



Alternatives to Sustainable Development: What can we Learn from the Pluriverse in Practice?

Grassroots innovation for the pluriverse: evidence from Zapatismo and autonomous Zapatista education

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Abstract

The social and environmental failure of successive Western development models imposed on the global South has led local communities to pursue alternatives to development. Such alternatives seek radical societal transformations that require the production of new knowledge, practices, technologies, and institutions that are effective to achieve more just and sustainable societies. We may think of such a production as innovation driven by social movements, organizations, collectives, indigenous peoples, and local communities. Innovation that is driven by such grassroots groups has been theorized in the academic literature as “grassroots innovation”. However, research on alternatives to development has rarely examined innovation using grassroots innovation as an analytical framework. Here, we assess how grassroots innovation may contribute to building alternatives to development using Zapatismo in Chiapas (Mexico) as a case study. We focus on grassroots innovation in autonomous Zapatista education because this alternative to formal education plays a vital role in knowledge generation and the production of new social practices within Zapatista communities, which underpin the radical societal transformation being built by Zapatismo. We reviewed the academic literature on grassroots innovation as well as gray literature and audio-visual media on Zapatismo and autonomous Zapatista education. We also conducted ethnographic fieldwork in a Zapatista community and its school. We found innovative educational, pedagogical, and teaching–learning practices based on the (re) production of knowledge and learning, which are not limited to the classroom but linked to all the activities of Zapatistas. Our findings suggest that innovation self-realized by Zapatistas plays a key role on the everyday construction of Zapatismo. Therefore, we argue that a specific theoretical framework of grassroots innovation for the pluriverse, based on empirical work carried out in different alternatives to development, is an urgent task that will contribute to a better understanding of how such alternatives grassroots groups imagine, design, and build, particularly across the global South.

Keywords Alternatives to education · Decolonial pedagogies · EZLN · Post-development · Social innovation · Transitions to sustainability

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Introduction: how may grassroots innovation contribute to building alternatives to development?

Capitalist reproduction involves various forms of imperialism and colonialism that have led to dependency in the global South (Hickel 2021; Veltmeyer and Petras 2015). For instance, many negative consequences arise from extractivism for exports of primary goods to the global North, which usually entails the growth of poverty, inequality, and environmental injustices across extractive zones (Toledo et al. 2013). As a result, a diverse array of grassroots movements, organizations and communities seek to design and build alternatives to development in the global South (Gudynas 2011a, b; Lang et al. 2013; Zibechi 2007). Examples include decolonizing money through local institutions like *minga* or *tequio*¹ in Latin America, eco-villages in Mexico and elsewhere, or the *Ubuntu* philosophy in South Africa (Cabaña and Linares 2022, this issue; Martínez-Luna 2009; Morris 2022, this issue; Ramose 2015). These alternatives are often based on the production of new knowledge and the revitalization of traditional knowledge. Likewise, alternatives to development seek the (re)construction of political and territorial autonomy, reclaiming the commons, the development of innovative forms of collective and economic organization, ecotechnology, sustainable architecture, educational practices and social enterprises, the design and application of critical decolonial² pedagogies, and relational³ ontologies, focusing on the well-being and sustainability of socio-economics rather than economic growth (Clarence-Smith and Monticelli 2022, this issue; Escobar 2011; Esteva 2019; Medina-Melgarejo 2015).

The notion of the “pluriverse” refers to the matrix of alternatives that exist in the world—and particularly across the global South—to the Western development project (Escobar 2012). Therefore, alternatives to development can be seen as paths to the pluriverse (Kothari et al. 2019b). The

pluriverse is underpinned by the huge cultural diversity that characterizes our species and can be found in any cultural domain. An early example of the pluriverse in practice can be found in the field of parenting and education. Notably in ‘*Our Babies, Ourselves*’, Small (1999) explained how biology and culture shape the way we parent. Her book introduced the new science of ethnopediatrics, which explores “why we raise our children the ways we do and suggests that we reconsider our culture’s traditional views on parenting”. The message is clear: there is not a single way of parenting, nor are the Western ways inherently better ones. In a more recent contribution, Dieng and O’Reilly (2020) present feminist parenting perspectives from Africa and beyond. Their anthology’s main contribution is “to broadcast reflections and experiences that emanate primarily from voices that are often overlooked, even by global feminist discourses: those of African women (and men), living on the continent or in the diaspora, and from others born and raised in the global South”. In doing so, these authors aim at “(re)claiming parenting as a necessarily political terrain for subversion, radical transformation and resistance to patriarchal oppression and sexism”. These insights call for acknowledging, embracing and fostering the diversity of cultural perspectives that are found worldwide in relation to every single aspect of social life.

The diversity of cultural perspectives naturally present in the world—including the pluriverse of non-Eurocentric perspectives—is not recognized by hegemonic institutions such as the United Nations, however. For instance, the Sustainable Development Goal 4 (SDG 4) is education, and aims to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”. Its intentions seem good, like all other SDGs. However, from a post-development perspective it is very problematic to see education from a single, universal viewpoint, which is the Western mainstream understanding of what education shall be. The modern, Western ontology assumes the existence of one single world, a universe, which is socially constructed based on the Western rationality that is underpinned by modernity, colonialism, capitalism, patriarchy and anthropocentrism, and is materialized and imposed worldwide by the development agenda (Escobar 2011). This is the vision behind the United Nations’ SDGs. Nevertheless, this hegemonic vision is questioned by the existence, practice and resistance of many communities and their worldviews around the world. They embody many distinct ways of imagining life, seeking well-being, parenting and education, and so forth. The alternative pathways being built by these communities, which represent breaking points with the dominant rationality could be understood as ontological struggles. They walk toward the “pluriverse”, a concept defined by the Zapatistas as “a world where many worlds fit”.

¹ *Minga* refers to a rich economic circuit that relied on non-monetized forms of exchange and communal forms of work-celebration (Cabaña and Linares 2022, this issue). In Mexico, *tequio* is also used in many indigenous communities as an element of communality and refers to unpaid labor that each person does once or twice a month for the community (Martínez-Luna 2009: 88).

² Decoloniality necessarily evokes coloniality. It is rooted in the modern/colonial matrix of power; therefore, it seeks to make visible, open and promote radically different perspectives that displace Western rationality as the only possibility of existence, analysis and thought (Mignolo and Walsh 2018).

³ We refer to “relational ontologies that avoid sharp divisions between nature and culture, individual and community, and between us and them that are central to the modern, Western ontology” (Escobar 2011: 139).

As noted, the pluriverse has a direct resonance with alternatives to development. Therefore, this idea is becoming increasingly important in the post-development literature where activists and scholars are exploring and studying concrete alternatives to development such as Zapatismo in South Mexico, *Buen Vivir* in Bolivia and Ecuador, and the Self-Help Groups in rural India (Chuji et al. 2019; Leyva-Solano 2019; Saha and Kasi 2022, this issue), most of which are immersed in socio-political projects of struggle and social and ecological justice in the global South (Baronnet and Stahler-Sholk 2019; Lang 2022, this issue; Zibechi 2012). We can assume that the construction of any alternative to development implies a radical rupture with the dominant capitalist rationality by organizing society in a profoundly different way. Therefore, in such situations, it is essential to generate new ideas, knowledge, practices, beliefs, technologies, norms and institutions. As these generative processes are created and promoted by grassroots groups, they can be thought of as “grassroots innovation” for the pluriverse.

Although we can intuitively think of the need for grassroots innovations to create designs for the pluriverse, alternatives to development or transitions to sustainability (Escobar 2011, 2017), innovation has barely been the focus of research in these contexts barring few exceptions (e.g., Escobar 2016; Manzini 2015). In addition, the concept of “grassroots innovation” has seldom been applied as an analytical lens in these contexts (Maldonado-Villalpando and Paneque-Gálvez 2022). The bulk of literature on grassroots innovation has rather focused on the analysis of social transformation processes that are far less critical of the dominant capitalist rationality. This literature has been produced mostly in Europe and India, though with distinct flavors in each geographical and cultural context. In Europe scholars have defined grassroots innovation as the generation of novel bottom-up solutions inspired by the local context to tackle social needs and environmental problems, and that are driven mostly by ideology (Seyfang and Smith 2007; Seyfang and Longhurst 2013). Grassroots movements and communities have designed many innovative ideas around such transformations and tend to organize in networks at different scales (Smith et al. 2017). While the literature on grassroots innovation is quickly growing in the global North, in the global South few scholars have paid attention to it. The exception to this observation is India, where the literature refers to the identification of innovative ideas, practices and technologies based on indigenous and local knowledge in marginalized communities, which are materialized in collaboration with academics and public institutions (Gupta et al. 2003; Gupta 2016; Kumar and Bhaduri 2014; Ustyuzhantseva 2015).

Since the analytical lens of “grassroots innovation” has not been adopted to research the potential role of innovation in the design and construction of alternatives to development (Maldonado-Villalpando and Paneque-Gálvez 2022), here we argue that it is key to begin exploring the alleged usefulness of this concept regarding the design of paths for the pluriverse. Although some academics may consider grassroots innovation as a Western theoretical framework of little value or relevance in contexts of the pluriverse, we argue that rather than dismissing the concept altogether, it is better to tailor it as necessary to acknowledge, value and foster the innovation that is realized by the grassroots agents who are engaged in the design and construction of the pluriverse. We posit that the analysis of what we call here “grassroots innovation for the pluriverse” must become a key element of the research agenda on the pluriverse because the radical proposals that are being put forward to create new worlds beyond capitalist development are imagined, weaved together, and materialized by communities through their autonomous, bottom-up innovations.

