

The cultural-historical theory and Alex Kozulin's contribution to pedagogical mediation¹

A teoria histórico-cultural e a contribuição de Alex Kozulin para mediação pedagógica

La teoría histórico-cultural y la contribución de Alex Kozulin a la mediación pedagógica

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ABSTRACT

This article examines Alex Kozulin's contributions to understanding learning mediated by external elements or other individuals, aligning with Lev S. Vygotsky's historical-cultural theory. The discussion centers on how Kozulin expands the concept of pedagogical mediation, emphasizing the role of psychological tools - such as language, signs, and technological innovations - in supporting the cognitive development of individuals embedded within cultural contexts. A cornerstone of Vygotsky's theory, the Zone of Proximal Development (ZPD), is highlighted by Kozulin as pivotal in guiding the mediator's actions, whether the mediator is a teacher, a more advanced peer, or a psychological tool. To effectively foster student learning, the mediation process must be continuous and characterized by intentionality, meaning, and transcendence. This entails ensuring that instruction is purposeful, transcends immediate contexts, and holds relevance for the learner. Only through such mediation can knowledge be fully comprehended, assimilated, and applied across diverse social, historical, and cultural settings. Kozulin advocates for dynamic cognitive assessments focused on understanding students' learning processes and potential rather than merely measuring outcomes or assigning grades. The article underscores Kozulin's role in revitalizing and broadening Vygotsky's theoretical framework, offering substantial theoretical and practical insights for contemporary education.

Keywords: Historical-Cultural Theory; Psychological Tools; Pedagogical Mediation; Technology.

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RESUMO

Este artigo analisa as contribuições de Alex Kozulin para a compreensão do aprendizado mediado por elementos externos ou por outras pessoas, alinhando-se à teoria histórico-cultural de Lev Semionovitch Vigotski. A discussão concentra-se em como Kozulin amplia o conceito de mediação pedagógica, evidenciando a relevância das ferramentas psicológicas — como a linguagem, os signos e as inovações tecnológicas — no apoio ao desenvolvimento cognitivo de indivíduos inseridos em uma cultura. Um dos fundamentos da teoria histórico-cultural de Vigotski é a Zona de Desenvolvimento Proximal (ZDP), que, segundo Kozulin, ocupa um lugar-chave no auxílio à ação do mediador, que pode ser um professor, um colega mais velho ou uma ferramenta psicológica. Para que o apoio ao aluno favoreça sua aprendizagem, é fundamental que o processo ocorra de maneira contínua, por meio de uma mediação atenta, pautada na intencionalidade, na transcendência e no significado. Isso implica garantir que o que está sendo ensinado tenha um propósito, ultrapasse a situação imediata e seja relevante para o aluno. Somente dessa forma o conhecimento poderá ser plenamente compreendido, assimilado e aplicado em diferentes contextos sociais, históricos e culturais. Nessa perspectiva, Kozulin defende uma avaliação cognitiva mais dinâmica, voltada a compreender como o aluno aprende e qual é o seu potencial de aprendizagem, e não apenas para medir resultados pontuais ou classificá-los com base em notas. O artigo ressalta que o trabalho de Kozulin é fundamental para atualizar e ampliar os fundamentos da teoria histórico-cultural de Vigotski, fornecendo contribuições teóricas e práticas significativas para a educação contemporânea.

Palavras-chave: Teoria Histórico-Cultural; Ferramentas Psicológicas; Mediação Pedagógica; Tecnologia.

RESUMEN

Este artículo analiza las contribuciones de Alex Kozulin a la comprensión del aprendizaje mediado por elementos externos y otras personas, en línea con la teoría histórico-cultural de Lev Semionovitch Vygotsky. La discusión se centra en cómo Kozulin amplía el concepto de mediación pedagógica, destacando la relevancia de las herramientas psicológicas — como el lenguaje, los signos y las innovaciones tecnológicas — en el apoyo al desarrollo cognitivo de los individuos inmersos en una cultura. Uno de los fundamentos de la teoría histórico-cultural de Vygotsky es la Zona de Desarrollo Próximo (ZDP), que, según Kozulin, ocupa un lugar clave en el apoyo a la acción del mediador, que puede ser un profesor, un colega mayor o una herramienta psicológica. Para que el apoyo al alumno favorezca su aprendizaje, es esencial que el proceso se realice de forma continua, mediante una mediación atenta, basada en la intencionalidad, la trascendencia y el significado. Esto implica garantizar que lo que se enseña tenga un propósito, vaya más allá de la situación inmediata y sea relevante para el alumno. Sólo de esta manera el conocimiento podrá ser plenamente comprendido, asimilado y aplicado en diferentes contextos sociales, históricos y culturales. Desde esta perspectiva, Kozulin defiende una evaluación cognitiva más dinámica, orientada a comprender cómo aprende el alumno y cuál es su potencial de aprendizaje, y no solo a medir resultados puntuales o a clasificarlos en función de las notas. El artículo destaca que el trabajo de Kozulin es fundamental para actualizar y ampliar los fundamentos de la teoría histórico-cultural de Vygotsky, aportando importantes aportes teóricos y prácticos a la educación contemporánea.

