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

Abstract

The social and environmental failure of successive Western development models imposed on the global South has led to the emergence of 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 barely examined innovation using grassroots innovation as an analytical framework. Here we assess how grassroots innovation may contribute to building alternatives to development using Zapatism in Chiapas (Mexico) as a case study. We pay special attention to 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 Zapatism. We reviewed the academic literature on grassroots innovation as well as literature and other sources on Zapatism 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 realized by the own Zapatistas plays a key role in the everyday construction of Zapatism. 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

32 task as it shall contribute to a better understanding of how such alternatives are imagined, designed

33 and built by grassroots groups, particularly across the global South.

34 **Keywords**: alternatives to education, decolonial pedagogies, EZLN, post-development, social

35 innovation, transitions to sustainability

1. How does grassroots innovation may contribute to building alternatives to development in the pluriverse?

Capitalist reproduction involve 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 are produced through 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 2011; Lang et al. 2013; Zibechi 2007). For example, 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, this issue; Martínez-Luna 2009; Morris, 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 decolonial[2] pedagogies, and relational[3] strengthening to focus on the well-being and sustainability of socioeconomics rather than economic growth (Clarence-Smith and Monticelli, this issue; Escobar 2011; Esteva 2019; Medina-Melgarejo 2015).

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[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, 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 the divisions between nature and culture, individual and community, and between us and them that are central to the modern, Western ontology" (Escobar 2011: 139).

56 The notion of the "pluriverse" refers to the matrix of alternatives that exist in the world—

57 and particularly across the global South—to the Western development project (Escobar,

58 2012). Therefore, alternatives to development can be seen as paths to the pluriverse

59 (Kothari et al. 2019b). The pluriverse is underpinned by the huge cultural diversity that

60 characterizes our species and can be found in any cultural domain. An early example of the

61 pluriverse in practice can be found in the field of parenting and education. Notably in '*Our*

62 *Babies, Ourselves*', Meredith Small (1999) explained how biology and culture shape the

63 way we parent. Her book introduced the new science of ethnopediatrics, which explores

64 why we raise our children the ways we do and suggest that we reconsider our culture's

65 traditional views on parenting. The message is clear: There is not a single way of parenting,

66 nor a better one, and it is definitively not the Western one. In a more recent contribution,

67 Dieng and O'Reilly (2020) present feminist parenting perspectives from Africa and beyond.

68 Their anthology's main contribution is to broadcast reflections and experiences that

69 emanate primarily from voices that are often overlooked, even by global feminist

70 discourses: those of African women (and men), living on the continent or in the diaspora,

71 and from others born and raised in the global South. In doing so, these authors aim at

72 (re)claiming parenting as a necessarily political terrain for subversion, radical

73 transformation and resistance to patriarchal oppression and sexism. These insights call for

74 acknowledging, embracing and fostering the diversity of cultural perspectives that are

75 found worldwide in relation to every single aspect of social life.

76 The diversity of cultural perspectives naturally present in the world—including the

77 pluriverse of non-Eurocentric perspectives—is not recognized by hegemonic institutions

78 such as the United Nations, however. For instance, the Sustainable Development Goal 4

79 (SDG 4) is the education goal and aims to "ensure inclusive and equitable quality education

80 and promote lifelong learning opportunities for all". It sounds like good intentions, like all

81 other SDGs. However, from a post-development perspective it is very problematic to see

82 education from a single, universal viewpoint, which is the Western mainstream

83 understanding of what education shall be. The modern, Western ontology assumes the

84 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, which is materialized and imposed worldwide by the development agenda (Escobar 2011). This is the vision behind 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".

As noted, the pluriverse has a direct resonance in 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 Zapatism in South Mexico, *Buen Vivir* in Bolivia and Ecuador, or the Self-Help Groups in rural India (Chuji et al. 2019; Leyva-Solano 2019; Saha and Kasi, this issue), most of which are immersed in sociopolitical projects of struggle and social and ecological justice in the global South (Baronnet and Stahler-Sholk 2019; Lang, 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 for the analysis of innovation 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 with 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 mounting 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; 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 preferrable 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 as "grassroots innovation for the pluriverse" must become a key element of the research agenda on the pluriverse because the radical ruptures that are being put forward to create new worlds beyond capitalist development are imagined, weaved, 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, Zapatism—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.