Some of the arenas of social life and culture in alternatives to development that may be key to the emergence and diffusion of grassroots innovation for the pluriverse are those concerned with popular education and collective learning, conviviality and communality,⁴ political autonomy, and relational ontologies linked with indigenous worldviews (Barkin 2019; Escobar 2014; Esteva 2002; Illich 1973; Martínez-Luna 2016). In this paper, we argue that popular education, autonomous education and collective spaces for free learning may be key spheres of social life to assess how grassroots innovation unfolds and can contribute to building alternatives to development. Our premise is that such alternatives to formal education form historical-political subjects and new subjectivities that are emancipatory of the dominant rationality, especially in contexts of the global South (Barbosa 2013, 2015, 2020).

In this paper, our aim is to assess the alleged importance of grassroots innovation for the pluriverse. To that end, we analyze a specific case study, Zapatismo—an alternative to development in Chiapas, Mexico—and take a closer look at the autonomous Zapatista education, which has been designed and implemented by Zapatistas according to their own worldviews.

⁴ According to Martínez-Luna (2016: 101), “communality is a territorialized society, communally organized, reciprocally productive, and collectively festive. It designs mechanisms, strategies, attitudes, projects that determine the quality of its relations with the exterior; likewise, it designs principles, norms, instances that define and reproduce its relations within itself”.

Table 1 Important theoretical aspects, authors and examples of grassroots innovations (GI) featured in the main academic literature strands on GI

Definitions of GI (empirical examples)	Some important authors and references	Practices	Processes	Goods or services
<i>Grassroots innovation (Europe, USA)</i> Networks of activists and organizations that generate novel bottom-up solutions for sustainable development (Seyfang and Smith 2007)	Seyfang and Smith (2007); Seyfang and Longhurst (2013); Feola and Nunes (2014); Boyer (2015)	Direct democracy as practice, e.g., participation in technology design and manufacturing New organizational practices, e.g., non-hierarchical structures between collectives, associations, or neighborhoods Food, solidarity, and healthy practices, e.g., EcoAlimentate Ecologist Workshop	Citizen-designed monetary networks, e.g., Sol-violette in France Collective organization of exchanges in barter markets, e.g., Banc de Temps de Lleida, Truequeweb	Community currencies in service credits or in paper, e.g., Bristol Pound, Sardex-Italy Organic food and sustainable goods, e.g., free-range eggs, craft beers, recycled cardboard furniture Village self-sufficiency, e.g., the farm and the Yarrow Deli, commercial entities within the Yarrow EcoVillage, Canada
Grassroots innovation movements (Europe and Latin America) Result of collective action for the creation of experimentation spaces focused on the production of knowledge and technology (Smith et al. 2017)	Smith et al. (2005, 2014, 2017); Feola and Nunes (2014)	Novel knowledge democratization and citizen science practice, e.g., InSPIRES project Socially just cooperative and organizational practices, e.g., women's self-organized groups in Kerala, water management bio-inputs in West Bengal	Collaborative spaces for design and learning-by-doing, e.g., Fab Labs and makerspaces Autonomy, participatory design, and knowledge production, e.g., Ateneus de Fabricació Digital	Social innovation laboratories and the creation of grassroots digital fabrication, e.g., 3D printers, GNU/Linux Biodiversity data on Earth in projects such as The Fragile Oasis: Map-a-Difference, Nairobi, Kenya Open-data repositories, e.g., open-data.go.ke
<i>Grassroots innovation networks (India, Africa, China)</i> Grassroots communities and collaborative networks activate innovations that stimulate the creation of new pedagogies, products, and processes (Gupta 2006, 2012, 2016)	Gupta et al. (2003, 2019); Gupta (2012); Kumar et al. (2013); Kumar and Bhaduri (2014)	Practices of intergenerational transmission of traditional knowledge, e.g., programs that enable the acquisition of reading, writing, and accounting skills in the local language Innovator-Network-Government-Business collaborative practices, e.g., Grassroots Innovations Augmentation Network (GIAN)	New combinations of local and traditional knowledge, e.g., principles of permaculture design New institutional designs for reduction of transaction costs, e.g., tracking and registration of patents	Adaptation of bicycle plow for weeding, hoeing and fertilizer application Hand Operated Water Lifting Device Groundnut Digger Paddy Thresher Tree Climber Biomass Gasification System

Theoretical framework: grassroots innovation, post-development and Zapatismo

Grassroots innovation

Theoretical perspectives and studies on grassroots innovation have emerged to a greater extent in the global North, particularly in Europe. Several researchers have defined grassroots innovation as novel networks of activists and organizations that generate bottom-up innovative solutions for sustainable development—e.g., coproduction of knowledge, development of alternative technologies, social learning, changes in consumption behaviors—thus responding to local social–ecological concerns from civil society (Seyfang & Smith 2007; Smith et al. 2017). In the global South, on the contrary, the conceptualization of grassroots innovation has been mostly oriented toward the identification and public promotion of new ideas, technologies and products in rural communities to improve the well-being of the poor (Gupta 2012; Gupta et al. 2019). Table 1 shows a synthesis of some of the main views on grassroots innovation and examples of practices, processes, and goods or services in contexts of the global North and South.

None of the main theoretical strands on grassroots innovation are primarily concerned with radical, bottom-up innovations aimed at creating alternatives to development. There are several recent studies on innovation realized by grassroots groups that seek to create radical ruptures with the dominant capitalist rationality (e.g., Apostolopoulou et al. 2022; Boyer 2015). At the same time, the academic literature on post-development, alternatives to development and the pluriverse has barely focused on the analysis of innovation *per se*, even though innovation is central to the creation of radically new societies. Rather, this literature includes many studies on issues that are related to innovation—often using concepts like creation, design, coproduction, self-organization, autonomy, alternatives, revolutionary, and so forth—but without a fine-grain analysis of innovation and its role. All in all, we identify two major research gaps in relation to innovation in the literature of post-development, alternatives to development and the pluriverse: (1) we know relatively little about how innovations may unfold and contribute to the design and construction of the pluriverse by grassroots groups, particularly across different contexts of the global South, partly because there are few empirical studies concerned with the analysis of innovation; and (2) we lack a specific conceptual–theoretical framework for innovation in this literature and a single appropriate term for this type of innovation, e.g., “grassroots innovation” or a similar one, has not been consistently used (Maldonado-Villalpando and Paneque-Gálvez 2022).

A relevant issue that may arise is whether the existing theoretical framework of “grassroots innovation” is well suited to analyze the innovation that is realized by grassroots groups in their designs for the pluriverse,⁵ considering that it has not been used for this purpose (see for instance recent reviews by Hossain 2016, 2018, and Maldonado-Villalpando and Paneque-Gálvez 2022). Some authors may argue that since this framework has been mostly developed by authors from the global North and is therefore embedded within a Western worldview, it may be unsuitable to explain the radical breaks with the capitalist development rationality that are the basis of alternatives to development in the pluriverse, which are often embedded in indigenous cosmologies. We argue that, rather than dismissing altogether this framework, it would be better to adapt it and tailor it to the case of alternatives to development. We see several advantages to this approach. First, the term “grassroots innovation” is short, clear, and marks unequivocally the agency of those in charge of the innovation, which is something usually neglected by the conventional, Western economic views on innovation (Solis-Navarrete et al. 2021). Second, although most grassroots innovation initiatives across the global North are less radical⁶ than their counterparts in alternatives to development across the global South, there are many valuable lessons that can be taken from the current literature on grassroots innovation. Third, using the same term as that used already in transformative contexts of the global North may allow for establishing more fruitful dialogues, learning spaces and alliances across sites, and facilitate comparative studies across different geographical contexts.

There are arguably difficulties to employing the concept “grassroots innovation” in the analysis of innovation within the literature of post-development, alternatives to development and the pluriverse. A key problem is that this term has seldom been used when innovation is analyzed in this literature. However, we posit that this limitation can be circumvented by digging into this literature not just for direct but mostly for indirect indications of innovation realized by

⁵ We paraphrase Escobar’s work *Designs for the Pluriverse. Radical Interdependence, Autonomy, and the Making of Worlds* (2017), where he addresses three designs for the pluriverse in relation to: 1) transitions, 2) social innovation and 3) autonomous design. The first considers post-development, *Buen Vivir*, the Rights of Nature, and post-extractivism in the global South; the second is oriented toward the relationship between design and social change from the postulates of Manzini (2015); and the third focuses on autonomy as a theory and practice of interexistence and interbeing, and the realization of the communal. In our view, grassroots innovation underpins these three dimensions of design.

⁶ It is important to note here that many of the experiences analyzed using the framework of grassroots innovation in the literature, both in the North and the South, seek to reform public policies and the negative outcomes of current institutions without seeking to radically transform the workings of society.

grassroots groups. In addition, we suggest it is crucial to produce empirical studies on the innovations carried out by grassroots groups engaged in the everyday design and construction of alternatives to development. Such studies, in turn, will allow for the design of an appropriate theoretical framework of grassroots innovation for the pluriverse.