Palabras clave: Teoría Histórico-Cultural; Herramientas psicológicas; Mediación Pedagógica; Tecnología.

1 Introduction

Historical-cultural theory constitutes a fundamental framework for understanding human development in its dynamic relationship with the surrounding sociocultural context. This theoretical model transcends mere analysis, compellingly demonstrating the influence of social experiences and symbolic mediation, which intertwine in the formation of cognitive potential and in learning that persists throughout a person's entire life.

This theoretical framework is based on the groundbreaking work of psychologist Lev Semionovich Vygotsky and his collaborators, such as Alexander Romanovich Luria and Aleksei Nikolaevich Leontiev.

In addition to these three collaborators as the initial core, Alex Kozulin (2001, p. 112)¹ notes that:

The troika attracted new members, becoming the “magnificent eight” with the addition of Lidia Bozhovich, Alexander Zaporozhets, Natalya Morozova, Roza Levina, and Lidya Slavina. The group's work was truly collective. All members accepted Vygotsky's theoretical leadership and were free to apply his ideas in their research.

Zoia Prestes (2021), who works as a researcher and translator of Vygotsky's works from Russian into Portuguese, presents the book “L. S. Vygotsky: Presence and Relevance in Interviews,” in which she compiles testimonies from renowned Russian scholars of historical-cultural theory, collected in Moscow between 2010 and 2016. In this context, the author engages in dialogue with various figures, offering an overview of Vygotsky's intellectual trajectory, the publication of his works, and the subsequent research and possibilities, thereby reiterating the relevance and timeliness of his scientific legacy.

The researchers of Vygotsky's work interviewed by Prestes (2021) include Tamara Mirrailovna Lifanova, Vladimir Petrovich Zintchenko, Elena Evgenievna Kravtsova, and Gennady Grigorievich Kravtsov, as well as Vladimir Tovievich Kudriavtsev, Anton Maksimov, and Vladimir Samuilovich Sobkin.

The aforementioned work features a foreword by Professor Elizabeth Tunes, who notes: “The accounts presented here by the eight individuals who participated

in the interviews and conversations address this and are important for understanding the state of the art in the publication of his works from his death to the present day” (PRESTES, 2021, p. 11).

Currently, research on Vygotsky remains relevant and continues to spark new interpretations, a fact highlighted primarily by the interview given by Vladimir Tovievitch Kudriavtsev to Zoia Prestes (2021), titled “L. S. Vygotsky’s work requires a process of excavation,” as seen in the following statement by Kudriavtsev:

In the opinion of some people, there is a moral task, a task of excavation. For example, one need only open the first volume of the *Collected Works*, which contains *Hamlet* [L. S. Vygotsky’s monograph]. There, indeed, are many possibilities for excavation – something that needs to be unearthed. (PRESTES, 2021, p. 98).

In this sense, Kudriavtsev presents a historical and critical analysis of Vygotski’s works, emphasizing the need for new research in psychology grounded in historical-cultural theory:

So, it is the language of meaning, which is specific, and, ultimately, if we understand it from the perspective of creation, it is the language of the imagination. Thus, imagination has its own language. We know only that the voice is laden with content, just as speech is – it is a semantic acoustics, which is very interesting from the perspective of historical-cultural theory and has never been studied (PRESTES, 2021, p.101).

