

Dialogues with Thinkers on Problematizing Practices for the Teaching of Mathematics in Early Childhood Education

Diálogos com Pensadores sobre Práticas Problematizadoras para o Ensino da Matemática na Educação Infantil

Diálogos con Pensadores sobre Prácticas Problematizadoras para la Enseñanza de las Matemáticas en la Educación Infantil

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Abstract

This article exposes part of a research of a teacher who teaches mathematics, based on her personal experiences as a basic education student and during her initial education in pedagogy and professional performance in early childhood education, phenomenological character, and whose theoretical section was presented in narrative format. Therefore, the literature review on theories associated with the research subject was developed in a dialogue format with researchers and thinkers considered key to the study. This text presents the dialogues with these authors whose ideas and concepts guided the researcher's thoughts in a movement of hermeneutic contemplation about their experiences, explaining the want to do pedagogical and opening ways for new questions.

Keywords: Teachers' Narratives. Research (Auto)biographical. Mathematics Teaching. Dialogical Education. Professional Teacher Development.

Resumo

Expõe-se parte de uma pesquisa de uma professora que ensina matemática, baseada em suas experiências pessoais, como aluna do ensino básico, sua formação inicial como pedagoga e atuação profissional na educação infantil, de caráter fenomenológico, e cuja seção teórica foi apresentada no formato de narrativa. Assim sendo, a revisão da literatura sobre teorias associadas com o assunto de pesquisa foi desenvolvida no formato de diálogo com pesquisadores e pensadores considerados chave para o estudo. Neste texto, são apresentados os diálogos com esses autores, cujas ideias e conceitos nortearam os pensamentos da pesquisadora, em um movimento de contemplação hermenêutica, acerca de suas experiências, explicando o fazer pedagógico e abrindo caminhos para novos questionamentos.

Palavras-chave: Narrativas de Professores. Pesquisa (Auto)biográfica. Ensino de matemática. Educação Dialógica. Desenvolvimento Profissional Docente.

Resumen

Se expone parte de una investigación de una profesora que enseña matemáticas, basada en sus experiencias personales, como alumna de la enseñanza básica, su formación inicial como pedagoga y actuación profesional en la educación infantil, de carácter fenomenológico, y cuya sección teórica fue presentada en el formato de narrativa. Así, la revisión de la literatura sobre teorías asociadas con el tema de investigación fue desarrollada en el formato de diálogo con investigadores y pensadores considerados clave para el estudio. En este texto se presentan los diálogos con esos autores cuyas ideas y conceptos guiaron los pensamientos de la investigadora, en un movimiento de contemplación hermenéutica, acerca de sus experiencias, explicando lo que quiere hacer pedagógico y abriendo caminos para nuevos cuestionamientos.

Palabras clave: Narrativas de Profesores. Investigación (Auto)biográfica. Enseñanza de matemáticas. Educación Dialógica. Desarrollo Profesional Docente.

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1. Introduction

This article is an excerpt from Peixoto's research (2022), whose object of study was the author's personal experiences around mathematics as a regular elementary education student and in the initial education in the pedagogy course, but also in her professional work as a teacher of early childhood education. The objective of this work is to present the polyphonic dialogue that, in the meeting with leading thinkers and researchers, allowed the construction of its theoretical and conceptual foundation. In this dialogical polyphony, we mention Bakhtin's (1981) conceptions, which, according to Mônica Franciele de Souza Dourado (2018), refer to

[...] a discourse in which several contradictory ideological voices coexist with the author's speech in an equivalent way. This conception comes from Bakhtin's postulates regarding the dialogic principle. For him, the reciprocity of statements is fully manifest due to their social character since dialogue can only be constructed based on a speaker/listener relationship. As Bakhtin mentions, (...) the enunciation as such is a pure product of social interaction, whether it is a speech act determined by the immediate situation or by the broader context that constitutes the set of living conditions of a given speech community. (BAKHTIN, 1986, p. 121) Thus, language must be conceived based on the foundation of dialogism, considering the multiplicity of voices that accompany each word, the idea that all discourses are permeated by the thoughts of others who thought them previously, or at the same time as us [...]

(DOURADO, 2018, p. 4, §1-§4)

Thus, the theoretical body on which Peixoto's research (2022) was based was constructed by developing an imaginary dialogue between the researcher and her interlocutors, which allowed the articulation of the concepts they defended and the researcher's experiences who, paying attention to the contributions of the referenced authors, developed at all times a continuous movement of: "listening" to the voices of others, reflecting on them, contrasting them with her own experiences; "metabolizing" them (HIDALGO; GONZÁLEZ; 2009), and constructed the "Repertoire of Theoretical and Conceptual Coordinates of Reference" (GONZÁLEZ, 2017) of her research.

