiev, 2014, p. 59).

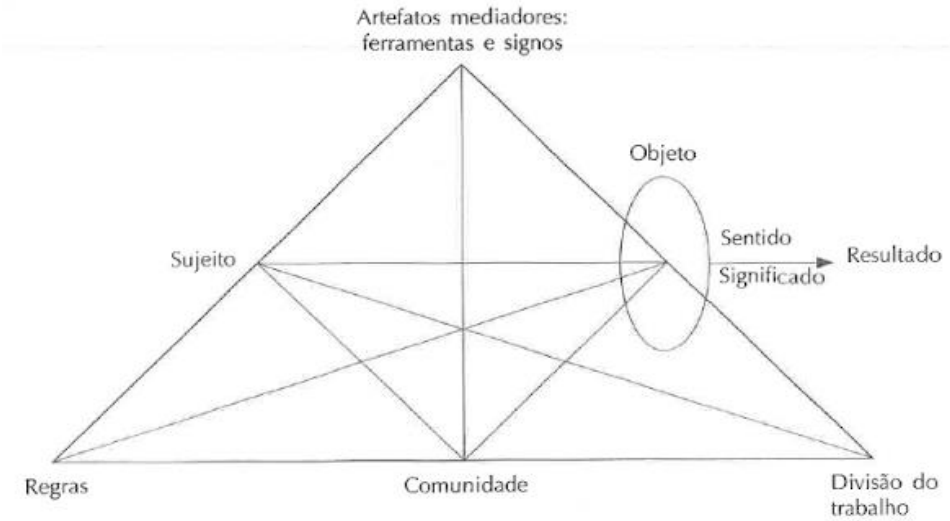
Operations, on the other hand, are characterized by the ways in which actions are carried out—that is, their modes of execution. These operations occur consciously but in an automated

manner (Medeiros, 2021), and their actual execution depends on the conditions, circumstances, and tools available (Daniels, 2011).

An activity is distinguished by its motive, which arises from a need and generates the actions responsible for its realization. Due to its dynamic nature, new actions can give rise to new motives and activities. At the collective level, this process involves social and historical elements, articulating needs, goals, and possibilities for action in activities organized by shared rules and the division of labor among participants (Medeiros, 2021).

Thus, these new structures—Rules, Community, and Division of Labor—develop as important mediating elements in the activity process (Cole & Engeström, 1993). To represent this mediating relationship, Engeström (1987, as cited in Daniels, 2011) presents the following diagram (Figure 1):

Figure 1.
The Structure of a Human Activity System



Note. Engeström (1987, p. 78, as cited in Daniels, 2011, p. 170).

In the activity system diagram, the upper part focuses on the realm of individual or group actions, while the base encompasses the structures of collective activity: rules, which correspond to the norms regulating the activity; community, formed by individuals who share the same object; and division of labor, related to the distribution of roles and tasks among participants (Engeström, 2001). At the center of the diagram, the circle surrounding the object indicates that the actions guided by it are marked by ambiguities, interpretations, meanings, and possibilities for transformation, constituting the primary space for tensions and contradictions within the activity system (Medeiros, 2021).

In the field of education, the activity system enables a broad understanding of teaching experiences, moving beyond the notion that the learning process is limited to the relationship between the student, the concept to be learned, and the teacher who will teach it (subject-object-mediator). Here, it is understood that all the structures that permeate the system can mediate, expand, or hinder the activity in teaching experiences.

Therefore, it is important to note that concerns regarding the teaching and learning process must take into account the entire structure of the system of activity; after all, it is not just about the didactic process, but also about space, culture, history, time, intentions, meanings, rules, and the ways in which work is divided—in other words, it concerns the totality of educational practices.

Based on this, it is understood that teaching experiences cannot be reduced to teacher-centered classes, with desks arranged facing the teacher, focusing on individuality and silence, but rather must be replaced by teaching experiences enriched by a structure of multiple interactions, communication, and experimentation that is relevant to and meaningful within the context of the student's reality, thereby fostering the distribution of cognition through actions and activities.