Historical-cultural theory is grounded in the understanding that the development of higher psychological functions occurs through processes of internalization and mediation, mediated by culturally produced signs. The importance of the Zone of Proximal Development (ZPD) and the role of the other in the construction of knowledge are fundamental elements of this concept, as highlighted by Vygotsky (2007) and by Leontiev’s theory of activity (2021). In this context, Piatti and Alves (2024, p. 67) assert that:

[...] from a historical-cultural perspective, we can consider that culture is realized through instruments and signs, which can be represented by both material and psychological elements.

Flauzino and Sade (2024) analyze the fundamental components of Vygotsky's historical-cultural theory, highlighting symbolic mediation, the relationship between language and thought, brain plasticity, and the fundamental role of social interactions in the development of higher psychological functions.

According to the authors, communication is an essential element in the mediation process, enabling the individual to assimilate knowledge and expand their cognitive capacities more profoundly. According to Flauzino and Sade (2024, p. 7), brain plasticity can be understood in the following terms:

[...] a fundamental concept for understanding the development of higher psychological functions, such as language, reasoning, and memory; it refers to the brain's ability to modify its structure and function in response to environmental stimuli and experience.

In the face of the discussions presented, this article proposes to analyze Alex Kozulin's contributions to the understanding of pedagogical mediation, drawing on the principles of Vygotsky's historical-cultural theory and considering the theoretical and practical challenges related to the teaching and learning process. Furthermore, it discusses psychological tools as methodological alternatives for developing meaningful, critical teaching practices aligned with the demands of contemporary education.

In light of Vygotsky's historical-cultural theory and its implications for the field of education, this study seeks to identify the central concepts of the theory that have been reinterpreted or expanded, as well as to analyze its contributions to the understanding of pedagogical mediation within this theoretical framework.

2 Brief Biography of Alex Kozulin

Alex Kozulin was born in Moscow, the capital of the former Union of Soviet Socialist Republics (USSR). He attended Moscow State University, where he earned his Ph.D. in Psychology. In 1979, he left his home country and became one of the most dedicated researchers of Vygotsky's ideas in the West.

He served as director of studies at the International Center for the Advancement of Learning Potential, located in Jerusalem, Israel. As a visiting professor, he taught at Tel Aviv University in the Department of Occupational Therapy.

Among his major works are “Psychological Tools: A Sociocultural Approach to Education” (KOZULIN, 1998), “Vygotsky’s Psychology: A Biography of Ideas” (KOZULIN, 2001), and “Vygotsky’s Educational Theory in Cultural Context” (KOZULIN, 2003), a volume edited by Kozulin. He is also the author of the chapter “The Concept of Activities in Soviet Psychology—Vygotsky, His Disciples, His Critics” (KOZULIN, 2013), translated from English into Portuguese and published in the book “An Introduction to Vygotsky,” edited by Harry Daniels (2013).

3 Alex Kozulin's Contributions to Educational Psychology

Alex Kozulin contributes to Educational Psychology through his studies and research on pedagogical mediation, the use of psychological tools, and the relevance of culture in the teaching and learning process, as well as through his updating of Vygotsky’s ideas in the educational context.

Kozulin’s (1998) reflections on pedagogical mediation offer an innovative perspective on higher psychological functions, highlighting the importance of the sociocultural context in the development of human thought.

Mediation, as conceived and elaborated by Kozulin (1998), is a multifaceted process that transcends the mere exchange of information between teacher and student. This process presupposes a constant dialogue, in which psychological tools play a key role in learning.

These tools go beyond simple teaching instruments; they act as mediators that assist children in learning, both individually and collectively. They enable the assimilation of practices and meanings that accompany individuals in their daily activities.

Kozulin (1998) emphasizes that learning is not an isolated event, but rather a fundamentally social process in which meaning is generated through interactions that transcend personal experience and the isolated act of learning. From this perspective, learning becomes a period full of changes and opportunities, in which language and culture are articulated in a logical and coherent manner, allowing for a deeper understanding of the complex reality that surrounds us.

Thus, Alex Kozulin offers a strong critique of contemporary teaching methods, prompting teachers to reconsider their pedagogical approach in light of the major historical and social interactions that shape knowledge and understanding throughout one’s life and academic journey.

It is therefore essential that teachers understand the role of the social environment in students' development, integrating their histories and experiences into classroom pedagogical practice.