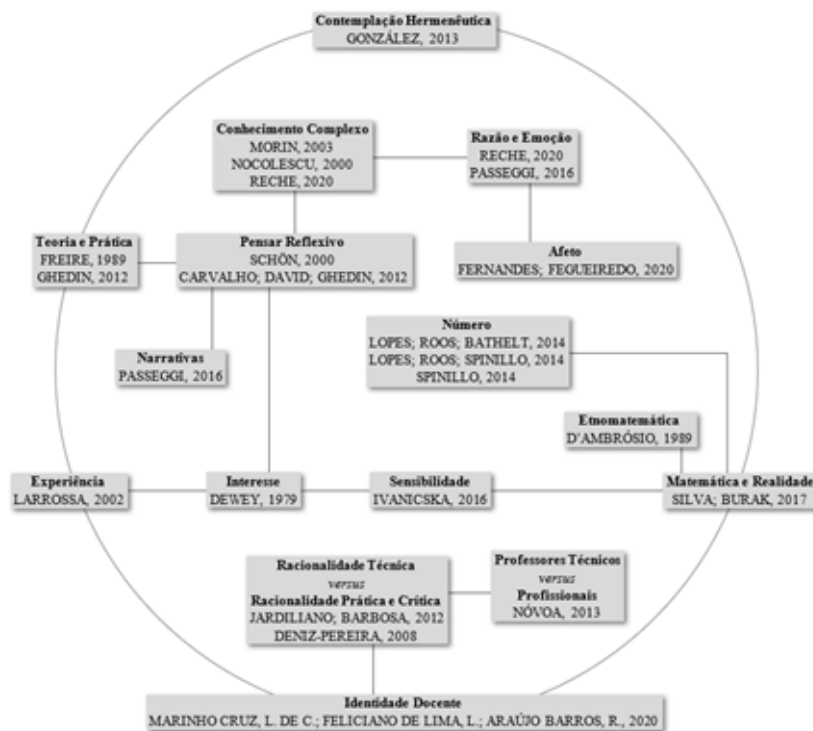
The written report of the outcomes of the dialogues was in a narrative format in which, appealing to my imagination, I created scenarios that allow the reader to take a stand in the context (idealized by me as a researcher) where the "dialogue" took place. The way the dialogues were presented made the part of the dissertation document that refers to the theoretical basis of the research not have the rigidity of academic course completion work in general. ***Presenting the theoretical section of the research narratively implied a great challenge that required me to carry out many readings from which I could make the narrative as credible as possible.***

It is important to emphasize that the interlocutors in the dialogues were selected based on what they had to say about the various aspects of the research (affectivity in teaching and learning mathematics; the transition from the condition of a student to the condition of a professional teacher; the initial moment of insertion in the actual work context); these aspects operated as criteria for choosing the authors with whom to dialogue; thus, the authors who defend the concepts and theoretical positions that are part of the researcher's pedagogical practice were chosen, but who were mainly responsible for her formation as an educator.

2. Echoes of the voices of my early education

During my initial education, I learned many theories and kept many of their authors by my side. I sought to understand some of them in greater depth, trying to appropriate them until I could incorporate them into my practices as a teacher, which transformed as I developed my master's research, whose theoretical basis I built by developing imaginary dialogical encounters with some of the authors who developed theories that intersect with my practices and helped me clarify many of my questions. Figure 1 presents the authors and their key concepts in the dialogues.

Figure 1: Conceptual Map of the Repertoire of Theoretical and Conceptual Coordinates of Reference



Source: The authors

Figure 1 presents all the authors used to compose the theoretical basis of the study. However, even though this conceptual map is an adequate means to summarize them, I must explain the various reasons for working with them and their theories. Thus, diverting from the rigidity of the structures of many academic works when describing the theoretical framework, I propose having a dialogue with the authors, developing a more informal conversation with them to understand better what they deal with in their theories and what their main concepts are, highlighting those that best articulate with my own work.

3. A retrospective journey in search of my interlocutors

Many of the authors I present in this work lived in other eras, some have even passed away. That is why I had to take a long trip back in time to be able to talk³ with them and delve deeper into the theories of Bicudo (1999, 2011), D'Ambrósio (2019), Dewey (1979), Freire (1989, 1996), Ghedin (2004), González (2017, 2020), Morin (2003, 2008), Nicolescu (1996), Passeggi (2011, 2021), Schön

³All dialogues described here will be based on works that will be cited throughout the text, all of which are, therefore, indirect citations.

(2000), Vygotsky (1998) and many other mathematicians whom today lead my reflections on mathematics teaching, reflective practices, and teacher education, guiding also my work as an educator.

The dialogues held with each of my interlocutors are presented in a narrative format; the analysis of the content of these narratives allowed me to establish relationships between the theories supported by the authors with the proposals developed by me in the classroom, but also with my thinking as a pedagogy professional who combines her practice with research. Therefore, I reflect on the importance of this theory-practice-theory blend that, in a continuous movement, helps me construct my identity as a teacher.

4. Dialogues with Thinkers of Educational Theories

Below are the transcripts of dialogues held with the great theorists of education: John Dewey, Paulo Freire, Donald Schön, Lev Vygotsky, and Edgar Morin, who were essential in constructing the general theoretical basis of the research.

4.1. Dialogue with John Dewey

The trip was a bit turbulent, I was a little worried, but I arrived safe and sound. My destination was the mid-late 19th and early 20th centuries, when John Dewey lived. I met him at the University of Chicago, in its garden, with its green flora. I arrived just in time for afternoon tea, and during that calm afternoon, I could talk to one of the most relevant thinkers in education.

