

Embodiment in Deleuze's Philosophy and Its Educational Consequences

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Abstract

Formation of the concept of embodiment in the contemporary philosophy and neuroscience, and elaborating and developing of it in recent century, open a lot of approaches up in different fields; one of them is educational sciences. As the theory is revolutionary, its employment in other fields would be revolutionary necessarily. Yet theories related to embodiment and knowledge take many different forms and have many different theorists and schools. In this paper, having Gilles Deleuze's doctrines in mind, especially the concept of rhizome, we try to elicit his doctrines about embodiment. Thus, doctrines of one of important contemporary philosophers would be related to one of most important contemporary theories. Then, we will apply the results to education. This paper, in fact, has two main parts: first, Deleuze and embodiment, and second, applying it to education. In the latter, a few elements of education, i.e., the role of student, the class and school, would be seen in the light of what is come from the former.

Keywords

Embodied Cognition, Deleuze, Rhizome, Pedagogical Implications

1. Introduction

What is cognition? It would be central element to organisational of behaviour. *Toader & Martin (2023)* and Domain Criteria (RDoC) believe that, cognitive abilities are considered one of the major transdiagnostic domains, cutting across mental disorders (*Morris & Cuthbert, 2012*).

In this process an authentic thought is one that is revealed in response to a crucial question. Moreover, an authentic question is characterized by its implicit reference to the inadequacy of previous replies; that is, it discloses the inadequacy of those replies and seeks a new one. Thus, when we ask what thought is, we

have in mind that extant replies to the question are inadequate. We believe that we need to transcend already established replies since they cannot stand scrutiny in the face of new questions. Those replies should be put behind, thrown away, and then we should move forward. Thus, we need a deconstructive thought, a new brave thought that seeks to topple down the pre-established replies. That is to say, a thought that is not afraid of counting as a minority; to the contrary, it praises such thought. Notwithstanding this, the minority stream of thought is what seems to offer an answer to our present questions. This is why we adopt a Deleuzian approach.

Now that we have found our philosopher, we shall treat him in just the same way as we treated other philosophers. Despite his remarkable critiques of the history of philosophy, Deleuze consults this history very often in an attempt to revive and reappropriate them. There is something to this apparently paradoxical approach that justifies both Deleuze's attempts and ours. Deleuze consults philosophers throughout history, although he is not a commentator or interpreter of their philosophies. Instead, he re-creates them anew. He cherry-picks things from their philosophies that he needs for his own philosophy. In fact, they become Deleuze's tongues, whereby new concepts are generated. For Deleuze believes that only philosophers are in a position to generate concepts. His opposition to a mere historical view of philosophy is because no new concept is created therein. New concepts should continuously be created, because, as we shall see, the world is in a constant process of renewal. Having said this, other philosophers can be deployed as one's tongue for the creation of new concepts. Now Deleuze is our tongue.

Deleuze is our tongue, in the sense that we draw on his views and integrate them with the theory of embodied cognition to examine and criticize contemporary approaches to education and to yield new pedagogical approaches and outlooks. Thus, the first thing we will do is to recount and explain the theory of embodied cognition in Deleuze's language: why and how he helps us to elaborate upon this concept and then prepare it to be deployed in theories of education. This essay has two general sections. We think Deleuze's Philosophy and his idea about education, learning process and embodied, can create better understanding and structure of education. So, in the first section, we consider the connection between Deleuze's views and the theory of embodied cognition. This is indeed a supplement to issues discussed in the second part. This section goes on to consider the materials of our main discussion about the pedagogical implications of his theory. In the second part, we shall scrutinize the pedagogical implications of Deleuze's view from the standpoint of the theory of embodied cognition.

2. Deleuze's Philosophy and Embodiment

2.1. Embodied Cognition

Embodied cognition is a relatively new theory of cognition of the whole range of the sub-fields of the cognitive sciences while maintaining a single core idea that

asserts “embodiment” as the necessary condition for cognition. In a straightforward term, the notion of “embodiment” describes how the sensory input of an organism enables it to interact with the world. In this way, the physical (or bodily) experiences of any organism gain the importance of being the gateway to its relationship with the surrounding world. Thus, the goal of this thesis is to formulate a “manner” appropriate enough to explain how the mind, body, and the world can interact with each other and influence the cognitive perceptions of an organism.

The relationship between mind and body is one of the oldest philosophical problems about which different opinions are articulated. We might divide the existing approaches to this problem into two categories: those arguing in favor of the embodied cognition and those who do not see the question as relevant. The proponents of the latter approach are against the interaction of a non-material substance with a material one. Moore explains the thoughts of Gilbert Ryle:

If we abandon the assumption that for a word to be meaningful, there must be some substantial entity for it to refer to, the mind-body problem no longer seems intractable... so the problem of how the mind interacts with the body is not a genuine problem... “Mind” is not the name of a thing or a substance but of a complicated set of bodily functions carried out in certain characteristic ways (Moore, 2010: p. 2).

Maurice Merleau-Ponty, a philosopher who belongs to the relatively new school of Phenomenology and the Existential theory, has a different view regarding this issue. In his philosophy, the only way to understand the world is through one’s lived experience, and the key to this experience is the bodily activities. Such an experience can never be static but is always dynamic. Our lived experience shapes us as we shape it. Our perceiving mind is embodied, and our perception cannot go beyond our lived experience; neither is it apart from it. Merleau-Ponty’s thought is focused on the understanding of the nature of lived and embodied human cognition. Bartend Claude Levi-Strauss, Michel Foucault, Paul Ricoeur, and Louis Althusser are among the leading theorists under his influence. Later on, he was also followed by several social scientists who were keen on criticizing the traditional notions pertaining to the relationship between mind, body, and the nature of the human experience.