4 Pedagogical Mediation according to Alex Kozulin: A Historical-Cultural Approach to Education

Pedagogical mediation is one of the most important concepts that Alex Kozulin explored and developed, grounded in Vygotsky's historical-cultural theory. His studies highlight the key role of interactions between the teacher, students, and cultural tools in shaping the teaching and learning process.

In this context, pedagogical mediation occurs when a mediator – who may be the teacher, an adult, or a tool – facilitates the internalization of knowledge, enabling students to develop cognitive abilities.

Kozulin (1998) emphasizes that learning is not an immediate process. Knowledge does not arise spontaneously; rather, it is mediated by psychological and social tools that restructure the student's cognition.

His work, particularly in the book "Psychological Tools: A Sociocultural Approach to Education" (KOZULIN, 1998), presents a detailed theoretical framework for understanding how mediation and its implementation occur in the educational context.

In addition, we can observe the pedagogical mediation developed by Kozulin (2003) in the first chapter, titled "Psychological Tools and Mediated Learning," of the book "Vygotsky's Educational Theory in Cultural Context", edited by Kozulin et al. This mediation is grounded in three fundamental concepts: psychological tools, the zone of proximal development, social interaction, and learning.

Oliveira and Silva (2022) characterize pedagogical mediation as a deliberate, critical, and planned action by the teacher that connects subjects, themes, topics, and contexts. This practice includes learning experiences that promote the development of knowledge, through the selection of methodologies, materials, and psychological tools that meet educational needs and goals.

5 Psychological tools: the mediators of learning

According to Kozulin (2013), psychological tools are cultural elements that contribute to the development of thought, including language, symbols, written texts, and forms of instruction. Thus, according to Kozulin (2013, p. 116), drawing on Vygotsky, it is stated that: “[...] the actualization of human activity requires intermediaries such as psychological tools and means of interpersonal communication.”

The theoretical precepts presented by Kozulin (2013) are grounded in the notion that psychological tools constitute specific forms of human activity, mediated by cultural instruments and signs, and prove indispensable for understanding cultural practices and social interactions.

These tools, as the author argues, play a fundamental role in human development, acting as mediators in the construction of knowledge.

According to what Kozulin (1998) presents in the third chapter of his book, “Psychological Tools: A Sociocultural Approach to Education”, he grounds the concept of mediated learning by stating that:

In a mediated learning situation, an adult or a more competent peer positions themselves ‘between’ the environment and the child – radically changing the conditions of interaction. The mediator selects, alters, expands, and interprets objects and processes for the child. [...] The concept of mediated learning changes our view of human behavior. [...] The role of mediation becomes even more pronounced in human learning. (KOZULIN, 1998, p. 60).

According to Kozulin (1998), Vygotsky did not specify the development of human mediators’ activities beyond their function as transmitters of symbolic tools, which created considerable gaps in his theory of mediation.

Kozulin (1998) elaborates in greater depth on the three universal principles of pedagogical mediation. The first of these is intentionality/reciprocity, which emphasizes the importance of the active participation of both the mediator and the students throughout the teaching and learning process.

The adult mediator’s main contribution is to transform the interactive situation from an incidental experience into an intentional one. This intentionality has two focuses: one is the object, the other is the child. [...] The adult ceases to be a mere provider of objects, information, or verbal

commands and becomes a source of constant affirmation that the objects and/or information involved are in fact intended for the child. (KOZULIN, 1998, pp. 65-66).

Intentionality refers to the mediator's conscious role in organizing and guiding the teaching-learning process. Rather than merely passing information, intentional mediation involves careful planning to promote the student's internalization of knowledge.

The mediator selects appropriate psychological tools, devises teaching methods, and adapts their approach to the student's needs, ensuring that learning is meaningful.

The principle of reciprocity refers to the student's active participation in their learning process. The student is not merely a listener who receives information, but an active participant in the assimilation of new ideas. The exchange between the mediator and the student must be based on mutual engagement, in which the curious and critical student responds to stimuli and becomes cognitively involved in the teacher's work.

The second principle, transcendence – in accordance with the universal principle of mediation proposed by Alex Kozulin – refers to the ability to apply the knowledge acquired by the student in situations different from those in which the learning took place. This principle emphasizes that knowledge must go beyond a specific context and be applicable to various circumstances, which allows the student to develop a more flexible, critical, and analytical mindset. The goal is to ensure that learning is not limited to mechanical work, but that the student acquires cognitive abilities applicable to various situations.