According to Cole and Engeström (1993), the activity system diagram provides a conceptual map of the distribution of human cognition by considering the subject and the other participants in the activity, thereby enabling an understanding of the mediating processes that constitute it. From this perspective, DCT understands cognition as a phenomenon that emerges from the relationships between subjects, artifacts, and contexts of action, with intelligence being realized within the activity itself and distributed among people, environments, and situations (Pea, 1993). The term "distributed" refers to the sharing of experiences, activities, language, and cultural heritage (Salomon, 1993), such that cognitive development transcends the relationship between subject and object and is constituted by the cultural, historical, and social relationships that permeate systems of activity. Thus, knowledge is socially constructed through shared goals, collaborative efforts, dialogues, and different perspectives (Pea, 1993). For Salomon (1993), participation in collaborative activities continuously transforms individuals and the collective processes of which they are a part, highlighting that cognition emerges from sociocultural interactions (Cabrini, 2024) and bringing DCT closer to Activity Theory.

In the educational context, this concept takes shape through the exchange of ideas, the use of multiple artifacts, argumentation, joint reflection, and collaboration in the process of action and/or activity. To the extent that teaching experiences are systematized to promote these

processes, new dynamics of interaction among individuals, artifacts, the environment, history, and culture are made possible, fostering new mental processes through the distribution of cognition among these elements.

SYSTEMATIZATION OF DIDACTIC EXPERIENCES IN LIGHT OF THE THEORY OF DISTRIBUTED COGNITION AND ACTIVITY THEORY

Based on the theoretical principles presented above, it is possible to argue that a didactic experience cannot be confined to individualism, student passivity, teacher-centered instruction, or the disregard of the spatial and temporal dimensions of the environment and culture. On the contrary, didactic experiences must encompass continuous interactions among individuals, artifacts, and the social context in which they are situated (Moraes & Lima, 2017) in order to foster collectivity, interactivity, the mediation of experiences, knowledge construction, and the enhancement of the process of distributed cognition.

The systematization of didactic experiences aimed at fostering distributed cognition requires consideration of recurring elements identified in the literature on Activity Theory and the Theory of Distributed Cognition.

It is important to emphasize that, in this study, the term *systematization* refers to the processes of planning, reflection, and structuring of didactic experiences, encompassing the socio-historical relationships of the individuals and the environments in which these experiences take place.

The analysis of the literature and its leading authors made it possible to identify five key elements for organizing these experiences: the organization of the school environment (Pea, 1993); the motive of the activity (Asbahr, 2014; Leontiev, 2014; Medeiros, 2021); the roles of teachers and students (Moraes & Lima, 2017; Vygotsky, 2010); the interaction with mediating artifacts (Moraes, 2017; Salomon, 1993); and the dynamics of the activity (Cole & Engeström, 1993; Leontiev, 2014; Moraes, 2017). These elements are discussed in the following sections in order to highlight their contributions to the systematization of didactic experiences that promote distributed cognition.

ORGANIZATION OF THE SCHOOL ENVIRONMENT

With regard to the organization of the school environment, Pea (1993) states that "the resources that shape and enable activity are distributed across the configuration of people, environments, and situations" (p. 50). From this perspective, the organization of the environment becomes fundamental to the development of activities, as it is within this environment that processes of social and material mediation emerge. The former refers to interactions and collaborations among individuals, while the latter involves the use of tools, technologies, and other artifacts that are part of the teaching and learning process (Pea, 1993).

The organization of the environment is fundamental to distributed cognition, as it acts as a mediator of the actions carried out during the activity and brings together the elements with which students interact to construct knowledge. Furthermore, the physical space and cultural artifacts can facilitate the completion of tasks, constituting central resources of the material dimension of distributed cognition (Karassavidis, 2002). This understanding contrasts with the reality of many school contexts, which are still characterized by individualizing environments (Ruiz, 2008), restricted student interactions, and pedagogical relationships centered on teacher-led instruction (Moreira, 2007).