Irrespective of whether we analyze grassroots innovation in alternatives to development by conducting a literature review or undertaking a case study, as we do here, it is essential to analyze information related to new collective ideas, designs, processes and outcomes, which generate new knowledge, practices, beliefs, behaviors, products, technologies, local institutions or programs. All these items can be considered as “grassroots innovation”. This type of innovation is driven by the exchange of knowledge and learning, based on the political-educational project of grassroots groups. In the global South, grassroots innovation is usually motivated by the defense of territories and life as a condition for (re)producing their livelihoods and cultural identity. In addition to novelty or newness, some characteristics of grassroots innovations in the context of alternatives to development refer to the creation of radical ruptures with capitalist and neocolonial logic, the construction of profound transformations and more just social–ecological transitions, the intercultural dialogue of knowledges, or the construction of community autonomy beyond the State and the neoliberal market. These innovations also incorporate values such as diversity, austerity, ethics and the defense of the commons, relational ontologies, social and ecological justice, horizontal links, the dignity of individual and collective work, care for life or ecological sustainability (Maldonado-Villalpando and Paneque-Gálvez 2022).

Post-development studies and grassroots innovation

Post-development studies focused initially on the deconstruction of both the dominant and the alternatives of development discourses, moving on to studying alternatives to development imagined—and sometimes enacted and materialized—by social movements, peasant organizations or indigenous peoples as forms of resistance to the extractivist, neocolonial and patriarchal project of modern capitalism (Franzen 2022, this issue; Gudynas 2012; Piccardi and Barca 2022, this issue; Svampa 2012). The current debate in Latin America and other regions of the world is focused on post-development and its articulation with the study of different alternatives to development as pluriversal paths; for example, projects such as post-extractivism, post-growth, post-patriarchy, post-colonialism, or transmodernity (Escobar 2012; Kaul et al. 2022, this issue; Naylor 2022, this issue). These alternatives are closely related to the radical critiques of many indigenous societies as they are not embedded in the

ideology of progress and transcend the Western development project, thus having the potential of relational transformations toward communal autonomy and ethics beyond market exchange (Demaria and Kothari 2017; Gudynas 2018; Loh and Shear 2022, this issue).

The manifestation of a transformative alternative may occur at several levels (Villoro 2015: 19): (1) at the level of the State it opens the dilemma of gradual, moderate change versus radical, fast-paced change or revolution, (2) at the level of society through enabling people to achieve higher levels of participation that enhance democracy, (3) in culture it may unfold by embracing a plurality of cultures, i.e., multi or interculturalism, (4) at a cosmological level it may be expressed by the idea of the relativity of space time, (5) at the religious or sacred level it may occur through the acceptance of multiple faiths and beliefs. Any alternative to development creates new radically different societal designs that produce new outcomes at the levels mentioned to a lesser or greater extent. As we have argued before, these radical societal transformations depend upon grassroots innovation which are often embedded in non-Western cosmologies.

Some empirical examples found through collective strategies or initiatives that are aimed at the transformation and improvement of grassroots communities are the solidarity exchanges in the autonomous rebel zones of Mexico, the matristic culture in Rojava, *Buen Vivir* as a bottom-up transformation based on indigenous worldviews, and the itinerant schools of the Landless Workers Movement of Brazil, or *La Via Campesina* (Barbosa 2013; Barkin 2018; Lang 2022, this issue; Piccardi and Barca 2022, this issue). Alternatives to development are characterized by several features, e.g., the suppression of hierarchies and anti-patriarchalism, conviviality and communality, care for life at the center, spirit of sufficiency and simplicity, reciprocity and solidarity, autonomy through self-government, direct participation, and defense of territory to live well (Barkin 2019; Esteva 2002, 2014; Kothari et al. 2019a; Martínez-Luna 2016; Schöneberg et al. 2022, this issue). Likewise, most alternatives to development have high in their political agenda issues concerning environmental sustainability like decarbonization, de-capitalization, degrowth or post-growth, decoloniality, and eliminating corruption from socio-political institutions through radical democracy (Gills and Hosseini 2022, this issue).

Grassroots innovation in Zapatismo and autonomous Zapatista education

The uprising of the Zapatista Army of National Liberation (EZLN, its Spanish acronym) in 1994 was made up of indigenous *Tzotzil*, *Tzeltal*, *Chol*, *Tojolabal* and *Mame* communities of Mayan descent. This process has evolved and matured since then, crystalizing into what is known as Zapatismo,

which is recognized as an alternative to development by academics and social activists (Escobar 2017; Leyva-Solano 2019). The Zapatistas have promoted and experimented with novel initiatives as an expression of the movement of struggle and territorial autonomy (EZLN 2015). These include, for example, self-government through the implementation of the seven principles of *Mandar Obedeciendo* (*Governing by Obeying*)⁷ (EZLN 2013: 22). The reappropriation of geographic space has led to new autonomous territorial delimitation⁸ through political organization at three levels of coordination: (1) the Zapatista support base communities, (2) Rebel Autonomous Zapatista Municipalities, and (3) *Caracoles*⁹ (literally translated into English as “snails”, a reference to the spiral course of history) and the *Juntas de Buen Gobierno* (*Good-Government Councils*) (EZLN 2005, 2013; González-Casanova 2009a). In 1994, in response to the demands that the State was unable or unwilling to address, the Zapatista indigenous people and peasants decided to implement autonomous Zapatista education as an alternative to the official educational system. This alternative was designed and implemented across Zapatista territories based on novel practices and pedagogies in multiethnic contexts (Baronnet 2015; Baschet 2018a, b).

In addition to looking for grassroots innovation in Zapatismo, we examine its occurrence within the autonomous Zapatista education because of its relevance to the defense of life and the construction of collective and territorial autonomy. Additionally, it is an alternative to the official educational system that goes beyond formal education and the classroom in the Zapatista support base communities. These communities create new notions, knowledge, practices, norms, pedagogies and teaching–learning methods in contexts of ethnic interculturality that are key to the (re) production of the cultural and political resistance project of Zapatismo (Barbosa 2020; Baronnet 2011, 2013; Baronnet and Stahler-Sholk 2019).

As with other alternatives to development, scholars of Zapatismo have rarely evaluated innovation explicitly, either in Zapatismo or in autonomous Zapatista education. However, many authors have acknowledged many distinct, new ideas, processes and outcomes that have emerged from Zapatismo, which can be regarded as grassroots innovation following the rationale we presented above. Nonetheless, the contributions of this type of innovation toward more just

and sustainable ways of life in contexts of political struggle, resistance and autonomy with respect to neoliberal development remains mostly unexplored in the literature on Zapatismo. Furthermore, grassroots innovation does not seem to have been evaluated in the design and materialization of alternatives to schooling in the global South. Given the potential of alternatives to schooling in the design and everyday construction of alternatives to development, in this paper we evaluate the role that grassroots innovation can play in the case of autonomous Zapatista education. Specifically, we seek to answer this research question: *How can grassroots innovation in autonomous Zapatista education contribute to the everyday construction of Zapatismo?* After answering this question, we will reflect upon the potential role of grassroots innovation for the design and construction of other alternatives to development and pluriversal paths.

Literature review, participatory action-research and ethnography

We first analyzed innovations in the design and everyday construction of Zapatismo and autonomous Zapatista education. To do this we reviewed literature and various documentary sources. We applied the search, assessment, synthesis, and analysis framework to the literature selected for its quality and relevance (Grant and Booth 2009). We searched for scientific and gray literature in both English and Spanish over the period 1994–2020 (we selected that period because the Zapatista uprising began on January 1, 1994). To perform the search, we used Web of Science, Scopus, and Google Scholar. We reviewed theories and case studies in publications and book chapters on grassroots innovation (38) as well as post-development and alternatives to development (24). We then looked for grassroots innovation in the literature on Zapatismo and autonomous education (27) and in documentary sources such as videos (3) (Agencia Prensa India 2011; Esteva 2014; PromediosMexico 2013).

In addition to the literature review, we analyzed grassroots innovation in an indigenous Tzeltal Zapatista community. Our research approach combined participatory action-research and ethnography. We conducted fieldwork during several visits throughout 2019–2021, though it was interrupted for most of 2020 and half of 2021 due to the COVID-19 pandemic. This entailed assisting the families of the community in their daily chores (e.g., agricultural tasks, cooking, cleaning, traditional rituals), helping with teaching–learning in the *Escuelita* (Zapatista school) and living with a family. We also attended important cultural and political Zapatista events outside of the community. Data collection and generation consisted in participant observation, a field diary, photographs and videos, open-ended interviews with family members and community actors, and

⁷ Seven principles of the Zapatista movement: To serve, not to be served; to represent, not to supplant; to build, not to destroy; to obey, not to command; to propose, not to impose; to convince, not to defeat; and to go down, not up (EZLN 2013: 22).

⁸ The autonomous territorial delimitation is made up of support base communities and municipalities with new names because they are not officially recognized by the Mexican State.

⁹ Regional coordinating instances of self-government with its Good-Government Councils.

