

**FROM TRAINING TO PRACTICE: CONTRIBUTIONS OF THE TRANSCOMPLEX
APPROACH TO THE DEVELOPMENT OF DIDACTIC SEQUENCES IN
ELEMENTARY EDUCATION**

**DA FORMAÇÃO À PRÁTICA: CONTRIBUIÇÕES DA ABORDAGEM
TRANSCOMPLEXA NA ELABORAÇÃO DE SEQUÊNCIAS DIDÁTICAS NOS ANOS
INICIAIS**

**DE LA FORMACIÓN A LA PRÁCTICA: CONTRIBUCIONES DEL ENFOQUE
TRANSCOMPLEJO EN LA ELABORACIÓN DE SECUENCIAS DIDÁCTICAS EN LA
EDUCACIÓN PRIMARIA**



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ABSTRACT: This study analyzes the contributions of a formative approach grounded in transcomplexity to teaching practice, with emphasis on the development of didactic sequences in the early years of elementary education. It is based on the assumption that pedagogical planning, guided by principles of complexity, transdisciplinarity, and humanizing education, can promote more integrated and contextualized practices. This qualitative and exploratory study was conducted through action research with teachers from a public school. Data were collected through questionnaires, reflective records, and analysis of didactic plans. The results indicate an expansion of teachers' theoretical-practical repertoire and a greater emphasis on contextualized teaching. Challenges remain regarding transdisciplinary integration, problematization, and assessment strategies. It is concluded that the transcomplex approach represents a promising path for rethinking pedagogical planning, although it requires continuous professional development and deeper conceptual understanding.

KEYWORDS: Teacher education. Transcomplexity. Didactic sequence. Humanizing education. Pedagogical planning.

RESUMO: O presente estudo analisa as contribuições de uma dinâmica formativa fundamentada na transcomplexidade para a prática docente, com ênfase na elaboração de sequências didáticas nos anos iniciais do Ensino Fundamental. Parte-se do pressuposto de que o planejamento pedagógico, orientado por princípios da complexidade, da transdisciplinaridade e da educação humanizadora, pode favorecer práticas mais integradas e contextualizadas. A pesquisa, de abordagem qualitativa e caráter exploratório, foi desenvolvida por meio da pesquisa-ação com professores de uma escola pública. Os dados foram produzidos a partir de questionários, registros reflexivos e análise de roteiros didáticos. Os resultados indicam ampliação do repertório teórico-prático docente e maior valorização da contextualização do ensino. Persistem desafios relacionados à integração transdisciplinar, à problematização e às estratégias avaliativas. Conclui-se que a abordagem transcomplexa constitui um caminho promissor para a ressignificação do planejamento pedagógico, embora demande continuidade formativa e aprofundamento conceitual.

PALAVRAS-CHAVE: Formação docente. Transcomplexidade. Sequência didática. Educação humanizadora. Planejamento pedagógico.

RESUMEN: Este estudio analiza las contribuciones de una dinámica formativa basada en la transcomplejidad para la práctica docente, con énfasis en la elaboración de secuencias didáticas en los primeros años de la educación básica. Parte del supuesto de que la planificación pedagógica, orientada por principios de complejidad, transdisciplinariedad y educación humanizadora, puede favorecer prácticas más integradas y contextualizadas. La investigación, de enfoque cualitativo y carácter exploratorio, se desarrolló mediante investigación-acción con docentes de una escuela pública. Los datos fueron producidos a partir de cuestionarios, registros reflexivos y análisis de secuencias didáticas. Los resultados indican una ampliación del repertorio teórico-práctico docente y una mayor valorización de la contextualización del ensino. Persisten desafíos relacionados con la integración transdisciplinaria, la problematización y las estrategias de evaluación. Se concluye que el enfoque transcomplejo constituye un camino prometedor, aunque requiere continuidad formativa y mayor profundización conceptual.

PALABRAS CLAVE: Formación docente. Transcomplejidad. Secuencia didáctica. Educación humanizadora. Planificación pedagógica.

INTRODUCTION

Teacher education has been widely discussed in the field of education as a central element in the development of effective teaching practices (Freire, 2022). In the contemporary context, marked by the complexity of social relations and the need to overcome the fragmentation of knowledge, it is essential to rethink pedagogical planning in light of approaches that integrate knowledge and value the human dimension of education (Boto, 2021; Morin, 2011).