2. Theoretical Framework: Grassroots Innovation, Post-Development and Zapatism

2.1. 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

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[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".

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.

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 & references	Practices	Processes	Goods or services
Grassroots innovation (Europe, USA) 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; Feola and Nunes 2014; Smith et al. 2014; Smith et al. 2017	- Novel knowledge democratization and citizen science practice, e.g., InSPIRES project. - Socially just cooperative and organizational practices, e.g., women's self-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., opendata.go.ke.
Grassroots innovation networks (India, Africa, China) Grassroots communities and collaborative networks activate innovations that stimulate the creation of new pedagogies,	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	- New combinations of local and traditional knowledge, e.g., principles of permaculture design. - New institutional designs for	- Adaptation of bicycle plow for weeding, hoeing and fertilizer application. - Hand Operated Water Lifting Device. - Groundnut Digger. - Paddy Thresher. - Tree Climber. - Biomass Gasification System.

products, and processes (Gupta 2006, 2012).	collaborative practices, e.g., Grassroots Innovations Augmentation Network (GIAN).	reduction of transaction costs, e.g., tracking and registration of patents.

174 None of the main theoretical strands on grassroots innovation are primarily concerned with

175 radical, bottom-up innovations aimed at creating alternatives to development. There are

176 several recent studies on innovation realized by grassroots groups that seek to create radical

177 ruptures with the dominant capitalist rationality (e.g., Apostolopoulou et al. 2022; Boyer

178 2015). At the same time, the academic literature on post-development, alternatives to

179 development and the pluriverse has barely focused on the analysis of innovation *per* se,

180 even though innovation is central to the creation of radically new societies. Rather, this

181 literature includes many studies on issues that are related to innovation—often using

182 concepts like creation, design, coproduction, self-organization, autonomy, alternatives,

183 revolutionary, and so forth—, but without a fine-grain analysis of innovation and its role.

184 All in all, we identify two major research gaps in relation to innovation in the literature of

185 post-development, alternatives to development and the pluriverse: (1) we know relatively

186 little about how innovations may unfold and contribute to the design and construction of the

187 pluriverse by grassroots groups, particularly across different contexts of the global South,

188 partly because there are few empirical studies concerned with the analysis of innovation;

189 and (2) we lack a specific conceptual-theoretical framework for innovation in this literature

190 and a single appropriate term for this type of innovation—e.g., "grassroots innovation" or a

191 similar one— has not been consistently used (Maldonado-Villalpando and Paneque-Gálvez

192 2022).

193 A relevant issue that may arise is whether the existing theoretical framework of "grassroots

194 innovation" is well-suited to analyze the innovation that is realized by grassroots in their

195 designs for the pluriverse[5], considering that is has not been used for this purpose (see for

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196 instance recent reviews by Hossain 2016, 2018, and Maldonado-Villalpando and Paneque-
197 Gálvez 2022). Some authors may argue that since this framework has been mostly
198 developed by authors from the global North and it is therefore embedded within a Western
199 worldview, it may be unsuitable to explain the radical breaks with the capitalist
200 development rationality that are the basis of alternatives to development in the pluriverse,
201 which are often embedded in indigenous cosmologies. We argue that, rather than
202 dismissing altogether this framework, it would be preferable to adapt it and tailor it to the
203 case of alternatives to development. We see several advantages to this approach. First, the
204 term "grassroots innovation" is short, clear, and marks unequivocally the agency of those in
205 charge of the innovation, which is something usually neglected by the conventional,
206 Western economic views on innovation (Solis-Navarrete et al. 2021). Second, although
207 most grassroots innovation initiatives across the global North are less radical[6] than their
208 counterparts in alternatives to development across the global South, there are many
209 valuables lessons that can be taken from the current literature on grassroots innovation.
210 Third, using the same term than that used already in transformative contexts of the global
211 North may allow for establishing a more fruitful dialogue, learning spaces and alliances
212 across sites, and to carry out comparative studies across different geographical contexts.

213 There are arguably difficulties to employ the concept "grassroots innovation" in the
214 analysis of innovation within the literature of post-development, alternatives to
215 development and the pluriverse. A key problem is that this term has seldom been used
216 when innovation is analyzed in this literature. However, we posit that this limitation can
217 been circumvented by digging into this literature not just for direct but mostly for indirect
218 cues on innovation realized by grassroots groups. In addition, we suggest it is crucial to
219 produce empirical studies on the innovations carried out by grassroots groups engaged in
220 the everyday design and construction of alternatives to development. Such studies, in turn,
221 will allow for the design of an appropriate theoretical framework of grassroots innovation
222 for the pluriverse.