When I met Dewey, I greeted him with a big bow and although we talked about life and family, I tried to highlight in the conversation one of his main books, entitled Democracy and Education, which also anchors my research. Thus, I asked:

—Mr Dewey what are the main ideas of your theory and, therefore, of your book Democracy and Education, from 1979?

Dewey began by explaining his main ideas in a very objective manner. He drew attention to the fact that some of them were in this book, emphasizing that its publication was very important to him. In response to my question, Dewey stated that he intended to disclose that ideas should be instruments for solving real problems. In this sense, one of its objectives was to educate the child as a whole, from their physical, emotional, and intellectual growth. Therefore, he assumed that his students learned better by carrying out tasks associated with the content, that is, that theory and practice were inseparable.

Continuing his speech, John stated that his theory resulted from extensive collective discussions in which experiences from which learning occurs can be shared in democratic environments. He also told me that experience was one of his main concepts and that the educational process succeeds through experience. Ah! Still discussing experiences, Dewey stated that not all are educational, and some may be disconnected. He concluded that everything depends on the quality of the experience one goes through. During his speeches, I asked:

—And where should this process occur?

He stated:

—At school.

And went on:

—That's because it is at school that children should learn to live in the world. Much more than reproducing knowledge, the school has the fundamental role of transforming the subjects and their context.

After answering this very important question, we took a break to have tea and biscuits, which, like the atmosphere, were perfect. We walked around the garden for a while, and John

showed me the university he was one of the founders. During the stroll, we continued our conversation, which is when I asked about the role of reflection in his theory. The theorist quickly replied that reflection goes hand in hand with practice and that every educational experience must happen through a process of reflection. I asked him again:

—How does this happen in the classroom?

He replied:

—Through problematization. For problematization to exist, the activity must be interesting for the student, which is another fundamental concept of his theory. Based on their interest, children become much more curious, and when they problematize, the challenge of dealing with new knowledge becomes greater.

During this speech, Dewey drew my attention to the fact that the educator's knowledge is still important and cannot be discarded, as is the curriculum, and that this should make students reflect on such problems and corroborate them so that they can elaborate the concepts, in contrast to the knowledge already systematized.

After chatting for a while, the time came to say goodbye to him, and I set off on a new journey. When I left Dewey at his university and set off for the times of his future follower, it was already getting dark.

4.2. Dialogue with Paulo Freire

*Continuing my journey, I headed to 1962, when the most critical literacy movement in Brazil began, conceived and directed by Paulo Freire. Freire, a Brazilian educator who lived between 1921 and 1997, was a teacher who gave voice to a new literacy method. He had many books published that are essential to this day. During my conversation with this educator, I emphasized the books *Pedagogy of the Oppressed* and *Pedagogy of Autonomy: Knowledge Necessary for Educational Practice*. It is worth remembering that, although we talked about the ideas contained in these two books, both had not yet been written or published, but, given the direction of the conversation, what was said is written in the books.*

I met Paulo Freire in Angicos, a Rio Grande do Norte countryside city. He spoke openly to me, showing the environment in which he organized himself to give classes to adult illiterate farmers. At first, I asked him where so many ideas had come from, and I discovered that Dewey's ideas strongly influenced Freire. In this way, he was one of those responsible for bringing and leveraging progressive education, initiated by John Dewey, to Brazil. As we talked, I became interested in knowing why he had become involved in this educational movement, and Freire explained to me that, like Dewey, he believed in an education that started from the context of the student's life; that it was essential to develop his pedagogical practices based on the experiences of the leading actor in the teaching-learning process: the student.

In the ongoing conversation, he stated that, in his practice, the student was seen as an active subject and that, instead of receiving knowledge, he was one of the main people responsible for this process. As I was inquisitive, I asked Paulo what he meant by "receiving knowledge," to which he replied with all his naivety:

—The education we are used to does not make our students think or reflect on the teaching in which they are involved. The teacher is seen as the one who possesses and holds knowledge and is responsible in the educational process for transferring knowledge, like a bank; in this way, this education that I speak of I call banking education.

The conversation was very interesting. We stopped for a coffee but continued talking. Being very curious, I asked him what kind of education he believed in and, therefore, what kind of education he developed. Freire replied that he advocated a transformative education and went on:

—The education that transforms the individual's life is the one that I defend with all my strength. And to transform, teaching cannot be one in which knowledge is transferred, but must be tirelessly lived and witnessed, which is why, like Dewey, I believe that theory and

practice are inseparable, because the teacher, besides believing and discussing ontological and epistemological issues, must put them into practice, in teaching with the student.

So, I asked:

—What should this relationship between student and teacher be like for transformative education to spread?

Freire explained in detail that the relationship between student and teacher must be dialogical for education to be transformative. Moreover, a dialogical relationship—as the concept itself is called—starts from the dialogue in which student and teacher develop together the knowledge necessary to construct new knowledge. Ah! He also stated that the teacher should not feel uncomfortable for not knowing how to answer the questions asked by the students, but that, through dialogue, he should be sincere and open to saying that he does not know, and together with the student, try to uncover these epistemological curiosities.

