



Popular engineering in the state of Amazonas: work, territory and sustainability

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Abstract. Popular engineering realizes that there is no single development model, that the world is diverse, with different cultures, and different realities, and that it is necessary to think of plural solutions. Among the guiding principles of popular engineering practice are: popular education; self-management; social and environmental justice; recognition and dialogue between different popular, traditional, and academic knowledge (Alvear et al., 2020). In the collective sphere, the prescription of collective work takes the form of work coordination, in contrast to effective collective work, which generally moves significantly away from coordination, taking the form of cooperation (Dejours, 2022). The territory has become a new frontier for the ergonomist who engages in a “making of a milieu” (Robert & Béguin, 2024). The territory is a terrain of actors capable of engaging together, of cooperating to develop and implement solutions (Du Tertre, Vuidel & Pinet (2019). The territory is the place of “belonging”, according to Zaoual (2003, 2006) the “symbolic site of belonging” is a space of practical beliefs adjusted to local circumstances. Its transversality articulates the culture of the actors in the situation, with society and the environment. Therefore, this research aims to collectively co-construct territorial solutions based on the constitution of territorialized work systems in the search for new economic, social and environmental trajectories in three socially vulnerable associations in the state of Amazonas. Regarding methodology, the ergonomic and social interventions presented are being developed in three municipalities (Manaus, Itacoatiara, and Silves) in the state of Amazonas/Brazil and started in the second half of 2022. The interventions come from a perspective of transforming the working conditions of the groups advised through the centrality of the work of the ergonomics of the activity (Daniellou, 2004; Falzon, 2007). The methodology of ergonomic action originated in French-language ergonomics (Laville, 2007), with a special focus on activity-oriented approaches (Daniellou & Rabardel, 2005), which seek to favor consideration of real work, with a dual objective of knowledge production and action in the world aligned with the transformation of work (Guérin et al., 2001). Regarding the collection of information and the techniques and tools used in interventions, the following stand out: the ergonomics of the activity through Ergonomic Work Analysis (Guérin et al., 2001; Wisner, 1994) through semi-structured interviews, non-structured interviews structured, direct observation; participant observation, simultaneous verbalizations, verbal interactions, document analysis and self-confrontation interviews. The moments of meetings and feedback on experiences followed Schon's approach to reflection in action (1997, 2000) and participant observation (Ghasarian, 2002; Malinowski, 1976). As for the moments as sources of data collection, these occurred in four types: (1) initial collection of information; (2) deepening work-related knowledge; (3) construction of a territorialized work system; and (4) implementation of a means. The intervention in Manaus and Itacoatiara takes place with two associations of recyclable material collectors and the intervention in Silves takes place with a sustainable extractivist association for



the development of products (soaps, candles, oils, among others) from species native to the Amazon region. In Manaus, there is also an intervention with two associations of organic producers who have properties close to Manaus and sell them at organic fairs in the city. All associations have as common characteristics the predominance of associated women, mixed race, of advanced age (over 45 years old), and with links to traditional and/or “ribeirinhas” populations. Among the main results of ergonomic and social interventions are the identification of initiatives related to production, marketing, and consumption in each territory; field visits to understand the scope of the work, the current difficulties faced, and how these associations interact with other actors in the territory. A survey of the system of actors in the territories was carried out and actions were implemented to bring associations and different consumers closer together. It is observed that ergonomic and social interventions adopt reflective practice, allowing the construction of knowledge and “savoir-faire” based on cooperation “based on debates” (Mollo & Nascimento, 2016) so that associations learn through experience. It is observed that the interventions seek new sustainable economic models through the collective co-construction of new sources of income for these associations, providing decent work, valuing the territory, culture, and cooperation (Du Tertre, 2013, Zaoual 2003, 2006, Robert & Béguin, 2024). Among the limitations of the study, the possibility of comparing the ergonomic approach used stands out, considering that ergonomics in the territory is still in an embryonic phase of interventions around the world. In this scenario, work is not just a monetary resource, on the contrary, work is an important dimension that makes life possible in these territories and that enables the transition of these populations within a process of economic, social, and environmental transformation through work.

Keywords: Popular engineering, Ergonomics, Work.

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