The concept of “embodiment” is the key to Merleau-Ponty’s book, *Phenomenology of Perception*. Unlike traditional approaches that focus merely on the mind, according to Merleau-Ponty, the mind cannot be the sole perceiver, experiencer, and representer of the world. On the contrary, the concept of embodiment shows that the body has a central role in what is experienced. The world (as Merleau-Ponty understands it) is a basis for our perception and experience. Thus, our perceptions of the external things are products of the way our bodies are experiencing them. Those philosophical traditions that believe that our understanding of the world is merely based on cognition, are wrong. In terms of Merleau-Ponty, one may not be capable of obtaining an understanding of the

world without a body, because the mind and body are integrally intertwined. Therefore, the mind is embodied; this prevents the possibility of an independent cognitive process, which excludes the body. The constant analysis of the world is an activity that belongs to an embodied mind (Määttä, 2015).

In his book *Phenomenology of Perception*, Merleau-Ponty uses the term “subject-body” that corresponds with the German concept *Leib*. The book expresses the idea that the body, mind, and the world are wholly entangled and (contrary to the Cartesian thought) cannot be separated. Merleau-Ponty’s phenomenology seeks to understand this relationship of an unchanging cognition beyond the world of bodies. The body-subject concept highlights his emphasis on the connection of the body to the world.

This is where the Cartesian dualism breaks down. There is no embodied mind to observe an object of the external world. We experience the world through our bodies. Subject and object are united and not dichotomous; this means that they should not be considered as two separate domains, but the two sides of the same entity with a single embodied existence in the world (Merleau-Ponty, 2005). In other words, Merleau-Ponty’s dialectic, which is based on the concept of *Leib*, is an attempt to rethink the relationship between the human mind, its body, and the world that it is facing.

Incarnated worldview is the relationship between the eternal sensualities of human beings. The “body-subject” understands its nature in the light of its perception of other similar bodies (or body-subjects). It is through this process that this “body-subject” finds out that the world, as perceived by other “body-subjects,” is the same as its own perceived world. The incorporation of the different body-subjects at this eternal level leads to an incarnated worldview.

In other words, Merleau-Ponty argues that what we experience in the world, or what we understand from it, is the product of our bodies and our incarnated minds. This perception is the basis of classification and theorization, even if it seems that our bodily experiences of that phenomena are secondary. The only door to the world is through physical time and space.

There are also philosophers (such as Merleau-Ponty, Deleuze, etc.) who not only refuse the separation of soul or mind from the body but also believe that without an intact connection to the body, no cognitive understanding can occur. More substantially, there is no abstract cognition which does not refer to bodily experiences. As we already saw in Merleau-Ponty’s philosophy, our cognition is based on our body’s motions and functions.

Those who believe in the separation of mind and body would also apply it to the field of education. According to them, an educational program seeking to develop the mental capabilities of the pupils would have no application to the programs for physical training. Each of these tracks requires different methods and procedures. This is what we witness today in the educational systems of many countries. If this distinction between body and mind is not warranted, then we have to admit that any sort of change or transformation in the physical development will result in changes in the cognitive and mental developments. In

other words, in order to increase learners' cognitive capacity, we should escalate the possibility of more environmental and physical experiences.

Other philosophers take issues with mind-body dualism from different perspectives and formulate new concepts based on it. For example, Deleuze refutes any sort of transcendence to the abstract, spiritual level with proposing the concept of "imminence". Heidegger introduced *Lebenswelt* (Lifeworld) to try to pin down the subject to the concrete world and refuse the transcendental Husserlian subject. Materialists, like Churchland, harshly repudiate such distinction and in cognitive science, several important and significant movements like those of Lakoff also have set against the mind-body duality.

2.2. Embodiment in Deleuze's Philosophy

Post-structuralists have not offered a direct theory of embodiment and embodied cognition. However, for reasons that will be elaborated below, their theories can serve as a source of inspiration for a theory of embodied cognition. In our view, Deleuze is a philosopher whose theories come very close to an account of embodiment. Although he does not offer a direct view of the embodiment, we believe that his intellectual principles directly target theories of embodied cognition, and implications of his views for the area of embodied cognition, as well as education, are sometimes very revolutionary. Thus, instead of dealing with the whole post-structuralist tradition, we restrict the discussion to Deleuze's theories, thereby trying to open new horizons to our view of embodied cognition.

The theory of embodied cognition is against much of the history of philosophy—from its rejection of any dualism to its denial of the metaphysical subject. Thus, if we reject the old philosophical tradition and want to replace it with novel theories, we need to know other people who have criticized the predominant philosophical tradition to be in a better position to elaborate the theory of embodied cognition. This is particularly important because principles and methods of the educational system, today and throughout history, were built on the metaphysics we are trying to reject.

The best candidate for this is Deleuze—"the philosopher of the twentieth century," as Foucault called him. Deleuze considers himself as an ontologist and an empiricist. Thus, to know him, we need to know the directions of his ontology and empiricism. It should be noted that our treatment of Deleuze's philosophy in this section will be very brief and limited to his view of embodied cognition.

There are deep connections between Deleuze's view and theories of embodied cognition. As much as different views of embodied cognition have their own disagreements, they agree over certain ideas encapsulated in the embodiment thesis. The embodiment thesis rules out transcendental and non-physical subjects, on the one hand, and rejects any reduction of consciousness and cognition to the brain. Both of these two main theses can be found in Deleuze's philosophy. For, correspondingly with the rejection of transcendental subjects, he emphasizes on the immanence of the subject, and corresponding to irreducibility to

the brain, he takes the subject as merely being a part of the organism, which is a product of political, social, cultural, environmental, and other forces.

Deleuze's ontology is about the singular and the particular in contrast to the universals. Since Plato, philosophy was intertwined with monism—with respect to the relation between ideal beings and particular objects. After Plato, philosophers made attempts at categorizations and classifications, in ontology (Aristotle and Medieval philosophy) and also in epistemology (modern-era subjectivism). The history of unity or monism is as old as the history of philosophy itself. For instance, Thales of Miletus reduced all pluralities in the world to the unity of water.

