



Historical aspects curriculum of the Degree in Rural Education — Natural Sciences and Mathematics at Federal University of Maranhão: weaving reflections

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Abstract: The Degree Course in Rural Education at Federal University of Maranhão (UFMA) began its activities in 2009 and was institutionalized in 2014. In order to encourage discussions, as well advance in the consolidation of this degree, we ask ourselves what the guiding principles of the curriculum are evident in the Pedagogical Political Project (PPP) of the Degree Course in Rural Education - Natural Sciences and Mathematics, at UFMA. Guided by this question, we bring a history of the creation of the course, we present the general aspects of its curricular organization and, finally, we weave reflections, in the hermeneutic perspective of Paul Ricoeur (1987), about the guiding principles of the curriculum that is evidenced in the PPP, namely: Education as a political act of social transformation; Teacher training in an emancipatory perspective and Alternation as a space for reflection-action-reflection. The interpretative exercise points to the need to broaden the debate regarding training by area of knowledge and interdisciplinarity in your curriculum.

Keywords: Rural Education. Training Teacher. Training by Area of Knowledge.


Aspectos históricos y currículo de la Licenciatura en Educación Rural — Ciencias Naturales y Matemáticas de la Universidad Federal de Maranhão: tejiendo reflexiones

Resumen: La Licenciatura en Educación Rural de la Universidad Federal de Maranhão (UFMA) empezó sus actividades en 2009 y fue institucionalizada en 2014. Para incentivar las discusiones, así como avanzar en la consolidación de esta licenciatura, nos preguntamos cuáles son los principios rectores del currículo que se evidencian en el Proyecto Político Pedagógico (PPP) de la Licenciatura en Educación Rural – Ciencias Naturales y Matemáticas de la UFMA. Guiados por esta pregunta, presentamos la historia de la creación del curso, los aspectos generales de su organización curricular y, finalmente, tejemos reflexiones, en la perspectiva hermenéutica de Paul Ricoeur (1987), acerca de los principios que orientan el currículo evidenciados en el PPP, a saber: la educación como un acto político de transformación social; formación docente en una perspectiva emancipatoria; la alternancia como espacio de acción-reflexión-acción. El ejercicio interpretativo apunta a la necesidad de ampliar el debate sobre la formación por áreas de conocimiento y la interdisciplinaria en el currículo.

Palabras clave: Educación Rural. Formación Docente. Formación por Área de Conocimiento.

Aspectos históricos e currículo da Licenciatura em Educação do Campo — Ciências da Natureza e Matemática da Universidade

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Federal do Maranhão: tecendo reflexões

Resumo: A Licenciatura em Educação do Campo da Universidade Federal do Maranhão (UFMA) iniciou suas atividades em 2009 e foi institucionalizada em 2014. No intuito de fomentar discussões, bem como avançar na consolidação dessa licenciatura, nos interrogamos sobre quais princípios orientadores do currículo evidenciam-se no Projeto Político Pedagógico (PPP) do Curso de Licenciatura em Educação do Campo – Ciências da Natureza e Matemática da UFMA. Norteados por tal interrogação, trazemos um histórico da criação do curso, apresentamos os aspectos gerais de sua organização curricular e, por fim, tecemos reflexões, na perspectiva hermenêutica de Paul Ricoeur (1987), acerca dos princípios orientadores do currículo que se evidenciam no PPP, a saber: Educação como ato político de transformação social; formação docente em uma perspectiva emancipatória e alternância como espaço de ação-reflexão-ação. O exercício interpretativo aponta para a necessidade de ampliação do debate quanto à formação por área do conhecimento e interdisciplinaridade no referido currículo.

Palavras-chave: Educação do Campo. Formação Docente. Formação por Área de Conhecimento.

1 Introduction

This article aims to identify and analyze which guiding principles of the curriculum constitute the Pedagogical Political Project³ (PPP) of the Degree Course in Rural Education — Natural Sciences and Mathematics at the Federal University of Maranhão (UFMA).

This course corresponds to a specific proposal for teacher training, still under development in Brazil, aligned with a broader public policy that defines and organizes the Rural Education. The Degree Courses in Rural Education (LEdoCs) constitute the materialization of a demand, at the same time that they are configured as the fruit of the struggle of Brazilian peasants and social movements for an education in/of the countryside (CALDART, 2002). This struggle is part of the confrontation "for [...] civil, social, and political rights, [which have long been denied to rural people], especially [the right to] land associated with dignified living conditions" (BORGES and SILVA, 2012, p. 212), that is, a permanent struggle against the cruel heritage of our colonial and slavery history.

The LEdoCs were conceived with and for rural people⁴ from the contribution and protagonism of social movements acting in this space. Considering the different

³ We use the term Pedagogical Political Project because it corresponds to the title of the document in focus, elaborated in 2014.