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44 [6] It is important to note here that many of the experiences analyzed using the framework of grassroots
45 innovation in the literature, both in the North and the South, seek to reform public policies and the negative
46 outcomes of current institutions without seeking to radically transform the workings of society.

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

240 **2.2. Post-development studies and grassroots innovation**

241 Post-development studies focused initially on the deconstruction of both the dominant and
242 the alternatives *of* development discourses, moving on to studying alternatives *to*
243 development imagined—and sometimes enacted and materialized—by social movements,
244 peasant organizations or indigenous peoples as forms of resistance to the extractivist,
245 neocolonial and patriarchal project of modern capitalism (Franzen, this issue; Gudynas
246 2012; Piccardi and Barca, this issue; Svampa 2012). The current debate in Latin America
247 and other regions of the world is focused on post-development and its articulation with the
248 study of different alternatives to development as pluriversal paths; for example, intellectual
249 projects such as post-extractivism, post-growth, post-patriarchy, post-colonialism, or
250 transmodernity (Escobar 2012; Kaul et al. this issue; Naylor, this issue). These alternatives
251 are closely related to the radical critiques of many indigenous societies as they are not

252 embedded in the ideology of progress and transcend the Western development project, thus

253 having the potential of relational transformations toward communal autonomy and ethics

254 beyond market exchange (Demaria and Kothari 2017; Gudynas 2018; Loh and Shear, this

255 issue).

256 The manifestation of a transformative alternative may occur at several levels (Villoro 2015:

257 19): (1) at the level of the State it opens the dilemma of gradual, moderate change vs

258 radical, fast-paced change or revolution, (2) at the level of society through enabling people

259 to higher levels of participation that enhance democracy, (3) in culture it may unfold by

260 embracing a plurality of cultures, i.e., multi or interculturalism, (4) at a cosmological level

261 it may be expressed by the idea of the relativity of space-time, (5) at the religious or sacred

262 level it may occur by the acceptance of multiple faiths and beliefs. Any alternative to

263 development creates new radically different societal designs that produce new outcomes at

264 the levels mentioned to a lesser or greater extent. As we have argued before, these radical

265 societal transformations depend upon grassroots innovation which are often embedded in

266 non-Western cosmologies.

267 Some empirical examples found through collective strategies or initiatives that are aimed at

268 the transformation and improvement of grassroots communities are the solidarity exchanges

269 in the autonomous rebel zones of Mexico, the matristic culture in Rojava, *Buen Vivir* as a

270 bottom-up of transformation based on indigenous worldviews, the itinerant schools of the

271 Landless Workers Movement of Brazil, or *La Via Campesina* (Barbosa 2013; Barkin 2018;

272 Lang, this issue; Piccardi and Barca, this issue). Alternatives to development are

273 characterized by several features, e.g., the suppression of hierarchies and anti-

274 patriarchalism, conviviality and communality, care for life-at the center, spirit of

275 sufficiency and simplicity, reciprocity and solidarity, autonomy through self-government,

276 direct participation, and defense of the territory to live well (Barkin 2019; Esteva 2002,

277 2014; Kothari et al. 2019a; Martínez-Luna 2016; Schöneberg et al. this issue). Likewise,

278 most alternatives to development have high in their political agenda issues concerning

279 environmental sustainability like de-carbonization, de-capitalization, degrowth or post-

280 growth, decoloniality, and eliminating corruption from socio-political institutions through
281 radical democracy (Gills and Hosseini, this issue).