School education has undergone countless transformations over the centuries, reflecting social, political, and cultural changes. Since the 16th century, the school has come to be understood as a space not only for the construction of knowledge but also for the formation of human values (Boto, 2021). However, the traditional teaching model, historically entrenched, has contributed to the fragmentation of knowledge, hindering the development of a holistic education for students by prioritizing the compartmentalization of knowledge at the expense of a coherent and contextualized view of learning.

In this context, didactic sequences serve as a relevant tool for organizing teaching, as they allow for the intentional and progressive structuring of the learning process (Zabala, 1998). However, their development still frequently occurs in a fragmented manner, with little coordination among curricular components and limited connection to students' realities. This gap highlights the need for training initiatives that contribute to redefining pedagogical planning, guiding it toward more integrative perspectives.

In light of this, this study aims to analyze how teacher education grounded in transcomplexity—understood as the intersection of Morin's (2011) complex thinking and Nicolescu's (2018) transdisciplinarity—influences the design and implementation of didactic sequences in the early years of elementary school. It is based on the understanding that the integration of complexity, transdisciplinarity, and humanizing education (Freire, 2022) can foster more meaningful, contextualized, and inclusive pedagogical practices.

As a contribution, this study advances by empirically analyzing the relationship between teacher education and the development of didactic sequences in light of transcomplexity, highlighting how this framework can facilitate the reframing of pedagogical planning in real teaching contexts.

Theoretical foundations for the resignification of instructional planning

The discussion on teacher education and instructional planning is grounded in theoretical perspectives that challenge the fragmentation of knowledge and advocate for integrative approaches. In this regard, the convergence between the ideas of Paulo Freire and Edgar Morin stands out, especially with regard to moving beyond traditional education, historically marked by the linear transmission of content and the dissociation between different bodies of knowledge. Both point to the need for a critical, humanizing, and dialogical education, capable of preparing students to face the complexity of the contemporary world.

Complex thinking, as proposed by Morin (2003), is based on the understanding that knowledge cannot be reduced to isolated parts but must be understood in terms of its interrelationships. For the author, “it is necessary to replace a mode of thinking that isolates and separates with one that distinguishes and unites” (Morin, 2003, p. 89), highlighting the need to reconnect bodies of knowledge. This perspective breaks with reductionist logic and contributes to a broader understanding of educational reality by considering the multiple dimensions that constitute the teaching and learning process.

In line with this approach, transdisciplinarity, according to Nicolescu (2018), proposes transcending disciplinary boundaries, thereby promoting integration among different fields of knowledge. According to the author, transdisciplinarity concerns what lies “at once between, across, and beyond disciplines” (Nicolescu, 2018, p. 53), which reinforces the need for pedagogical practices that articulate knowledge and contexts.

Morin’s contributions, especially in his work *Os sete saberes necessários à educação do futuro* (2011), reinforce this perspective by highlighting that “teaching understanding among people is a condition and guarantee of humanity’s intellectual and moral solidarity” (p. 81). This statement underscores that education must go beyond the cognitive dimension, incorporating ethical, social, and relational aspects.

In the field of education, Paulo Freire (1996, 2022) makes a decisive contribution by proposing a pedagogy grounded in dialogue, problematization, and the valorization of individuals. For the author, “teaching is not transferring knowledge, but creating the possibilities for its production or construction” (Freire, 1996, p. 47). This conception breaks with the “banking” logic of education and reaffirms the active role of students in the learning process.

In this context, humanizing education takes the form of an ethical and political practice, guided by the development of autonomy and critical consciousness. Freire (2022) states that

“dialogue is this encounter between people, mediated by the world, to give voice to it” (p. 22), reinforcing the relational and transformative nature of the educational movement. This perspective implies recognizing students as historical subjects, capable of interpreting and intervening in reality.

Contemporary authors expand this discussion by bringing complex thinking closer to pedagogical practices. Behrens et al. (2022), Morin (2021), and Petraglia (2008) highlight the importance of an education that considers the multidimensionality of the subject and promotes the integration of knowledge. From this perspective, Behrens et al. (2022) assert that the complex approach “proposes a dialogical, intuitive, and recursive rationality” (p. 191), essential for addressing the challenges of contemporary teaching.

