

# POSTDIGITAL PEDAGOGY AS A SYNTHESIS OF RHIZOMATIC LEARNING AND THE POSTDIGITAL ERA

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## Pedagogía posdigital como síntesis del aprendizaje rizomático y la era posdigital

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### Abstract

This paper is conducted around two central axes: rhizomatic learning and the post-digital era. Rhizomatic learning bases its principles on the construction of knowledge based on the contributions of students in real time, with the aim of understanding the community as a curriculum. For its part, the post-digital era is understood as the situation in which digital technology is an imposed social necessity. Since education, despite being public, is not free, digitization increases the socio-economic gap between students with access to digital tools and those who do not. Thus, the possibility of counter-digitization is proposed: using digital technology as another emancipatory tool, i.e., when it is possible, use it competently and equitably; however, when this situation cannot be achieved, we must have a post-digital praxis that understands the world-system with the same or similar possibilities. To this end, rhizomatic learning and post-digital era will be presented as inherent parts for the production of the upcoming pedagogical proposal: the possibility of establishing a post-digital pedagogy. To provide philosophical grounding, a literature review of the two aforementioned axes is presented from the work of Deleuze and Guattari, exposing a distant and rupturist approach to the digitalist positions of current technocapitalist education.

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### Keywords

Educational philosophy, e-learning, critical thinking, information society, inclusive education, technology.

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### Resumen

El presente trabajo se construye alrededor de dos ejes centrales: el aprendizaje rizomático y la era posdigital. El aprendizaje rizomático asienta sus principios en la construcción del conocimiento a partir de las aportaciones del alumnado en tiempo real, con la finalidad de entender la comunidad como currículo. Por su parte, la era posdigital se entiende como la coyuntura en que la tecnología digital es una necesidad social impuesta. Partiendo de que la educación, pese a ser pública, no es gratuita, la digitalización aumenta la brecha socioeconómica entre el alumnado con acceso a herramientas digitales y el que no. Así, se propone la posibilidad de contradigitalización: usar la tecnología digital como una herramienta emancipadora más. Esto es, cuando sea posible, utilizarla de manera competente y equitativa. Ahora bien, cuando esta situación no pueda darse debemos contar con una práctica posdigital que comprenda el sistema-mundo con las mismas o similares posibilidades. Para ello, aprendizaje rizomático y era posdigital serán presentados como núcleos inherentes a la producción de la propuesta pedagógica viniente: la posibilidad de establecimiento de una pedagogía posdigital. Como sustento filosófico se presenta una revisión de literatura de los dos ejes mencionados desde la obra de Deleuze y Guattari, exponiéndose un acercamiento rupturista con las posiciones digitalistas de la educación tecnocapitalista actual.

### Palabras clave

Filosofía de la educación, aprendizaje en línea, pensamiento crítico, sociedad de la información, educación inclusiva, tecnología.

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## Introduction

The topic addresses the transformation of educational methods, especially in the transition from conductivist, cognitivist and constructivist approaches to connectivist learning, highlighting the rhizomatic model. It states the influence of the digital age and the need to explore new forms of education in the post-digital era.

The main objective is to explore the possibilities of educational counterdigitization to ensure equitable access to knowledge, proposing a postdigital approach that is aware of the socioeconomic and ethically responsible limitations in the use of technology.

The main question that guides this research is how to address educational counterdigitization to ensure equal access to knowledge, considering the socioeconomic and ethical limitations in the use of technology?

In order to answer the question, it is necessary to adopt a post-digital approach in education, recognizing digital obligatory education as a privilege, and proposing pedagogical practices that are competent, equitable and ethical, both in digital and analog environments.

The research topic highlights the importance of overcoming the socioeconomic gap in education, recognizing that the post-digital era requires a critical reflection on access to technology and advocating for more inclusive pedagogical practices. It is a current topic, it focuses on the reality of the year 2020, demonstrating the need to adapt to virtual

classrooms and the digital gap, which underlines the urgency of rethinking educational practices in the post-digital era. Its relevance lies in the search for non-commercial educational alternatives, exploring new pedagogical territories that allow to reverse the digitalist vision of education and build a more equal perception.

Methodologically, this work raises the need to adopt a post-digital approach, recognizing the socioeconomic and ethical limitations in the use of technology, and exploring developments and possibilities for the application of rhizomatic learning from this perspective. To this end, an exhaustive review of the academic literature related to the subject of study has been carried out, selecting and critically analyzing key texts, theories and concepts. In addition, an analysis has been made from fundamental concepts related to the research topic, exploring gaps in knowledge and looking for connections between different concepts or theories, with the aim of generating new perspectives or research approaches. Hence, this article proposes new directions or approaches for applying rhizomatic learning in the post-digital context.

The work is conducted by dismantling various developments and possibilities arising from the application of rhizomatic learning in a post-digital context. In addition, it aims to explore vanishing lines that lead to a pedagogical protosystem: post-digital pedagogy. It is considered that memorization, repetitive mechanization and the production of chain knowledge typical of industrial and “post-industrial” society are partially replaced by digital educational resources during the digital era (Siemens, 2004). The intention is that students increase participation by looking for connections between contents, analyzing concepts, sharing the learning process, etc. (Starkey, 2011).

To this end, several authors agree that conductivist, cognitivist and constructivist learning must evolve towards connectivist learning, such as proposals similar to the pedagogy of cyberspace (Hermann Acosta, 2011) or, in this case, rhizomatic learning (Reigeluth, 2000; *Martín et al.*, 2011; Cabero and Llorente, 2015). Thus, it is intended, understanding the construction of knowledge in the network society (Hermann Acosta, 2013), to propose an alternative besides digitization to be able to work from the connectivism.