However, Deleuze tries to topple down the tradition and highlight differences. In his philosophy, particular and different things constitute the truth, and unity is but an illusion. Even when he gives a central role to the notion of force, he talks about forces. The interaction of forces that are always becoming constitutes the experience, and the experience constitutes the subject. In his account of the world, he does not seek to go beyond the world itself to dualistic ontologies. This is why he extracts the concept of *immanence* from Spinoza's work (Spinoza, 1994).

Deleuze greatly admires Spinoza's philosophy. For, Spinoza seeks an account of the foundation of the world and its interrelations entirely within the world itself, without going beyond. Spinoza's philosophy was formed in the background of the Cartesian philosophy. We say "Cartesian" because his philosophy is not an answer to Descartes himself, but also Cartesian philosophers such as Malebranche and Pascal. When Descartes arrived at his distinction between the soul and the body, Cartesians such as Pascal and Malebranche sought to fill in the gaps of his theory, particularly the causal relationship between the soul and the body. To do so, they proposed occasionalism.

The idea was that it is God who occasions the relations between beings. For instance, if the soul wants to raise the hand, it cannot do so because the hand is a real extension. Thus, God raises the hand once the soul wants to. In response to these philosophies, Spinoza highlighted the immanence of the world as well as the following two ideas: 1) there is nothing beyond this world, be it a soul or any other entity, and whatever there is, including the soul, exists in this world and is a property of the substance, where the substance is present in the world; 2) all relations are formed in this world, and whatever happens comes either from properties of the immanent substance or from its states (Spinoza, II/64, 100)¹.

In other words, For Spinoza, everything happens within the boundaries of the ONE substance, which is God. So, everything, including the subject, must be determined in this world. The place and origin of the subject is the point at which Deleuze links Spinoza, the Rationalist, to Hume, the Empiricist. We have already talked about the notion of the metaphysical subject and its persistence in the history of philosophy. Now let us see how Deleuze stands against the subject.

¹It must be noticed that for Spinoza God is the one substance and that the whole plurality of the world is just the infinite many attributes or modi(states) of the one substance. This holistic and at the same time Monistic aspect of Spinoza's philosophy leads him to immanentism.

When he refers to himself as an empiricist, he has in mind philosophers who espouse a subject prior to experience, holding the subject forms that experience. In other words, the subject is a transcendental and *a priori* condition of experience. It is the subject that constitutes the experience, particularly in the view of philosophers such as Kant and Hegel. Kant's transcendental subject and his categories allow the unification of the pluralities of experience so that they can become objects of thoughts after being filtered by all categories. Kant's *pure perceptual unity* is what came under an attack by [Deleuze \(2000\)](#): "Empirical subjectivity is constituted in mind under the influence of principles affecting it; the mind, therefore, does not have the characteristics of the pre-existing subject" (p. 29).

For Hegel, the rational is prior to the world. History is a path to the self-consciousness of the soul. That is, the soul prior to experience is what makes the world and history, and informs, or constitutes experiences. However, Deleuze believes that the subject is not prior to experience. Indeed, it is a product of experience.

"The mind is not subject; it is subjected". (p. 31)

In his first book, *Empiricism and Subjectivity*, Deleuze discusses Hume's philosophy, because in the Empiricist tradition, and in particular for Hume as the most radical Empiricist, the subject is a product, rather than constitutive of experience. Hume seeks to account for understanding and imagination in terms of experience by way of relations such as adjacency, similarity, causation, and the like. All these come from sensory data or experience. The fact that Deleuze exchanges the places of the subject and the object and makes the constitution of the subject contingent upon experience turns experience into something prior and transcendental, but not in the sense that this prior entity is metaphysical, as Kant's subject was, but in an empirical and immanent sense.

The given is no longer given to a subject; rather, the subject constitutes itself in the given. Hume's merit lies in the singling out of this empirical problem in its pure state and its separation from transcendental and the psychological. (p. 87)

It is the critique of the transcendental that encourages us more and more to extract a theory of embodiment from Deleuze's philosophy. For, if the subject is not transcendental, it must be embodied.

[Alberto Angelli \(2014\)](#) recollected the contemporary idea of "postmetaphysical" thought which is a form of "event." Event is evidently a significant factor of Deleuze's work however, it cannot be satisfactorily clarified without understanding Deleuze's relationship with metaphysics.

[Rocco Gangle \(2022\)](#) cross-examines the potentials which subsist for articulating Deleuze's metaphysics. Deleuze's metaphysics and its composite relation to structuralism addresses problems for any effort to structure a model for his philosophy mathematically. It is imperative that mathematics plays a key role in

Deleuze's work.

Julia Sushytska (2019) contends that if metaphysics can be considered as an act of thinking, then Deleuze is, certainly, a metaphysician. The major issue of univocity in Deleuze's literatures settles the point that Deleuze is engrossed in the process of thinking. Deleuze, however, is an unclear metaphysician as his thought process proceeds the form of paradox and challenges dogmatization of thought. Deleuze's anonymity unavoidably induces misconceptions and indicates to the opinion of being an anti-metaphysician.

3. Pedagogical Implications of Deleuze's Views

Deleuze is a revolutionary philosopher. Thus, an application of his theories to various domains must be somewhat radical. That is to say, it cannot rest content with minor modifications. Thus, in the domain of education, it is not Deleuzian to rest content with minor modifications and stick to pre-established frameworks. So, we need to take the question to its extreme, that is, to the heart of theories of education, or the very philosophy of education. In the remainder of this essay, we will go into more details, scrutinizing Deleuze's views from our own perspective concerning particular problems of education.

