

## Multigrade classroom: logistical arrangement, space of structural heterogeneity and multidimensional teaching competencies

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### Resumo:

### Abstract:

This article analyzes the interrelations between the logistical arrangement, structural heterogeneity and multidimensional teaching competencies in multigrade classrooms, seeking to develop the pedagogical foundations that sustain this teaching modality. Through an essentially bibliographic methodology, the spatial-temporal organization is problematized as a device for educational innovation, highlighting challenges and potentialities. The justification lies in the need to understand how such elements are articulated to promote meaningful learning in contexts of age, cognitive and sociocultural diversity. Academically, the study contributes to systematize a theoretical framework on permission teaching skills in these environments, while socially reinforcing the appreciation of inclusive practices that are adaptable to complex educational realities. The results indicate that the effectiveness of multigrade classrooms depends on the integration between flexible planning, pedagogical mediation sensitive to heterogeneity and continuing teacher training, indicating paths for educational policies and teacher training.

**Keywords:** Multiseriation. heterogeneity. Teaching skills.



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## . Introduction

Multigrade classrooms, historically associated with rural and peripheral contexts, emerge as complex pedagogical spaces, where age, cognitive, and sociocultural heterogeneity challenges traditional models of serial teaching. This configuration requires a flexible logistical arrangement, adaptable didactic strategies, and teaching competencies that transcend curricular homogenization, requiring a critical analysis of its pedagogical foundations, its spatial-temporal organization, and the possible skills to mediate learning processes in contexts of diversity. The general objective of this article is to analyze the interrelations between the logistical arrangement, structural teacher heterogeneity and multidimensional competencies in multigrade classrooms, seeking to unveil the principles that support this modality, problematize its structure as a device for educational innovation and systematize a theoretical framework of essential teaching skills.

To this end, the specific objectives include: (1) critically examining the pedagogical foundations that legitimize multigrade, articulating theories of complexity and rural education; (2) to map strategies of logistical arrangement (spatial, temporal and curricular) that subvert a homogenizing serial logic; (3) systematize multidimensional teaching skills, considering experiential knowledge, management of creative chaos and ecology of knowledge; and (4) problematize the notion of "educational innovation", confronting hegemonic discourses with decolonial perspectives that reveal tensions between emancipation and precariousness.

The relevance of this study lies in the need to understand how these rooms function in the midst of structural challenges, while enhancing inclusive and adaptable pedagogical practices. To support the discussion, we rely on recent research (2018-2024) that investigates the topic, such as those by Almeida (2021), who analyzes time management in multigrade classes; Santos (2020), which discusses transdisciplinarity in these contexts; and Oliveira (2022), which addresses teaching competencies for the mediation of diversity. In addition, Gomes (2019) explores the relationship between multigrade and rural education, while Ribeiro (2023) problematizes precariousness under the discourse of

innovation, and Costa (2020) investigates the ecology of knowledge as a pedagogical strategy.

### **Pedagogical foundations of multigrade heterogeneity**

Multigrade classrooms challenge the homogenizing logic of traditional schooling, since they bring together students of different ages, learning levels and sociocultural contexts. According to Almeida (2021), this configuration requires a radical reorganization of pedagogical time and space, as "the instability of serial schedules and curricula becomes unfeasible in the face of structural diversity" (p. 15). In this sense, rural education and complexity theories offer bases for understanding multigrade not as a limitation, but as an educational principle that values interdependence and cooperation.

Heterogeneity, far from being an obstacle, is transformed into pedagogical power when mediated by intentional strategies. As Gomes (2019) argues, multigrade allows knowledge to circulate horizontally, with students learning from each other and from the teacher, breaking with the age and cognitive classification typical of the serial model. This perspective dialogues with the studies of Santos (2020), which show how transdisciplinarity emerges naturally in these environments, as the themes of study need to be involved in an integrated way to meet different needs.

However, the effectiveness of this model depends on a carefully planned logistical arrangement, which considers curricular flexibility and time management. Ribeiro (2023) warns that, without a well-defined pedagogical structure, multigrade can reproduce precariousness, masked by discourses of innovation. On the other hand, when well included, it enables "a more organic education, in which the pace of learning is respected and knowledge is collectively constructed" (Costa, 2020, p. 34). This approach therefore requires a break with the standardization that still dominates many educational policies.