The third universal principle of pedagogical mediation is linked to meaning; that is, it emphasizes the need to interpret the knowledge acquired, connecting it to the student's reality and experience.

This principle shows that learning becomes truly effective when students recognize the importance and applicability of what they have learned in their lives, which fosters greater engagement in the learning process.

These principles are based on the idea that learning is dynamic, not static. They establish fundamental connections between teachers and students, with the goal of transmitting knowledge.

We also consider a key principle of Vygotsky, which highlights the distinction between what a student can already do without help and what they can accomplish with the assistance of a mediator, known as the Zone of Proximal Development.

5.1 Zone of Proximal Development and Dynamic Cognitive Assessment according to Alex Kozulin

The origins of the concept of the Zone of Proximal Development, known by the acronym ZPD, can be found in Vygotsky's early works. This theorist significantly emphasized the role of interaction and sociocultural context in the formation of thought and the advancement of knowledge in the learning process. Thus, Vygotsky (2007, p. 97) refers to:

[...] the zone of proximal development [...] is the distance between the actual level of development – which is usually determined by independent problem-solving – and the potential level of development, determined by problem-solving under the guidance of an adult or in collaboration with more capable peers.

This collaborative work is indispensable, given that the ZPD is a central concept of historical-cultural theory. The ZPD illustrates the vital relationship between learning and development, emphasizing that learning begins in a socio-historical-cultural context – in which interaction and dialogue with others are fundamental – and gradually progresses to a deeper and more meaningful individual level.

Costa' (2024) observations confirm that the theoretical concept of the ZPD, proposed by Vygotsky, continues to be the subject of extensive research and implementation across various educational disciplines, underscoring its enduring relevance.

The ZPD is one of the key concepts of Vygotsky's theory, discussed and explored in depth by Kozulin in his work *Psychological Tools: A Sociocultural Approach to Education*. He argues that the ZPD is characterized not only as a space for learning but also as a dynamic process of pedagogical mediation, in which social interactions and psychological tools play a significant role in cognitive development. "The subject of capacity, therefore, is not the child in isolation, but a pair: child-culture" (KOZULIN, 1998, p. 69).

It is from this perspective that Kozulin discusses assessment from Vygotsky's viewpoint, noting that this process considers not only how the brain processes information but also the stage of development at which students find themselves when being assessed.

The ZPD refers to the distance between the abilities a student can demonstrate on their own and those they can achieve with the help of a mediator, whether a teacher, a more experienced peer, or a learning tool. According to Kozulin (1998), this idea goes beyond mere temporary support, encompassing a continuous process of knowledge construction, in which the mediator plays an important role in guiding the student toward higher levels of understanding and autonomy.

This author highlights the importance of intentionality in pedagogical mediation of the ZPD, as seen in this statement:

ZPD can be interpreted both qualitatively and quantitatively. Qualitatively, it points to those cognitive functions that are absent in the child's unaided performance but become evident when the child is assisted by adults. Quantitatively, the ZPD is a measure of the difference between unassisted performance and assisted performance. The ZPD can also be interpreted as a reflection of the child's ability to benefit from adult assistance and cooperative learning. For this reason, determining a child's ZPD is an important task in education. (KOZULIN, 1998, p. 69).

Thus, according to Kozulin (1998), teachers should not merely provide answers or facilitate learning in a simplistic manner, but rather create learning situations that encourage students to think critically. This process involves reflection, group activities, and problem-solving strategies, which foster active and collaborative participation in learning.

One of the key insights Kozulin provided for understanding the ZPD is the relationship between this concept and the use of psychological tools. He states that mediation occurs through the introduction of cultural elements—such as speech, writing, numbers, and scientific symbols—which help students organize their thinking and enhance their cognitive abilities.

In contrast to the traditional assessment model, the dynamic cognitive assessment proposed by Kozulin (1998) investigates how students respond to instructional activities

and whether they can make progress with a teacher's mediation. This model seeks to assess the quality of students' learning, rather than merely measuring their already acquired knowledge.

Regarding the development of dynamic cognitive assessment, Kozulin (1998, p. 70) outlines the following fundamental principles that are essential for a new assessment model:

1. Cognitive processes are highly malleable. For this reason, the task of assessment is to verify the degree of malleability, not the manifest level of functioning.
2. Interactive assessment that includes a learning phase provides a better understanding of a child's learning abilities than unassisted performance.
3. The goal of assessment is to reveal the child's learning potential and suggest psychoeducational interventions aimed at enhancing and realizing that potential.