3.1. Rhizome and Its Pedagogical Consequences

"Rhizome" is a term borrowed by Deleuze from botany and metaphorically used in his philosophy. A tree has a fixed root in the soil and grows vertically. Everything springs from within it, and it establishes no new connections. However, the rhizome is a plant that moves on the surface of the earth and resides everywhere; it goes just like a nomad. A rhizome has no specific movement patterns and grows in every direction. Unlike trees that have one root and a fixed vertical joint, rhizome makes new and various connections. Rhizome creates new relations in order to determine itself. It is not a passive product of its relations. Thus, rhizome allows no specific unity and pre-determined identity.

In fact, a rhizome is always renewing itself. Newly established communications are not copied by rhizomatic communication, but they create a new map every moment; a new "cartography" will be created, which is not made of dimensions but dimensions and directions. A rhizome is a non-concentrative system based on uncertain patterns that are in the process of becoming every moment. Instead of moving only in one direction, they move in many directions and expand their lines. A Deleuzian rhizome is another name for Dewey's empirical investigation. A naturalistic investigation is an open investigation (Semetsky, 2003: p. 148).

Deleuze and Guattari make use of discourse in two spaces: smooth and striated space. Smooth space or rhizomatic space is a place where a rhizome grows in and striated space or tree space is where the tree grows (cf. what was mentioned of rhizome and tree previously). Inhabiting within these spaces have a substantial implication in the way of thinking and humane and social activities. Deleuze describes the smooth space as a dominant space of nomads and striated

space, a dominant space of sedentary living.

Nomadic thought is one of the significant concepts of a rhizomatic approach, which is always on the lookout for tracing repetition and multiplicity; nomadic thinking cannot stand stability and fixity. Deleuze introduces the nomadic war machine as the archenemy of the dominant culture. Another element in relation to nomadic thought is “smooth space.” It stands opposite to layered and steep space and is always in the process of becoming. This space is the nomadic space in which movement and activity are far more critical than standing still. Nomads have a soft spot for rhizomatic learning to multiply itself and change ideas. Nomads are always looking for differences and avoid preordained conventional ways; they do not follow instructions but rather to make them (Cormier, 2008: p. 4). The strategy of the nomadic war machine is to escape official possibilities by extraction from unprecedented formulas. This machine fundamentally paves the path of thinking formulating, inventing, and constructing new concepts, which differ from the proscription of states.

The rhizomatic approach stands against the transcendental and essentialist tradition of western metaphysics, egocentrism, and, of course, immutability of modernist principles. In this confrontation, rhizome acts as metaphors for the creative subject of artist and author to create a heterogeneous space in an environment subjected to the rules of capitalism.

In a rhizomatic environment, every point can and should be relatable to any other point, a relation that has no constraints and boundaries. The principle of binary opposition is entirely abrogated since the binary systems of classifications are quite restrictive and do not act openly in relation to other things. Deleuze and Guattari (1988) in *A Thousand Plateaus* criticize the binary systems of linguistics (Noam Chomsky) and believe that rhizome focuses not only on various symbolic systems but takes into consideration different methods and relations instead of extended communications and relations. In a rhizomatic system, there is no universal or mother language (Deleuze, 1991: p. 7). Homogeneity is meaningless, but there are extended groups of local languages and accents and special languages in this system (7). In communication and heterogeneity, every point is related to another point, and there are close relations between circles and chains of signs and different codes. A rhizome is a non-hierarchical environment within which all points and bonds are intertwined, and none is in the center of the system.

Thus, the rhizomatic thought is a deterritorializing deconstructive thought that knows no boundaries, and it provokes pluralities and heterogeneities with the rejection of centrality and dogmatism, as well as unity and totality. The rhizomatic thought is a plural thought seeking to break hierarchies down; that is, hierarchies consistently reproduced in the education system. However, it should be noted that the dialectical relationship we outline below is the very structure of power that depends on the outcome. They reproduce each other²: (Figure 1)

²Note that we do not reduce the power structure to this process. Rather, we have expressed only one aspect of the power structure.

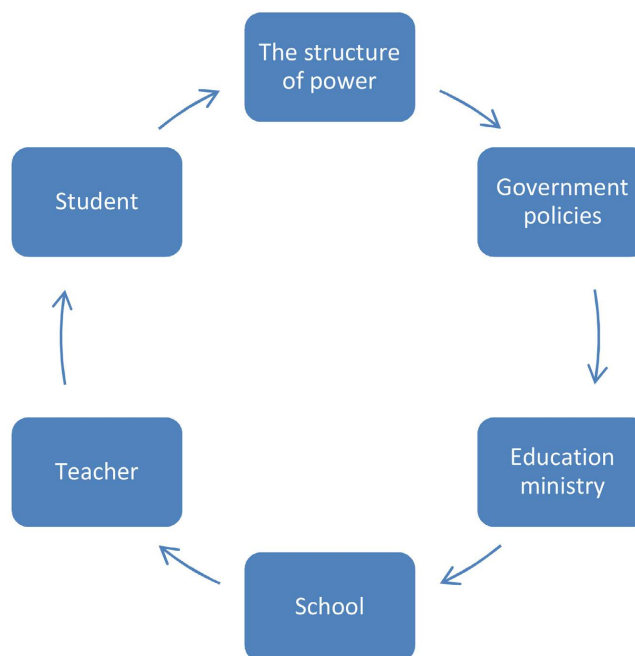


Figure 1. Education model of Deleuze.

This hierarchical system imposes a variety of concepts in terms of rigid and static categories to students. Categorization and categories are cornerstones of all our thoughts. We always categorize or subsume our new observations in terms of our prior categories, and it seems as if thought is even impossible except through categorization. For example, we cannot help categorizing things in terms of categories such as “human,” “animal,” “food,” “man,” “woman,” “mammal,” “table,” “chair,” and so on. The problem arises when such categories and concepts are treated as absolute, transcendental, and preexisting concepts that can only be determined by the institution of power. The institution is in charge of conveying these categories to students. This is just how Plato conceived the education system. The philosopher-king, who discovers the nature of categories, should control, censor, and then convey concepts to students. The modern period does the same with its instruments.