Regarding transdisciplinarity, authors such as Martinazzo (2020), Santos (2008), and Suanno (2022) understand it as an epistemological, methodological, and ethical stance. This perspective broadens the understanding of learning by integrating different dimensions of knowledge and considering students’ sociocultural context.

The interplay between complexity, transdisciplinarity, and humanistic education underpins the development of more inclusive pedagogical practices, in which knowledge is connected to the lives and experiences of learners. From this perspective, education involves promoting the collective construction of knowledge, recognizing that learning occurs in the relationship between individuals and the world. As Arelaro and Cabral (2019) emphasize, “students’ prior knowledge is the starting point” (p. 280), and should be expanded through activities aimed at critically examining reality.

In the context of pedagogical planning, these perspectives materialize in the organization of teaching through didactic sequences. According to Ferino (2020), a didactic sequence constitutes “a set of interconnected activities” (p. 35), intentionally planned to guide learning. Complementarily, Barros-Mendes et al. (2012) state that didactic sequences are “forms of organizing pedagogical work” (p. 5), highlighting their structuring role in the educational process.

When considering the educational potential of these pedagogical organizations, it is important to note that planning must go beyond the simple coordination of activities, incorporating practices that promote student agency. As Pham and Ngo (2025) point out, “teaching methods not only encourage active and creative thinking but also emphasize the development of problem-solving skills applicable to real-life and professional situations” (p.

4), highlighting the need for practices that go beyond the mere transmission of content and foster the development of critical awareness.

From a transcomplex perspective, the didactic sequence ceases to be merely a technical tool and instead becomes a space for the integration of knowledge, the critical examination of reality, and the meaningful construction of knowledge. This implies taking into account the complexity of human beings in their relationship with the world, while respecting different paces, experiences, and contexts. As Morin (2021) highlights, it is necessary to recognize “the complexity of human beings and their existence in the world” (p. 252), reinforcing the need for more integrative and humanizing pedagogical practices.

Thus, the articulation between complex thinking, transdisciplinarity, and humanizing education constitutes the epistemological foundation of this research, guiding the development of pedagogical proposals that seek to overcome the fragmentation of knowledge and promote meaningful, critical, and emancipatory learning.

METHODOLOGY

This study is characterized as qualitative and exploratory in nature, conducted through action research. The qualitative approach was adopted because it allows for an understanding of the phenomenon within its context of occurrence, taking into account the relationships, meanings, and interpretations attributed by the participants (Amado, 2014; Creswell, 2014).

The exploratory nature is justified by the objective of deepening the understanding of teachers' perceptions regarding humanizing education, complex thinking, transdisciplinarity, and the use of didactic sequences, seeking greater familiarity with the problem under investigation (Gil, 2002).

As a methodological design, action research was adopted due to its potential to integrate investigation and intervention within the same formative dynamic. According to Tripp (2005), action research involves the active participation of the subjects and critical reflection on practice, with a view to its transformation. This choice proved consistent with the study's objectives, since the research was not limited to the analysis of teaching practices but accompanied a formative dynamic aimed at their reframing.

The study was conducted with teachers in the early grades of elementary school at a public school located in the municipality of Videira, Santa Catarina. The training program included sessions of theoretical study, the development of lesson plans, and the implementation

of these plans in the classroom, integrating theory and practice in a continuous process of reflection.

Data collection took place in interrelated stages. Initially, a questionnaire was administered to characterize the participants and understand their conceptions regarding the use of lesson plans and pedagogical practices. Next, the training activities were carried out, which included guided study, the development of the Transcomplex Teaching Guide, and the implementation of the proposals by the teachers. Subsequently, a second questionnaire was administered, focusing on teachers' perceptions regarding the planning and implementation of the didactic sequences. Additionally, a discussion circle was held, recorded and transcribed, along with an analysis of the teaching scripts developed throughout the process.

The Transcomplex Teaching Guide was one of the main tools of the research, guiding the development of didactic sequences based on elements such as a central theme, problem-posing, the articulation of knowledge, inclusive strategies, interactions with students' realities, and assessment. This framework made it possible to analyze the extent to which the lesson plans incorporated principles of complexity, transdisciplinarity, and humanizing education.