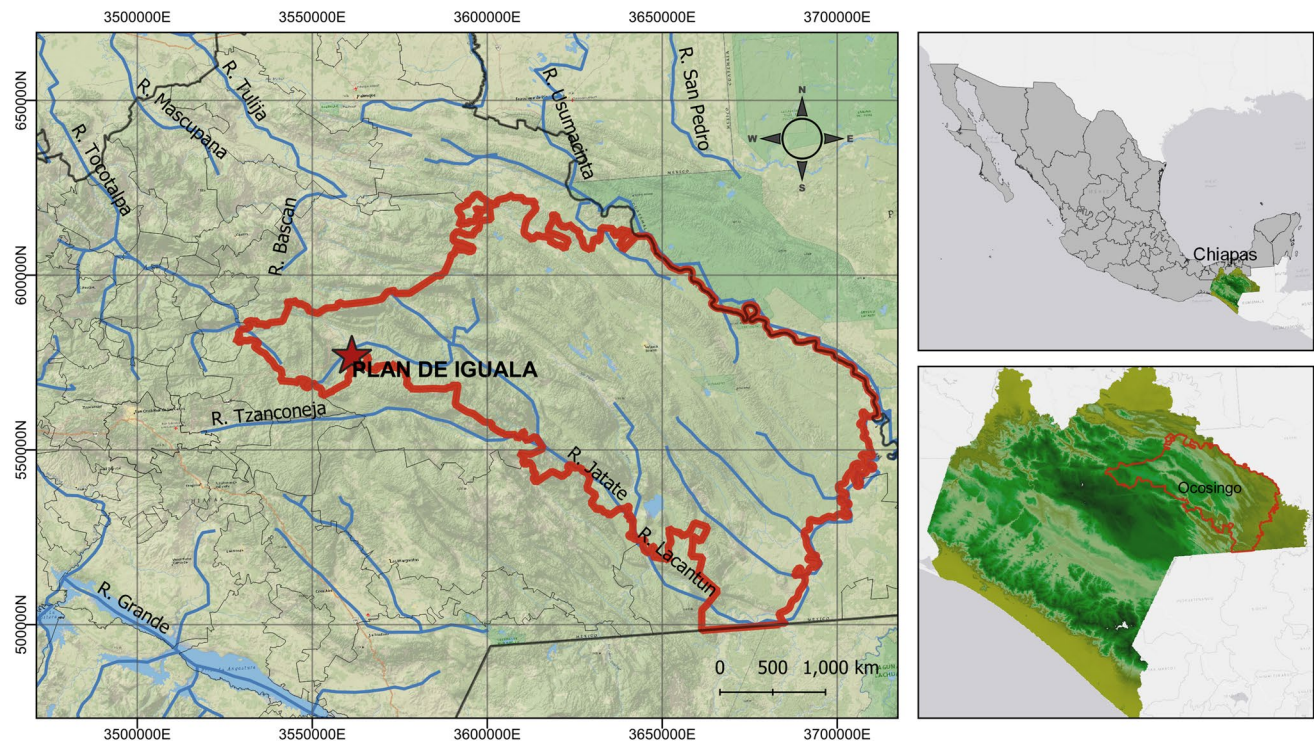


Fig. 1 Maps of Chiapas in Mexico, the Zapatista region, and the municipality where the community we worked with is located. The exact location and name of the community are not shown to maintain their anonymity

many informal conversations with men, women, teenagers, boys, and girls in the community.

During fieldwork, we evaluated to what extent the everyday knowledge, practices, beliefs, technologies, norms, institutions and programs created through autonomous Zapatista education are innovative in meeting human needs, improving social relations and empowering community members to better address the environmental problems and territorial conflicts facing the community (we sought here the three dimensions of local innovation proposed by Moulaert et al. 2005). The action-research was manifested in the processes of mutual learning, dialogue, and exchange of knowledge in Spanish and in their Tzeltal Mayan language with all members of the Zapatista community. At the request of the community, we taught literacy, geography, and arts in the *Escuelita*.

Case study: Zapatismo and autonomous Zapatista education in Chiapas, Mexico

As part of the pluriverse of alternatives to schooling and decolonial pedagogies in Latin America, autonomous Zapatista education can be understood as a vital building block in the construction of alternatives to development (Baronnet et al. 2011; Medina-Melgarejo 2015; Walsh 2003). The Zapatista Autonomous Rebel Education System for National

Liberation has been gradually formed since 2000 and is not intended to be a mere alternative to the official education of the Mexican State (Barbosa 2015, 2016; Baronnet 2019). Rather, the design and implementation of autonomous Zapatista education aims at building the foundations of Zapatismo in every community (EZLN 2013; Lang 2015; Zibeche 2007).

Their Zapatista *Caracoles* were created in 2003 and govern the Zapatista Autonomous Rebel Municipalities to resolve the conflicts and inequalities that may occur between them. These changes correspond to a very novel and advanced form of political organization and territorial autonomy through the *Caracoles* and the Good-Government Councils that allow for common languages and increasingly broader consensus (Aguirre-Rojas 2007; González-Casanova 2009b; Romero 2019). In 2019 new *Caracoles* were created from the declaration “*Y rompimos el cerco*” (“*And we broke the siege*”). There are currently twelve *Caracoles* with their Good-Government Councils, autonomous municipalities, and their Zapatista support base communities.¹⁰

¹⁰ In 2019, the Zapatistas expanded their territory through six new *caracoles*: <http://enlacezapatista.ezln.org.mx/2019/08/17/comunicado-del-ccri-cg-del-ezln-y-rompimos-el-cerco-subcomandante-insurgente-moisles/>.

Our study area is in the *Caracol La Garrucha*, which includes five municipalities. The Tzeltal indigenous community where we conducted our study is in the municipality of Ocosingo, close to the Lacandon Rainforest (Fig. 1).

In the *Caracol La Garrucha*, the autonomous Zapatista education began in 1999 with the training of educational promoters at municipalities Francisco Gómez and San Manuel. Students are taught to count, read, write, and talk about issues that concern their daily life, including the EZLN's struggle. The study community is made up of five Tzeltal families from the municipality of Oxchuc—in the highlands of Chiapas—and has several wooden houses, a school, an autonomous health post, a chapel, corn plots, coffee plantations, a water spring, and a graveyard. The school is attended by 13 boys and 8 girls aged 3–14, with a temporary teacher assigned by the community. They attend school every morning from Monday to Friday and spend the afternoons with their parents or grandparents helping them with agricultural and domestic activities (e.g., fetching water and firewood, working in the family's cornfield). Their main recreational activities are swimming in the river, fishing and climbing trees to harvest fruits.¹¹

The political and military contexts across the study area are complex and shape not just Zapatismo and its autonomous educational system, but also the possibilities for doing fieldwork. The entire Zapatista territory is surrounded by the Mexican army. Its presence can be seen from the hill-top of the Tzeltal indigenous community we conducted the study in. The Zapatista territory is discontinuous (Souza 1995), so Zapatistas, supporters and former Zapatista militants coexist. Paramilitary groups funded by local ranchers and possibly the Chiapas State government, and government social programs are used as counterinsurgency strategies against the Zapatista movement (Aquino Moreschi 2013; López y Rivas 2013). In addition, as elsewhere in Mexico, the territories inhabited by the Zapatistas endure the presence of narco cartels. It is unclear to what extent the organized crime groups that try to displace Zapatista and non-Zapatista indigenous communities from their territories are financed by the State.

How can grassroots innovation in autonomous Zapatista education contribute to the design and everyday construction of Zapatismo?

The construction of the autonomous educational and pedagogical processes after almost thirty years has been both gradual and radical. The transition of autonomous education has two crucial moments: the configuration of the

autonomous educational system (1997) and the creation of *Caracoles* and municipalities (2003). We identify and analyze the following innovative practices of autonomous Zapatista education: (a) Practices of educational autonomy, for example, the co-design of guides and textbooks, self-organization and self-management of educational projects and materials; (b) Political-pedagogical practices of resistance, supported by teaching–learning inside and outside of the classroom through political-militant practices of the Zapatista movement; and (c) Autonomous teaching–learning practices, for example, regarding the needs of community life and Zapatista territorial political autonomy. Below, we present the main characteristics and several examples of the grassroots innovations we have identified in the literature review, during fieldwork and through complementary audiovisual sources on autonomous Zapatista education.

Practices of educational autonomy

The practices of educational autonomy are constituted in both new and reimagined forms of self-organization and self-management. For example, each of the *Caracoles* through the Good-Government Councils and the education commissions decide in assembly what type of educational projects will be collectively self-managed using local and international resources, and how they will be implemented in the autonomous municipalities through new regulations that guide educational practices as alternatives to official education in Mexico (Table 2).

The political-pedagogical practices of resistance

The political-pedagogical practices of resistance to capitalism and the neoliberal State are constituted by the diversity of Mayan indigenous, traditional, and ideological knowledge of the Zapatista struggle (Table 2). These practices have new and traditional elements whose central axis is the transmission and generation of practical knowledge in the classroom and the community to address the needs of daily life and strengthen individual and collective autonomy. Zapatista resistance pedagogies barely rely on written knowledge and can be planned or arise spontaneously during the teaching–learning processes with the participation of students in the classroom, community, assembly, collective work, and cultural encounters. Raúl Zibechi says with regard to his experience in the *Escuelita* Zapatista:

[...] It is a pedagogy of fraternity, a pedagogy in which we are all equal in hierarchies, and we are equal in work, in sharing work that is the most important thing [...] and from there, sharing food, sharing housing, sharing the territory [...] so I think that there, what is born is another pedagogy that starts from another

¹¹ Information collected by participant observation, 2019.