⁴ We assume rural people, based on Decree 7.352/2010 (BRASIL, 2010), which defined rural populations as "family farmers, extractivists, artisanal fishermen, river dwellers, agrarian reform settlers, rural wage workers, quilombolas, caiçaras, forest peoples, caboclos, and others who produce their material conditions of existence through work in rural areas".

contexts and "fields", both in geographical, cultural, and social terms existing in Brazil, two basic characteristics were listed for the curricula of LEdoCs, namely: I) the organization by areas of knowledge, providing for a multidisciplinary teaching; and II) the organization by "stages equivalent to regular semesters fulfilled in Alternation Regime between School-Time and Community-Time" (BRASIL, 2008).

In the notices of the Program to Support Higher Education in Degree Course in Rural Education (PROCAMPO) in 2008, 2009 and 2012 (BRASIL, 2008, 2009, 2012), there was a relevant recommendation regarding training by area of knowledge: that these degrees should preferably offer training in the areas of Natural Sciences and Mathematics, given the deficit of teachers with training in these areas in Brazil.

In this sense, it is due to such recommendation of the MEC (BRASIL, 2008, 2009, 2012) and the relevance of these courses in the defense of a conception of science that values and gives visibility to the knowledge of rural people, that of the 44 LEdoCs in operation in the Brazilian Federal Network (LEAL, DIAS, and CAMARGO, 2019), 34 offer training in the areas of Natural Sciences or Life and Natural Sciences, Exact and Natural Sciences and combinations with Mathematics or with Agricultural Sciences (DALMOLIN, 2020). Of these 34 LEdoCs, 3 correspond to degrees in the area of "Natural Sciences and Mathematics" (BRASIL, 2022; MEDEIROS; AMORIM and CARVALHO, 2020), according to the National Register of Higher Education Courses and Institutions — e-MEC⁵ registry and the official portals of the institutions in question. But, only one of them, the LEdoC of the Federal University of Maranhão (UFMA), is located in the Northeast region.

The LEdoC — Natural Sciences and Mathematics (LEdoC — CNM) at UFMA began its operation in November 2009. It was institutionalized in 2014 and already has 12 years of experience under the same Pedagogical Political Project (PPP). However, there are few works that discuss/reflect about its curriculum, guidelines and operation. Thus, it becomes a necessary step to know and reflect on the history of creation and curricular organization of this LEdoC, as well as on the principles that guide its Pedagogical Political Project (PPP). This in order to foster advances in the discussion of teacher education in Rural Education, in the area of "Natural Sciences and Mathematics".

⁵ The e-MEC Registry corresponds to the official database of courses and Higher Education Institutions - IES, regardless of Teaching System, regulated by Normative Ordinance No. 21, of 21/12/2017 (BRASIL, 2022).

Next, we present the methodological trajectory outlined. Subsequently, we present three sections that address, respectively, the history of the course, its curricular organization and the guiding principles that are shown in its PPP. Finally, we present the final considerations.

2 Methodological notes

We take the PPP as a formal document, institutionally assumed, which aims to guide the actions to be developed in a particular course. An official document that carries "political visions of training — of person, citizen and professionals — put in a clear way as an action to be performed, aiming at the effectiveness of the intended" (BICUDO; MOCROSKY and BAUMANN, 2011, p. 125). And, also considering the need to look at the LEdoCs — CNM, especially the LEdoC — CNM of UFMA, we ask ourselves: Which guiding principles of the curriculum are evidenced in the PPP of the Degree Course in Rural Education - Natural Sciences and Mathematics of UFMA?

Seeking a posture of openness, letting ourselves be guided by our questioning (ESPOSITO, 1994), we identified some basic questions, arising from the problem that guided this study. Since we understand that the construction of a curriculum takes place from the moment of the understanding of its demand and context, we have as part of these basic questions: What is the origin of the demand for the course? What is the path taken to make it effective? How was its PPP elaborated? Who were the actors that participated in this process? Why did these subjects opt for the formation in Natural Science and Mathematics instead of only "Natural Science" or only "Mathematics", as it happened in other LEdoCs?

To answer these questions, we organized the history of the course from reports, official documents and other existing records in the Coordination of LEdoC at UFMA. In addition, we considered two semi-structured interviews conducted with significant subjects (BICUDO; MOCROSKY and BAUMANN, 2011), namely: 1) the professor in charge of the Supervision of Rural Education of the Maranhão Education Secretariat (Seduc-MA) during the construction of the Course proposal, who today composes the teaching staff of UFMA (São Luís Campus), Cacilda Rodrigues Cavalcanti; and, 2) the Course Coordinator, while it functioned as a Program, from 2009 to 2014, José de Ribamar Sá Silva, who granted authorization for the disclosure of their speeches and identification.

When analyzing the interviews and other documents cited, in order to answer

the basic questions listed above, "we search for the perspective from which to look at the phenomenon and whatever else comes to meet what we ask" (BICUDO, 2011, p.42). We read the materials successively times, rearrange the events, trying to organize them in a chronological and coherent way. And, through a refiguration and configuration (RICOEUR, 2010) of the texts and interviews, we constructed section 3 of this article entitled "The LEdoC — Natural Sciences and Mathematics of UFMA", striving for a "critical purification, contextualization, identification and differentiation of the various aspects of the speeches"(GHEDIN and FRANCO, 2011, p. 124).