The day went on, and I did not realize hours were flying by. Even though I wanted to continue talking for hours and hours with Professor Paulo, I had to move on. However, I needed to ask him the last question, actually two: What would a problem-based education be, and how could I, as a teacher, develop problem-based teaching in my classroom? Thus, he told me that problem-solving education is one in which the student is made to reflect critically on the educational context in which he/she lives and that he/she can build a relationship between theory and practice to elaborate on new knowledge. He stated that as a teacher, I should challenge my students by presenting practices in which they must think to solve problems. He also said that such problems and, more than that, these problematizations must come from the context in which they live so as not to repeat examples such as the activity “Ivo viu a uva.” [Ivo saw the grape] Then, the teacher asked me:

—Has your student ever seen a grape? Did he have the pleasure of experiencing it? Does he know who produced it? And what's more... Does he know what the work of the person who produces it is like? That this professional lives in a context of exploitation?

And concluded:

—Bringing students' experiences into the classroom helps them understand that this is their place, that school is the space where they can learn a variety of knowledge they will use throughout their lives.

At the end of our conversation, Freire caught my attention by saying:

—Remember that on top of these things I have already told you, another one is also essential for educational practice: teaching requires loving the students.

So, he explained:

—The teacher must feel open to demonstrate his affection for his practice and for his students, and this does not mean that he should leave aside his rigor, quite the opposite because when the educator seeks to be rigorous in his teaching work, he becomes responsible and shows respect for education. Furthermore, the fact of being an affective educator should not be an impediment to fighting for their rights and accepting everything that the system imposes on teachers and their profession.

After saying these words, I said goodbye with a big hug and thanked him for all the knowledge I had learned and that, from then on, I could take to my classroom and my life.

4.3. Dialogue with Donald Schön

I resumed my journey the following day because I was already quite tired. I would search for a dialogue with Dewey's contemporary, Donald Schön. That is how I arrived at the Massachusetts Institute of Technology in Boston, USA. Schön was a professor there, and there he explained his entire theory to me. Although Schön's main book, *Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions*, was only published three years after his death, I wanted to find out from him what the bases that supported his theory on the concept of the reflective teacher were.

When I asked Schön about the beginnings of the concept of the reflective teacher, he replied that, before this theory emerged, he had drunk from the source of the pragmatic thought of theorist John Dewey. Surprised, I told him that I had just met John and told him how amazed I was by his whole theory. At that moment, Donald told me this was why he wanted to follow in his footsteps. As I had already had contact with Dewey's theory, I already knew that one of its characteristics was that theory and practice are inseparable, and this was the main reason for Schön to develop his thinking on the reflective teacher.

During our conversation, Professor Schön explained that he was completely against the ideas of traditional education, in which theory and practice are separated from each other. In this sense, guided by Dewey's reflective thinking, he created the concept of a reflective professional.

Schön defended that, following reflective thinking, the reflective professional becomes responsible for reflecting on his professional practice; that is, the teacher learns in action and by doing. Then I asked how, in his view, a teacher could be a reflective professional, to which he promptly replied:

—A teacher who reflects develops his work based on the context in which he is present, who, in his own practice, stops and thinks critically about what they are working on in their classroom, self-evaluating their teaching. Therefore, the teacher learns by doing.”

At the end of our conversation, I asked if the concept of a reflective teacher only encompassed teachers who already had experience in teaching practice, and he told me that no, on the contrary, teachers in initial education could indeed reflect on their future practices as a way of building a critical and reflective mindset about their work from the start.

*After answering this question, I paused my conversation with Schön and told him that I would look for someone who would love to meet him. So, I brought with me, in my time machine, fellow researcher and educator Evandro Ghedin. He, who is a contemporary of Schön's ideas, felt privileged to be able to meet him. At that moment, Ghedin thanked Donald for his ideas and spoke briefly about the book he and another teacher had organized: *Professor reflexivo no Brasil: gênese e crítica de um conceito*. According to Evandro, after coming into contact with Donald Schön's ideas, both decided to apply the concept in the Brazilian education context, which generated profound reflections on the initial and continuing teacher education scenario. About his book, Ghedin said that they could demystify some erroneous interpretations about the concept of reflective teacher and give voice to the origin of the concept proposed by Schön, inspired by John Dewey's theory.*

After this splendid double encounter, I thanked Schön for all his teachings. Ghedin also thanked him for his enormous contribution to education. I also thanked Ghedin for accepting the invitation to meet with Schön and for his contributions to my pedagogical practice. Then, I continued my journey towards new lands.

4.4. Dialogue with Lev Vygotsky

*I returned to the early 20th century, and I ended up in Belarus, where I met Vygotsky. Initially, I told this scholar about the great success of his works today, his future in time, and his education and how much they contributed in this sense. He seemed quite happy and moved by the results of his studies. At first, he told me about his studies in psychology and that Marxism strongly influenced his ideas. Thus, his theory is undoubtedly based on the principle that one must consider the subjects' context, that is, their social environment, which is a founding element of their learning process. Speaking about this, I was quite excited and asked some questions since I was with the creator of the socio-historical theory of education. So I focused on this famous theorist's ideas, included in his book *The Social Formation of the Mind*, even though the work was published many years after his death. At the time, I asked what interaction would be for him, and Vygotsky, attentively, explained:*

—We live in a social environment, and in this environment, the basis of knowledge already exists, which is, therefore, cultural and has already been constructed by society. In this way, through our interaction with the space in which we live, we begin to acquire, from our lived

experiences, this base, which is responsible for our cognitive development since the process is built from the outside in.