Data analysis was conducted using content analysis, as proposed by Amado (2000, 2014), allowing for the organization of the empirical material into categories of meaning and the interpretation of the meanings attributed by the participants. The analytical process involved an in-depth reading of the corpus, identification of recurrences, similarities, tensions, and contradictions, as well as the articulation between the different data collection instruments, in dialogue with the adopted theoretical framework. The triangulation of the different instruments contributed to the interpretive validity of the data by enabling the analysis of the phenomenon from multiple perspectives.

From an ethical standpoint, the research adhered to the principles applicable to studies involving human subjects, ensuring participants' consent, the confidentiality of information, and the integrity of those involved. The project was approved by the Research Ethics Committee of the University of Alto do Vale do Rio do Peixe (UNIARP), in accordance with decision no. 7,612,818, CAAE no. 88440325.2.0000.0259.

Teachers' conceptions prior to training

Even before the formative training, teachers already recognized didactic sequences as a relevant strategy for organizing teaching, associating them with the contextualization of learning and the structuring of content. However, this understanding was predominantly

practical and not very systematically grounded in theory, and was not explicitly linked to the concepts of complexity and transdisciplinarity. This scenario highlights the presence of teaching knowledge built on experience, albeit lacking in conceptual depth. The data from Questionnaire 1 indicated that, prior to the training, teachers already recognized didactic sequences as a relevant strategy for organizing instruction. In some statements, this understanding appears associated with the contextualization of learning, as indicated by one participant who stated that “the sequence helps organize the content in a way that is closer to the students’ reality” (P3).

It is observed, therefore, that the didactic sequence was conceived as a means of promoting more meaningful learning, linked to students’ reality and social demands, although these conceptions were not explicitly tied to the theoretical frameworks of complexity and transdisciplinarity.

Challenges encountered in the use of didactic sequences

Despite recognizing their pedagogical potential, teachers pointed out various challenges related to the use of lesson plans. The responses indicate that the main difficulties are linked to the practical realities of teaching, as one participant noted: “There isn’t enough time to plan everything in an integrated way” (P5). Another teacher reinforces this perception by stating that “we are not always able to integrate all subject areas as planned” (P3), showing that such challenges are common among participants. These findings indicate that the challenges are not limited to the theoretical understanding of the approach, but also extend to the actual conditions of its implementation.

In addition, difficulties related to student engagement and curricular requirements were also mentioned, highlighting tensions between the proposal for more integrated teaching and institutional demands. These findings suggest that, although the didactic sequence is valued, its implementation still faces limitations in the school context.

Strategies for adapting to students’ needs

The results indicate that teachers were already developing strategies to adapt didactic sequences to students’ needs, demonstrating sensitivity to the diversity present in the classroom. Among the actions mentioned, the following stand out: differentiation of activities, the use of multiple pedagogical resources, and individualized support.

There is also a focus on valuing students' prior experiences and knowledge, as well as on creating more welcoming learning environments. These elements highlight the presence of practices aimed at inclusion and greater flexibility in teaching, even if they are not always systematically incorporated into lesson planning.

Perceptions regarding the impacts of didactic sequences on learning

Regarding the impacts on learning, teachers expressed a predominantly positive view, linking the use of didactic sequences to increased student engagement and participation. On the other hand, this perception is not uniform, as limitations also emerge regarding implementation conditions, class profiles, and planning difficulties, revealing tensions between pedagogical intent and the concrete possibilities of practice.

Furthermore, the data also reveal a contextualized understanding of these results, as teachers recognize that the effectiveness of the sequences depends on the class profile, implementation conditions, and the strategies adopted. This perception indicates a critical and non-idealized view of pedagogical practice.

Another relevant aspect identified relates to teachers' reflective stance toward their own practice. The responses indicate that the evaluation of didactic sequences is associated with observing student performance and engagement, class feedback, and the exchange of experiences among colleagues.

These elements indicate that teachers already engage in processes of analyzing and revising their practices, which constitutes an important aspect for professional development and for resignifying pedagogical planning.

Teacher training in the context of action research

The teacher training program was structured based on the principles of action research, combining periods of study, reflection, and the development of teaching practices. Initially planned for 12 hours, the training was expanded to 18 hours, divided between asynchronous and in-person sessions held at the participating school.