Rhizomatic learning is a new type of learning that moves away from the curricular hierarchies and is proposed as a break to the homogenization of contents, i.e., the construction of knowledge from the contributions of the subject of learning in real time, namely, understanding the community as a curriculum (Cormier, 2008). One of the main character-



istics of this methodology is that it is established from a digitalist point of view, defending that ICTs are the main guarantors of constant, updated and multiple access to knowledge. This makes the use of digital technologies inherent to rhizomatic learning, which subjects the character to the condition of having sufficient resources to carry it out (Jandrić, 2020).

In this way, it is observed that learning based on a digital methodology seems to be precipitated when it comes to self-proclaim as global educational tools and free access. The problem lies in rooting the rhizomatic learning in the digital age, which was exhausted by the superposition of the obligatory access to the digital. Thus, the current situation must be understood as a post-digital era, namely, the period in which the fact of being digital will only be noticed by its absence and not by its presence (Negroponte, 1998). This causes an increase in the socioeconomic gap between students with access to digital tools and those who do not.

This phenomenon has been observed throughout 2020. Classrooms transformed into virtual spaces as open as they are inaccessible, where digital technology becomes a social necessity that denies access to education to the few and brings enormous benefits through an educational commodification process to the few others. The school system continues to perpetuate the punishment of students who do not adapt, in this case those without access to digital (Czerniewicz *et al.*, 2020).

In response, educational counterdigitization possibilities that allow access to knowledge similar to that offered by smart devices should be explored. It is not a question of formulating a “luddite revolution” that advocates the death of machines, but rather of seeking a practice that is capable of bringing digital pedagogy to new territories in which digital resources are limited, namely, where possible, to use it in a competent and equitable way. However, when this situation cannot occur, we must have an alternative that will become post-digital.

Becoming post-digital will refer to the ability to understand the privilege that is the incorporation of digital obligation into the school system and, in this way, an ethical and conscious use of digital in local and global socio-economic limitations should be made. Thus, post-digital ruptures must be applied in order to reverse the digitalist vision of education towards a more equal perception, which allows understanding the situation of the non-privileged population: “Could we do this activity without digital resources?”, the teaching staff must ask. Throughout this work it will be made explicit how the construction of developments, such as the one mentioned above, must be carried out from the minority (Deleuze and Guattari, 1988). To become a post-digital minority is to



denounce privilege, to look for non-commercial educational alternatives, to explore new pedagogical territories; it is, in short, to pack up: to tear down walls, to build bridges.

In the conduction of the research, the different developments and possibilities manifested in the application of rhizomatic learning from a post-digital point of view will be broken down. It also aims to navigate through the lines of flight that will gradually emerge in order to draw paths that converge in a pedagogical protosystem: post-digital pedagogy.

## Precariousness and Capitalism in the Post-Digital Era

*Period when the fact of being digital will only be noticed by its absence and not by its presence (Negroponte, 1998).*

Although the epigraph allows to establish and understand the starting point of the post-digital era, it is useful to turn to certain points, which allow a more precise description of the fact to be presented. The concept “post-digital era” is understood as the conjuncture that allows analyzing the effects and implications of the digital era (Agamben, 2002), so it implies a distancing from the typical digitalist enthusiasm of the previous era (Cramer, 2015).

The fetishization of the so-called “digital revolution” has involved the creation of exclusionary binarisms, socioeconomic computerization: ones or zeros, on or off, digital or analog (Pepperell and Punt, 2000). Therefore, the post-digital presents as a flexible response that multiplies the possibilities of digitization from an inherently extensive perspective, namely the post-digital landscape-network.

The landscape-network, from the digital perspective, is understood as the process in which digital technologies increase the possibilities of panoramic organization of a digitalized territory (Stam, 2000). This leads digital environments to try to synthesize natural and cultural aspects individually, i.e., landscape and inhabitants become entangled unity (Londoño and Gómez, 2011). The digital landscape-network is established in principle and similarity to the capitalist regime, perpetuating its power devices through the obligatory commodification of the digital.

On the other hand, the landscape-network from the post-digital perspective will be understood as a territorial palimpsest that uses the residue of the digital to create counterdigital -or post-digital- tensors that allow sketching the same or similar territorial lines as those offered by digital devices without the need to depend on them.

The use of digital technology is understood as a prosthetic organic projection, i.e. it replaces organic functions by external devices (Kapp *et al.*, 2018). In the post-digital era, digitalism seeks prostheses necessary for the correct functioning of the individual (Smith, 2018). Thus, the optimization offered by digital devices is exploited by the capitalist system to create supposedly dysfunctional subjects to whom it can prescribe increasingly expensive prostheses: although it cannot be paid for, that prosthesis is necessary to walk, to study, to live (Jones, 2019). Drama of post-digital capitalism.

As in Foucault's Panopticon (1976), the individual who fails to adapt to the norms, in this case digital, is punished, i.e., those who cannot afford access to the digital. And the pseudo-solution to cost-cutting is not sustainable, because no matter how cheap a product is, there will always be people who cannot afford it. Thus, understanding post-digital capitalism as a reality, it is necessary to look for vanishing lines in the face of educational commodification.

These lines will be proposed as post-digital and counterdigital alternatives to the imposition of dysfunctionality: rehabilitation prior to prostheses. To do this, there must be an alternative capable of reactivating anatomical mechanisms in a post-digital key, namely: if a methodology in which it is intended to explore the non-digital potentials, the possibility of sporadic use of digital devices will allow the competent and equitable use of these tools. Be able to work functionally and, when possible and necessary, apply this rhythm to the prosthetic incorporation (Smith and Morra, 2006).