He also emphasizes that it is through exchange with other subjects that learning takes place.

To be clear, I was calling him "Mister," but Lev Vygotsky, always very attentive and polite, said I should call him by his first name, Lev, mainly because he was very young. So, I requested Lev to explain the learning subject's position in the learning process. He answered:

—The learning process, as I have been seeing, although it occurs interpersonally, that is, in the interaction with subjects and society, also needs to occur intrapersonally, which is what happens inside the individuals so that the subject can develop cognitively; it goes through the so-called internalization, a process that occurs for each subject."

When explaining interaction to me, I asked him to tell me how this concept works in education: how interaction happens in the classroom. So, he developed his idea:

—Look, in the classroom, according to my theory, interaction occurs through direct contact between teacher and student, which is why they are the main actors in the learning process. However, here, the teacher does not transmit knowledge, as in traditional education, but instead mediates the process of exchanging knowledge.

—And how does the teacher carry out this mediation process? I asked, and Vygotsky went on:

—The mediation process occurs due to the development zones, which I divide into three: zone of actual development, zone of proximal development, and zone of potential development. The zone of actual development, as the name suggests, is the zone in which the child is, that is, in which knowledge is already established, has already been acquired, and is everything that the child can already do on their own. The zone of potential development is the one the child intends to reach, to acquire with all the pedagogical work developed by the teacher. Between both zones is the zone of proximal development, the main zone for learning. Teachers play a vital role here, as they mediate this process.

At the end of his speech, Vygotsky concluded and emphasized that man is a social subject and, because he is social, he learns in society, he learns by exchanging knowledge with others, which is why socialization and interaction between the subject and his environment is critical. After he finished speaking, I thanked him for all his explanations and told him with all my heart how happy I was to have had the pleasure of learning about his theory.

My journey that day was already too long, and although I was packed with knowledge and overflowing with gratitude, I had to stop and rest. So, I decided to take a break from the trip and continue the next day.

4.5. Dialogue with Edgar Morin

The day dawned, and the sun was already showing signs of being steady and shiny throughout the day. I woke up from an excellent sleep. I had a good cup of coffee and set off on new paths. This time, I did not need to go so far, as I was going to meet Edgar Morin, the author of the theory of complex thought, who was then enjoying his glorious 100th birthday. I took advantage of his visit to Brazil and spoke to him about his theory, which scholars so coveted. When I saw him, I could not refrain from expressing my admiration for his rich work. Then, I greeted that gentleman with a big hug... I felt like we were already great friends. And even without knowing me, he responded with a very warm hug.

Well, I began our conversation by asking the theorist to detail the concept of complexity that he had dedicated himself to by studying so diligently, which he offered us in his book *On Complexity*. Morin described:

—For a long time, to be considered a science, some knowledge had to follow a certain scientific rigor; that is, it had to comply with some standards characterized by objectivity and neutrality. And what would these aspects be? For a science to be objective, it must not depend on particular conceptions, it must stick only to the facts. That is, only that which

can be proven can be called a scientific theory. The concept of neutrality comes from the scientist's non-interference, and, therefore, they cannot omit his opinion regarding the theory that is being formulated— and Morin went on: —Then, listen carefully! For a long time, due to those aspects, science followed a fragmented model established by the philosopher Descartes, who said that if a phenomenon is complex, its difficulties must be divided into as many parts as necessary to be able to resolve them, so, being fragmented, reason should be dissociated from emotion. This reason is presented as an explanation for the fact that social and human sciences are not considered sciences, precisely because of the existence, in their methods, of the researcher's interference for the effective development of research.

The conversation was very exciting, and I asked:

—Then, was that why complexity arose?

To which he replied:

—That's right! In the method I created, this fragmentation was banned, as the human being is a complex subject, that is, he is constituted by reason and emotion. In this way, I propose the reconnection of knowledge because, by reconnecting knowledge, the subject can build bridges between all the aspects present in him/herself, indispensable for his/her entire constitution as a human being.

Knowing this, I sought to go further with the following question: How can we work based on complex thought in education? Edgar Morin explained:

—Just as there is a fragmentation of knowings, which is constituted by human beings, by 20th-century science, and by Descartes' method, science has also become responsible for the fragmentation of knowledge, and this implies that if today's teaching is all divided into subjects, it is because education followed the models of this science that works with the division of knowledge, those it considers scientific, the natural sciences, and those it does not consider scientific, the human and social sciences. Thus, the theory of complex thinking emerges to criticize how knowledge is presented by 20th-century science and to transform education through the reconnection of knowings.

While talking, Basarab Nicolescu came by. He authored the theory of transdisciplinarity, which, together with complexity, revolutionized the way of thinking about the world and, therefore, education. Nicolescu loved the meeting, and I could not help but ask questions about his theory. When I asked how transdisciplinarity develops in education, Nicolescu replied:

—I believe, just like Morin, who is here and must have already enlightened you about the construction of the concept of complexity by criticizing the fragmentation of the whole. Well, transdisciplinarity, combined with complexity, proposes that the learning process be pleasurable, so that we can rescue the meaning of knowledge.