2.3. Grassroots innovation in Zapatism and autonomous Zapatista education

283 The uprising of the National Liberation Zapatista Army (EZLN by its Spanish acronym) in
284 1994 was made up of indigenous *Tzotzil, Tzetzal, Chol, Tojolabal and Mame* communities
285 of Mayan descent. This process has evolved and matured since then, crystalizing in what is
286 known as Zapatism, which is recognized as an alternative to development by academics and
287 social activists (Escobar 2017; Leyva-Solano 2019). The Zapatistas have promoted and
288 experimented with novel initiatives as an expression of the movement of struggle and
289 territorial autonomy (EZLN 2015). These include, for example, self-government through
290 the implementation of the seven principles of *Mandar Obedeciendo* [governing by
291 obeying][7] (EZLN 2013: 22). The reappropriation of geographic space has led to new
292 autonomous territorial delimitation[8] through political organization at three levels of
293 coordination: (1) the Zapatista support base communities, (2) Rebel Autonomous Zapatista
294 Municipalities, and (3) *Caracoles*[9] [literally translated in English as "snails"] and the
295 *Juntas de Buen Gobierno* [*Good-Government Councils*] (EZLN 2005, 2013; González-
296 Casanova 2009a). In 1994, in response to the demands of struggle that the State was unable
297 or unwilling to resolve, the Zapatista indigenous and peasants decided to implement
298 autonomous Zapatista education as an alternative to the official educational system, which
299 was then built and implemented across Zapatista territories based on novel practices and
300 pedagogies in multiethnic contexts (Baronnet 2015; Baschet 2018a, 2018b).

301 In addition to looking for grassroots innovation in Zapatism, we examine its occurrence
302 within the autonomous Zapatista education because of its relevance in the defense of life
303 and the construction of collective and territorial autonomy. Also, because it is an alternative

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53 [7] Seven principles of the Zapatista movement: To serve, not to be served; to represent, not to supplant; to
54 build, not to destroy; to obey, not to command; to propose, not to impose; to convince, not to defeat; and to go
55 down, not up (EZLN 2013: 22).
56 [8] The autonomous territorial delimitation is made up of support base communities and municipalities with
57 new names because they are not officially recognized by the Mexican State.
58 [9] Regional coordinating instances of self-government with its Good-Government Councils.

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304   to the official educational system that goes beyond formal education and the classroom in
305   the Zapatista support base communities. These communities create new notions,
306   knowledge, practices, norms, pedagogies and teaching-learning methods in contexts of
307   ethnic interculturality that are key to the (re)production of the cultural and political
308   resistance project of Zapatism (Barbosa 2020; Baronnet 2011, 2013; Baronnet and Stahler-
309   Sholk 2019).

310   As with other alternatives to development, scholars of Zapatism have barely evaluated
311   innovation *per se* either in Zapatism or in autonomous Zapatista education. However, many
312   authors have acknowledged many distinct, new ideas, processes and outcomes that have
313   emerged from Zapatism, which can be regarded as grassroots innovation following the
314   rationale we presented above. Nonetheless, the contributions of this type of innovation
315   toward more just and sustainable ways of life in contexts of political struggle, resistance
316   and autonomy with respect to neoliberal development remains mostly unexplored in
317   Zapatism. Furthermore, grassroots innovation does not seem to have been evaluated in the
318   design and materialization of alternatives to education in the global South. Given the
319   potential of alternatives to education in the design and everyday construction of alternatives
320   to development, in this paper we evaluate the role that grassroots innovation can play in the
321   case of autonomous Zapatista education. Specifically, we seek to answer this research
322   question: *How can grassroots innovation in autonomous Zapatista education contribute to*
323   *the everyday construction of Zapatism?* After answering this question, we will reflect upon
324   the potential role of grassroots innovation for the design and construction of other
325   alternatives to development and pluriversal paths.

326   **3. Literature review, participatory action-research and ethnography**

327   We first analyzed innovations in the design and everyday construction of Zapatism. To do
328   this we reviewed academic literature and various documentary sources on autonomous
329   Zapatista education. We applied the search, assessment, synthesis, and analysis framework
330   to the literature selected for its quality and relevance (Grant and Booth 2009). We searched
331   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 Zapatism 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. It 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 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 that are faced by 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*.

3.1. Case Study: Zapatism and Autonomous Zapatista Education in Chiapas, Mexico

As part of the pluriverse of alternatives to education 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 Zapatism in every community (EZLN, 2013; Lang, 2015; Zibechi, 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].

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

Insert Fig. 1

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

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.

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[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-moises/.