Once understood the context of this research, as well as the main problems of the post-digital era, it is necessary to specify what role the post-digital plays with education. First, it must be understood that digital is not part of a specific type of methodology or didactics, but that in the post-digital era it is part of the understanding that digital is inherent to human development (Lewis and Kahn, 2010).

The reality is that the academic training of teachers is quite limited and the new generations see how social digitization is still being processed in educational research (Knox, 2016), hence the ambition and difficulty of the project. For this reason, it is emphasized that the digital is understood as a sociological necessity and the rarity lies in the non-achievement of the digital fact, i.e., the lack of digital instruction, the scarcity of digital resources, the ignorance of the digital or the supine ignorance, among others.

From these conditions, the post-digital will be understood as an optimized return to the first educational concerns applied in a landscape in constant opening, already entangled and constituted by the omnipres-



ence of the digital (Knox, 2019). Thus, it is observed that the digital tools used by teachers are not merely educational, but are part of an accelerated capitalist framework that aims to change education, i.e., the school becomes a Silicon Valley company, where qualification becomes statistical accuracy, the contents become data and the student becomes client (Srnicek, 2017).

The notion of open digital education has not been able to thrive as the capitalist machine has taken care of it. Ideological attempts at educational openness have resulted in a commercialization of the community, where there has not been an achievement of the ideal of sharing because access to digital creates socioeconomic parallels in which the privileged will glorify the benefits of its use, while the non-privileged will not be able to appreciate these characteristics because of the lack of capital that denies them access (Birchall, 2017). Thus, it is observed that open digital education is not inherently inclusive, on the contrary: the economic level of the individual will continue to perpetuate exclusionary structures that aim to focus education towards a specific client-pattern: middle and upper class students (Schlagwein *et al.*, 2017). It is considered essential that teachers are able to appreciate this false sense of inclusion laundered by the capitalist system, as well as the main borders and digital boundaries that seek exclusion and educational socioeconomic homogeneity (Funes and Mackness, 2018).

To do this, the characteristics of digital education must be rethought, specifically, those most suitable for this work are the dynamics of critical digital pedagogy (Sweeny, 2004). This type of education states that teachers must be aware of the oppressive machinations prevailing in the digitization process of education offering a critical role in this, namely: focusing on the oppressed pedagogy of Freire (1972), it is intended to use digital tools to develop a conscious system of social inequality and discrimination (Hamilton, 2014). Thus, digital openness could break the hierarchical teacher-student binarism; focus their practices on community collaboration; remain open to continuous review according to local and global needs; create a cacophonous system in the educational community as found on the Internet; exit from methodological traditionalism (Stommel, 2014).

Therefore, from the critical digital pedagogy, the other great theoretical axis of this work is proposed: rhizomatic learning.

## Rhizomatic learning as pedagogical fertility

*Rhizomes are anomalous developments produced by the formation of transverse alliances between different and coexisting terms within an open system (Deleuze and Guattari, 1988, p. 10).*

Rhizomatic learning is as an alteration of the hierarchical systematization of educational knowledge, as well as of contents, concepts and objectives, in order to seek a break from pedagogical sedentarism (Gough, 2006). To this end, nomadic thinking will be postulated as the basis for the formation of a creative teaching that questions the prevailing monoculture understandings or hegemonic knowledge.

The nomad refers to the condition of rejection towards the sedentary settlement of knowledge, thus, it is intended to leave the territory of instruction designated by the state in search of deterritorialized educational multiplicities: becoming lost curriculum (Zilcosky, 2004). Likewise, the claim will never be the loss of the curriculum from its destruction or accelerated transgression, but rather the possibility of opening this: curriculum in search, infinite curriculum.

For this, the curriculum in rhizomatic learning becomes community, i.e., it is understood the high competence of the group-classroom when creating hypotheses, building theories and exploring meanings (MacNaughton *et al.*, 2007). Thus, one of the main pillars of this methodology will be the participation of students in relation to the construction of post-curricular contents that allow developing a relentless flow of knowledge (Chan, 2010).

The aim is to carry out a pedagogy of the minority that is not distinguished by the aggressiveness of its reformist perspectives, but from the rationalist development of the curriculum the students cannot be limited by any type of educational reactionary policy: even if the curriculum only contemplated three contents —god, homeland and family— the rhizomatic methodology involves the intrinsic construction of educational counterhegemonic multiplicities (Strom and Martin, 2013). And why?, and why?, *ad infinitum*.

The question will be understood as the main tool of pedagogical research in the classroom, capable of interrupting the proliferation of educational binarisms and hierarchies (Freire, 1972; Kennedy, 2009). Thus, it is observed how unexpected questions make rhizome, namely: they are presented as vanishing lines before the sedentary conformity of educational institutions seeking multiple alternatives of reform (Roy,



2003). From the isolated concretion to the pansophic multiplicity, becoming complex.

The pansophic multiplicity refers to the constant potential for acquiring knowledge implied by rhizomatic learning, i.e., from the pansophic pedagogy it is intended to teach “everything to everyone” (Comenius, 1986/1633). Hence the optimized return to the first didactic concerns: Comenius, father of pedagogy, formulated the need to establish a pedagogy —pansophia— that would be able to provide access to all knowledge to the entire population, so that rhizomatic learning as a methodology in the post-digital era aims to be an approach to the Comenian utopia. From this perspective, approaches to a new construction of knowledge can be seen from the current educational reality (Moreno, 2012).