In addition to these basic questions, others have been present in this study. They are the following: How is the curricular structure of the course organized? How is the alternation presented in the curriculum? How are internships and teaching practices articulated? What is the proportion and how is the knowledge of Natural Sciences and Mathematics related to knowledge of general education and of the Human Sciences?

This second group of questions led us to the construction of section 4, called "The Curricular Organization of LEdoC — CNM at UFMA". We resorted, thus, to the PPP of the course, elaborated in 2014 and still in force in the year 2022. And we seek to present an overview of its structure in a descriptive way.

Finally, in section 5, guided by the central question of this study and anchored in the contextualization offered by the previous two sections, from a hermeneutic perspective (RICOEUR, 1987, 2010; TERRA, 2007), we reflect on the guiding principles of the curriculum that are evident in its PPP. This section was entitled "Education, Teacher Training and Alternating Cycle: articulations between guiding principles of the curriculum".

For Paul Ricoeur (1989), interpretation is constituted as a dialectic between explanation and understanding, integrants of a single process, constituents of a hermeneutic circle. This hermeneutic circle or spiral refers to a movement that starts from an understanding by conjecture, which allows us to capture the meaning of the text as a whole in a naive way (RICOEUR, 1989, p. 105). This naive form claims, however, for an explanation, that is, for a structural analysis. And, thus, crossed by the explanation, the comprehension movement closes its circle, having started from a point of conjecture and reached appropriation.

From this perspective, we took the sentence as the text analysis unit

(RICOEUR, 1989) and started with an initial reading of the PPP. Then, we did a critical reading, and both were repeated as many times as we deemed necessary. From these readings, we identified the units of analysis that we believe can contribute to the understanding of what is said in the PPP and, we searched for its appropriation (TERRA, 2007), that is, we searched for the appropriation of the world of the text (RICOEUR, 1987), a way of being in the world that is opened, in this case, from the PPP of LEdoC - Natural Sciences and Mathematics of UFMA.

Moreover, guided by the research question, we constructed three categories that express the guiding principles of the curriculum that are evidenced in the PPP: 1) Education as a political act of social transformation; 2) Teacher training in an emancipatory perspective; and 3) Alternating cycle as a space for reflection-action-reflection. We have chosen, however, to present them in a summarized form, suppressing the units of analysis due to their extension.

3 The LEdoC — Natural Sciences and Mathematics of UFMA

The degree course in Rural Education — Natural Sciences and Mathematics at UFMA began in 2009, as the Program to Support Higher Education in Rural Education (PROCAMPO). However, its demand and construction does not begin on that date, but originates from the struggle and efforts of rural people and social movements seeking to reduce inequality and guarantee basic rights in the state of Maranhão, Brazil.

In Maranhão, the movement for a rural education started in the 1960s. The organization of this movement allowed the concretization of some initiatives directed to this part of the population. Among them, we can mention projects developed by UFMA since 1999, such as the "education projects through PRONERA [National Program for Education in Agrarian Reform], in partnership with the MST — Landless Rural Workers Movement and ASSEMA - Association in Settlement Areas in the State of Maranhão" (UFMA, 2014, p.8).

In the governmental sphere, in 2003, the Coordination of Rural Education, linked to the Maranhão Education Secretariat (Seduc-MA), began to function. However, its constitution did not happen, necessarily, by an effort or real sensibility of the state government in relation to Rural Education. But rather, by requirements to be fulfilled with the International Bank for Reconstruction and Development (BIRD), referring to a Project for Rural Education (CAVALCANTI, Interview, 2019).

Even in the face of the efforts of this Coordination in order to meet the demands and requests of the BIRD, without disregarding the yearnings and needs of the rural people, the constructed project was not implemented. According to the then Coordinator of the Coordination of Rural Education of Seduc-MA, Cacilda Rodrigues Cavalcanti (Interview, 2019), this occurred because the state no longer had the power of indebtedness.

From the agreement with the World Bank, there were the mapping studies carried out and the execution of two State Seminars. But, above all, Seduc-MA remained the approach with social movements and the partnerships signed, because during the execution of these studies and mappings, Seduc-MA:

[...] had already opened a dialogue channel with movements, because of this demand to have a dialogue with the movements, with the secretary of agriculture, with Undime, with the municipalities. So it was too late to turn back, a structure or a demand had already been created in the Secretariat of Education to which the state secretary of education could no longer close its eyes, it was no longer possible, that was already in place (CAVALCANTI, Interview, 2019).

As a result of this approach, of this dialogue channel that was opened and of the work developed by Seduc-MA, in 2004 the I State Seminar on Rural Education took place. In the same year, the State Committee for Rural Education was established, composed of 20 institutions, 10 governmental and 10 non-governmental (CAVALCANTI, 2009, p.4). And, in 2005, the Supervision of Rural Education was made official at Seduc-MA.

At that time, Seduc-MA was already characterized as a secretariat more open to dialogue and had specific policies for the rural area, since the rupture of the State Governor with the Sarney group brought changes to the Secretariat. Soon, new airs allowed unusual achievements for Rural Education in Maranhão.