So, I asked:

—And how does this happen?

He replied:

—This concept can transit through different types of knowledge, and, in doing so, it mobilizes these types of knowledge so that students can construct meanings for themselves.

At the end of his speech, I was immensely grateful for Nicolescu's unexpected presence and the conversation I had with Edgar Morin. It was a great trip for me as it provided me with much learning.

5. Dialogues with my reference mathematics educators

Below are the transcripts of dialogues held with great mathematics educators whose theoretical, conceptual, and philosophical positions were essential in constructing the specific theoretical basis focused on mathematics education of the research.

5.1. Dialogue with Ubiratan D'Ambrósio and Silva and Burak

*Setting out in search of new knowledge, I left theorists Morin and Nicolescu and met mathematicians who believe in concrete teaching that is close to the subject's reality: D'Ambrósio, Maria Bicudo, and Silva and Burak. Initially, when talking to D'Ambrósio, I immediately asked about his perspective on ethnomathematics, as set out in his book *Etnomatemática elo entre tradições e modernidade* [Ethnomathematics: a link between traditions and modernity]. He told me that this perspective leads mathematics to its cultural place, since, in his conception, it is nothing more than a strategy created by human beings to be able to explain, understand, and conduct their own reality, their own culture.*

Observing what was explained by Professor D'Ambrósio, researchers Silva and Burak agreed with his speech and spoke to me about the importance of including in the mathematics teaching the meaning generated through working with the context, which is most often discarded. They also told me that mathematics is taught in a decontextualized way. He believes students are not motivated or interested in learning mathematics because they do not understand what it is for.

5.2. Dialogue with Maria Aparecida Viggiani Bicudo

*Upon hearing such concepts, Bicudo also took the opportunity to explain to me her point of view focused on the phenomenological approach, which she discusses very well in her book *Pesquisa em educação matemática: concepções e perspectivas* [Research in mathematics education: concepts and perspectives]:*

—For phenomenology, mathematical education is worked on by trying to find the meaning of what is done when teaching and learning mathematical knowledge, whether it is content transmitted to culture or knowledge typical of common sense or whether it is transmitted to books or articles that are part of the school and/or academic. By assuming a phenomenological stance, mathematics education seeks to understand the meaning given by the world to each subject present in it, of its teaching and learning process so that it dialogues with the meaning given by other subjects, in a constant process of analysis, reflection, and criticism.

After Bicudo finished her speech, we went for a hot coffee and talked about life before saying goodbye. I thanked her for the great pleasure of meeting her and for learning a lot from her speeches, which only complemented each other.

6. Dialogues with authors of research with (auto)biographical narratives

Before finishing my trip, I felt that I still needed to visit other theorists. Then I realized that by making this long journey, I was narrating my experience the whole time. Also, through this narration of mine, I came to develop all this research that you are reading at this moment.

6.1. Dialogue with Fredy González

I then went to see Professor Fredy González so that he could explain a little more about research as I had already read several of his articles that addressed this topic. So, I went to the Federal University of Rio Grande do Norte, located in Natal/RN, and he explained to me what quantitative research was, but what caught my attention was qualitative research. This is because in qualitative research, the researcher has a voice, and this was the type of research that I would like to develop. He told me that qualitative research still suffers much prejudice because it can be conducted through the researcher's subjectivity. However, it was in that kind of research that I found myself reflected.

6.2. Dialogue with Maria da Conceição Passeggi

At this point, Maria da Conceição Passeggi arrived, who, upon joining our conversation, stated that science needed more qualitative research, in which the object of study is the

subject itself. Passeggi explained some ideas from her articles: *A experiência em formação [Experience in education] e Narrativas da experiência na pesquisa-formação: do sujeito epistêmico ao sujeito biográfico [Narratives of experience in research-education: from the epistemic subject to the biographical subject]*. In this sense, she highlighted a research methodology that is still not very widespread: autobiographical narratives. Then, with a sparkle in my eyes, I asked what she meant by autobiographical narratives. She answered that an autobiographical narrative is nothing more than a subject narrating their own life. So, I went on to say that I was narrating and describing my school, academic, and professional life in my research and asked how, by making this move, I could be helping other professionals reflect on their entire academic and professional life.

She retorted:

—Although your narrative is yours, and by doing this movement of narrating, you are self-reflecting and self-criticizing, which can help other professionals who, like you, have experienced similar situations and can also do this exercise of analyzing their own education and their own performance in the classroom.

The conversation with these researchers, although short, was very fruitful. I could say thank you and go back on my way home. I finished the trip very tired, but I learned a lot from all these theorists who make education much better.

Echoing the voices of my interlocutors (inspiring bases of my pedagogical practice)

Below, I explain the relationships between the theories advocated by my interlocutors and my pedagogical practice. The order followed is the same as in the development of dialogues with the authors, starting with John Dewey.

6.3. John Dewey

Some of the concepts Dewey developed are still important for education today, and I consider them very relevant to the development of my classroom practices. Firstly, I would like to highlight the value of the inseparability of theory and practice because, as a teacher-researcher, I constantly think about my practice, basing myself on the main theories supporting my work. While using this concept, I constantly reflect on my actions and, therefore, improve my work.