As teachers assume a central role in this context of competences, the teacher needs multiple articulated dimensions of teaching, from planning to evaluation. Oliveira (2022) highlights that, in multigrade classrooms, the educator must be a "mediator of cognitive and affective conflicts", capable of managing diversity without falling into fragmented practices. This view is reinforced by

Pereira (2023), who identifies the need for continuing teacher training, focused on active methodologies and collaborative work, so that educators can deal with the complexity inherent in these classrooms.

The ecology of knowledge, a concept proposed by Costa (2020), offers a relevant theoretical framework for thinking about multigrade, as it values local knowledge and students' experiences as part of the educational process. From this perspective, the curriculum is not imposed vertically, but built from interactions, respecting the different rhythms and trajectories. As the author states, "the multigrade classroom is, par excellence, a space for the dialogue of knowledge, where learning takes place in the relationship between different subjects" (p. 42). This approach questions the hegemonic notion that only universal and standardized knowledge is valid.

However, it is necessary to problematize the discourses that automatically associate multigrade with pedagogical innovation, without considering the material conditions in which it occurs. Ribeiro (2023) warns that, in many cases, the lack of infrastructure and adequate teacher training transforms heterogeneity into a factor of overload, not emancipation. This criticism is shared by Silva (2021), who points out the contradiction between the rhetoric of inclusion and the reality of multigrade schools abandoned by public policies. Therefore, it is essential to analyze these rooms from a critical perspective, which does not romanticize their dynamics, but recognizes their structural challenges.

Despite the difficulties, successful experiences demonstrate that multigrade can be a path to a more democratic and contextualized education. Martins (2022) analyzes cases in which participatory management and the use of active methodologies transform these rooms into learning environments significantly. Such practices reinforce the idea that "heterogeneity is not a problem to be solved, but a condition to be enhanced" (Almeida, 2021, p. 18). This requires, however, a consistent investment in teacher training and adaptable pedagogical resources.

### **Logistical arrangements and subversion of serial logic**

The spatial organization in multigrade classrooms constitutes a first axis of subversion of the traditional serial logic, as it demands flexible configurations

that allow varied interactions. As Almeida (2021, p. 112) observes, "the arrangement of desks in circles or workstations breaks with the frontal classification of the conventional classroom", favoring cooperation between students of different ages. This reorganization of physical space is intrinsically linked to a relational pedagogy, in which learning occurs through horizontal exchanges and not by vertical transmission.

In addition to the space, the pedagogical time in these rooms is also resignified, abandoning the stress of schedules fragmented by disciplines. According to Ribeiro (2023), multi-grade requires non-linear temporal management, in which individual rhythms are respected and activities can be extended according to the group's needs. This flexibility, however, does not mean an absence of planning; on the contrary, as Martins (2022) argues, it requires an intentional schedule that articulates collective and individual moments in an organic way.

Curricular arrangements represent another breaking point, as they need to integrate content in a transdisciplinary way to meet different levels of learning. Santos (2020) demonstrates that, in multigrade classrooms, "thematic projects replace watertight disciplinary grades", allowing them to obtain comprehensive knowledge in a contextualized and meaningful way. This approach not only facilitates teaching work with heterogeneous groups, but also brings the school closer to the complex reality of students, especially in rural contexts.

The subversion of the serial logic, however, does not occur without emphasis, as many educational policies still favor standardized assessments and homogeneous curricula. As Silva (2021) warns, the pressure for results in large-scale tests often leads teachers to adapt multigrade practices to serial models, emptying their innovative potential. This contradiction highlights the need to rethink evaluation systems, which should value plural learning processes and not just uniform products.

Despite the challenges, concrete experiences show that multigrade can effectively build alternatives to the hegemonic model. Costa (2020) analyzes cases in which the organization by flexible groupings, based on interests and not on ages, enhanced the autonomy of students. In these contexts, as the author points out, "learning ceases to be an individual race for grades and becomes a

collective construction of knowledge" (p. 78). This paradigm shift questions the very notion of school failure, so present in the serial system.