Nowadays, there is a different view of categories, at least in cognitive sciences, psychology, and even philosophy. Theorists of embodied cognition account for the formation of categories in terms of phenomena such as environmental-perceptual experiences, neuronal arrangements, and spatiotemporal movements and orientations. For example, Lakoff takes categorization as essential to the survival of every animal, holding that neuronal arrays grounding the formation of categories are essential for survival. He emphasizes, however, that the formation of such categories entirely depends on organic structures of the embodied entity and its environmental interactions. Proponents of the motor theory maintain that the formation of categories is a function from the movements of an embodied entity in its environment and its orientation to environmental phenomena. A consideration of Deleuze’s view in terms of the thesis of

embodied cognition reveals that the formation of categories, which depends both on the organism, and according to the theory of body without organs, in cultural, political, environmental, and other contexts, cannot be accommodated within the traditional view of concepts and categories. The main pedagogical implication of this is the necessity of revising the concept of school and classrooms.

3.1.1. Classrooms

Deleuze's conception of a rhizomatic space is as an infinite, fluid, and open space, which is continuously in the process of change, and in which movements and fluidities can give rise to new connections despite disconnections. Deleuze and Guattari argue that people in rhizomatic networks are subject to constant movements and go beyond limits and frameworks with quick changes of positions in fluid spaces. Rhizomatic movements and fluidities occur in all dimensions and respects and yield the possibility of plurality, interminglements, and creations (Edwards & Usher, 1994). A rhizomatic space informs an open system. An open rhizomatic system subjects one to different experiences and allows him to adopt varying perspectives and undergo consecutive changes of positions. Such space shifts the focus from uni-perspectival fixed and rigid meanings to polysemic centers as well as varying and fluid perspectives. Just as in film montages in which the adjacency of irrelevant pieces leads to the formation of new ideas, in a rhizomatic space, irrelevant and heterogeneous things are juxtaposed to give rise to new creations.

The student is a "decentralized" being, and contrary to traditional spatial patterns of education based on perspectival space, the student participates in the formation of the rhizomatic space by way of dialogues. The classroom space is a shared space among people, each of whom participates therein with their lived experiences. Such space is basically concomitant with body-centrism and embodied presences of people, and no rhizomatic teaching can be conceived without the learner's bodily presence. Thus, the classroom space should be such that the student can have maximal bodily experiences. Since the traditional architecture of classrooms does not yield us with enough possibilities, we should, in addition to designing new spaces structurally different from the present form, contemplate the use of out-of-school environments as classrooms.

The way in which a classroom and a natural environment are constructed helps the teacher to suggest laws and beliefs that students were supposed to be taught in far better ways. For example, an energy workshop should be designed in ways that introduce the student to the concept of energy, heat, and other concepts of physics. The student can also comprehend the relation between plants and animals by means of examining them in the school's ecology. In fact, the student should be able to feel (experience) with her/his body.

As pointed out, concepts and categories can be learned not through classrooms and mere listening, but environmental experiences and bodily orientations:

From the neurological perspective, the categorization is functionally orchestrated by the connections of neurocognitive structures, such as the prefrontal cortex, with other anatomical structures dedicated to processing core affect and memory. These intrinsic neural networks enable a conscious being to contextualize its various sensory, somatosensory and somatovisceral inputs with the prior affective information stored in the brain in order to **conceptualize** the qualities of the core affect in some form of subjective meaning. Researchers in the cognitive science maintain that the information about these emergent prototypical emotional categories is activated when people remember past experiences, during emotion self-regulation and simulation of the future events. (Perak, 2011: p. 198)

Constructing the situations for neurodiversity in an university, is about adapting to the undercurrents of innovative conflict. It is the way to be focused on the pathway in which the generation of neurotypical knowledge; however it has always been countered even though neurotypical methods of knowledge are not frequently addressed. It is in fact a questioning on what occurs when the twirl toward the neurodiversity starts (Manning, 2018).

However, the educational structure has classically pursued the learning of categories only in classrooms, and thus students have always been deprived of environmental and bodily experiences. Obviously, confinement of students in classrooms and their deprivation of having such experiences will seriously undermine their understanding and creation of new concepts and categories. Classrooms and schools in their present form should be done away with. For just as a rhizome has no fixed location and just as a nomad is in constant migration, thought and education do not have a fixed place and can express themselves in different environments.

Moreover, paying attention to the aesthetic and artistic aspects of educational environments are among the issues which have a tremendous effect on the feelings and mentality of students during the learning process. Some specialists are mainly engaged with the relation of educational environments and architecture with the attitude of the learners. They have emphasized on the physical structure of these environments as an essential factor in perception and recognition of educational and training methods (Margolis, 2001: p. 27). In other words, it is assumed that factors such as designation and structure of classrooms, corridors, visual features, the arrangement of chairs, desks and other educational appliances, and other aesthetic considerations have a considerable effect on learning and the students' perception of schools and educational process.

The importance of the order of classroom and school is capitalized when their relations to senses and bodies have been clarified on the one hand, and knowledge and thought on the other. Perak states this relation in the following way:

The entanglement of the body and culture in shaping the human notion of reality is perhaps best exemplified in the study of categorization and conceptualization of emotions. There are several reasons for this. Firstly, emo-

tions are embodied phenomena that are intimately shared by all humans, regardless of their culture origin. Furthermore, emotional categories have been introduced in all languages and cultures. In this sense, emotions are universal, intrinsic part of the human biological evolution and cultural heritage which makes them a valid scientific domain of inquiry. (Perak, 2011: p. 193)

Applying the theory of Gerzles, Gordon (1982) claims that every physical structure depicts an image of ideal students in the minds of students. For example, in rectangular classroom setting, in which students' desks and chairs are arranged in a straight line fixed to the ground, and teacher's desk is right in front of them in the middle of the class, brings this image to the mind that students are beings bereft of knowledge and subjected to the teacher as the primary source of learning. Therefore, it is evident that the existence of such sterile and banal educational facilities without any aesthetic or visual effects leads to the decline of communication and passive, unconditional acceptance of materials to the students.