387 Students are taught to count, read, write, and talk about issues that concern their daily life,

388 including the EZLN's struggle. The study community is made up of five Tzeltal families

389 from the municipality of Oxchuc—in the highlands of Chiapas—and has several wooden

390 houses, a school, an autonomous health post, a chapel, corn plots, coffee plantations, a

391 water spring, and a graveyard. The school is attended by 13 boys and 8 girls aged 3–14,

392 with a temporary teacher assigned by the community. They attend school every morning

393 from Monday to Friday and spend the afternoons with their parents or grandparents helping

394 them with agricultural and domestic activities (e.g., fetching water and firewood, working

395 in the family's cornfield). Their main recreational activities are swimming in the river,

396 fishing and climbing trees to harvest fruits[11].

397 The political and military contexts across the study area are complex and shape not just

398 Zapatism and its autonomous educational system, but also the possibilities for doing

399 fieldwork. The entire Zapatista territory is surrounded by the Mexican army. Its presence

400 can be seen from the hilltop of the Tzeltal indigenous community we conducted the study.

401 The Zapatista territory is discontinuous (Souza 1995) so Zapatistas, supporters and former

402 Zapatista militants coexist. Paramilitary groups funded by local ranchers and possibly the

403 Chiapas State government, and government social programs are counterinsurgency

404 strategies against the Zapatista movement (Aquino Moreschi 2013; López y Rivas 2013). In

405 addition, as elsewhere in Mexico, the territories inhabited by Zapatista endure the presence

406 of narco cartels. It is unclear to what extent the organized crime groups that try to displace

407 Zapatista and non-Zapatista indigenous communities from their territories are financed by

408 the State.

409 **4. How can grassroots innovation in autonomous Zapatista education contribute to**

410 **the design and everyday construction of Zapatism?**

411 The construction of the autonomous educational and pedagogical processes after almost

412 thirty years has been both gradual and radical. The transition of autonomous education has

413 two crucial moments: the configuration of the autonomous educational system (1997) and

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69 [11] Information collected by participant observation, 2019.

414   the creation of *Caracoles* and municipalities (2003). We identify and analyze the following

415   innovative practices of autonomous Zapatista education: (a) Practices of educational

416   autonomy, for example, the co-design of guides and textbooks, self-organization and self-

417   management of educational projects and materials; (b) Political-pedagogical practices of

418   resistance, supported by teaching-learning inside and outside of the classroom through

419   political-militant practices of the Zapatista movement; and (c) Autonomous teaching-

420   learning practices, for example, regarding the needs of community life and Zapatista

421   territorial political autonomy. Below we present the main characteristics and several

422   examples of the grassroots innovations we have identified in the literature review, during

423   fieldwork and through complementary audiovisual sources on autonomous Zapatista

424   education.

425   **4.1. Practices of educational autonomy**

426   The practices of educational autonomy are constituted in both new and reimagined forms of

427   self-organization and self-management. For example, each of the *Caracoles* through the

428   Good-Government Councils and the education commissions decide in assembly what type

429   of educational projects will be collectively self-managed using local and international

430   resources, and how they will be implemented in the autonomous municipalities through

431   new regulations that guide educational practices as alternatives to official education in

432   Mexico (Table 2).

433   **4.2. The political-pedagogical practices of resistance**

434   The political-pedagogical practices of resistance to capitalism and the neoliberal State are

435   constituted by the diversity of Mayan indigenous, traditional, and ideological knowledge of

436   the Zapatista struggle movement (Table 2). These practices have new and traditional

437   elements whose central axis is the transmission and generation of practical knowledge in

438   the classroom and the community to solve the needs of daily life and strengthen individual

439   and collective autonomy. Zapatista resistance pedagogies do barely rely on written

440   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 this according 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 way of doing politics and a new political culture is a fundamental learning[12].

4.3. 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 nowadays 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, exposes the issue about "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

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

466   understand our world and within our Zapatista struggle an autonomous

467   education started from the heart and in the thinking of our people[13].

468   The novel practices of educational autonomy, political-pedagogical resistance, and

469   autonomous teaching-learning in the *Caracol "La Garrucha"* and four autonomous

470   municipalities—including that of the study community—are based on the objective of

471   "sharing, learning together and from everyone". Through coordination between Zapatista

472   communities and the NGO Enlace Civil (1995), they implemented the project called

473   *Semillita del Sol* [Little Seed of the Sun] and is structured in three levels. In the first level

474   students learn to read, write, and draw. In the second they learn about the Zapatista

475   demands while in the third they study the public statements issued by the Zapatista to

476   communicate their goals, their efforts to construct autonomy, and the opposing social-

477   political strategies of the government. In the *Caracol "La Garrucha"*, Zapatistas are more

478   interested in learning about trade, deprofessionalization and decision-making in

479   Autonomous Government, the self-management of projects demanded by the support bases

480   (indigenous communities) in the *Caracoles*, and the building of autonomy and Zapatista

481   territorial control[14].