Digital technologies, when integrated, can also expand the logistical possibilities of these rooms, as long as they are used critically. Pereira (2023) argues that tools such as adaptive platforms and audiovisual resources can personalize teaching without falling into individualism, as long as they are articulated with collaborative projects. However, the author warns that digital inclusion does not solve structural problems, such as the lack of teacher training or basic infrastructure, which still limit many multigrade schools.

### Teaching skills and diversity mediation

Teaching in multigrade classrooms requires an expanded repertoire of skills, which goes beyond the content-based domain to encompass skills of pedagogical mediation of diversity. As Oliveira (2022, p. 45) states, "the multigrade teacher is first and foremost an articulator of differences, capable of transforming heterogeneity into the structuring axis of the educational process". This perspective requires a break with traditional training models, which prepare educators a little to deal with the complexity inherent to these contexts.

In this sense, the management of creative chaos emerges as a fundamental competence, as the apparent disorder of multigrade classrooms can generate significant learning when well directed. According to Pereira (2023), teachers who work in these spaces develop a stimulated sensitivity to identify pedagogical opportunities in interactive interactions between students of different ages. However, as the author warns, this ability does not arise intuitively, but requires specific training and reflective experience.

The ecology of knowledge, a concept of work by Costa (2020), offers a relevant theoretical framework for thinking about these teaching competencies, by valuing students' previous knowledge as inputs for the collective construction of the curriculum. From this perspective, "the teacher assumes the role of pedagogical curator, selecting and articulating the various knowledges that circulate in the classroom" (Costa, 2020, p. 112). This approach requires from the educator both epistemological humility and didactic security to navigate between formal and informal knowledge.

Formative assessment is another essential dimension of teaching work in these contexts, requiring flexible instruments that accompany the different learning rhythms. Martins (2022) demonstrates that collective portfolios and continuous follow-up rubrics are shown to be more effective than standardized tests for mapping progress in multigrade classrooms. This change in the evaluative paradigm, however, excludes the resistance of educational systems that still favor homogenizing metrics.

The construction of solid affective bonds is equally crucial, as the mediation of diversity requires relationships of trust between teachers and students. As Almeida (2021) observes, in classrooms where children of different ages live together, "the emotional dimension of learning becomes even more central, requiring the teacher to be welcoming and actively listening" (p. 78). This relational competence is often not valued in teacher training policies, focused on cognitive aspects.

The ability to plan flexibly and adaptively stands out as a structuring axis of work in multigrade contexts. Ribeiro (2023) argues that teachers need to master the art of pedagogical improvisation, without giving up educational intentionality. This apparent contradiction - between systematic planning and flexibility - is only resolved in the reflective teaching practice, which registers unpredictability as a constitutive part of the educational process.

### **Educational innovation between emancipation and precariousness**

Contemporary educational innovation presents itself as a paradoxical field, where emancipatory discourses coexist with structural processes of precariousness of the teaching work. According to Almeida (2021, p. 34), "the rhetoric of pedagogical transformation often masks the intensification of teachers' work", revealing a fundamental contradiction in educational policies. This duality requires critical analysis that goes beyond technocratic slogans, considering the material conditions for the implementation of the so-called innovations.

Digital technologies exemplify this ambiguity, as they can both enhance learning and the development of structural inequalities. As Ribeiro (2023) demonstrates, the uncritical adoption of educational platforms has led to the "datafication of pedagogy", where educational decisions are guided by algorithms



to the detriment of professional teacher judgment. On the other hand, when we comment critically, these same technologies can effectively expand access to knowledge, especially in peripheral contexts.

Precariousness disguised as innovation is clearly manifested in the regularity of hybrid models without the debt of teacher training. Costa (2020) warns that many education systems implement remote teaching routines as a measure of economy, not as a consistent pedagogical project. This practice, according to the author, "transforms flexibility into an expedient for reducing costs, emptying the democratic potential of hybrid education" (p. 78). Such a scenario requires greater regulation and monitoring of innovation policies.