Table 2 Innovative autonomous educational practices and transformations by political-organizational level of Zapatismo

Innovative practices	Zapatista Movement	Caracol "La Garrucha"	Tzeltal community of study	Transformations
Practices of educational autonomy New forms of self-organization and self-management of autonomous education, e.g., management of educational projects in <i>Caracoles</i> and educational committees	Collective design of values and purposes of education, e.g., Charter of the Zapatista Autonomous Rebel Education System of National Liberation-Zona de Los Altos de Chiapas The reinvention of the teaching function (e.g., despecialization and deprofessionalization) and its reinvention of anti-capitalist struggle Elaboration of the Municipal Agreements on the training of education promoters, by the Council of MAREZ Ricardo Flores Magón (2001)	The educational model is experimental, e.g., main objectives are sharing, learning together Renewal of the organization of areas of knowledge and educational levels in primary school, e.g., management of the project "Semillita del Sol" Communality as a pedagogical educational and collective learning principle in the Assembly and the Good-Government Council	Direct participation as promoters of education and health, and in political positions in the municipal and vigilance committees Strengthening of the links and communication, e.g., annual organization of the Zapatista meetings (Second Film Festival "Puy ta Cuxiejaltic", 2019)	Inclusive and bilingual education Expansion of skills and abilities to address human needs, environmental problems, and territorial conflicts Collective work and construction of housing, schools, clinics
Political-pedagogical practices of resistance Innovative learning methods and mechanisms in <i>Escuelita</i> in contexts of interculturality, e.g., political training from primary school, autonomous educational pedagogies are key in the reappropriation of territory	Areas and methods of cross-cultural knowledge transmission and exchange, e.g., pedagogy of insurgency, rebellion, resistance, dialogue, silence, and autonomy Training of educational promoters at the Zapatista Autonomous Rebel Spanish and Mayan Language Center, 2000	New spaces for political exchange of knowledge and multiethnic learning, e.g., cultural, and political events for the anniversary of the EZLN: First Meeting of Women 2008, For Commander Ramona In the Tzeltal Jungle Zone, through pedagogical autonomy, they invent content and teaching methods through the community assembly, e.g., games, artistic activities, the true history of social fighters	Co-production of knowledge and learning, e.g., from age 13 they decide to be education or health promoters, learn trade or political functions New political pedagogies of resistance in everyday life, e.g., Civil services and positions as community representatives and in the autonomous municipal councils	More equitable distribution of power relations between the EZLN and the civilian bases Reappropriation of communal lands as autonomous territory
Autonomous teaching-learning practices. Development of new learning and knowledge through conviviality and autonomy, e.g., narratives of struggle and autonomy, <i>Caracoles</i> as spaces of radical democracy	Creation and diffusion of new narratives and experiences of the movement, e.g., Critical Thought in the Face of the Capitalist Hydra (Vol. I, II and III), The Third Compas, Free Media The autonomous territory as a space of reproduction of the movement, e.g., the 11 Caracoles, municipalities, and autonomous communities The local history book, the mathematics book and the 11 versions of reading and writing manuals in Tzeltal, Tsotsil and Tojolabal published in 2005	Construction of novel alternatives that go beyond education and the <i>Escuelita</i> , e.g., de-professionalization of political positions, free learning in construction of musical instruments with recycled materials The educational act is built in four spaces: the family, the community (Assembly, Caracoles and Good-Government Councils), the <i>Escuelita</i> and the milpa Training for promoters in two centers, one in the <i>Caracol La Garrucha</i> , and the other in the <i>Centro Compañero Manuel in La Culebra</i> , autonomous municipality Ricardo Flores Magón	New learning applied to territorial autonomy, e.g., ecological management of their territory as distribution of space, organic cultivation of coffee, corn, beans, and squash, food sovereignty	Exercise of indigenous rights without the presence of the State Decentralization, radical democracy, and autonomous government

Is a letter describing the main principles of autonomous Zapatista education. Retrieved from https://serazln-altos.org/habia_uma_vez_una_noche_cast_tsotsil.pdf

way of doing politics and a new political culture is a fundamental learning.¹²

The autonomous teaching–learning practices

As for the autonomous teaching–learning practices, they express the militant experience of the indigenous and peasant leaders who initiated the Zapatista political movement (Table 2). The teenagers and children learn the history and actions of the movement in other spaces beyond the *Escuelita*, e.g., in everyday family and community spaces. They learn about all organizational levels through direct participation in positions or political actions to sustain life and autonomy in their territories. Comrade Magdalena from *Caracol II* (Oventik), a member of the general coordination of the educational system of *Los Altos de Chiapas* region, discusses “the other education” that has been implemented:

The other education is one of our demands, which forced us to become rebels against the “bad government” and the “big capitalists” [...] for that reason we began to build the new education for the people based on the humanistic thinking of our ancestors [...] the practice teaches us and what we learn will be what becomes “awareness education” [...] we seek the transformative action of society [...] teaching is for life to better understand our world and within our Zapatista struggle an autonomous education started from the heart and in the thinking of our people.¹³

The novel practices of educational autonomy, political-pedagogical resistance, and autonomous teaching–learning in the *Caracol “La Garrucha”* and four autonomous municipalities—including that of the study community—are based on the objective of “sharing, learning together and from everyone”. Through coordination between Zapatista communities and the NGO Enlace Civil (1995), they implemented the project called *Semillita del Sol (Little Seed of the Sun)*, which is structured in three levels. In the first level students learn to read, write, and draw. In the second, they learn about the Zapatista demands; while in the third, they study the public statements issued by the Zapatistas to communicate their goals, their efforts to construct autonomy, and the opposing social–political strategies of the government. In the *Caracol “La Garrucha”*, Zapatistas are more interested in learning about trade, deprofessionalization and decision-making in Autonomous Government, the self-management of projects demanded by the support bases (indigenous communities) in

the *Caracoles*, and the building of autonomy and Zapatista territorial control.¹⁴

Further insights from the field

In the community where we did fieldwork, the dynamics of knowledge and social learning are generated from the construction of the discourse of autonomy and resistance, the defense of the territory and its Tzeltal culture. The autonomous educational, political-pedagogical practices of resistance and innovative teaching–learning identified at the Zapatista movement level, the *Caracol “La Garrucha”* and the indigenous Tzeltal community where we did fieldwork, are based on the daily construction of autonomy (see Table 2). Also, they are not limited to the educational promoter. Rather, they involve the participation and interaction of parents and grandparents with the children. Likewise, the adults, teenagers and children of the community create protest art and share knowledge in the Tzeltal language in the kitchen, the *milpa* (cornfield), the water spring, coffee plantation, *temazcal*¹⁵ or in rituals. A grandfather and his eldest son commented on the importance of listening, learning, and putting into practice the ideas that are collectively generated and shared:

[...] Receive the theory and do practice. How? You have to organize as *Subcomandante* Moisés says, not only because you listen, what you hear you have to do, you have to practice; what you see the same, you have to think. [...] All that moves us forward, what you hear, what you see, what you do, pick everything that can move us forward.¹⁶

This community has a temporary educational promoter. For that reason, the representatives of the community asked us to participate in some classes of the *Escuelita* (which has children aged four and older). Within the classroom, teaching–learning and pedagogical practices are not imposed by teachers. Children raise their concerns and voice their opinions with confidence. The creation of knowledge and learning is not authoritarian or imposed. These communities drive change through knowledge and learning in decision-making spaces such as the assembly and in the creation of educational content according to the Zapatista principles

¹² Transcript of video entitled: Entrevista a Raúl Zibechi, La Experiencia de La Escuelita Zapatista (PromediosMexico 2013).

¹³ Transcript of video entitled: Los Pueblos Zapatistas y La Otra Educación II (Agencia Prensa India 2011).

¹⁴ Field diary entries about conversations with a former educational advocate from the study community the first week of January 2020.

¹⁵ An ancestral indigenous practice that is performed every day before sleeping in the Zapatista community of study, it consists of a restorative steam bath for the body. The members of the community lie down on the wooden floor and receive the steam given off by red-hot stones after the grandfather pours water on them. Shared activity in the study community during fieldwork in 2019–2021.

¹⁶ Interview with ex-health care promoter, July 2019.

of *Mandar Obedeciendo*. They always keep in mind the philosophy of the movement, the Mayan identity, and the everyday construction of territorial autonomy. For example, the importance of autonomous education is expressed in the words of a colleague from the community:

[...] Our children have to learn how we live, how we organize ourselves. For example, in history: Why was the war raised in 1994 or how did our ancestors live? How was the bad government in 1968? [...] After 1994 they have to learn: Why did people organize and how quickly they did so? Zapatista organization is already at the national level and children have to know it. They have to learn our history how it is; they have to learn everything that concerns us, they have to learn to write and count, and they also have to learn their Tzeltal language.¹⁷

The novel practices analyzed in autonomous Zapatista education are innovative to the extent that they generate profound transformations in power relations that are more horizontal than vertical, the resolution of conflicts between Zapatistas and non-Zapatistas, the improvement of life conditions, the reappropriation of land, and the enhancement of environmental management and defense of territory. In addition, Zapatista communities, municipalities, and Good-Government Councils have implemented initiatives and autonomous educational projects oriented toward the construction of self-sufficiency, self-management, and intercultural self-organization. This allows them to inhabit their autonomous territory in harmony with nature and ancestral local knowledge. Zapatistas do not expect the Mexican State to grant them quality of life and they are independent of the national and international markets.

Reflections upon the potential of grassroots innovation in autonomous Zapatista education and Zapatismo

The findings of our literature review and fieldwork indicate that the potential of grassroots innovations in the Zapatista autonomous education arise from the motivations of political struggle, its social demands and the seven principles of *Mandar Obedeciendo* (EZLN 2013) as well as from their pluri-ethnic sociocultural context, all of which is expressed in their novel educational practices and learning as alternatives to the official national educational system and the dominant capitalist rationality (Esteva 2002, 2014). The conception of autonomous education incorporates the socio-historical vision of political struggle and the

construction of individual and collective autonomy from the *Escuelita*, the family and the community, through the connection between theory and the daily practice of Zapatista militants (Barbosa 2016; Baschet 2018b; EZLN 2015). The materialization of innovations in autonomous education by its promoters, is not limited to teaching–learning in the community schools. This is because pedagogies and didactics have been collectively created to meet needs, address problems and continue the search for radical changes through more horizontal relations in contexts of ethnic diversity and direct democracy (Villoro 2015; Baronnet 2013, 2015, 2019).