In light of this, we ask: how does Alex Kozulin develop the proposal for cognitive assessment based on the notion of the ZPD? For the author, is the ZPD a fundamental concept in Vygotsky's theory, referring to the difference between what a student can accomplish on their own and what they can achieve with the help of a mediator? Kozulin emphasizes that, to truly understand a student's potential, it is essential to analyze their response to the instruction received.

This means that a student may initially have difficulty solving a problem on their own, but by receiving guidance, clarification, or by interacting with peers, they are able to achieve significant results. This progression is a much more reliable indicator of their cognitive ability than a standardized test, which only measures performance under predetermined conditions.

Dynamic cognitive assessment supports the idea that learning is not a solitary or rigid process, but rather a social and interactive one, with mediated support. Thus, Kozulin (1998) proposes that the mediator use forms of assessment that involve students' active participation, observing how they interact with elements such as words, numbers, or cultural symbols.

In this sense, the teacher acts not only as a guide but also as a mediator, helping students to understand their own learning more effectively and to express themselves with greater autonomy in various social contexts.

Kozulin (1998) states that assessment should be a means of mediating learning, not merely a measurement. When done correctly, dynamic assessment supports more personalized instruction, ensuring that all students have the necessary support to reach their full potential. In the words of Kozulin (1998, p. 75): “The increase in the child’s cognitive modifiability during the assessment process is the central element of this approach.”

5.2 Social Interaction and Learning

In the work “La Psicología de Vygotsky: Biografía de unas ideas,” Kozulin (2001) closely examines Vygotsky’s historical-cultural theory, its relationship to cognitive development, and the importance of mediation in the learning process.

One of the ideas discussed by Kozulin (2001) is the social nature of learning, according to which knowledge is produced on an interpsychological level before being internalized on an intrapsychological level and integrated into the subject’s higher psychological functions.

This idea is also central to Vygotsky’s historical-cultural theory, in which learning is understood as a process mediated by tools derived from the available social and cultural environment.

In fact, Kozulin (2001), drawing on Vygotsky’s ideas, asserts that learning arises from the interaction between the individual and their social environment, in which symbolic tools—such as speech and cultural signs—act as mediators of this process. Thus, knowledge is not acquired in a straightforward manner but is constituted during this interaction, resulting in an internal change.

Kozulin (2001) asserts that mediation is the key to transforming collective knowledge into personal knowledge. Thus, the teacher plays a more active role than simply transmitting information: he or she organizes the learning environment, presents challenges, and uses resources to foster the student’s creative progress.

6 Future Perspectives for Historical-Cultural Theory and Pedagogical Mediation

Vygotsky’s theory of learning, based on the historical-cultural perspective, changed the way human development and learning were viewed for many years by

highlighting the role of social interaction, mediation, and cultural tools in the construction of knowledge.

Based on this theory, Kozulin (2003) expanded our understanding of the effects of symbolic tools and pedagogical mediation on cognitive development, as we can see in this statement:

In addition to these primitive tools, there are vast areas of higher-order symbols and mediators, including various signs, symbols, writing systems, formulas, and graphic organizers. Cognitive development and learning, according to Vygotsky, depend essentially on the child's mastery of symbolic mediators, their appropriation, and internalization in the form of internal psychological tools. (KOZULIN, 2003, pp. 23–24).

The author analyzes and explains how cultural tools—including technology—can mediate thought and the acquisition of knowledge.

The mediation of meaning is an essential stage in the acquisition of psychological tools, since psychological tools derive their meaning solely from the cultural conventions that generate them. Symbolic tools (e.g., letters, codes, mathematical symbols) have no meaning outside the cultural convention that gives them meaning and purpose. (KOZULIN, 2003, p. 26).

The arrival of new technologies in the school environment presents both challenges and opportunities for more successful teaching and learning. From Vygotsky's perspective, technology can be viewed as a psychological tool that, when used correctly, expands students' cognitive capacities and transforms their relationship with what they learn.

The central issue is understanding how technology can be pedagogically mediated to enhance learning, ensuring that its introduction occurs in an intentional and structured manner. In Vygotsky's words (2007, p. 103): "[...] learning is a necessary and universal aspect of the process of developing culturally organized and specifically human psychological functions."