3.1.2. The Student

In the present system, educational contents are systematically imposed on students in a top-down manner, in which demands of students are taken into account. Even if we make the obviously false assumption that the education system seeks to convey the pre-existing truth to students, the question arises of how the truth should be conveyed: will students learn the alleged truth through a top-down transmission and presentation of contents as truths? In his *Proust and Signs*, Deleuze says:

Proust does not believe that man, nor even a supposedly pure mind, has by nature a desire for truth, a will-to-truth. We search for truth only when we are determined to do so in terms of a concrete situation... truth is never the product of a prior disposition but the result of violence in thought. (Deleuze, 2000: p. 15)

For Deleuze, thought is not a volitional action towards the good; it is a reaction. Like Nietzsche, Deleuze sees self-awareness and thought as being in relation to the superior. External factors, signs, and external stimuli are what provoke thoughts. Thus, the role of external factors in the educational structure should be taken seriously. The necessity of considering such factors is felt both in organisms and those constituting a body without organs. We have pointed out earlier that, for Deleuze, the subject or body is a product. The subject does not make the world; it is affected by the world. Thus, emotions come to have an important place in his view. Given the dualism governing the educational environment, the role of emotion in the process of cognition has not been recognized in education systems. In other words, students go to their classes every day and regardless of emotional conditions in which they are on that day. They are obligated to learn the material without there having been a plan to control their

emotions, and this is an openly misplaced expectation. Obviously enough, a student's emotional condition directly bears on his or her learning potentials. The way we respond to the physical and social world around us is hugely dependent on our emotional condition. Since childhood, we experience intense emotional patterns such as expectations, disappointment, or satisfaction, which are indeed embodied experiences. The way we interpret events, which includes our final-stage abilities such as critical analyses, is always affected by our emotions. Delight, stress, anger, fear, and satisfaction constitute parts of a fundamental matrix that inform our reactions and even "rationality." However, these factors are not taken into account in textbooks, which serve as essential tenets of education.

Facing Up to the Unknown, and Problem-Solving

Given the significance and role of creativity for Deleuze and post-structuralism, as well as the need for creativity in this approach, instead of learning a preexisting body of knowledge, the education system should try to train the student as a problem-solver. Thus, the "problem-solving" approach should be emphasized. The student should be subjected to problems in different sciences, such that his mind is tickled, and as Deleuze suggests, he comes to have violence in thought. For Deleuze, learning is not knowing what is already known. The known does not provoke thoughts in us. What provokes thoughts is the student's doubt when facing up to the unknown. When the student faces something unknown or something missing, then in response, he will engage in a stream of thought.

If we want to demonstrate the theoretical definition of the problem, it would be like this: teaching method for problem-solving is a sequential and orderly process of ways to achieve a goal or a solution. In a situation in which a person encounters problems, she must overcome the obstacles over the head to goals. The leading proponent of problem-based learning is utilizing previous experiences to solve unknown and unprecedented problems. At least, a special situation in which the person is involved in, the previous experiences and skills are prerequisite to solving the problems.

In addition to the importance of dealing with the problem in order to solve it, the role of the body in the process is of paramount importance. For example, there have been many investigations about the role of the body in learning mathematics and solving math problems. We are not going to get into them here, but the role of the body in solving problems must be studied within the theories of embodied cognition. For instance, Dixon and others studied playing cards and concluded that the previous supposition on the separation of motor processes and cognitive processes was mistaken (Dixon, Kelty-Stephen, & Anastas, 2014: p. 165). In this study, two groups of students were asked to do two different tasks. The first group had to organize some cards based on a pattern and then deduce the exact pattern. The second group was given a pattern from the very beginning. While two groups were organizing the cards, their gestures and hand movements were studied. The accuracy of this study is reported as follows:

For both conditions, we tracked the motion of the participant's dominant hand (i.e., the hand used to sort the cards) at a high sampling rate (60 hertz) and with considerable precision (on the millimeter scale). We used the time series of the motion data to quantify the multiscale activity of the system. (p. 164)

This study implies that the process of problem-solving does not merely occur in the cognitive process, but rather the body and bodily activity are intertwined with the cognitive process, and both lead to conclusions and new patterns.

The foundation of textbooks, signs within the educational environment, and teacher-student encounters should always be problem-centered since this can lead to creativity. This is the case both in the natural and human sciences. In humanities, the student should be faced with problems with which intellectuals were concerned, instead of views espoused by such intellectuals, and then the student should be asked to find a solution for them. Furthermore, through solutions the student offers, the teacher should challenge his view based on the views of those intellectuals and should then ask him to either defend his view or to find another answer to the problem. Moreover, students should face each other and converse or exchange ideas about their views. Thus, introducing problems and dialectics is the best way to enhance creativity in students.

3.1.3. The School

Since the core of Deleuze's idea of the school rests upon a rejection of a hierarchical and organizational structure, it is not required for a school to have a fixed location or for the hierarchy of its official positions and educational principles be determined in advance.

In comparison to closed educational environments, the student is provided with more space in daily life in which he can find a way out of imposed hierarchical frameworks and view things from a different dimension, and this is for the simple reason that the body finds a more expanded space for movement and experience. New perceptions and experiences are made sense of or understood as depending on preexisting frameworks and networks of beliefs. Such frameworks are not, nevertheless, rigid or unchangeable, and the factor which enables one to go beyond such frameworks is the *body*. To ignore the body and to restrict the process of knowledge or cognition to textbooks and crypt-like schools preclude the flourishing of the student's body and bodily senses.