We found that, in the *practices of educational autonomy*, grassroots innovation is manifested in the defense, reappropriation, and management of territorial autonomy. For instance, educational promoters teach children and teenagers about Zapatista territorial political organization and autonomy. The new territorial limits produce new knowledge, learning and pedagogies from the support base communities and schools (Aguirre-Rojas 2007; González-Casanova 2009b). *Teaching–learning practices* are linked to traditional and local knowledge, and transformative learning of the Zapatista movement. These are, for example, artistic practices such as the creation of murals with natural materials, poems of rebellion, coordination of cultural events, and documentaries. The *political-pedagogical practices of resistance* are strategies created collectively as political acts of struggle and learning spaces, which aim to go beyond alternatives to schooling. These include free apprenticeships, teaching of trades and knowledge in service of indigenous communities and deprofessionalization (Barkin and Sánchez 2019; Esteva 2014; Pinheiro-Barbosa 2013, 2015).

The innovative practices identified in autonomous education are linked to the reproduction of traditional knowledge and multiethnic learning and are strengthened by the collective art of resistance as a source of creative liberation for children and teenagers. Likewise, the proposal of autonomous design by Escobar (2017), where "every community practices the design of itself", applies to the new designs and conceptions of autonomous education, but also to all areas of the Zapatista movement that have operated in contexts of autonomy and resistance. For this reason, the innovative educational practices found in the Zapatista autonomous collective design is key in the generation and management of knowledge and social learning for strengthening the relational ontological diversity of native identities and the socialization of values of coexistence with the natural environment across Zapatista territories (Baronnet 2015; Illich 1973; Martínez-Luna 2016; Escobar 2017).

Learning and knowledge coproduction are essential in grassroots innovations, especially on sustainability and

¹⁷ Interview with ex-promoter of education and health, July 2019.

more critical understandings of nature (Gupta et al. 2003; Kumar and Bhaduri 2014). In addition, whereas for these authors the use of technological innovations and information technologies are central to grassroots innovations, in the Zapatista context this is mostly related to the use of the internet and independent media for the dissemination of Zapatismo regionally and globally. Educational and pedagogical practices are innovative because they enhance horizontal power relations together with economic activities of resistance, self-sufficiency, alternative and traditional health, the organization of autonomous government and justice, and the defense of territorial autonomy (Barkin 2019; Baronnet et al. 2011; Lang 2015; Leyva-Solano 2019). The construction of networks functions as a symbol that unites communities of interest and practice (Seyfang and Smith 2007; Smith et al. 2017). Zapatista grassroots innovations are influential in the creation of international networks such as the alter-globalization movement (Pleyers 2019). The links and alliances built through autonomous Zapatista education are a concrete expression of post-capitalism and decoloniality (Kothari et al. 2019a, b).

When analyzing grassroots innovations in autonomous Zapatista education, we find that Baronnet et al. (2015, 2019) and Barbosa (2013, 2015, 2020) reflect on innovation in educational processes and practices. Baronnet recognizes that it is necessary to deepen the understanding of these issues. However, neither of them conceptualize innovation in autonomous education, nor do they analyze Zapatismo in terms of an alternative to development, but in terms of the importance of critical political praxis and the need for a radical social transformation. In addition, they focus on the decolonial aspects of autonomous Zapatista education, and the importance of epistemic referents in educational processes as generators of creative potentiality through their language and their Mayan cosmovisions.

Escobar (2017: 151–164) proposes designs for processes of transition, autonomy, and orientation of social change toward sustainability from a social innovation approach (Manzini 2015). Although it is unlikely that professionals or academics can help in the construction of Zapatista autonomy, they could analyze the autonomous collective designs co-created from the ethnic and ecological diversity across Zapatista territories (Escobar 2017). However, it is necessary to build a specific theoretical framework of innovation beyond the existing Western conceptions of social innovation or grassroots innovations and from the relational ontologies and cosmologies of indigenous and peasant societies that are engaged in the creation of a pluriverse of alternatives to development—as observed in several Latin American experiences (Escobar 2011, 2014).

Grassroots innovation may play a key role in the design and everyday construction of alternatives to development and pluriversal paths

In this paper we have identified grassroots innovations and assessed how they may contribute to building Zapatismo—a specific alternative to development in Chiapas, Mexico—by analyzing the case of autonomous Zapatista education. We have analyzed how new knowledges, practices, beliefs, technologies, norms, institutions and programs are created through this autonomous educational system, which appears to be a constant source of grassroots innovation. This alternative to the national system of education enables the collective acquisition and learning of knowledge and skills that are key to achieving more just and sustainable socionatures, which is a central political outcome of Zapatismo. It is important to emphasize that the pedagogical conception of an educational process from the Zapatista perspective exerts a radical critique of the colonial character of the official Mexican educational system.

Through this case study we have learned that grassroots innovations are more intangible than tangible during the construction of Zapatista political and territorial autonomy, consisting of self-organized and self-managed collective practices that seek radical transformations for better living, and that are based on indigenous Mayan cosmovisions, the dialogue of intercultural knowledge in the assemblies and the Good-Government Councils in the Zapatista *Caracoles*, and a more horizontal redistribution of power from the grassroots level. We have also observed that the spread of grassroots innovations present in Zapatismo and its autonomous education fosters new and expanded networks of solidarity and anti-systemic resistance among national and international social movements and collectives (e.g., adherents to the Sixth Declaration of The Lacandon Rainforest of EZLN and sympathizers anywhere on Earth), thus contributing to healthier, more just, ethical, and ecologically sustainable ways of life that enrich the pluriverse. In addition, we have unveiled new collective designs and educational-pedagogical conceptions in the innovative autonomous educational practices. These practices have helped advance Zapatistas as new historical-political subjects that are better equipped not just to resist the neoliberal development project orchestrated by the Mexican State in alliance with other governments, multilateral and financial institutions, but to actively transform and improve their reality. In imagining, designing and materializing their own world through a large and diverse array of radical epistemic, ontological and political building blocks, Zapatista's grassroots innovations are key to the everyday construction of Zapatismo as part of the pluriverse.

Based on our work, we argue that “grassroots innovation for the pluriverse” could be understood as new ideas, processes, autonomous designs and transitions, and principles of collective ethical–political life that are transformed into new forms of political and territorial organization, knowledge and learning strategies, social practices, more horizontal relationships, multi-scale networks, and sustainable coexistence with more-than-human natures in contexts of social and environmental struggle by grassroots movements and communities across the global South. In this sense, grassroots innovation for the pluriverse can be distinguished by actively seeking a rupture with the ideologies of capitalist development. It does so by creating solutions that explicitly question the central assumptions of the hegemonic development discourse, and by encompassing a set of ethics and values that are radically different from those underpinning the current capitalist system. This can be partly explained because grassroots innovation in alternatives to development is often embedded in indigenous cosmologies and relational ontologies.

Finally, we suggest that using grassroots innovation as a conceptual lens can be useful for analyzing the autonomous societal designs of grassroots groups to transition toward more socially and ecologically just societies. Future research should be oriented towards deepening the theoretical conceptualization of grassroots innovation for the pluriverse and further assessing its potential in specific experiences of alternatives to development. Such efforts would in our view contribute to a better understanding of how such alternatives are designed and constructed, and how they can lead to large-scale societal transformations and transitions to just sustainabilities, particularly in contexts of the global South where most of such alternative are flourishing. In addition, it would be important to create new methodological approaches for a more consistent identification and operationalization of the analysis of grassroots innovation in empirical case studies. This methodological improvement would allow for undertaking comparative analyses across different pluriversal paths which, in turn, would improve the construction of a theoretical framework of grassroots innovation for the pluriverse.