During its period of operation, among other actions, the Supervision of Rural Education instituted the Support Program to the Rural Family Houses (CFRs) and, from then on, the State began to support these schools financially. This financial support included resources related to the cost of maintenance and the hiring of teachers, through a specific selection process, something unprecedented in the state of Maranhão. Thus, *"[...] for the first time we started to make a selection, in the state, for teachers of the alternating cycle school hired by the State"* (CAVALCANTI, Interview, 2019). This specific selection process was important in order to guarantee the minimum necessary for teaching in the alternating cycle schools, because: *"[...]*

these teachers did not have any link with the schools. Many were volunteers or hired temporarily by some municipalities, or by the school itself. But, without any officialization, without any regime that assured them." (CAVALCANTI, Interview, 2019).

From the execution of this selection process, a new demand arises: that of degree courses aimed for the training of teachers who work or will work in the countryside. The specific selection revealed that many of the teachers who worked in the CFRs, that is, who lived the struggle for the materialization of an education in/of the countryside, *"who had all the experience with the pedagogy [of alternating cycle]"* (CAVALCANTI, Interview, 2019), had not had access to higher education.

This situation prevented many teachers who already worked in the alternating cycle schools from applying for the selection process. *"This was a temporary challenge that we had to overcome"* (CAVALCANTI, Interview, 2019). Temporary because, little by little, this challenge was being and is still being overcome by the degrees in rural education in operation in the state.

It is with this experience and knowledge, built during its operation, that the Supervision of Rural Education, in 2008, with the launching of MEC's notice N^o 2, of April 23rd 2008 (BRASIL, 2008), took on another challenge: to mobilize institutions, entities and movements in the construction of a project for a degree in Rural Education. This led the Rural Education Committee, in one of its meetings, to set up a committee whose goal was to articulate and produce the Political Pedagogical Project of the proposals to be submitted to the MEC. According to the then coordinator of the Rural Education Supervision at Seduc-MA:

[...] This commission was organized with the MST representing the social movements and UAEFAMA, because of a clear need to have courses to train its teachers, UEMA, represented by the teacher Ariadne, SEDUC, represented by me [Cacilda] and by Jane Selma, [...] and, UFMA, although UFMA participated in very few meetings in this period [...] (CAVALCANTI, Interview, 2019).

The project was constructed with the effort and protagonism of the Supervision of Rural Education and cooperation of the Social Movements and several teachers from UEMA and UFMA (CAVALCANTI, Interview, 2019; SÁ SILVA, Interview, 2019). They helped in this construction, around 50 faculty members, who contributed with suggestions for subjects, menus and references: *"[...] but the project was written by a smaller team composed of representatives of the Secretariat of Education and*

representatives of the university, who made the compilation of the propositions" (SÁ SILVA, Interview, 2019).

The commission responsible for the construction of the project deliberated in favor of UFMA assuming the submission and execution of the project, considering its experience with PRONERA and the impossibility of the Supervision of Rural Education of the state to assume such a function.

UFMA was open to the commission's proposition, however, despite providing support for the course's operation, there were no faculty members available to sign the project and assume its coordination, so that, after some onslaughts, the Commission decided to invite Professor José de Ribamar Sá Silva, in view of his work and identification in the area (CAVALCANTI, Interview, 2019).

With the issue of coordination resolved, two habilitations⁶ were defined for the Degree Course in Rural Education that would operate at UFMA: Agricultural Sciences and Natural Sciences and Mathematics. As for the habilitation in Natural Sciences and Mathematics, its choice was due to the deficit of education professionals with training in the area, especially in the countryside, as stated in its PPP (UFMA, 2014).

After defining the habilitations to be offered and the construction of the PPP, the University Council (Consun) of UFMA approved the project proposal through Resolution No. 111/2009. Still in 2009, UFMA participated in the MEC's notice for Proposals No. 09 of April 29th, 2009 (BRASIL, 2009), being contemplated by it, and launched two notices regarding the Special Selection Process of the course.

The LEdoC — UFMA began operating on October 18th, 2009, at the Pirapora Training Center, on São Carmelo Street, in the city of São Luís - MA, with 60 students for the first selection, being 30 for each habilitation. Its second class began in 2010, with 30 students per habilitation and both provided in their selectives the "priority in attending [teachers] of the final years of elementary school and high school, without a degree, working in schools in the countryside" (LORENZONI, 2013).

Unlike the scenario found in other LEdoCs, at UFMA there was no resistance from the Rector and/or Pro-Rector of Education (PROEN). The Coordinator, José de Ribamar Sá Silva, tells that:

⁶ We use the term "habilitation" because it is the term used in notice 127/2009 of PROEN (UFMA, 2009a) and notice N° 325/2009 of PROEN (UFMA, 2009b), and in the Pedagogical Political Project of the Course itself (UFMA, 2014).

[...] in the case of UFMA [...] at that moment we immediately had the receptivity of the pro-rector and, also, we talked to the rector and he made available what was possible to make available.