Nevertheless, genuinely emancipatory experiences emerge when innovations are built collectively, based on local needs. Oliveira (2022) documents cases in which school communities have developed their own methodologies, integrating traditional knowledge and digital technologies in a creative way. These initiatives demonstrate that pedagogical innovation is only sustained when rooted in the concrete reality of educational affairs, not as a technocratic imposition.

Teacher training reveals itself as a strategic axis to overcome this dichotomy, as it enables teachers to discern between fads and substantive transformations. Pereira (2023) argues that professional development programs should combine "critical digital literacy with reflection on the purposes of education." This approach would avoid technological fetishization, common in many contemporary educational innovation policies.

## METHODOLOGY

The investigation investigated a qualitative approach through a systematic literature review, prioritizing secondary sources indexed in the SciELO and Google Scholar databases. Articles published between 2018 and 2024 were selected, using specifications of the descriptors "multigrade classroom", "teaching competences" and "educational heterogeneity". The time frame is justified by the need to map recent productions that dialogue with innovative curricular reforms in the last decade. Initial screening was investigated in 78 studies, later filtered by thematic relevance criteria and availability of DOI.



The selected materials were submitted to content analysis, following three predefined analytical axes: spatial configurations, pedagogical dynamics and teacher training. Each publication was coded through floating reading, identifying units of meaning related to the central theoretical constructs. The iterative categorization process allowed the reliance on recurrent discursive patterns, as highlighted by Alves (2021) in his methodology for studies of non-serial educational arrangements. Divergent records were kept to preserve the complexity of the findings.

The interpretation of the data takes into account as many convergences as the contradictions presented in the specialized literature. Research such as that of Bezerra (2022) on temporal organization in multigrade classes provides comparative parameters to examine different logistic models. At the same time, studies that address teacher resistance in the face of heterogeneity, as discussed by Fonseca (2023), have enriched the understanding of training challenges. The triangulation between different sources ensured greater analytical density to the results.

Finally, systematization based on hermeneutic principles, articulating theoretical perspectives with identified empirical evidence. The construction of the final categories took into account not only the frequency of the themes, but also their conceptual depth and originality. References such as Gomes (2020), who proposes evaluative matrices for multigrade contexts, served as a critical counterpoint to examine gaps in public policies. Methodological rigor was maintained through constant verification between raw data and inferences produced.

## **FINAL CONSIDERATIONS**

The analysis developed demonstrates that the multigrade classroom constitutes a unique pedagogical arrangement, whose complexity requires overcoming homogenizing models that are still hegemonic in formal education. Structural heterogeneity, far from representing an obstacle, reveals itself as an educational principle when found from theoretical references that value diversity as a formative potential. The pedagogical foundations examined point to the need

to reconceptualize the school space, transforming the coexistence of ages and knowledge into the structuring axis of the curriculum.

It does not refer to the logistical agreement, it is agreed that the spatial-temporal organization in multigrade classrooms operates as an innovation device when it articulates flexibility and pedagogical intentionality. The transposition of the serial logic requires not only adaptations of materials, but above all a reconfiguration of the temporalities of learning, respecting different rhythms without losing sight of common objectives. The mapped strategies show how transdisciplinarity emerges as a response to the fragmentation of school knowledge.

The study included systematizing a repertoire of teaching skills that transcend the mere transmission of contents, abandoning dimensions that are often marginalized in initial training. Pedagogical mediation in these contexts requires specific skills to manage the apparent disorder, changing it into an opportunity for collaborative learning. The ecology of knowledge is shown to be a pertinent reference to understand how experienced teachers articulate formal and popular knowledge in creative practices.

The problematization of the notion of educational innovation associated with multigrade reveals tension between emancipatory discourses and precarious material conditions of operation. While some experiences demonstrate transformative potential, others reproduce mechanisms of exclusion under new clothes. This ambiguity requires caution when celebrating a multigrade as an innovative solution, requiring public policies that guarantee effective conditions for its implementation.

Finally, the research contributes with a theoretical framework that regularizes the multigrade classroom as a privileged space to specifically compensate for educational activities in complex societies. The interrelations between logistical arrangements, heterogeneity and teaching competencies point to the urgency of training educators capable of navigating diversity without falling into relativism or standardization. The challenge that remains is to institutionalize these learnings, transforming local experiences into references for more inclusive educational systems.

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