Another of Dewey's concepts I use is interest. When developing my plans, I always try to make the topics start with my students' interests so they can achieve the skills and competencies established by the National Common Curriculum Base (BNCC) through a motivational process. This does not mean that my teaching is disorganized since I do not "dictate the rules" of what to learn in the classroom, but it shows that I start from the principle that teaching should be enjoyable and consider children's needs.

Furthermore, interest also arises when I problematize, and this means that I do not bring ready-made answers to my students; rather, I move towards thinking about new questions with them. When using problematization in the classroom, I realize that students become overly curious and want to respond as quickly as possible to what was problematized. Problem-solving in early childhood education is even more delicate, as questions must be asked while respecting the children's understanding. If they do not understand, new questions must be asked.

6.4. Paulo Freire

By learning about Paulo Freire's theory during my initial education, I could have the pleasure of changing my perspective on education. I already believed that education has a transformative role, but with Freire's concepts, the reflection I have today is different, as it gained strength with this educator's knowledge.

In my pedagogical practice, I seek to be a professional who educates by considering theory and practice inseparable, and this is true given that this work in which I dialogue with several authors in the field of education is already reflected in my teaching practice. In addition

to the dialogical issue that Freire addresses so openly, another concept he uses that makes me reflect much about my practice is the concept of problematization.

As mentioned, my first contact with this concept occurred during my initial education when I lived several experiments in which mathematics teaching was developed in a challenging way, using problematization as a method. In this contact, I realized that it is possible to learn mathematics in a motivating way. That is how this teaching was characterized for me. When I experienced this teaching method, I realized that it profoundly impacted me; I took it on as my own, wanting to apply it throughout my professional life. Today, working in the classroom, I also try to make my math teaching challenging and realize that, by doing this, my students become very engaged and excited to learn more.

Finally, I think that, by stating that educating requires loving the students, Freire gives us teachers confidence, especially those who do not want to convey a certain affection so as not to have to show weakness or lose the rigor a teacher has. I have never been one of those teachers, I have always been a teacher who likes to demonstrate how well I feel when I teach. However, it is also true that I never believed in a vocation to be a teacher because, although I believe that I was not born with this vocation, the fact that every day I seek to learn to become the best teacher I can be for my students makes me understand that a person is not born a teacher, but rather becomes a teacher. It is a tireless struggle; it is hard work but enjoyable, especially when I am sure my students love the new knowledge and will take it throughout their lives.

6.5. Lev Vygotsky

The Bielorussian thinker's theory gave my education a precise view of how I want to act in my classroom and, in this way, reflect on my practice according to his theory. I try to work so that my classroom is an environment for socialization and interaction. Thus, I prioritize constant dialogue between the entire class about the knowledge to be achieved. Furthermore, based on Vygotsky's theory, I began to consider my students' prior knowledge, which, according to his theory, would be the students' actual development zone. This way, I can find out what they already do on their own and move on to more in-depth knowledge or new knowledge. When I, as a teacher, start to become a mediator, I realize that not only do my students learn, but I also learn because each subject has its own perspective on the knowledge before them. This exchange of knowings is fundamental to the teaching and learning process.

6.6. Edgar Morin and Basarab Nicolescu

The theories of complexity and transdisciplinarity gave me the basis to understand the criticism that emerged through the aspects named by 20th-century science in relation to the context of fragmentation and how education fits into this context. By knowing these theories, I could develop a teaching method where the student constructs and gives meaning to knowledge.

6.7. Ubiratan D'Ambrosio and Maria Aparecida Bicudo

By presenting these authors, I sought to systematize my thoughts about mathematics, or rather, about mathematics teaching. Because they have a mindset of teaching in search of meaning, having intentionality, starting from a context, today I implement this knowledge learned in my classroom and in my research as a theoretical framework.

7. Final Considerations

This research sought to develop a methodology that could reflect on the experiences obtained by the author in her initial education and during her first two years as a teacher in a preschool class. Then, I decided to adopt a narrative variety of qualitative research to compose the work.

Narrative as one of the modalities of qualitative research assigns an essential role to the researcher which, as González (2020) suggests, makes him/her “the main research device” and by constituting this device, the researcher assumes himself/herself as “[...] someone willing, who wants to generate knowledge by developing research on some subject of interest.”

As described in the excerpt above, developing qualitative research and being a qualitative researcher is a very challenging process for the subject because, while they must describe their practice as a means of obtaining records for their research, at the same time, they must generate interpretations about the materials they wrote and produced. It may even seem like a confusing process, as the researcher must maintain harmony between the purposes and objectives of the research and the movements of “archaeological immersion and hermeneutic contemplation” (González, 2020, p. 162).

Despite the confusing appearance, this process makes the researcher a strongly reflective subject and demands a great deal of learning to constantly carry out this self-evaluation of one’s own practice as a teaching subject. Furthermore, I was able to observe that qualitative research proposes the elaboration of more flexible work, and this does not mean that it is not rigorous, but rather that subjectivity, reflection, and the social context, or rather the epistemological place, are taken into consideration in its intention to do so.