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References

- Agencia Prensa India (2011) Los Pueblos Zapatistas y la Otra Educación II. https://www.youtube.com/watch?v=ECxmVaB_wXs&t=516s. Accessed 07 Feb 2021
- Aguirre-Rojas CA (2007) Mandar obedeciendo. Las lecciones políticas del neozapatismo mexicano. *Contrahistorias y Centro “Immanuel Wallerstein” CIDECI-UNITIERRA CHIAPAS*, México
- Apostolopoulou E, Bormpoudakis D, Chatzipavlidis A, Vázquez JJC, Gearey M, Levy J et al (2022) Radical social innovations and the spatialities of grassroots activism: navigating pathways for tackling inequality and reinventing the commons. *J Polit Ecol* 29(1):143–188
- Aquino Moreschi A (2013) No me desilusioné del movimiento, me desesperé: Las paradojas de la militancia zapatista en tiempos de guerra. *Nueva Antropología* 26(78):163–189
- Barbosa LP (2013) Pedagogías alternativas. El Movimiento de los Sin Tierra y el Movimiento Zapatista. In: Gómez Sollano M, Corenstein M (eds) *Reconfiguración de lo educativo en América Latina, Experiencias pedagógicas alternativas*. Universidad Nacional Autónoma de México Facultad de Filosofía y Letras, México, pp 249–302
- Barbosa LP (2015) Educación, resistencia y movimientos sociales: la praxis educativo-política de los Sin Tierra y de los Zapatistas. *LIBRUNAM*, México
- Barbosa LP (2016) Educación, resistencia y conocimiento en América Latina: por una teoría desde los movimientos sociales. *De Raíz Diversa. Revista Especializada en Estudios Latinoamericanos* 3(6):45–79. <https://doi.org/10.22201/ppela.24487988e.2016.6.58425>
- Barbosa LP (2020) Pedagogías sentipensantes y revolucionarias en la praxis educativo-política de los movimientos sociales de América Latina. *Revista Colombiana de Educación* 1(80):269–290. <https://doi.org/10.17227/rce.num80-10794>
- Barkin D (2018) De la protesta a la propuesta: 50 años imaginando y construyendo el futuro. *Universidad Autónoma Metropolitana, Ciudad de México*
- Barkin D (2019) Conviviality. In: Kothari A, Salleh A, Escobar A, Demaria F, Acosta A (eds) *Pluriverse: a post-development dictionary*. Tulika Books, Delhi, pp 136–138
- Barkin D, Sánchez A (2019) The communitarian revolutionary subject: new forms of social transformation. *Third World Q* 41(8):1421–1441. <https://doi.org/10.1080/01436597.2019.1636370>
- Baronnet B (2011) Autonomía educativa zapatista: hacia una pedagogía de la liberación. *Em Aberto, Brasília* 24(85):127–144
- Baronnet B (2013) Autonomías y educación en Chiapas: Prácticas políticas y pedagógicas en los pueblos zapatistas. In: Walsh CE (ed) *Pedagogías decoloniales prácticas insurgentes de resistir, (re) existir y (re)vivir*. Universidad Andina Simón Bolívar, Perú, pp 304–329
- Baronnet B (2015) La educación zapatista como base de la autonomía en el sureste mexicano. *Educação & Realidade* 40(3):705–723. <https://doi.org/10.1590/2175-623645794>
- Baronnet B (2019) Pedagogical strategies in the struggle for indigenous autonomy in Mexico. *Latin American Philosophy of Education Society, Lápiz*, pp 43–58
- Baronnet B, Stahler-Sholk R (2019) “Never again a Mexico without us”: education and indigenous autonomy struggles in Mexico. In: Aman R, Ireland T (eds) *Educational alternatives in Latin America*, pp 63–87. https://doi.org/10.1007/978-3-319-53450-3_4
- Baronnet B, Bayo MM, Stahler-Sholk R (2011) Luchas “muy otras”: zapatismo y autonomía en las comunidades indígenas

- de Chiapas. CIESAS, Centro de Investigaciones y Estudios Superiores en Antropología Social, México
- Baschet J (2018a) ¡Rebeldía, Resistencia y Autonomía! La Experiencia Zapatista. Ediciones Eón, Ciudad de México
- Baschet J (2018b) La escuela zapatista y el contagio de la autonomía. Aprender preguntando, de corazón a corazón. In: López-Flores PC, García-Guerreiro L (eds) Movimientos indígenas y autonomías en América Latina: escenarios de disputa y horizontes de posibilidad. CLACSO, Ciudad Autónoma de Buenos Aires, pp 285–313
- Boyer RH (2015) Grassroots innovation for urban sustainability: comparing the diffusion pathways of three ecovillage projects. *Environ Plan A* 47(2):320–337
- Cabaña G, Linares J (2022) Decolonising money: learning from collective struggles for self-determination. *Sustain Sci*. <https://doi.org/10.1007/s11625-022-01104-3>
- Chuji M, Rengifo G, Gudynas E (2019) Buen vivir. In: Kothari A, Salleh A, Escobar A, Demaria F, Acosta A (eds) *Pluriverse. A post-development dictionary*. Tulika Books, New Dehli, pp 111–114
- Clarence-Smith SA, Monticelli L (2022) Flexible institutionalization in auroville: a prefigurative alternative to development. *Sustain Sci*. <https://doi.org/10.1007/s11625-022-01096-0>
- Demaria F, Kothari A (2017) The post-development dictionary agenda: paths to the pluriverse. *Third World Q* 38(12):2588–2599. <https://doi.org/10.1080/01436597.2017.1350821>
- Dieng RS, O'Reilly A (2020) Feminist parenting: perspectives from Africa and beyond. Demeter Press, Bradford
- Escobar A (2011) Sustainability: design for the pluriverse. *Development* 54(2):137–140. <https://doi.org/10.1057/dev.2011.28>
- Escobar A (2012) Más allá del desarrollo: postdesarrollo y transiciones hacia el pluriverso. *Revista de Antropología Social* 21:23–62. https://doi.org/10.5209/rev_RASO.2012.v21.40049
- Escobar A (2014) Sentipensar con la tierra. Nuevas lecturas sobre desarrollo, territorio y diferencia. Ediciones UNAULA, Medellín
- Escobar A (2016) Autonomía y diseño: la realización de lo comunal. Editorial Universidad del Cauca, Popayán
- Escobar A (2017) Designs for the pluriverse. Radical interdependence, autonomy, and the making of worlds. Duke University Press, USA
- Esteva G (2002) Sentido y alcances de la lucha por la autonomía. In: Mattiace SL, Hernández Castillo RA, Rus J (eds) *Tierra, libertad y autonomía: impactos regionales del zapatismo en Chiapas*. Centro de Investigaciones y Estudios Superiores en Antropología Social, México, pp 365–401
- Esteva G (2014) De la educación alternativa a las alternativas a la educación. https://www.youtube.com/watch?v=NTi_Ws6MzDk&list=PL_2pjPG4p-E8S3MSI3QedsPd-72SHVjyr. Accessed 28 Aug 2021
- Esteva G (2019) Autonomía. In: Kothari A, Salleh A, Escobar A, Demaria F, Acosta A (eds) *Pluriverse: a post-development dictionary*. Tulika Books, Delhi, pp 170–173
- EZLN (2005) Sexta Declaración de la Selva Lacandona. Comité Clandestino Revolucionario Indígena, Comandancia General del Ejército Zapatista de Liberación Nacional, México
- EZLN (2013) Gobierno autónomo I. Cuaderno de texto de primer grado del curso de “La libertad según l@s zapatistas.” Chiapas, México
- EZLN (2015) El Pensamiento Crítico Frente a la Hidra Capitalista, 1. Participación de la Comisión Sexta del EZLN. Sin pie de imprenta, México
- Feola G, Nunes R (2014) Success and failure of grassroots innovations for addressing climate change: the case of the transition movement. *Glob Environ Change* 24(1):232–250. <https://doi.org/10.1016/j.gloenvcha.2013.11.011>
- Franzen S (2022) Plurality in black rural development. *Sustain Sci*. <https://doi.org/10.1007/s11625-022-01153-8>
- Gills BK, Hosseini SAH (2022) Pluriversity and beyond: consolidating radical alternatives to (mal-)development as a commonist project. *Sustain Sci*. <https://doi.org/10.1007/s11625-022-01129-8>
- González-Casanova P (2009a) Causas de la rebelión en Chiapas. In: *De la sociología del poder a la sociología de la explotación: pensar América Latina en el siglo XXI*. Siglo del Hombre Editores-CLACSO, Bogota, pp 265–292
- González-Casanova P (2009b) Los “Caracoles” zapatistas: redes de resistencia y autonomía (ensayo de interpretación). In: *De la sociología del poder a la sociología de la explotación: pensar América Latina en el siglo XXI*. Siglo del Hombre Editores CLACSO, Bogotá, pp 335–354
- Grant MJ, Booth A (2009) A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Inf Libr J* 26:91–108. <https://doi.org/10.1111/j.1471-1842.2009.00848.x>
- Gudynas E (2011a) Buen vivir: Germinando alternativas al desarrollo. *América Latina En Movimiento* 462:1–20
- Gudynas E (2011b) Debates sobre el desarrollo y sus alternativas en América Latina: Una breve guía heterodoxa. In: Lang M, Mokrani D (eds) *Más allá del desarrollo*. Grupo Permanente de Trabajo sobre Alternativas al Desarrollo. Fundación Rosa Luxemburg/ Abya Yala, Berlin, pp 21–53
- Gudynas E (2012) Desarrollo, extractivismo y postextractivismo. Red peruana por una globalización con equidad (RedGE), Lima
- Gudynas E (2018) Post-development and other critiques of the roots of development. In: Veltmeyer H, Bowles P (eds) *The essential guide to critical development studies*. Routledge, Oxon and New York, pp 84–93
- Gupta AK (2012) Innovations for the poor by the poor. *Int J Technol Learn Innov Dev* 5(1–2):28–39. <https://doi.org/10.1504/IJTLID.2012.044875>
- Gupta AK (2016) Grassroots innovation: minds on the margin are not marginal minds. Random House, India
- Gupta AK, Sinha R, Koradia D, Patel R, Parmar M, Rohit P et al (2003) Mobilizing grassroots’ technological innovations and traditional knowledge, values and institutions: articulating social and ethical capital. *Futures* 35(9):975–987. [https://doi.org/10.1016/S0016-3287\(03\)00053-3](https://doi.org/10.1016/S0016-3287(03)00053-3)
- Gupta A, Shinde C, Dey A, Patel R, Patel C, Kumar V, Patel M (2019) Honey bee network in Africa co-creating a grassroots innovation ecosystem in Africa. ZEF working paper series, 62. <https://doi.org/10.2139/ssrn.3332251>
- Hickel J (2021) The anti-colonial politics of degrowth. *Polit Geogr*. <https://doi.org/10.1016/j.polgeo.2021.102404>
- Hossain M (2016) Grassroots innovation: a systematic review of two decades of research. *J Clean Prod* 137:973–981. <https://doi.org/10.1016/j.jclepro.2016.07.140>
- Hossain M (2018) Grassroots innovation: the state of the art and future perspectives. *Technol Soc* 55:63–69. <https://doi.org/10.1016/j.techsoc.2018.06.008>
- Illich I (1973) *Tools for conviviality*. Harper & Row, New York
- Johanisova N, Suriñach-Padilla R, Parry P (2015) Co-operatives. In: D’Alisa G, Demaria F, Kallis G (eds) *Degrowth: a vocabulary for a new era*. Routledge, New York, pp 152–155
- Kaul S, Akbulut B, Demaria F, Julien-François G (2022) The pluriverse in practice: delinking from capitalist modernity? *Sustain Sci* (forthcoming)
- Kothari A, Salleh A, Escobar A, Demaria F, Acosta A (2019a) Crisis as opportunity: finding pluriversal paths. In: Klein E, Morreo CE (eds) *Postdevelopment in practice. Alternatives, economies, ontologies*. Routledge, Abingdon, pp 100–116
- Kothari A, Salleh A, Escobar A, Demaria F, Acosta A (2019b) *Pluriverse. A post-development dictionary*. Tulika Books, New Delhi. ISBN: 9788193732984
- Kumar H, Bhaduri S (2014) Jugaad to grassroot innovations: Understanding the landscape of the informal sector innovations in India. *Afr J*