The process ran normally in the deliberative instances [...] of UFMA, and the rapporteur of the process of creating the course, although he was not a person who had links to the rural area, was a person who was sensitized to the importance of the project, and made a favorable opinion, so that the project was officially created through a resolution of the University Council (SÁ SILVA, Interview, 2019).

Despite the absence of resistance to the implementation of the course by the university, the challenges came along during its operation. One of the challenges faced within UFMA was the implementation of the course in alternating times and spaces, that is, the alternation between the University Time and School-Community Time. According to Sá Silva (Interview, 2019), because of its administrative structure, the institution could not adapt to the "new" system of operation proposed by the course, so adaptations in terms of the Integrated System of Academic Activities (Sigaa) had to be made to maintain its operation.

Also according to Sá Silva (Interview, 2019), in addition to this issue, there were other adversities faced, related to the very implementation of the course, arising from the insufficient resources made available by the MEC and delay in receiving them. Among such adversities, Sá Silva (Interview, 2019) cites the inadequate facilities and the delay in bidding, which sometimes implied very long stages, triggering coexistence problems, among others.

These problems found a committed team and a network of collaboration among people (CAVALCANTI, Interview, 2019; SÁ SILVA, Interview, 2019). This allowed the course to remain in operation and enabled the training of a significant amount of teachers who, today, work in the countryside meeting the needs of the regions from which they once moved leaving work, family and land in search of higher education focused and thought for the people of the countryside (SÁ SILVA, Interview, 2019).

Another challenge, indicated by the first course coordinator José de Ribamar Sá Silva (Interview, 2019), was the training itself by area of knowledge. This challenge is faced by the course until the present day. According to Sá Silva (Interview, 2019), at the time of the construction of the first version of the PPP, the existing discussion regarding the organization model of the LEdoC matrix and the experience of some universities that went down the path of a matrix organized by thematic axes was pondered. However, due to UFMA's incipient experience, it was decided to keep the traditional and disciplinary curricular structure. And, despite the discussions and some

advances in the search for an interdisciplinary work, the formation posed by the PPP of the course is still a subject of debate and reflections, constituting a permanent challenge.

In 2012, the Pedagogical Political Project of the UFMA course was selected in the Selection Notice No. XXX/2012 — SESU/SETEC/SECADI/MEC of ... of ... 2012 (BRASIL, 2012) which aimed at the institutionalization of the degree courses in Rural Education. The participation of UFMA in this notice reveals itself as a milestone in the educational policy aimed at the people of the countryside in the state of Maranhão, because it is from this notice that the course ceases to be a special program and becomes a regular course of the university, which allowed it to have its own faculty and a competitive examination and expanded student access to programs and student aid.

In the period of institutionalization of the course, according to the then coordinator, professor José de Ribamar Sá Silva (Interview, 2019), the discussion about the emphasis/habilitation in "Natural Sciences and Mathematics" (CNM) arose. This discussion was stimulated by a debate, already existing nationwide, regarding the need for a specific training for Mathematics. However, UFMA kept the habilitation in CNM, because the group of professors⁷ involved in the construction of the PPP understood that:

[...] when you are going to do any physics or chemistry calculation you need to have a solid mathematical background, if you do this training together, you do training in the area of knowledge, this is very good for all disciplines, both for mathematics and for the others. [...] the volume of content that is given in a mathematics undergraduate training at university does not need to be all worked in the training by knowledge area, we have to consider that these students will be teachers [...] of the final series of elementary school and then they will be high school teachers [soon] it would be enough that [if] made, with due care, a choice of which contents would be more necessary for the rural education until high school [...] (SÁ SILVA, Interview, 2019).

The LEdoC — Natural Sciences and Mathematics at UFMA began its academic activities, as a regular course, in January 2015, operating in the Center for Sciences of Bacabal (CCBa), in the city of Bacabal, Maranhão. And, currently, in 2022, it has 12 classes in progress, with students from 48 different municipalities, totaling 311 students. The first class is in the phase of production and defense of TCC and the two most recent classes had their entry in 2020/1.

⁷ The interviewees José de Ribamar Sá Silva and Cacilda Rodrigues Cavalcanti informed that more than 50 professors linked to UEMA and UFMA participated in the construction of the PPP of the course, with greater contributions in the areas of Natural Sciences and Mathematics coming from UFMA.

4 The Curricular Organization of LEdoC - CNM at UFMA

The degree course in Rural Education at UFMA enables students to teach subjects in the area of Natural Sciences and Mathematics in the last four years of Elementary School, in High School, and in Technical Professional Education.

The curricular matrix of the course provides 4545 hours of total workload. This workload must be fulfilled over eight terms (four years), and, on average, nine curricular components are offered per term (Table 1).

Table 1: General information on the Degree Course in Rural Education with emphasis on Natural Sciences and Mathematics at the Federal University of Maranhão (UFMA).

Institution	Startup	Current Curriculum	Total Workload registered in e-MEC	Course Length	Authorized annual vacancies
UFMA	04/14/2009	2014	4545 hours	4 years	30

Source: Pedagogical Political Project (UFMA, 2014) and the e-MEC Registry (BRASIL, 2022).