Thus, when working with the various dialogues, with the authors who founded and continue to ground my pedagogical work, more than appearing to “escape” from the rigidity and traditional structure of scientific works, I could clearly, but also subtly, establish the existing relationships between the many theorists and the concepts they defend. In addition to providing a light explanation of these concepts, by proposing informal dialogic encounters, the research becomes easy to understand, thus making reading much more enjoyable.

As we cannot forget, this way of doing research allows the emergence of sensitivity, which arises through the researcher’s character and immerses them in such depth that they find themselves intertwined in their own research. González (2020) considers the researcher’s place paramount, as they carry out an individual practice that keeps moving them around. The author also affirms that the qualitative researcher is immersed, embedded, imbued, and implicated in their research, with all their subjectivity.

8. References

BAKHTIN, Mikhail. **Problemas da poética de Dostoiévski**. 1. ed. Rio de Janeiro: Forense Universitária, 1981.

BICUDO, Maria Aparecida Viggiani (org.). **Pesquisa em educação matemática: concepções e perspectivas**. São Paulo: Editora UNESP, 1999.

BICUDO, Maria Aparecida Viggiani (org.). **Pesquisa Qualitativa segundo a visão fenomenológica**. São Paulo: Cortez, 2011.

DOURADO, Mônia Franciele de Souza. O abandono no olhar: diálogo polifônico entre olhos nos olhos e o abismo prateado. **Scripta Alumn**, Uniandrade, n. 20, 2018. ISSN: 1984-6614. 2018. [[link](#)]

D' AMBROSIO, Ubiratan. **Etnomatemática**: elo entre as trações e a modernidade. 6. ed.–Belo Horizonte: Autêntica Editora, 2019.

DEWEY, John. **Democracia e educação**: introdução à filosofia da educação. São Paulo: Ed. Nacional, 1979.

FREIRE, Paulo. **Pedagogia do oprimido**. Rio de Janeiro: Paz na Terra, 1989.

FREIRE, Paulo. **Pedagogia da autonomia**: saberes necessários à prática educativa. São Paulo: Paz e Terra, 1996.

GHEDIN, Evandro. A pesquisa como eixo interdisciplinar no estágio e a formação do professor pesquisador-reflexivo. **Olhar de Professor**, v. 7, n. 2, p. 57-76, 2004.

GONZÁLEZ, Fredy Enrique. *Repertorio de Coordenadas Teórico-Conceptuales de Referencia (RCT-CR) en las Tesis del Primer Doctorado en Educación Matemática de Venezuela*. Comunicación Breve (CB-1.414) presentada en el **VIII Congreso Iberoamericano de Educación Matemática**, realizado en Madrid, España, 10 al 14 de julio de 2017. LIBRO DE ACTAS. ISBN 978-84-945722-3-4, 69-77. Disponível in: [[link](#)]

GONZÁLEZ, Fredy Enrique. Reflexões sobre alguns conceitos da pesquisa qualitativa. **Revista Pesquisa Qualitativa**, v. 8 n. 17, p. 155-183, 2020. ISSN 2525-8222. Disponível: [[link](#)]

HIDALGO, Belkys; GONZALEZ, Fredy Enrique. Metabolización de información: un modelo dinámico para interpretar el proceso de producción de conocimiento. **Investigación y Postgrado**, Caracas, v. 24, n. 1, p. 010-045, jan. 2009. Disponível em [[link](#)] Acesso em: 29 set. 2022.

MENDONÇA, Letícia Peixoto de. **Minhas marcas com a matemática são marcas de amor**: afeto e matemática na formação inicial e trajetória profissional de uma pedagoga. 2022. 104f. Dissertação (Mestrado em Educação)–Centro de Educação, Universidade Federal do Rio Grande do Norte, Natal, 2022.

MORIN, Edgar. **Introdução ao Pensamento Complexo**. 5. ed. Lisboa: Instituto Piaget, 2008.

MORIN, Edgar *et al.* **Educar para a era planetária**: o pensamento complexo como método de aprendizagem no erro e na incerteza humana. São Paulo: Cortez, 2003.

NICOLESCU, Basarab. **Manifiesto de la transdisciplinariedad**. Mónaco: Rocher. 1996

PASSEGGI, Maria da Conceição. A experiência em formação. **Revista Educação**, Porto Alegre, v. 34, n. 2, p. 147-156, maio/ago. 2011.

PASSEGGI, Maria da Conceição. Narrativas da experiência na pesquisa-formação: do sujeito epistêmico ao sujeito biográfico. **Roteiro**, v. 41, n. 1, p. 67–86, 2016. Disponível em: [\[link\]](#). Acesso em: 16 jul. 2021.

RECHE, Bruna Donato. POR UMA FORMAÇÃO HUMANA: A EDUCAÇÃO TRANSDISCIPLINAR. **Revista Humanitaris**, n. 2, n. 02, p. 76–96, 2020. Disponível em: [\[link\]](#)

SCHÖN, Donald A. **Educando o profissional reflexivo: um novo design para o ensino e a aprendizagem**. Porto Alegre: Artmed, 2000.

VIGOTSKI, Lev Semenovich. **A formação social da mente**. 6.ed. São Paulo: Martins Fontes, 1998.

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