Regarding this theory of the teaching and learning process, it should be emphasized that the structuring of this theory in a set of norms, binarisms, technical concretions or educational patterns will never be possible, thus, methodological standardization cannot have a place in a system immanent to multiplicity (Sellers, 2005). Thus, requiring a classification that characterizes rhizomatic learning would be counterproductive. However, it is possible to speak of practical singularities that, in order to be able to comprehend this type of teaching, are presented below.

### *From polyvosity or becoming a pack*

*Contextualization.* In the educational context, polyvosity emerges as a response to the traditional unidirectional relationship between the teacher and the student. It is based on the idea that learning transcends individuality and is enriched through the active participation of the student community. The approach of becoming a herd seeks to strengthen community ties, transforming the teacher-student universe into a transformative polyvocity, where the continuous contributions of students are essentially integrated into the process of rhizomatic learning.

*Foundation.* Learning abandons the traditional individuality in which “one” - teacher - speaks and “other” - subject - listens, as this is understood as a castration of psychosocial development. Thus, the goal will be to develop a herd of students: to strengthen the community bond, both in the center and in the classroom. To this end, the emasculating teacher-student universe becomes a transformative polyvinity, in which the continuous contributions of students will be an essential part of rhizomatic learning and -already as a herd- the student cooperates to achieve an interpersonal, intersubjective and open training (Carreño, 2018).

### *From multiplicity or rhizome*

*Contextualization.* In the educational field, multiplicity challenges the notion of static content and establishes that teaching should adopt a rhizomatic and dynamic structure. This approach implies a radical change in the educational perspective, focusing not only on what content is taught, but on how it is taught. The importance of openness and flexibility in the curricular approach is highlighted, allowing students to constantly explore and expand the limits of their knowledge.

*Foundation.* The contents are no longer watertight and are defined as inherently multiple, so the presentation of concepts and the curriculum work will be rhizomatic and dynamic, where the imposition of a script or teaching pattern becomes imperceptible because the point of view and access to knowledge changes radically. It is not what content is taught, but how they are taught, how much they are opened and how much the students achieve to stretch and tighten the curriculum: make rhizome, constantly create pedagogical multiplicity (Harris, 2016).

### *Territoriality or Geopedagogy*

*Contextualization.* Geopedagogy recognizes the school as a territory in constant construction, inextricably linked to its environment and the educational community. This approach implies an analysis that starts from the local towards the global, considering contemporary globalization and its consequences. Rhizomatic pedagogy is committed to the harmony between the institute, the school community, the environment and its interconnections.

*Foundation.* The school and its environment are essential elements for achieving rhizomatic learning. This is because the educational institute will be understood as a territory in permanent construction, geopedagogical territory formed by its population and relationships, thus, the pedagogy can only be carried out in harmony with the school community, the context and its links (Soler *et al.*, 2015). Thus, the idea is to work from an analysis that goes from the local to the global, understanding the current globalization system-world and its implications to, subsequently, develop a perspective-oriented learning not exclusive rooted in local immediacy.



### *From tension, creepage and breakages*

*Contextualization.* The tension in rhizomatic learning is manifested through vanishing lines, continuous processes in which the perspectives of the student constantly stress and reformulate the educational contents. These vanishing lines possess a creative power of escape, generating significant ruptures that reconfigure the teaching and learning process. The rhizomatic methodology embraces the idea that the transformation and enrichment of knowledge occur through these moments of rupture.

*Foundation.* Knowing that each line of the rhizome can be connected with any other, these lines will also be constantly subjected to stress processes, i.e., what is being learned is continuously reformulated by the students through the presentation of new perspectives that, in the form of incessant questions, strain the contents and concepts to the point of producing escape lines. These lines are characterized by their creative flight power: escaping from conceptual sedentarism, giving rise to significant breaks that allow rethinking the teaching and learning process, enriching and opening knowledge, making rhizomes (Sermijn *et al.*, 2008).

### *From school intensities or pace*

*Contextualization.* The intensities in rhizomatic learning refer to the variations generated by the concatenation of experiences and their transformative impact. The rhizomatic multiplicity, besides being extensive, recognizes the constant reformulation, revision and rupture inherent to the construction of knowledge. The importance of the school rhythm is highlighted, understanding that the educational process involves moments of movement and rest, speed and slowness, being essential both dynamism and pause for conceptual grounding.

*Foundation.* The concept of “intensity” refers to the variations produced by the concatenation of experiences and their role as modifying a whole (Bergson, 2020/1925). Thus, rhizomatic multiplicity will always be intensive as well as extensive, i.e., not only will the numerical openness of a set of knowledge be taken into account, but also as the very construction of a multiplicity implies its constant reformulation, revision and rupture (Deleuze, 2002). In this way, rhizomatic learning must understand the intensities implicit in the exercise of teaching and learning, i.e., relationships of movement and rest, speed and slowness. When the educational process is considered as a constant change, there will be situations of movement, as well as rest, both inherently complementary to education. For this reason, the importance of the school rhythm and its speed and

slowness relationships is emphasized, namely: a critical, rationalist and open learning cannot be streamlined, it will have accelerated moments and other pauses, here is the relevance of rest and interruptions for the conceptual settlement (Brown, 2007; Olsson, 2008; Semetsky, 2013).

### *From becoming a child or counterinfantilization*

*Contextualization.* The contrainfantilization in rhizomatic learning represents a resistance to the infantilization prevalent in Primary Education. It is based on a counterhierarchical approach, where the objective is that the teacher assumes the perspective of the child to understand the complexity of his reasoning. This approach recognizes the benefit of children's ability to generate hypotheses without the restrictions of adult thought, facilitating the rhizomatic opening of concepts and contents.