When comparing the total workload of the course with the other LEdoCs — Natural Sciences and Mathematics, which are listed in the e-MEC Registry (BRASIL, 2022) as active, it is possible to identify that the LEdoC of UFMA has a higher total workload (Table 2). As a reason for this higher workload, the PPP indicates the need for an "expanded training" (UFMA, 2014, p.12), however, it does not discriminate it.

Table 2: General information on the Degree Courses in Rural Education with emphasis on Natural Sciences with active registration in the e-MEC Registry Database.

Institution	Federal University of Santa Catarina (UFSC)	Federal University of Roraima (UFRR)	Federal University of Maranhão (UFMA)
Total Workload	3255 hours	3045 hours	4545 hours

Source: Pedagogical Political Project (UFMA, 2014) and the e-MEC Registry (BRASIL, 2022).

According to this document, this need arises both from the existing educational deficit in the state, as well as from the curricular organization by area of knowledge. In addition, the PPP points out that this larger workload allows the curriculum matrix to include, at the same time, "the contents of conventional courses and specific training for the countryside" (UFMA, 2014, p. 27), a factor that allows greater coverage of the area of action of these future educators, extending it to schools located in the urban area.

The compulsory curricular components are organized into three cores. These cores are subdivided into: a) axes, when they compose the Basic Core; b) groups of

curricular components by type, as in the Core of Specific Studies in Natural Sciences and Mathematics; or yet, c) in the curricular components themselves, as in the case of the Core of Complementary Activities (Table 3).

Table 3: Curricular Organization of the Degree Course in Rural Education - Natural Sciences and Mathematics at UFMA.

Cores		Axes / Group / Curricular Components
Basic Core (2040 hours)	Axes	General Education Studies (1080 Hours)
		Fundamentals of Training for Rural Educators (720 Hours)
		Organization of Pedagogical Processes in Rural Education (240 Hours)
Core of Specific Studies in Natural Sciences and Mathematics (2235 hours)	Group of Curricular Components	Curricular Components Referring to the Habilitation Area of the Course (1665 Hours)
		Monography (120 Hours)
		Internships (450 Hours)
Core Complementary Activities (180 hours)	Curricular Components	Research Seminar I (15 Hours)
		Research Seminar II (30 hours)
		Research Seminar III (45 hours)
		Seminars on Innovative Pedagogical Practices (30 hours)
		Complementary Courses (60 hours)
Total Workload		4455 hours ⁸

Source: Adapted from the PPP of the Degree Course in Rural Education - Natural Sciences and Mathematics at UFMA (2014).

The educational times are organized in alternating cycle between the University-Time, which corresponds to the "intensive face-to-face study time when students stay at the university campus" (UFMA, 2014, p. 21) and the School-Community Time, which "comprises the time for study, research, and guided pedagogical practices, developed in schools and other educational spaces in the communities, between one stage and another of the University-Time" (UFMA, 2014, p. 21).

As for the teaching practices as a curricular component, the resolution that governs the PPP corresponds to Resolution CNE/CP 1/2002 (BRASIL, 2002c). This

⁸ Due to the divergences found in the data obtained via the e-MEC Registry, the Curricular Matrix, and the PPP of the Course, we opted to use the detailed sum found in the latter document.

resolution inserted 400 hours of practices in Initial Teacher Education Courses. And, despite the opinions CNE/CP 9/2001 (BRASIL, 2002a) and CNE/CP 28/2001 (BRASIL, 2002b) indicating the materialization of these 400 hours of practice in the PPPs as a curricular component, this does not occur in the PPP of the LEdoC — Natural Sciences and Mathematics at UFMA. These hours are, however, integrated into the course matrix, distributed in various activities that compose different curricular components (UFMA, 2014). Moreover, the nature of such activities is not described in the PPP.

Except for the components related to the Core Complementary Activities, Monography and Internships, the other 72 curricular components offered in the discipline format have 25% of their workload corresponding to School-Community Time. The exception in this case is the History of Chemistry subject, which has a total workload of 30 hours concentrated in University Time.

The fact that practically all curricular components have 25% of their total workload allocated in Community Time allows them to be in line with one of the specific objectives of the course, which is to construct "through integrated school and community action, new educational experiences in the classroom, strengthening the role of the school and the countryside culture" (UFMA, 2014, p. 20). In addition, it is in line with the fact that the dialogical relationship between theory and practice is constituted as an articulating principle of the course and, thus, should permeate it from beginning to end, integrating diverse knowledge and space-time.

As for the mandatory internship, the 450 hours foreseen in the PPP of the course are distributed in three curricular components: Internship in Teaching in the Final Series of Elementary Education (180 hours), Internship in Teaching in High School and in Professional Technical Education (180 hours), and Internship in Popular Education in the Countryside (90 hours). The first two internships refer directly to teaching in rural schools, whose areas of knowledge, the object of this teaching, must be defined in the Internship Activity Plan. The Internship in Popular Education, on the other hand, differs from these two, as it corresponds to activities of diverse nature related to the management of school and community educational processes "that contribute to the transformation of the countryside school and strengthening of entities and social movements in the countryside" (UFMA, 2014, p.101), and may be developed in associations, social movements, cooperatives, unions, among other institutions, not necessarily rural schools.