William James (1907) introduces an interesting theory known as "radical empiricism," which was later developed by Michael Jackson and applied to anthropological studies. Michael Jackson, in *Paths toward a Clearing: Radical Empiricism and Ethnographic Inquiry*, suggest that we always seek to make sense of our new observations in terms of our prior theories. For example, when a Western sociologist tries to analyze the behaviors, rituals, ceremonies, traditions, beliefs, and conducts of an African tribe, he tries to do so in terms of a particular sociological theory, rather than an immediate or direct presence among people of the tribe. Thus, there will always be much of what people of the tribe do, which re-

mains meaningless to the Western sociologist, and thus he fails to see the world from their standpoint. Of course, the way a tribal man sees the world and the use he makes of his senses might as well be helpful or beneficial to our theoretical and practical lives and may help us embark upon new discoveries. Such immediate encounter demands a bodily presence and fully bodily experiences among those people. From this, we learn that negligence of immediate bodily experiences can deprive us of seeing the world from a variety of points of view to a considerable extent.

As Jackson indicates, many human experiences cannot be enclosed within a theory or scientific method (since this method is based on observation and put aside other senses). To determine such experiences, there needs to be an unmediated, bodily presence in the environment because it does not only fill the gap of theory but also disrupts the authority and imposition of dominant frameworks.

I want to stress that lived experience encompasses both the “rage for order³” and the impulse that drives us to unsettle or confound the fixed order of things. Lived experience accommodates our shifting sense of ourselves as subjects and as objects, as acting upon and being acted upon by the world, of living with and without certainty, of belonging and being estranged, yet resists arresting any one of these modes of experience in order to make it foundational to a theory of knowledge. (Jackson, 1989: p. 2)

Therefore, a bodily and living experience, engaging all human senses, can open up new horizons to understand the world. Eschewing the supervisory perspective of traditional empiricism (which, as Foucault observes, privileges gaze as an instrument of both knowledge and control), the radical empiricist tries to avoid fixed viewpoints by dispersing authorship, working through all five senses, and reflecting inwardly as well as observing outwardly.

To demonstrate the dependence of categorization on human body, Lakoff gives the following example:

To take a concrete example, each human eye has 100 million light-sensing cells, but only about 1 million fibers leading to the brain. Each incoming image must therefore be reduced in complexity by a factor of 100. That is, information in each fiber constitutes a “categorization” of the information from about 100 cells. Neural categorization of this sort exists throughout the brain, up through the highest levels of categories that we can be aware of. When we see trees, we see them as trees, not just as individual objects distinct from one another. The same with rocks, houses, windows, doors, and so on. (Lakoff & Johnson, 1999: p. 27)

Johnson remarks that image schema is a repetitive and dynamic pattern of our sensual and kinesthetic interactions that unify and organize our experiences

³The order is what Foucault is talking about, the order of discourse, the order of things, and so on. That human societies have always tried to control people by creating order that negates freedom and at the same time represses the people.

(Johnson, 2013: p. 28). These patterns are meaningful structures that come into existence by our bodily movement, dealing with objects, and our perceptual interactions. These patterns have a significant role in our perception, reasoning and understanding of our surroundings. The number of patterns is limited, and they are mostly visual but as Johnson says, they can exist on an abstract level and be the repetitive patterns can be observed in wide variety of events and human experiences. In fact, the patterns are embedded on a mental background and act as an intermediary between objective images and abstract propositions. According to Turner (2011), the patterns are made out of few components, organized in determined and limited relations. For example, image schemas include container schema, force schema, path schema and so on. Some of them refer to location in space and its relations such as: up-down, back-front, part-whole. Some are essentially dynamic and refer to growing movements or expansion of space and steep. Turner claims that all schemas are repetitive patterns derived from our experience of surrounding environment.

The path schema comprises of three elements: the starting point (A), the ending point (B) and the path that connects the two. Johnson (2013) says:

“This FROM-TO schema is a recurrent structure manifested in a number of seemingly different events, such as: (a) walking from one place to another, (b) throwing a baseball to your sister, (c) punching your brother, (d) giving your mother a present, (e) the melting of ice into water. For each of these very different cases, we have the same schema with the same basic parts and relations. In (e) the schema must be interpreted metaphorically, with points A and B representing state (e.g., solid and liquid) of a substance (water). So, we see that image schemata are more general, abstract, and malleable than rich images”. (p. 28)

These schemas are quite dynamic for two reasons: first, they organize our experiences in such ways as to comprehend them. Secondly, they are very flexible so that they can cover our experiences in different texts. These patterns are reflected in language very well. Johnson gives the following examples to illustrate his point:

“I give up”, “I’m getting out of the race”.

“Whenever I’m in trouble, she always bails me out”.

As we see in the above examples, the competition and person’s state are deemed as a space or a capacity that he can enter or exit. These samples are all metaphorical representation of container schema which lead to our comprehension of abstract concepts. Johnson believes that above examples show how image schemas, as a repetitive structure, can help us to understand and judge our various experiences.

Thus, textbooks that seek to put forth concepts in terms of preexisting frameworks and their concomitant educational environments that do not allow the student to have bodily and immediate inquiries or quests preclude the student

from having new concepts or points of views, and naturally, they cannot help the student to develop a critical insight of phenomena.

It is indubitable that present educational environments fail to fulfill bodily needs, provide possibilities of movements in different directions within the environment, and help the student to acquire new perceptual experiences, and this can constitute a serious flaw in the process of education. It should be noted that, as pointed out earlier, all senses and the body, in a general sense, as well as my movement in an environment with the aim of maximal *reception* from the environment are involved in perception. As Merleau-Ponty says,

I adjust my body, for example, by turning my head and moving my eyes, squinting or cupping a hand around my ear, leaning forward, standing up, reaching, trying all the while to achieve a “best grip” (*meilleure prise*) on the world. Eventually, things come into focus, and my environment strikes me as organized and coherent; my surroundings make sense to me, and I can find my way about. Only then do I recognize things and establish “associations” among them. (Carman & Hanson, 2005: p. 57)

Due to their considerable limits, present educational environments fail to provide students with such a range of possibilities. Therefore, present schools should be transformed, either based on the Deleuzian view of acquiring novel experiences and escaping systematic control or based on theories of embodied cognition (or both, because they are compatible and can complement each other). Schools and their facilities should be expanded, and school trips should be promoted.