We found, in Kozulin (2003), that technology plays a key role in supporting the expansion of the ZPD. This enables students to improve their cognitive skills and interact with digital resources that challenge their knowledge. Virtual learning

environments, such as adaptive platforms and educational video games, can be designed to support the ZPD by providing explanatory hints and assessments tailored to each student's level.

Based on Kozulin's reflections, we caution that technology should not replace the teacher. The presence of a human mediator is essential for interpreting students' difficulties, adjusting the teaching process, and ensuring that learning is meaningful. Technology should serve as an auxiliary tool in pedagogical mediation, not as a substitute for traditional teaching.

We reiterate that the main challenge is to ensure that these interactions are meaningful and well-planned, preventing technology from becoming a mere passive tool. The teacher, as a mediator, must foster students' active participation, ensuring that these interactions promote reflection and the construction of knowledge.

Watari and Almeida Júnior (2022) highlight an important point: the unease surrounding the introduction of digital technologies in schools. This is where mediation becomes crucial. Such mediation is a key element in ensuring that technological tools can truly enhance the learning process.

The aforementioned authors assert that the integration of Digital Information and Communication Technologies (DICTs) into the educational environment requires mediating actions, carried out with intention, planning, awareness, and sound guidance on the part of teachers and other information professionals. In this case, mediation is not merely technical assistance, but an active process characterized by a dialogue that shapes meanings and interpretations.

From the perspective of Vygotsky's historical-cultural theory, as elaborated by Watari and Almeida Júnior (2022), mediation proves to be a key element in understanding human development. According to these authors, individuals internalize culture through exchanges involving tools and signs. Thus, digital technologies can be viewed as mediating tools; when used intentionally, they facilitate new methodologies for teaching, learning, and communication.

An important aspect highlighted in the article by Watari and Almeida Júnior (2022) is the concept of information mediation. Information mediation is described as an action—both conscious and unconscious—carried out by information professionals, such as librarians and teachers, with the aim of assisting individuals

in acquiring knowledge, as Watari and Almeida Júnior (2022, p. 15) illustrate with this statement:

[...] that this interference must be made explicit, affirmed, and brought to consciousness so that, with a critical mindset, all professionals can address it in a way that mitigates and minimizes the potential problems arising from this interference.

This process of appropriation manifests itself in specific sociocultural contexts and includes the incorporation of various languages and forms of communication, such as texts, images, videos, and audio, constituting an active and often conflict-ridden process.

In this regard, information mediation aligns with pedagogical mediation by valuing the student's role in the learning process and the relevance of context.

7 Concluding Remarks

Alex Kozulin's contributions, grounded in Lev Semionovich Vygotsky's historical-cultural theory, promote an understanding of teaching and learning processes in the contemporary educational context. His view of pedagogical mediation in learning – often understood as the mere transmission of content – posits knowledge as an active, socially mediated, and historically and culturally situated construction.

Kozulin points out that learning first begins on the interpsychological level – that is, in interactions between people – before being internalized at intrapsychological level, becoming part of the cognitive structure. In this process, the role of the mediator – whether a teacher, more experienced peers, or psychological tools – is essential, as this mediator is the one who introduces the tools that qualitatively transform the student's thinking.

Therefore, Kozulin helps us reflect not only on teaching methods but also on ways to assess learning, presenting a dynamic and process-oriented model centered on identifying students' developmental potential and using the ZPD as the basis for educational action. In this way, assessment ceases to be merely a tool for grading and becomes an essential pedagogical tool in teaching, capable of pointing the way toward cognitive advancement, provided it occurs within contexts of meaningful mediation.

Finally, it is essential to emphasize that, by introducing technology into the educational discourse from the perspective of mediation in historical-cultural theory, Kozulin expands the opportunities for pedagogical practice in the 21st century. Technology, viewed as a cultural tool, can enhance learning when intentionally mediated by teachers who recognize its importance.

However, we also caution against the risks of using these resources out of context, which, rather than expanding the Zone of Proximal Development (ZPD), may reinforce traditional and minimally interactive practices. Thus, Kozulin's insights are essential for teachers who wish to transform their pedagogical practices, valuing interaction, mediation, and culture as central components of human development and the appropriation of historically constructed knowledge.

8 References

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