482   **4.4. Further insights from the field**

483   In the community we have done fieldwork, the dynamics of knowledge and social learning

484   are generated from the construction of the discourse of autonomy and resistance of the

485   struggle movement, the defense of the territory and its Tzeltal culture. The autonomous

486   educational, political-pedagogical practices of resistance and innovative teaching-learning

487   identified at the Zapatista movement level, the *Caracol "La Garrrucha"* and the

488   indigenous Tzeltal community where we did fieldwork, are based on the daily construction

489   of autonomy (see Table 2). Also, they are not limited to the educational promoter. Rather,

490   they involve the participation and interaction of parents and grandparents with the children.

491   Likewise, the adults, teenagers and children of the community create protest art and share

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79 [13] Transcript of video entitled: Los Pueblos Zapatistas y La Otra Educación II (Agencia Prensa India 2011).

80 [14] Field diary entries about conversations with a former educational advocate from the study community the

81 first week of January 2020.

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 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

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[15] It is 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.

517   have to learn our history how it is; they have to learn everything that concerns

518   us, they have to learn to write and count, and they also have to learn their

519   Tzeltal language[17].

520 The novel practices analyzed in autonomous Zapatista education are innovative to the

521 extent that they generate profound transformations in power relations that are more

522 horizontal than vertical, the resolution of conflicts between Zapatistas and non-Zapatistas,

523 the improvement of life conditions, the reappropriation of land, and the enhancement of

524 environmental management and defense of territory. In addition, Zapatista communities,

525 municipalities, and Good-Government Councils have implemented initiatives and

526 autonomous educational projects oriented toward the construction of self-sufficiency, self-

527 management, and intercultural self-organization. This allows them to inhabit their

528 autonomous territory in harmony with nature and ancestral local knowledge. Zapatistas do

529 not expect the Mexican State to grant them quality of life and they are independent of the

530 national and international markets.

531 **Table 2** Innovative autonomous educational practices and transformations by political-organizational level of
532 Zapatism.
533

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 *Caracoles* 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[18]. - The reinvention of the teaching function (e.g., de-specialization and de-professionalization) and its reinvention of an 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 Cuxlejaltic", 2019).	- Inclusive and bilingual education. - Expansion of skills and abilities to solve human needs, environmental problems, and territorial conflicts. - Collective work and construction of housing, schools, clinics.
Political-pedagogical practices of resistance Innovative learning	- Areas and methods of cross-cultural knowledge transmission and	- New spaces for political exchange of knowledge and multiethnic learning,	-Co-production of knowledge and learning, e.g., from age 13 they	- More equitable distribution of power relations between the

86 [17] Interview with ex-promoter of education and health, July 2019.
87 [18] Is a letter describing the main principles of autonomous Zapatista education. Retrieved from https://serazln-
88 altos.org/habia_una_vez_una_noche_cast_tsotsil.pdf

91   22
92

methods and mechanisms in *Escuelita* in contexts of interculturality, e.g., political training from primary school, autonomous educational pedagogies are key in the reappropriation of territory.	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.	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.	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.	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, *Caracoles* 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 *Escuelita*, 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 *Escuelita* and the milpa. - Training for promoters in two centers, one in the *Caracol La Garrucha*, and the other in the *Centro Compañero Manuel in La Culebra*, 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.	- They exercise indigenous rights without the presence of the State. - Decentralization, radical democracy, and autonomous government.

534

5. Reflections upon the potential of grassroots innovation in autonomous Zapatista education and Zapatism

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* [*Governing by Obeying*] (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).

547 Regarding the materialization of innovations in autonomous education by its promoters,
548 they are not limited to teaching-learning in the community schools. This is because
549 pedagogies and didactics have been collectively created to meet needs, address problems
550 and continue the search for radical changes through more horizontal relations in contexts of
551 ethnic diversity and direct democracy (Villoro 2015; Baronnet 2013, 2015, 2019).