The training program focused on understanding and applying the fundamentals of complexity, transdisciplinarity, and humanizing education, with an emphasis on resignifying pedagogical planning through the development of Transcomplex Teaching Guides.

The sessions were organized progressively. In the initial stages, the goal was to familiarize participants with theoretical frameworks, using videos and readings as catalysts for

reflection. These sessions served to raise awareness, facilitating the revisiting of past experiences and the critical examination of pedagogical practices, particularly regarding the fragmentation of knowledge.

In the in-person meetings, the centrality of dialogue and collective construction stood out, evident in group discussions, the sharing of ideas, and the systematization of concepts. The interactions revealed that, in this context, although teachers recognize the importance of more integrated and contextualized practices, they still face challenges in implementing them in everyday school life.

In the next phase, focused on linking theory and practice, teachers were encouraged to develop pedagogical proposals based on guiding themes, subtopics, and issues, taking into account the realities of their classrooms. This process revealed initial difficulties, particularly in defining problems and organizing lesson plans in an integrated manner, but it also showed progress as teachers began to collaboratively develop their proposals.

The development of teaching scripts and their sharing demonstrated the participants' engagement and openness to incorporating new forms of planning. Despite emerging doubts and insecurities, especially in the face of a break with traditional models, a shift toward reframing teaching practices was observed, even as traditional models persisted, particularly in the difficulty of breaking away from fragmented practices and the centrality of the teacher in the teaching process.

The training emerged as a space for reflection and reconstruction of teaching practice, in which teachers were able to revisit their knowledge, share experiences, and experiment with new possibilities for organizing instruction. This scenario demonstrates that pedagogical change does not occur in a linear fashion, but through advances, resistance, and adaptations, revealing the complexity of the formative training.

Results of Questionnaire 2: planning, implementation, and resignification of practice

The analysis of Questionnaire 2 revealed significant shifts in the resignification of teaching practice, particularly regarding the interplay between planning, implementation, and pedagogical reflection, which is a central feature of action research.

- a) Transcomplex planning: between challenge and the expansion of pedagogical awareness. Teachers recognized planning based on the transcomplex guide as a complex and challenging activity, particularly due to the need to integrate knowledge, define

guiding themes, and structure proposals for longer periods. This shift reveals a break from fragmented and occasional practices, indicating a transition toward a more systemic and relational approach. However, the data reveal that this incorporation occurred gradually and, in some cases, was still marked by difficulties in articulating the different elements of planning. As one participant highlights, “it is difficult to organize everything in an integrated way, especially at the beginning” (P4), showing that understanding the proposal does not always immediately translate into its implementation. Even so, the accounts indicate that the new model fostered a broader pedagogical perspective, especially regarding the articulation between content, the intentionality of teaching, and the development of more meaningful proposals;

- b) Contextualization and problematization: bridging the gap between school and reality. For the most part, teachers indicated that the planning made it possible to better align school content with students’ real-life experiences. The choice of themes linked to daily life and the emphasis on students’ experiences fostered the problematization and construction of meaningful learning. As one participant noted, “when the theme stems from their reality, they are more involved” (P6), highlighting the relevance of contextualization for student engagement. Nevertheless, the data indicate that this integration does not always occur in a thorough manner, especially regarding the systematization of problematization throughout the proposed activities. This trend highlights the incorporation of a perspective aligned with complexity, by recognizing knowledge as situated and relational, and with transdisciplinarity, by fostering connections between different dimensions of reality;
- c) Transdisciplinarity and humanistic education: advances and tensions. The transdisciplinary approach was recognized as feasible and relevant, and was incorporated primarily through the integration of different fields of knowledge. However, tensions emerged regarding curricular rigidity and the difficulty of integrating social and cultural dimensions in a more in-depth manner. Regarding humanized teaching, the data reveal a strong presence of practices based on dialogue, active listening, and valuing students’ individuality. These actions indicate a shift in the focus of teaching toward a more relational perspective, albeit with varying levels of adoption among teachers;
- d) Implementation of the didactic sequence: protagonism, flexibility, and situated learning. During implementation, it was observed that student protagonism was fostered by

strategies that encouraged active participation, the expression of ideas, and the construction of knowledge based on students' own experiences. Flexibility in planning emerged as a central element, highlighting the understanding of pedagogical practice as adaptive and constantly reconfiguring in response to the demands of the educational context. Adjustments were made continuously, taking into account learning paces, difficulties, and specific contexts. Furthermore, valuing students' prior knowledge and experiences strengthened the construction of more meaningful learning, reaffirming the centrality of the individual in the educational process;