- Sci Technol Innov Dev 6(1):13–22. <https://doi.org/10.1080/20421338.2014.895481>
- Kumar V, Chand VS, Zhang L, Hoppers CAO, Zhang W, Esders M, Gupta AK (2013) Grassroots innovations for inclusive development: need for a paradigmatic shift. *Vikalpa* 38(3):103–122. <https://doi.org/10.1177/0256090920130307>
- Lang M (2022) Buen vivir as territorial practice. Building a more just and sustainable life through interculturality. *Sustain Sci*. <https://doi.org/10.1007/s11625-022-01130-1>
- Lang M (2015) México: Desde abajo todo, desde arriba nada. La autonomía zapatista en Chiapas y la Otra Campaña. In: Lang M, Cevallos B, López C (eds) *¿Cómo Transformar? Instituciones y cambio social en América Latina y Europa*. Fundación Rosa Luxemburgo/Abya-Yala, Quito, pp 219–276
- Lang M, Lopez C, Ortiz C, Ojeda S (2013) Alternativas al capitalismo/Colonialismo del siglo XXI. Fundación Rosa Luxemburgo, Quito
- Leyva-Solano X (2019) Zapatista autonomy. In: Kothari A, Salleh A, Escobar A, Demaria F, Acosta A (eds) *Pluriverse. A post-development dictionary*. Tulika Books, New Delhi, pp 335–338
- Loh P, Shear BW (2022) Fight and build: solidarity economy as ontological politics. *Sustain Sci*. <https://doi.org/10.1007/s11625-022-01165-4>
- López y Rivas G (2013) *Autonomías Democracia o contrainsurgencia*. Ediciones Era, México
- Maldonado-Villalpando E, Paneque-Gálvez J (2022) Grassroots innovation in alternatives to development: a review. *Nordia Geogr Publ*. <https://doi.org/10.30671/nordia.111293>
- Manzini E (2015) *Design, when everybody designs: an introduction to design for social innovation*. MIT Press, Cambridge
- Martínez-Luna J (2009) *Eso que llaman comunalidad (Colección). Culturas Populares*, CONACULTA/Secretaría de Cultura, Gobierno de Oaxaca/Fundación Alfredo Harp Helú Oaxaca, AC, Oaxaca
- Martínez-Luna J (2016) *Cocinamiento y comunalidad. Bajo El Volcán*, vol 15. Benemérita Universidad Autónoma de Puebla, México, pp 99–112
- Medina-Melgarejo P (2015) *Pedagogías insumisas. Movimientos político-pedagógicos y memorias colectivas de educaciones otras en América Latina*. Universidad de Ciencias y Artes de Chiapas, Centro de Estudios Superiores de México y Centroamérica/Educación para las Ciencias en Chiapas AC/Juan Pablos Editor
- Mignolo WD, Walsh CE (2018) *On decoloniality: concepts, analytics, praxis*. Duke University Press, Durham
- Morris O (2022) How ecovillages work: more-than-human understandings of rentabilidad in Mexican ecovillages. *Sustain Sci*. <https://doi.org/10.1007/s11625-022-01162-7>
- Moulaert F, Martinelli F, Swyngedouw E, Gonzalez S (2005) Towards alternative model(s) of local innovation. *Urban Stud* 42(11):1969–1990. <https://doi.org/10.1080/00420980500279893>
- Naylor L (2022) Solidarity as a development performance and practice in coffee exchanges. *Sustain Sci*. <https://doi.org/10.1007/s11625-022-01148-5>
- Piccardi EG, Barca S Jin-jian-azadi (2022) Matristic culture and Democratic Confederalism in Rojava. *Sustain Sci*. <https://doi.org/10.1007/s11625-022-01099-x>
- Pleyers G (2019) *Movimiento Alterglobalización*. In: Kothari A, Salleh A, Escobar A, Demaria F, Acosta A (eds) *Pluriverso: un diccionario del posdesarrollo*. Icaria, pp 343–346
- PromediosMexico (2013) *Entrevista a Raúl Zibechi, la experiencia de la escuela zapatista*. <https://www.youtube.com/watch?v=ydkxUIBkhm4>. Accessed 07 Feb 2021
- Ramose MB (2015) *Ubuntu*. In: D'Alisa G, Demaria F, Kallis G (eds) *Degrowth: a vocabulary for a new era*. Routledge, New York, pp 212–214
- Romero R (2019) Los Caracoles Zapatistas. *La Jornada*. <https://www.jornada.com.mx/2019/08/17/opinion/015a2pol>. Accessed 9 Sept 2021
- Saha A, Kasi E (2022) Mapping self-help groups (SHGs) as growth models for post-development: an ethnographic enquiry from India. *Sustain Sci*. <https://doi.org/10.1007/s11625-022-01171-6>
- Schöneberg J, Haudenschild D, Darvishi H, Momeni S, Ziai A (2022) The many faces of post-development: alternatives to development in Tanzania. *Sustain Sci*, Iran and Haiti. <https://doi.org/10.1007/s11625-022-01164-5>
- Seyfang G, Longhurst N (2013) Desperately seeking niches: grassroots innovations and niche development in the community currency field. *Glob Environ Chang* 23(5):881–891. <https://doi.org/10.1016/j.gloenvcha.2013.02.007>
- Seyfang G, Smith A (2007) Grassroots innovations for sustainable development: towards a new research and policy agenda. *Environ Polit* 16(4):584–603. <https://doi.org/10.1080/09644010701419121>
- Small MF (1999) *Our babies, ourselves: how biology and culture shape the way we parent*. Anchor Books, New York
- Smith A, Stirling A, Berkhout F (2005) The governance of sustainable socio-technical transitions. *Res Policy* 34(10):1491–1510. <https://doi.org/10.1016/j.respol.2005.07.005>
- Smith A, Fressoli M, Thomas H (2014) Grassroots innovation movements: challenges and contributions. *J Clean Prod* 63:114–124. <https://doi.org/10.1016/j.jclepro.2012.12.025>
- Smith A, Fressoli M, Abrol D, Arond E, Ely A (2017) *Grassroots innovation movements*. Routledge, London. <https://doi.org/10.4324/9781315697888>
- Solis-Navarrete JA, Bucio-Mendoza S, Paneque-Gálvez J (2021) What is not social innovation. *Technol Forecast Soc Chang* 173(1):50. <https://doi.org/10.1016/j.techfore.2021.121190>
- Souza MJLD (1995) O território: sobre espaço e poder, autonomia e desenvolvimento. In: *Geografia: conceitos e temas*, vol 353. Bertrand Brasil, Rio de Janeiro, pp 77–116
- Svampa M (2012) *Pensar el desarrollo desde América Latina*. In: Masuh G (ed) *Renunciar al bien común: Extractivismo y desarrollo en América Latina*. Mardulce, Buenos Aires, pp 17–58
- Toledo VM, Garrido D, Barrera-Basols N (2013) Conflictos socioambientales, resistencias ciudadanas y violencia neoliberal en México. *Ecología Política* 46(46):115–124
- Ustyuzhantseva OV (2015) Institutionalization of grassroots innovation in India. *Curr Sci* 108(8):1476–1482
- Veltmeyer H, Petras J (2015) *El neoextractivismo: ¿Un modelo posneoliberal de desarrollo o el imperialismo de siglo XXI*. Crítica, México
- Villoro L (2015) *La alternativa: perspectivas y posibilidades de cambio*. Fondo de Cultura Económica (FCE), México
- Walsh C (2003) *Introducción. Lo pedagógico y lo decolonial. Entretejiendo caminos*. In: Walsh C (ed) *Pedagogías decoloniales. Prácticas insurgentes de resistir, (re)existir y (re)vivir*. Tomo I (Serie Pens). Editorial Abya-Yala, Quito, Ecuador, pp 23–68
- Zibechi R (2007) *Autonomías y emancipaciones: América Latina en movimiento*. Editorial Quimantú, Santiago de Chile
- Zibechi R (2012) *Territories in resistance: a cartography of Latin American social movements*. AK Press, Oakland

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