With regard to the distribution of cognition, we should therefore strive for a culturally rich environment that fosters collectivity and interactivity, given that "the complexity of a given act of thought may have more to do with the complexity of the environment in which the action takes place than with the intrinsic mental complexity of the activity" (Pea, 1993, p. 51); in other words, the organization of the environment can enhance learning by expanding the ways in which students can engage.

In this sense, when systematizing the teaching experience with a view to the distribution of cognition, teachers must focus on the organization of the school environment, given that it serves as the "stage" for educational activity and, consequently, for the processes of cognitive distribution. To this end, teachers must pay close attention to and constantly question themselves about the greatest possible number of elements that make up this environment. For example, here are some questions that can help teachers think about and organize the environment for teaching experiences:

- How are the chairs arranged?
- How do students use the space to express themselves and communicate?
- How does the teacher move around the classroom?

- Does the teacher participate in the activities, or does he or she remain stationary, waiting for the children to take action?
- What sounds can be heard in this environment?
- How many, what kinds, and what is the quality of the materials available for students to use?
- Do students have the opportunity to express themselves through different types of language in this environment?
- Is the classroom the only space that can be used for this activity?

These reflections are essential for the school environment to become a dynamic space conducive to the development of activities that promote distributed cognition, enabling students to reach their full potential while also facilitating new teaching approaches.

MOTIVE

For learning to be effective, it is necessary to establish connections between the content taught and the students' reality (Asbahr, 2014). From this perspective, motivation is the element that gives meaning to the activity, relating to the subject matter, the students' needs, and their ways of making sense of the world (Asbahr, 2014).

According to Leontiev (2014), motives can be classified into stimulus motives and motives that shape personal meaning. The former operate primarily in the emotional realm and can either drive the individual toward or away from the activity. Motives that create personal meaning, on the other hand, are those that attribute significance to the activity, establishing connections between the actions performed and their objectives. For this reason, they constitute the central focus of this discussion, since they foster a connection between the activity and the subject's personal meaning, contributing to the formation of their consciousness (Leontiev, 2014; Medeiros, 2021).

Personal meaning refers to the significance that an activity takes on for the individual based on their experiences, needs, and sociocultural context. As Asbahr (2014) points out, "personal meaning reflects the relationship between the motive and the end" (p. 268), influencing the way in which the individual appropriates meanings. Due to its subjective nature, personal meaning cannot be directly measured. Thus, in the process of systematizing educational experiences, it is essential to mobilize motives that foster its development, since

"what ensures awareness of what has been studied is the meaning that study activities hold for the student" (Asbahr, 2014, p. 271).

In the educational context, the teaching experience must link content to students' reality, interests, and experiences, thereby fostering the development of motivations for learning. As Asbahr (2014) points out, awareness of the subject matter is directly related to the motivation that guides the activity and captures the student's attention.

With this in mind, we can consider some guiding questions to ensure that the teaching experience being developed relates to the students' reality:

- What do students already know about the concept to be explored in this learning experience?
- Do students have personal experiences related to this activity?
- What elements of the students' culture can I draw upon to contextualize and explore the concept being taught?
- How can I help students feel a sense of belonging to the activities they are engaging in?
- Am I giving students the space to be creative? To bring their personalities, interests, and needs into what they are doing in the classroom?

These questions can serve as important starting points for developing an experience that creates meaning, connects with students' reality, fosters learning, and broadens the scope of its meanings.

THE ROLES OF TEACHERS AND STUDENTS

The distribution of cognition in learning processes requires a reevaluation of the roles of teachers and students, moving beyond practices focused exclusively on the presentation of content. The teacher acts as a mediator of learning, without relinquishing their role as an educator, as it is their responsibility to "'monitor students' learning and the stages they go through, while always maintaining a focus on the objectives to be achieved" (Moraes, 2017, pp. 62–63).