Finally, it is necessary to highlight that, differently from what mostly occurs in the disciplinary degrees and in the LEdoCs themselves, as stated by Medeiros, Amorim and Carvalho (2020), there is no superimposition of curricular components of the specific area of Natural Sciences and Mathematics over the pedagogical components of the Humanities and general education. These components correspond, respectively, to a percentage of 37.37% and 45.79% of the total workload.

5 Education, Teacher Training and Alternating Cycle: articulations between curriculum guiding principles

In this section, we briefly present the three categories that express the guiding principles of the curriculum that emerge from the analysis of the PPP: 1) *Education as a political act of social transformation*; 2) *Teacher education from an emancipatory perspective*; and 3) *Alternating cycle as a space for action-reflection-action, in an attempt to dialogue with the previous sections*.

The first category, *Education as a political act of social transformation*, concerns the conception of education that guides the proposed teacher education. In the text of the PPP, education is seen as a process, a cultural act that aims at the integral formation of the subjects. A cultural process capable of provoking/contributing to social transformations that range from the reality in which these subjects are inserted to the broader social structure of which they are a part. In this sense, the course is seen in its duality, for, at the same time that it is part of this transformation, it seeks to foster it.

Throughout the text, it is possible to understand this political act as a conduct:

[...] capable of awakening a taste for freedom, solidarity, responsibility for the being of the other and for the world, for one's own destiny, conditions that make the human being a true revolutionary [translated] into a stance in favor of freedom, justice, ethics, and the common good (GHEDIN, 2012 p. 37).

Moreover, being the human a social, historical, biological, psychic, affective and rational being (FREIRE, 2011; MORIN, 2000) and education a specifically human activity, it is "gnosiological [and] directive, therefore political" (FREIRE, 2011, p. 68). Because it is political, the educational act cannot be neutral and requires the teacher to be aware and take decisions. Such positioning involves from the theoretical and epistemological bases that underpin their practice, through awareness of the ideologies present in the school environment, to the ethical testimony to teach, that is, the "coherence between what I say, what I write and what I do" (FREIRE, 2011, p.

101).

The term *transform* complements the idea of education as a political act, because it carries with it an intentionality: *to change the form* of what is not consistent with the principles of freedom, justice, ethics and the search for the common good. *To convert, alter, make different* the reality experienced by people in the countryside, characterized by educational backwardness and social inequality, because "learning is to construct, to reconstruct, to observe in order to change" (FREIRE, 2011, p. 68).

In this context, the PPP also defends, as formative and/or educational spaces that can enable the articulation between teaching, research, and extension, not only the school, but also popular and union organizations, social movements, and the community as a whole, in which the subjects of this process are inserted. This conception allows a more comprehensive understanding of education and the performance of these educators in their communities. Such understanding is marked throughout the text of the PPP and materialized in the curricular components that compose the matrix, namely: Methodologies of Work with Popular Education, with 45 hours, and the Internship in Popular Education, with 90 hours.

Furthermore, the PPP, when defining the objectives and/or characteristics of the degree offered, reinforces the required connection between the training and the search for social transformation. The fact that this education pursues a comprehensive (political, technical and human), multidisciplinary and critical education that contributes to this transformation, that is, that contributes to this political and social project, especially of the reality in which its subjects live, thus points to an emancipatory perspective.

In this sense, the document is closely related to the precepts of Rural Education already established at the time of its construction. Furthermore, it brings the vision of social movements and other entities that participated in its structuring in the search for the materialization of a counter-hegemonic education.

The document also comprehends this formation as a dialectical movement between theory and practice. A process of action-reflection-action that articulates different formative spaces and that considers as starting and ending point the reality of these subjects, that is, the experience of the Maranhão peasant people. Thus, it seeks a teacher training able to overcome the dichotomy between theory and practice, contrary to the teacher training policy that has been developed in Brazil, characterized

by its fragmentation and its utilitarian scope (NASCIMENTO and SANTIAGO, 2012).

Thus, such understanding led us to define as the second guiding principle that is evidenced in the PPP, *teacher training from an emancipatory perspective*. This perspective represents a critical education constructed in a "context of reflexivity that encourages [teachers in training] to question their ideas and conceptions of society, school and teaching and the daily relationships established between these dimensions" (MARTINS, J., 2016, p. 80). In this sense, an emancipatory training directs those who are part of it to the construction of a new look on the political and social context in which they are inserted, which allows them to unveil the veil that rests on the oppressed/oppressor situation, thus taking the first step in engaging in the struggle for freedom (FREIRE, 2022).

Here, to emancipate means to loosen one's hands, to free oneself from the bonds imposed by colonialist heritages, by the ideology of "Jeca Tatu" (MARTINS, F., 2019), and by the mercadological logic of capitalism. It means avoiding/impeding that a single discourse, that of those who hold power, is the locus of certainty and approval (ALMEIDA and RODRIGUES, 2019). It means being able to reflect and criticize, to then be able to transform the reality in which these subjects are inserted.