*Foundation.* Rhizomatic learning is a methodology that is directly opposed to the infantilization prevailing in Primary Education because it is inherently counter-hierarchical, as explained above. Thus, one of the main objectives of the teacher will be to become a child: change the point of view in order to understand the complexity of the student's reasoning, i.e., the child is not as conditioned as the adult to the construction of certain hypotheses, since this is highly beneficial in terms of the rhizomatic openness of concepts and contents (Hickey-Moody, 2013). Teachers must therefore become children: constantly rethinking the contents taught, looking for possibilities of conceptual breakthrough, being able to make constant formulations of questions, etc. To make rhizome it is necessary to put into play a "cultural" system based on a creative involution: not to advance linearly towards an end —involution— allows to explore vanishing lines that will create new relationships and connections that will expand the capacity of creation and acquisition of knowledge —creation— (Semetsky, 2004).

In short, rhizomatic learning is a methodology that, far from the digital obligation, will be able to propose incessant academic openings, leaving the students and the rest of the school community to act towards the construction of a multiple, critical, rational teaching with openness pretensions.

## Building knowledge and becoming the internet

In the post-digital era, the consensus reached is that the greatest source of collection and reproduction of concepts and knowledge is the Internet, for that reason studies related to digital education emphasize the relevan-



ce of access to this tool for the acquisition of a pedagogy whose methodology and contents are in constant review. Because of this emerges the critique that considers that *e-learning* or *digital learning* cannot constitute a totality of the teaching-learning process, namely: it must be understood that digital tools, despite their unfathomable content, are nothing more than a resource that cannot be isolated from the socially tangible activities to which it is intrinsically connected (Fawns, 2019).

Thus, continuing with the above proposed, to explore the possibilities of counter-digitization, rhizomatic learning is considered from a post-digital perspective, so, just as the Internet is understood as the main guarantor of constant, updated and multiple access to knowledge, teachers must become the Internet.

This postulate is because academic literature influences the need for teachers to go through a professionalization process with regard to the application of digital methodologies, stressing on certain occasions the absence of an alternative to these methods (Kimmons and Veletsianos, 2015). In this way, this argument is considered classist because, as explained above, there are situations and social conjunctures in which there will not be a real investment in digital tools.

Likewise, it is no less true that the teaching staff must understand their role as a digital individual (Choi *et al.*, 2018) and, therefore, must be able to act as a search engine in situations of non-digitalization. This implies that, when accessibility to digital tools is not possible due to the impossibilities of the educational environment, teachers should acquire the role of researcher that from the relentless formulation and answer of questions offers multiple results to the commands introduced by the students, namely: to have an intelligent screening system based on relevance and timeliness when answering. Internet-teacher, search-engine-teacher, always ready to seek rhizomatic access to knowledge, supplying the digital obligation by post-digital openness.

In this way, the construction of knowledge from rhizomatic learning could occur —speculatively and reduced— from the following tetrad:

1. *Creative analysis and study of images*. One of the main characteristics of rhizomatic learning is its reflective nature. Therefore, the exhibition of images is considered a post-digital educational tool -analog capacity- that can result in a more open or multiple treatment of concepts and curricular contents. Thus, it is observed that the analysis and study of images allows the introduction towards a dialogic approach to concepts, which implies the acquisition of knowledge in an experiential — or material — way and in turn reflective (Papen, 2020). This dimension or



rhizomatic line is inherently positive with an extrapolable nature to all educational levels, i.e., the course in which the creative analysis of images is carried out is not relevant, since as the academic level increases, the reflections will be more complex and will delve exponentially into the proposed concepts and contents.

In addition, its positivity is emphasized because there is a substantial change from the imposition of a signifier for each concept - single definition by word - to the acceptance of a construction of intersubjective meanings created from the alliance and educational multiplicity (Oztop and Gummerum, 2020). These meanings allow the students to make proposals and reflections regarding the contents exposed by the teachers, which allows establishing links between individual interventions that guarantee a construction of the knowledge that becomes the Internet: the students introduce a command —speech— obtaining multiple results —answers— that will be reflected as a conceptual *whole* that will be complemented by the reflections and answers of the teachers.

2. *The conceptual or pansophic 'whole'*. After multiple discussions with the teaching staff, the possibility of establishing minimum contents per course, coordinated at the level of the institution, is considered. This paper refers to the definition of the “pansophic whole”, i.e., starting from the Comenian utopia, to define a finite whole in its infinity: a “whole” based on the multiplicity of dimensions and not on their quantity. Knowledge could be divided into plateaus, namely: concepts and contents treated extensively, creating relationships of multiplicity among them and avoiding reaching specific climax or ends (Bateson, 1998). These plateaus would be understood as minimum contents and thus, starting from these, the didactic programming and their respective didactic units would be established.

This dimension is postulated as a rhizomatic line of action that aims to establish an interconnected curriculum, where cycles follow a coherent development based on rhizomatic learning. One of the foundations of this type of teaching-learning system is the achievement of a future educational community and for this purpose the coordination of the teaching staff and the management team of the center is considered relevant. The coordination of the curricular contents and the establishment of this “pansophical whole” will exponentially increase the construction of knowledge in students and will allow exploring all kinds of pedagogical dimensions, following the rhizomatic principles of concordance, multiplicity, cooperation and connectivity, typical of connectivist educational theories (Homanova *et al.*, 2018).



It is usually found that the implementation of innovative methodologies by some teachers is limited by the subsequent return to traditionalism by other teachers: the efforts of a few are sunk into the majority pedagogical sedentarism (Voogt *et al.*, 2016). In this way, the establishment of a practice that seeks the establishment of conceptual lines and forms of action for the entire educational community, will allow the implementation of a rhizomatic learning based on the openness of the curricular contents and the construction of knowledge.