Therefore, scientific tour method can be used. Scientific tour or an empirical activity outside school are among the activities that take place outside school, laboratory, and library; it includes direct and comprehensive studies of problems, gathering information by observation, interview, measurement, questionnaire, sampling and other research techniques. Thereby, the validity of assumptions, determining changes, and validity of situations are guaranteed. Mostly, scientists investigate in a lab, office, or outdoor environment. If students are willing to be educated in the scientific method, they should follow the scientific method in the lab, outside school and home. Situations in which observation and investigation of actual content of lessons are possible, scientific tour method can be used. The scientific tour can be short term and limited or long term. Generally speaking, scientific tour can be a visit to a city, museum, exhibition, factory, farm, and other places available. Experience can be attained from school environment or other educational institutions. Thus, it needs not to be a visit to far-away places but rather the environment around the students can be utilized for scientific tours.

Info-computationalism is a variety of natural computationalism, which recognises the entire nature as a computational procedure. Humans gain knowledge through communications with their ecosystem and process relevant information through interaction with other humans. Therefore, info-computationalism de-

scribes the protocol to process information and create new information that progressively alters and evolves by natural computation (Dodig-Crnkovic, 2014). The term cognitive architecture refers to a theory on the complex structure of a mind, both in the biological or artificial systems; also, it explains the mechanism of the function of a mind in respect to knowledge and skills. Cognitive architecture produces intelligent behaviour in diverse environments. Communication or interaction between two minds happens by exchanging messages which are termed as information, which eventually helps them to synchronise their activities in terms of the information they get and share through social cognition.

In the recent past decades, computational methods are being implemented for the development and understanding of cognitive architectures. For a range of natural cognitive designs, info-computational outline is applied which results in the progress of complicated cognitive systems. Innovative improvements assist a productive interdisciplinary outline framework for cognitive architectures regarding natural computing, where communications between elements at a diverse organizational level led to complexification and enhance cognitive capabilities. Several important research problems are there for future exploration which will help to increase knowledge of cognition in the nature and will help to develop innovative cognitive technologies. Bio-cognition of cells connected into tissues/organs, and organisms with the group (social) levels of information processing provides insights into cognition mechanisms that can support the development of new artificial intelligence (AI) platforms and cognitive robotics (Dodig-Crnkovic, 2021).

Embodied cognitive analysis is crucial for several applications, investigating how the brain and behaviour are subjective to sensory inputs has become a critical contest in the real world. Development of real-time conditions to examine the dynamics and status of the neural system is critical. The neural activity of behind the embodied mind and cognitive mind states can be assessed using simple experimental protocols. Embodied body have impacts on the mental status and psychological enactment under cognitive tasks. The neural markers can be applied in the real-time brain computer interface (He et al., 2021).

There is an intricate relationship between info-computation on morphological computation and advancements in the artificial (deep learning) and natural sciences (neurobiology, cognitive science), social sciences (social cognition) and philosophy (philosophy of computing and mind). The focus of AI differs from the goals of the natural computationalism framework. AI addresses practical problems and targets on intelligence (not emotional nor embodied intelligence, while natural computationalism framework implements computational models of diverse types in the natural systems, including the living organisms and their development, dealing with both intelligence, cognition with emotion and behaviours. The importance of info-computational naturalism is to gather information (knowledge) about the nature, while AI is primarily focused on practical problem solving (Dodig-Crnkovic, 2020).

Field Trips

From the beginning of the field trip, the teacher should scrutinize and guide the activities of students. A teacher should plan for the study of regions visited during the trip. For example, the teacher can start discussions concerning their geographical, historical, and social circumstances inside the bus or the vehicle, and personally guide the discussions in order to affect more consciousness and more learning. Alternatively, the teacher can design a map of the road, and mark specific locations so that students can more carefully attend to their surroundings and answer the teacher's questions. After arriving at the location and introduction to the guide, they should immediately start the visit. The visit should proceed in accordance with the itinerary, and it should be guided in a way that all students are involved in the collection of information. It should be noted that it is complicated to carry out all the activities following the anticipated plan because numerous factors might disrupt the procedure. Thus, the flexibility of the plan should always be taken into account.

During the field trip, the teacher should make sure that answers and materials are being collected, and if students encounter a new question about which they have not already thought, they should be allowed some time to think of an answer. After the field trip, students are required to perform various scientific activities in the class. Given the goal, these activities can be limited or wide. In activities after the field trip, what they have learned should be classified and solidified. The findings of the field trip can be presented in the classroom in the form of prose, poems, stories, plays, or reports. Creative writing of what happened during the trip is usually evidence for the success of the field trip. The final report of the trip can be written by the teacher or students and be then submitted to the school.

4. Conclusion

This essay begins with the question of what a body is. We first pointed out how difficult it is to define bodies in Deleuze's view. We then provided an account of his different views of the body. We then considered the relationship between Deleuze's views and the embodiment thesis: despite their disagreements, different theories of embodied cognition share specific ideas as encapsulated in the embodiment thesis. The latter thesis emphasizes, on the one hand, on the rejection of transcendental and non-physical subjects, and on the other hand, it rejects the reduction of consciousness or cognition to the brain. Deleuze holds both main theses. For he emphasizes on the immanence of the subject, which corresponds to the rejection of transcendental subjects, and following anti-reductivism, he takes the subject to merely be a part of an organism that results from political, social, cultural, environmental, and other forces.

Having outlined these preliminaries, we then dealt with our main problem, that is, pedagogical implications. In the last part, we pursued a critical concept in Deleuze's philosophy-rhizome and gleaned the pedagogical implications of it.

Further study perhaps would be helpful to consider the Deleuze's views of the body to consciousness or cognition to the brain.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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