- e) Impacts on learning: critical development and connections to reality. Most teachers identified changes in student behavior, particularly in the development of critical thinking, participation, and the ability to make connections between academic knowledge and reality. This perception is also evident in teachers' accounts, such as that of a teacher who notes that "students participate more when they can see meaning in what they are learning" (P7). Although teachers acknowledge progress, they also indicate that these results depend on specific conditions, revealing a tension between pedagogical intent and practical feasibility. In this context, these transformations, in addition to being gradual, coexist with structural and pedagogical limitations, indicating that change does not occur in a linear manner;
- f) Structural and training challenges: obstacles to the consolidation of the proposal. During the training, some teachers reported initial difficulties, noting that "thinking about the guiding theme and the problem at the same time was challenging" (P2). Despite the progress made, teachers pointed out significant challenges, such as time constraints, the difficulty of integrated planning, the need for greater coordination among teachers, and the restrictions imposed by the school system itself. In addition, a demand for ongoing professional development emerged, especially regarding the implementation of transdisciplinarity and the development of practical strategies, highlighting that the consolidation of the transcomplex approach depends on continuous and in-depth professional development initiatives.

These findings indicate that the consolidation of transcomplex proposals depends not only on teacher training but also on institutional and organizational conditions that support collaborative and integrated practices.

DISCUSSION OF THE RESEARCH FINDINGS

The analysis of the results shows that the development of didactic sequences grounded in transcomplexity goes beyond the instrumental dimension of planning, constituting an epistemological shift in the way we understand the educational process. As evidenced by the empirical data, this process involves moving beyond fragmented logics toward a systemic, relational, and contextualized understanding of teaching.

The findings indicate that knowledge comes to be understood as a situated construction, emerging from interactions between subjects, contexts, and experiences. This perspective resonates with Freire's (1996) critique of banking education, according to which "teaching is not transferring knowledge, but creating possibilities for its production" (p. 47). Similarly, Morin (2011) asserts that "relevant knowledge must confront complexity" (p. 38), indicating the need to overcome reductionist approaches. In this vein, the valorization of students' prior knowledge and experiences assumes a structuring role in pedagogical planning.

The critical examination of reality emerges as the central focus of this process. In line with Freire (1989), "reading the world precedes reading the word" (p. 11), which reinforces the need to ground teaching in the concrete experiences of the learners. This understanding is linked to complex thinking, which recognizes the inseparability of the part and the whole, and to Nicolescu's (2018) transdisciplinary perspective, which conceives knowledge as the result of the interplay between different levels of reality.

In the realm of teaching practices, the results reveal a transitional landscape marked by tensions between continuity and advancement. There is a noticeable incorporation of more integrative, collaborative, and contextualized strategies; however, traces of traditional models persist, especially in the centrality of the teacher and in the difficulty of operationalizing problematization and transdisciplinarity. This trend confirms that the transformation of pedagogical thought occurs gradually, as Morin (2003) indicates when arguing for the need to reform thought as a condition for educational change.

Transcomplex training proved fundamental in this process by fostering the expansion of teachers' epistemological awareness. Teachers began to recognize practices previously developed intuitively and to reinterpret them in light of theoretical frameworks. This shift aligns with Freire's (2022) notion of praxis, understood as the articulation between reflection and action regarding reality.

The analyses indicate that, prior to the training, teachers already valued aspects such as dialogue, welcoming, and participation of students, albeit without a consistent theoretical

framework. After the training, greater intentionality is observed in the articulation between planning, development, and evaluation, indicating an understanding of planning as dynamic, flexible, and reflective.

However, challenges remain regarding effective transdisciplinary integration, the development of meaningful problematizations, and the expansion of assessment practices. On the other hand, Nicolescu (2018) emphasizes that transdisciplinarity is not limited to the articulation between disciplines, but involves transcending their boundaries, which still presents a challenge in the school context.