3. *Hypertextuality for the acquisition and development of concepts and contents.* Rhizomatic learning, being an open and multiple practice, implies that concepts and contents are shown and worked from a perspective, in addition to intense, extensive. Doing rhizome could be assimilated to stretching an unbreakable gum or to hypertextual internet browsing (Heinonen, 2015).

The posing of questions and the constant participation of the students will cause that a kind of navigation is put into play within the proposed concepts and contents: superficial and deep issues; adjacent to each other, juxtaposed; imperceptible to the naked eye, tensioning and with capacity of conceptual flight, etc. Always goes beyond the established, becomes internet. Thus, the idea of digital hypertextuality is extrapolated to the tangible educational reality, namely: rhizomatic approaches to the construction of knowledge allow the development of highly complex conceptual lines, which results in students acquiring advanced critical reasoning mechanisms (Movahedian *et al.*, 2020) or, inciding on previous expression, gives rise to creative reasoning “in leaps”.

The role of hypertextuality, inherently rhizomatic, allows access to knowledge in a more mature, complex and dynamic way than when the provided definitions are watertight and have the final claim of conceptual fixation. A commitment to the extensive exploration of knowledge will lead to cognitive constructions that in the future will help students to develop a more open and powerful mentality and attitude.

4. *From non-error and individuation.* As with the Internet, error is a fundamental part of knowledge construction. In this case, when error is referred to as a pedagogical tool, it is not from the perspective of learning by working conditioning by Skinner (1975) or Thorndike (1905). Rhizomatic learning does not have as an end the establishment of a system in which the student should be guided —behaviorism— towards success, but works with the supposed error in its own uniqueness: it is about understanding the implications and the creative power for the individuation process of the student.

Individuation is understood as a process constituted by a cluster of acts that allows to determine the singularities of individuals. The study of the individual is inherent to rhizomatic educational practice, i.e., to make rhizome and to create multiple alliances it is necessary to understand the individual singularities of the students, put them into play and establish incessant connections between them (Brugnera, 2013).

In this way, the construction of knowledge from rhizomatic learning also lies in offering students the possibility of enunciating hypotheses, assumptions and elucidations: moving forward and stopping, without systematically assuming that it is right or wrong. This is the way of achieving individuation acts that allow a construction of the knowledge that becomes the Internet. The faculty, which becomes the search engine, will collect all these data and actions —none wrong, all necessary— and incorporate them into the “classroom *cookie* policy”, creating an interconnected network of rhizomatic nature in which the group whole is understood and intended to achieve interindividual growth —both individual and group— in all its possibilities.

This tetrad is a kind of exemplification or putting-into-action the power of a post-digital and rhizomatic approach to the construction of knowledge that becomes the Internet without needing this tool. After this reflection, it is possible to analyze the contents and their treatment from a possible post-digital pedagogy.

## Curricular contents and transformative polyvocity

One of the fundamental pillars of rhizomatic learning is pedagogical polyvocity, namely: an educational praxis that expands the capacity for critical transformation in learning through the review of traditional power relations (Arnold and Brennan, 2013). Contrary to the unambiguous perspective in which, usually, a subordinate relationship is established in which teachers teach and students listen and trace the discourse, polyvocity characterizes by giving rise to a construction of knowledge from the multiplicity of voices, i.e., the participation of the entire educational community.

The participation in the herd allows to approach the objectives and curricular contents from a rhizomatic perspective that, from the non-hierarchization of schools, leaves room for any contribution that is wanted to be made, offering the students an active role in which they will be able to develop their thoughts, concerns and reflections. This allows a transformation of education, particularly the curricular contents (Field-



ing, 2011). Therefore, a brief compendium of the dimensions or transformative capacity of pedagogical polyvocality is exemplified in the form of a triad and how students, through rhizomatic learning, are able to understand the contents.

1. *Methodology as content or irrelevance of contents.* One of the main characteristics of transformative polyvocality is the irrelevance of content, i.e., the methodology itself becomes curricular content. With irrelevance it is not intended to postulate that the contents have no place in this pedagogical system, rather the opposite: it does not matter whether we are faced with a curriculum with great content wealth or a poor curriculum, fixed, organized and censored. Obviously, the greater the fertility of the curriculum, the more opportunities there will be for educational openness. See the following example of maximum curricular poverty: in the face of the possible imposition of the contents “god, homeland and family”, polyvocality will transform the curriculum clandestinely or imperceptibly. Tool of educational resistance. Students, by hearing and participating in the multiple perspectives regarding the content presented, will not adapt to the curricular objectives due to the rhizomatic nature of their thinking, namely: however reductionist the curricular contents may be, the dimension of polyvocality will give rise to rich non-curricular reflections (Bilek-Golias, 2014). Polyvocality can potentially transform all relationships: god-ethics-love; homeland-territory-landscape; family-environment-pack.

This is what is understood as the irrelevance of content, where irrelevance becomes pedagogical flexible (Aktan, 2021). Defining and concretizing a series of curricular contents, even if it is from the maximum degree of coercive specificity, will not be a problem from the rhizomatic learning; it will not have a negative relevance. Faced with the policies of inquisitorial reductionism of the educational legislation in terms of what content to treat, polyvocality -building of learning alliances- allows students to understand the curricular contents from a wide and multiple spectrum, thanks to the coexistence with the perspectives of the classmates.

2. *The evolution of polyvocality or subjective resonance.* Given the dimension related to polyvocality and its transformative role, it is considered necessary to delve into the reason of this capacity for change and its transformations: metamorphosis.