552 We found that, in the *practices of educational autonomy*, grassroots innovation is
553 manifested in the defense, reappropriation, and management of territorial autonomy. For
554 instance, when educational promoters teach children and teenagers about Zapatista
555 territorial political organization and autonomy. The new territorial limits produce new
556 knowledge, learning and pedagogies from the support base communities and schools
557 (Aguirre-Rojas 2007; González-Casanova 2009b). *Teaching-learning practices* are linked
558 to traditional and local knowledge, and transformative learning of the Zapatista movement.
559 These are, for example, artistic practices such as the creation of murals with natural
560 materials, poems of rebellion, coordination of cultural events, and documentaries. The
561 *political-pedagogical practices of resistance* are strategies created collectively as political
562 acts of struggle and learning spaces, which aim to go beyond alternatives to education.
563 These include free apprenticeships, teaching of trades and knowledge in service of
564 indigenous communities and deprofessionalization (Barkin and Sánchez 2019; Esteva
565 2014; Pinheiro-Barbosa 2013, 2015).

566 The innovative practices identified in autonomous education are linked to the reproduction
567 of traditional knowledge and multiethnic learning and are strengthened by the collective art
568 of resistance as a source of creative liberation for children and teenagers. Likewise, the
569 proposal of autonomous design by Escobar (2017), where "every community practices the
570 design of itself", applies to the new designs and conceptions of autonomous education, but
571 also of all areas of the Zapatista movement that have been driven in contexts of autonomy
572 and resistance. For this reason, the innovative educational practices found in the Zapatista
573 autonomous collective design is key in the production and management of knowledge and
574 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 2015; Escobar 2017).

Learning and knowledge production are essential in grassroots innovations, especially on sustainability and 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 integrated 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 symbols that unite 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; 2019b).

When analyzing grassroots innovations in autonomous Zapatista education, we find that Baronnet et al. (2015, 2019) and Barbosa (2013, 2015, 2020) infer about 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 Zapatism 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 cosmovision.

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).

6. 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 Zapatism—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 Zapatism. 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 historically present in the Mexican official 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 the indigenous Mayan cosmovision, the dialogue of intercultural knowledge in the assemblies and the Good-Government

630 Councils in the Zapatista *Caracoles*, and a more horizontal redistribution of power from the
631 grassroots. We have also observed that the spread of grassroots innovations present in
632 Zapatism and its autonomous education fosters new and expanded networks of solidarity
633 and anti-systemic resistance among national and international social movements and
634 collectives (e.g., adherents to the adherents to the Sixth Declaration Of The Lacandon
635 Rainforest of EZLN and sympathizers anywhere on Earth), thus contributing to healthier,
636 more just, ethical, and ecologically sustainable ways of life that enrich the pluriverse. In
637 addition, we have unveiled new collective designs and educational-pedagogical
638 conceptions in the innovative autonomous educational practices. These practices have
639 helped propel Zapatistas as new historical-political subjects that are better equipped not just
640 to resist the neoliberal development project orchestrated by the Mexican State in alliance
641 with other governments, multi-lateral and financial institutions, but to actively transform
642 and improve their reality. In imagining, designing and materializing their own world
643 through a large and diverse array of radical epistemic, ontological and political building
644 blocks, Zapatista's grassroots innovations are key for the everyday construction of
645 Zapatism as part of the pluriverse.

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

659   Finally, we suggest that using grassroots innovation as a conceptual lens can be useful for

660   analyzing the autonomous societal designs of grassroots groups to transition toward more

661   socially and ecologically just societies. Future research should be oriented towards

662   deepening the theoretical conceptualization of grassroots innovation for the pluriverse and

663   further assessing its potential in specific experiences of alternatives to development. Such

664   efforts would in our view contribute to a better understanding of how such alternatives are

665   designed and constructed, and how they can lead to large-scale societal transformations and

666   transitions to just sustainabilities, particularly in contexts of the global South where most of

667   such alternative are flourishing. In addition, it would be important to create new

668   methodological approaches for a more consistent identification and operationalization of

669   the analysis of grassroots innovation in empirical case studies. This methodological

670   improvement would allow for undertaking comparative analyses across different pluriversal

671   paths which, in turn, shall improve the construction of a theoretical framework of

672   grassroots innovation for the pluriverse.

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