In this scenario, the Transcomplex Teaching Guide serves as a relevant mediating tool by linking theoretical foundations and pedagogical practice without being prescriptive. Its contribution lies in organizing planning as an open and recursive practice, in line with Morin's (2011) understanding that knowledge involves constant reconstruction.

One aspect that stood out throughout the analysis relates to the evaluative dimension of didactic sequences. Although recognized by teachers as a central element of pedagogical planning, difficulties in its implementation became evident, especially regarding the incorporation of evaluative practices consistent with the principles of transcomplexity and humanizing education. This tension reveals the persistence of traditional assessment models, often required by the educational system, which limits the consolidation of more integrative approaches. In this sense, it is acknowledged that the present research did not explore this dimension systematically, indicating it as a limitation of the study and as a possibility for future investigations, especially regarding the articulation between assessment, problematization, and transdisciplinary pedagogical practices.

Overall, the results indicate that transcomplexity contributes to the promotion of humanizing pedagogical practices by repositioning planning as a space for the integration of knowledge, individuals, and contexts, reinforcing the centrality of dialogue, problematization, and contextualization in the educational process.

FINAL CONSIDERATIONS

The present study aimed to understand how the development of didactic sequences grounded in transcomplexity can contribute to the promotion of humanizing pedagogical practices in the early years of elementary school. Through the integration of theoretical review and empirical data generated in an action research study, it was possible to identify significant

advances in understanding and teaching practice, as well as limitations that still exist for the consolidation of this approach in the school context.

The results show that teacher training guided by the principles of complexity, transdisciplinarity, and humanizing education contributes to the resignification of pedagogical planning, shifting it from a fragmented logic to a more integrated, contextualized, and relational perspective. This shift is expressed in the expansion of teachers' pedagogical awareness, the valuing of students' prior knowledge, the incorporation of problematization as a structuring axis, and the attempt to articulate different areas of knowledge.

It is also worth noting that transcomplexity promotes an understanding of planning as a dynamic, open, and reflective process in which teaching and learning are interdependent. From this perspective, the Transcomplex Teaching Guide proved to be a valuable tool for mediating the relationship between theory and practice, by enabling the development of pedagogical approaches that are more attuned to students' realities and the multiple dimensions of learning.

However, the findings also show that the incorporation of this approach occurs gradually and non-linearly. Challenges persist regarding the operationalization of transdisciplinarity, the construction of more consistent problem-based learning, and the overcoming of assessment practices still centered on traditional models. Furthermore, structural factors, such as planning time, curricular organization, and institutional conditions, directly influence the possibility of consolidating these practices.

In light of this, the importance of continuing training dynamics that are not limited to the presentation of theoretical frameworks but that promote spaces for reflection, experimentation, and the collective construction of teaching knowledge is emphasized. Action research, in this context, emerges as a powerful approach by integrating training and practice in a cohesive manner, fostering the production of situated knowledge and the transformation of pedagogical practice.

As a contribution, this study broadens the debate on pedagogical planning by highlighting transcomplexity as a theoretical and methodological framework capable of supporting more integrative, critical, and humanizing practices. At the same time, it points to the need for conceptual deepening and a reconfiguration of teachers' working conditions, in order to facilitate the consolidation of approaches that integrate knowledge, context, and holistic professional development. As a scientific contribution, the study highlights the potential of the Transcomplex Teaching Guide as a formative and analytical tool, linking theoretical foundations and teaching practice in a process of resignifying pedagogical planning.

Furthermore, the study's findings also prompt reflection on initial teacher education, given the complexity inherent in the transcomplex approach analyzed here. The incorporation of principles such as transdisciplinarity, problematization, and the integration of knowledge highlights the need for these foundations to be addressed from the outset of initial teacher education, rather than solely in continuing professional development programs. In this regard, the relevance of future research that links initial and continuing education is highlighted, in order to understand to what extent teacher preparation can foster the implementation of pedagogical practices that are more inclusive and aligned with the contemporary challenges of education.

Future research is encouraged to explore the application of the transcomplex approach in other educational contexts, as well as its long-term impacts on student learning, thereby contributing to the advancement of pedagogical practices committed to addressing the complexity of contemporary education.

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