Once the contents are presented, the students are able to search curricular vanishing lines that they always encounter thanks to the construction of a postsignifying intersubjectivity, i.e., a process of collective subjectivation is established that allows the overcoming of systematized

signifiers (DeMaria, 1991). Thus, the evolution of transformative polyvocality could be established in the subjective resonance, which is nothing more than the dimension that allows to carry out the postsignifying intersubjectivity processes explained above. This dimension occurs through coordination and connection between interactive-social cognition and collaboration in the construction of the sense of logic (Mühlhoff, 2014).

Collaboration in the construction of the sense of logic is understood as a system of non-accidental correlation between the behaviors or attitudes of a group of individuals (De Jaegher and Di Paolo, 2007). These inter-individual connections are what allow polyvocality to become subjective resonance, creating the students a multiplicity of redefined conceptions of the curricular contents: thus, giving a constant metamorphosis of the contents.

3. *From the quantum flows and the school.* Understanding the subjective resonance of polyvocality, it is considered necessary to make explicit, as a conclusion, the process that allows the formation of the polyvocal, as well as the nature of its dimensions and their pedagogical applications.

For this, we find the term referring to the flows of quantum, namely: material flows dominated by beliefs and desires; fluctuations that are created and endlessly exhausted; intersubjective relationships and alliances that allow to establish a post-significant rhizomatic network (Cole, 2019). The flows of all are based on an objective relational indeterminacy called “intuition”. This intuition is the one that allows the construction of the fluctuating alliances and connections explained above and consists of three processes, which are those that constitute the quantum flows (Deleuze, 1988):

- The problematization, which involves the understanding and analysis of current problems, as well as the relentless construction of new problems.
- Differentiation, which involves diverging and converging according to how different natural joints are understood. Understand the relations of synonym and opposition.
- Temporalization, which implies understanding the non-homogenization of things. The famous “everything changes nothing remains”: material fluctuations.

Thus, the students go through the process of intuition as the polyvocality is built: they understand the problems and raise new ones in a constant way, since they are aware that learning is not fixed or stagnant. “And why? And why? And why?”

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Understanding the relations of synonymy and opposition makes the students go through different processes of intuition, there is the importance of differentiation. Once a cluster of differences has been established, it continues to problematize its relationships: constant problematization because all these relationships fluctuate, they are temporalized (Cole and Throssell, 2008). The flow of the few and their consequent creation of mobile alliances leads to an accelerated individual development, propitiated by the intuitive flexibility of the idea of the group.

Therefore, it is considered essential to study the relevance of the flows of quantum in school: students, through intuition, build relational indeterminations based on their capacity for problematization, differentiation and timing. These relationships are part of the interactive-social cognition or psychosocial development, so the methodological application of rhizomatic learning based on polyvocality will allow, not only the transformation and extensive evolution of the curricular contents, but also the development and construction of the individual from a collective vitalism that understands the singularities of his own and of his colleagues.

## Applicable Epitome and Evolution

The reading faculty may ask the author of this paper for a greater concreteness in the applicability of post-digital pedagogy. However, in order to show the possibilities of rhizomatic learning in the post-digital era, it is considered necessary to have an impact on action-research, specifically on educational action-research. This is understood as the process by which the teaching staff becomes a researcher in the reality of the classroom (Stenhouse, 1984). This notion is literal: to investigate is to inquire, to discourse or to ask questions. No epistemological or methodological rigidities, no specific manuals.

The teaching staff, dissatisfied with the current state of the teaching and learning process, must identify the problems and their intensities for the subsequent formulation of hypotheses executable in school praxis: a rhizome of pedagogical hypotheses that involve the introduction of *N* possibilities for educational improvement. From these hypotheses, it will be possible to generate reasonings as to what potential future must be assumed by the teaching practice, what changes will be introduced, what are the objectives of these pedagogical reformulations, among other questions.

Therefore, educational research-action from a rhizomatic perspective involves a constant review and renewal of teaching methods and,

for this to be possible, teachers must be highly involved in the methodological non-sedentary and willing to explore theoretical-experimental vanishing lines towards changes or breaks beneficial for the entire school community. Thus, throughout the concatenation of all the school events that happen during the teaching exercise and their respective intensive relationships - of movement and rest, speed and slowness - the teaching staff could develop a compendium of rhizomatic applicability and how these approaches allow the evolution of the school community.

Having said this, it is understood that the possible pedagogical applications of rhizomatic learning in the post-digital era are practically infinite since, from the study of a “conceptual whole” in which knowledge grows extensively, it is not possible to make a tour of all its possible practices. Therefore, it is intended to make an analytical compendium of the possibilities of application, namely: an applicable epitome. For which it takes into account the main rhizomatic lines or dimensions and their becoming:

- Understanding knowledge as a multiplicity: becoming a rhizome.
- Seeking an approach to digital from the counterdigital margins: becoming the Internet.
- Promoting the construction of community alliances: becoming a pack.
- Creating intersubjective hypertextualities: becoming transformative polyvocality.
- Seeking the extensive development of the contents: becoming a pansophia.
- Understanding the territorialities of the educational community: becoming an environment.
- Understanding the relationships of movement and rest: becoming a master-metronome.
- Promoting the intuition processes (to problematize, differentiate and temporalize): to become a flow.
- Enhancing the development of intra- and interpersonal singularities in the individuation process: becoming an individual.
- Adopting ethical mechanisms constantly: becoming pure power.