This is not about equating the roles of teachers and students, but rather about understanding the teacher as someone who, drawing on their experience and knowledge, guides

the pedagogical process through interaction, dialogue, and partnership (Moraes, 2017). Their main challenge is to give meaning to teaching activities, creating conditions for students to actively engage with the learning content. As Marestone and Franco (2024) point out, pedagogical proposals must generate needs that motivate students toward the activity's objectives. To this end, it is essential that the teacher establish a dialogic relationship with students, understanding their realities, cultures, and specific circumstances, in order to design activities capable of creating motivation for learning.

This change also affects the student's role, as they shift from being a mere recipient to taking an active part in the production of knowledge. By understanding the reasons behind the activity and attributing personal meaning to it, students recognize their participation in the learning process, which fosters awareness of the subjects being studied (Asbahr, 2014). In the field of distributed cognition, this role establishes the student as the author of their own learning, since cognitive development occurs through interactions among individuals, artifacts, and the environment (Hutchins, 1995). Thus, in contrast to the passivity often present in traditional teaching experiences, the student is conceived as a researcher and inventor (Pea, 1993), capable of analyzing, making sense of, and acting upon reality through interactions, mediations, and cognitive confrontations (Moraes, 2017).

Taking into account the need for a shift in the roles of both teachers and students, here are some fundamental questions to consider when structuring educational experiences in light of DCT:

- Am I creating spaces where children can be creative, share their ideas, and take action to turn them into reality?
- Is the focus of the class on what I say and write on the board? Or is it on the interactions between students and other elements in the classroom?
- How can I design lesson content so that there are moments when students can create and get hands-on to build their knowledge?
- In my classes, do students spend more time engaging in creative activities, or do they spend more time sitting with their textbooks open, facing the board, and following my instructions?

These questions can facilitate a self-assessment of student engagement, while constantly prompting reflection on the need for everything taught in the classroom to involve student creativity and active participation.

INTERRELATIONSHIP WITH MEDIATING ARTIFACTS

Artifacts, whether analog or digital, are central elements in the systematization of teaching experiences, since, by mediating human activities, they influence students' modes of action, understanding of reality, and cognitive development (Pea, 1993). More than mere tools, they function as cultural productions that transform individuals' relationship with the world, affecting the meanings and motivations attributed to activities. Through them, students can organize their knowledge, construct new pathways for problem-solving, and expand their possibilities for interaction, learning, and participation (Moraes, 2017). Furthermore, artifacts contribute to transformations in the forms of intelligence that are socially valued and in the processes of cognitive, social, and emotional development (Lalueza & Camps, 2010).

To facilitate the construction of teaching experiences that harness the potential of artifacts as mediators, certain questions are necessary to guide the work:

- What digital and analog artifacts will be used in the teaching experience?
- How can these artifacts facilitate the learning process and encourage interaction among students?
- Do the selected artifacts allow for multiple forms of student expression and participation?
- How do the chosen artifacts align with the activity's objectives and the proposed content?
- How will students be guided to use these artifacts actively and collaboratively?

By starting with these questions, the teacher initiates a process of reflection not only on the artifacts themselves and their potential, but also on the possibilities for student action—a process that is essential to the activity. The artifacts enable a shift in the roles played in the classroom and, consequently, also alter the essence of the teaching experience.

ACTIVITY DYNAMICS

After identifying various common elements to design a learning experience, it is necessary to understand what new dynamics need to be implemented in the activity so that these elements can develop. Designing new dynamics for learning experiences that enhance the distribution of cognition requires an understanding of the importance of collective action by students and teachers, based on key concepts of the activity, such as rules and division of labor.

By assuming the role of an author in the construction of knowledge, students begin to engage in investigative processes that go beyond the individual, making collaboration with peers and interaction with different artifacts fundamental elements of learning. In this context, students share knowledge, negotiate meanings, employ various forms of communication, and collectively participate in the construction of knowledge (Moraes, 2017). More than simply engaging in group activities, the goal is to structure collaborative experiences that involve dialogue, decision-making, the expression of opinions, and the negotiation of perspectives (Vieira et al., 2023). This process includes conflicts and disagreements, which are understood as constitutive elements of dialogic practices and cognitive development, in addition to fostering self-reflection and shared responsibility for the learning of the students themselves and their peers (Moraes, 2017).