This last “becoming pure power” refers to the ability to open rhizomatic learning and, therefore, access to knowledge should be understood as a constant reformulation of the acquired contents, its implications and dimensions, territorialities and its borders, and possibilities of flight, etc. This development has a changing nature, in the power lies its main singularity: power that is understood as that real without being cur-



rent yet, i.e., any possibility of development in all directions of a development that does not cease to progress and that does not expect a watertight completion or determined end.

These potentialities stand out for being the incessant process of becoming an individual that is so relevant at an educational level. The becoming of the individual moves away from the anthropocentric position of the subject and allows to understand the perspectives in which knowledge is located -territory and environment- towards its acquisition (Giorza and Murris, 2021).

Likewise, one of the main characteristics of the potential is its capacity of metamorphosis, which is necessary at an educational level. Not only for the implementation of hypertextual dimensions or polivocity towards the construction of changing knowledge; it is more about finding the vanishing lines within the dynamics of exploitation or asymmetric violence suffered by students (Snaza and Weaver, 2014). This refers to the position traditionally imposed on students in education, i.e., a mere reproducer of ideas without any interests and castrated in their capacity for intuition and critical thinking. To get out of these dynamics, the implementation of a pedagogy that understands the true relevance of the role that students should enhance allows the advance towards the construction of individualities that, later, will be connected in collective developments.

Therefore, rhizomatic learning, as a methodology in the post-digital era, is postulated as a real pedagogical alternative, multiple in nature and with immediate and non-classist applicability. Explore the margins of digital from analog reality; become the Internet so that, where there is no access to this digital tool, the teacher is able to promote multiple access to knowledge. Becoming the Internet is not becoming an encyclopedia: it is about giving way to polivocity, working with hypertextuality, empowering individuations, exploring unpredictable territories, making more flexible access to knowledge. Teaching is learning to make rhizome.

## Contributions and limitations

Once the theoretical review has been completed and certain applications have been exposed to thinking, it is considered pivotal to launch a discussion that analyzes the contributions and limitations of rhizomatic learning in the post-digital era. To do this, the author will use the observations and reflections extracted from the bibliography used in this work,



as well as the teaching exercise, emphasizing those aspects that are still considered necessary to deepen academically.

As has been analyzed throughout this work, rhizomatic learning is proposed as an alternative to the obligatory school digitization. This is considered a contribution to take into account, since a methodology is proposed that allows exploring the multiplicity offered by the Internet from a non-digital system. Innovation is not synonymous with digitization, the innovation lies in finding methods that are capable of being applied in any circumstances, with the resources available and without discriminating on socio-economic grounds. Another contribution is that rhizomatic applications have multiple nature, which does not seek the achievement of certain objectives or the fixation of the contents taught: it is about building intersubjective connections between the entire educational community —students, teachers and family— which results in learning being flexible and allows a more efficient construction of knowledge in which all students are part of their learning and the group.

There are also some limitations when it comes to understanding, studying and applying rhizomatic learning from the post-digital. One of the major barriers is to understand the situation of digitalist taxation and its implications in terms of socio-economic discrimination suffered by those who do not have access to digital tools. Academics, *mass media* and *mainstream* pedagogies *focus on* working from the digital at all costs, as the only possibility of teaching innovation, showing an excessive commitment to “cut costs” to universalize access to digital technology. Nothing could be further from the truth, since it could not be intended to provide digital resources to regions where they had not even had access to the pedagogical principles centuries ago. The West cannot continue to perpetuate its ethnocentrism in order to replicate its socioeconomic systems around the globe.

Another major limitation that arises in a recurrent way is the development of digital competence (DC): how can DC develop from a practice self-denominated as counterdigital? While it is true that the postulate here stands out for its capacity for analog application, it should be borne in mind that counterdigitization does not mean the same as anti-digitization or classical Luddism. Teacher training and the economic investment made in terms of digitalization is a good thing, so it is not about eliminating digital from school: rather it is about knowing how, when and why to use digital tools - if available. The teaching-learning process cannot be a redoubt of digitization of all possible contents and resources, but, understanding the privilege of the digital, it must be made an ethical and



responsible use, it must focus the application of digital resources in certain occasions when its use is considered exponentially positive and this is possible to do so. The post-digital is to understand the socioeconomic limits of the digital and act accordingly, from the pedagogical openness, and therefore, the application of a post-digital pedagogy of the indeterminate and the unpredictable can be limited and obstructed in a digitalist juncture of the parameterized, performance and excellence.

## Conclusion

Concluding this research, several reflections on rhizomatic learning in contemporary times are postulated, particularly in the context of the post-digital era, giving rise to the concept of post-digital pedagogy. Although this study is fundamentally attached to a theoretical approach, it emphasizes the inherent applicability of post-digital pedagogy in general educational practice.

In response to the research question about the application of rhizomatic learning in the post-digital era, it is evident that post-digital pedagogy emerges as a concrete proposal to address current educational challenges. The research highlights that, despite its theoretical basis, post-digital pedagogy is an intrinsic pedagogical practice to teacher intuition, where application and theory naturally converge.

The idea to defend highlights the autonomy and pertinence of rhizomatic practices in education, stressing that post-digital pedagogy does not require a formal theoretical justification. It is argued that teacher intuition acts as a driving agent of these practices, facilitating their implementation in an organic way and consistent with educational reality.

In summary, the wide scope of applicability of post-digital pedagogy is emphasized and the training of teachers is advocated, considering it a way to exploit its potential in improving educational practices. It promotes the adoption of an open and disruptive perspective, rejecting the predetermined systematization and embracing an education that is oriented towards the extensive construction of knowledge, participatory and without a concrete purpose, based on the variation of the educational chaos.



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