With regard to rules, educational experiences should establish guidelines to direct the development of activities; these may be defined by the teacher or developed collectively. More than simply regulating behavior, these rules contribute to students' responsible participation and respect for collective decisions. As for the division of labor, it is essential to ensure that all students participate in the decisions, reflections, and cognitive conflicts involved in the activity, avoiding situations of exclusion or isolation.

Finally, the potential of these elements depends on their integration into teaching experiences conceived as spaces for multiple interactions. In an activity system, all structures have mediating potential and influence its outcomes (Cole & Engeström, 1993). Thus, rather than promoting isolated actions, it is necessary to integrate environment, motivation, roles, artifacts, and collectivity into experiences that enable students to investigate, understand, and transform reality, thereby giving meaning to learning.

To reflect on changes in the dynamics of classroom activities, teachers can consider and reflect on the following questions.

- Is the activity taking place collaboratively, with an exchange of ideas, or are the children working in silence, each acting only within their own individual space?
- Am I creating a space where children can share ideas and actions?
- Am I creating an environment of multiple interactions? Are the students constantly interacting with one another and with different objects around them?
- Is the experience challenging from a cognitive development perspective? Are students engaging in discussions, experiencing conflicts of ideas, and resolving them?
- Am I paying attention to the quality of the students' group dynamics? Are students discussing what is important for the activity? How can I mediate and guide this group dynamic toward the activity?
- Am I constantly assessing whether everyone is participating and having a say in the decisions made during group activities?
- Am I directly and constantly intervening in the students' actions, or am I mediating and giving them the opportunity to discover and find relevant solutions to the problems at hand?

These questions are important for considering new dynamics within the context of activities in teaching experiences that promote the distribution of cognition, taking into account the collective nature of learning and the need for multiple interactions in the educational environment.

FINAL CONSIDERATIONS

The primary objective of this study was to investigate how the systematization of didactic experiences, grounded in Activity Theory and the Theory of Distributed Cognition in the early years of elementary education, provides a foundation for pedagogical practices based on multiple interactions and collective engagement. To achieve this objective, the theoretical foundations of Activity Theory and Distributed Cognition were examined, leading to the identification of a set of core elements. In total, five common elements were identified: the organization of the school environment; motives; the roles of teachers and students; the interaction with mediating artifacts; and the dynamics of the activity.

Regarding the organization of the school environment, its importance as the foundation

for the entire development of the activity is emphasized. It is through the organization of the environment in teaching experiences that many processes of distributed cognition can take place. This is because the environment serves as the basis for cultural, material, and social mediations, which enable the expansion of students' and teachers' actions.

In the realm of motives, even though it is not directly related to the distribution of cognition, this element is of extreme importance to the learning process. This is because it is through the systematization of the motives behind activities in teaching experiences that the teacher can provide meaning to students and help them make sense of their actions.

Regarding changes in the roles of teachers and students, it is important to move beyond teaching experiences centered on the teacher and characterized by student passivity. To enhance the process of the distribution of cognition, the student's role must come to the forefront, enabling their active participation and agency within the educational context, with the teacher serving as an integral part of the collective production of knowledge.

The interrelation with artifacts, in turn, was characterized by an understanding of the need to systematize teaching experiences that treat artifacts as mediating elements—culturally complex and of great importance for the distribution of cognition and children's learning.

Finally, changes in the dynamics of the activity are key to moving beyond teaching experiences based on individual actions. For the distribution of cognition, processes involving multiple interactions among individuals, artifacts, culture, and history are essential to enabling collective actions that generate new cognitive pathways. In other words, to develop cognition through various types of interactions, the collectivization of the school environment is essential.

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