Such training, however, only occurs from the understanding and concretization of a political and dialogical educational act (FREIRE, 2011, 2022), which leads us to the third guiding principle that is evident in the PPP: *Alternating Cycle as a space of action-reflection-action*. This guiding principle takes the alternating cycle beyond a mode of curricular organization, configuring it as a space of articulation between theory and practice. A movement of action-reflection-action, which permeates the whole course, seeking to foment moments of political, technical, and human formation in a way that is contextualized to the reality of the students.

Thus, alternating cycle establishes a relationship between the environment in which these trainee teachers are inserted (family, community, and other places where they work) and the university, the latter being "the privileged place for listening and reflecting on the problems [arising from their realities], a receiver [and] propeller of reflected action" (MARTINS, F., 2019, p. 44). This last principle is intertwined with the previous two so that, throughout the text and in the constitution of the curriculum matrix itself, there is an indication that they feed each other.

Education as a political act of social transformation both underlies and

constitutes the objective of the teacher education offered. Such education, by taking the experience of these subjects as a starting and ending point, concretized in the alternating cycle, it involves distinct knowledge and instigates a critical view of their realities. In view of this, it provokes and supports the formative and organizational needs of the families and social groups of origin of these teachers in formation.

As Santos, S. (2019) states, alternating cycle formation does not situate scientific knowledge as the only way of knowing, or the only method that makes it possible to have contact with a certain object, but "it can place itself as an instrument that provokes internal and external changes," subverting the traditional logic experienced in the academy by "granting academic status to the knowledge that emerges from the ground of the peasant people" (SANTOS, S., 2019, p.267).

Thus, School-Community Time, in line with the theoretical-practical work developed during University Time, corresponds to an educational space-time in which we seek to develop practical teaching, research and extension activities. These activities should be elaborated on the basis of the problems experienced in the communities and other spaces of origin of the students, structuring the action-reflection-action exercise that runs through the proposed curriculum.

This understanding of alternating cycle gives indications that the epistemology that underlies the proposed curriculum corresponds to an epistemology of *praxis*. This epistemology takes *praxis* as "a movement operationalized simultaneously by action and reflection [...] a final action that brings in its interior the inseparability between theory and practice" (GHEDIN, 2012, p. 35).

We understand that the defense of education as a political act of social transformation and the search for a comprehensive teacher training that articulates theory and practice, considering the context in which the subjects of this training live, circumscribes the course proposal in the perspective of critical rationality (DINIZ-PEREIRA, 2014; FONSÊCA, 2008). However, we agree with Fonseca and Santos (2021), when they state that undergraduate courses have a hybrid presence in their curricula, with a greater or lesser degree of teacher training models (technical, practical and critical rationality) and that, therefore, one should not reduce/discard the need for such courses to make explicit in their pedagogical projects the bias that supports their curricular organization and teaching, learning, research and extension actions.

In this sense, it is necessary to pay attention to the fact that, in the text of the

PPP, this perspective of teacher training can only be understood from a reader's interpretation, since this is not explicitly found in the document. In addition to this issue, the concept of training and/or curricular organization by area of knowledge also requires attention. The inexistence of its discussion in the document in focus exposes a lack already pointed out by Medeiros, Amorim, and Carvalho (2020) when they analyzed the curriculum of LEdoCs in the northeastern region. At the same time, it resumes issues discussed during the construction of the curriculum when, for example, it was chosen the disciplinary organization and the training in CNM instead of specific training for Natural Sciences and Mathematics, which reinforces the demand for its discussion.

The rural people "experience a cultural diversity as of natural spaces that they occupy and that are responsible for the production of situated knowledge that must be shared in the experience of their families, communities, social organizations, school and university" (SILVA and LOPES, 2020, p. 222). This requires that the discussion about the conception of science assumed, both be explicit in the pedagogical proposal of the degree courses in Rural Education, and be part of the training itself, especially in the LEdoCs that offer training in the area of Natural Sciences and/or Mathematics. In this perspective, a conception of knowledge that depends on the context, being, at the same time, local and total (MORIN, 2000), and of a multidisciplinary, transversal and multidimensional reality, not compartmentalized (SANTOS, B., 2008), also needs to compose the curriculum and be problematized in the training of these educators.

Regarding this issue, the text of the PPP presents a conception of science as a complex system that encompasses distinct knowledge, traditional and scientific (UFMA, 2014). However, it does not articulate this conception with the training for teaching in the area of Natural Sciences and Mathematics.

However, when we look at the term interdisciplinary, that is, its location and meaning in the text of the PPP, we realize that its place in the proposed training is not clear. Its presence indicates an understanding of its relevance, however, its meaning points to a process under construction, which requires expansion of the debate.

The term interdisciplinarity appears explicitly in two moments. The first, in which it is argued that the pedagogical work should contemplate the communication between scientific and popular knowledge, in order to foster interdisciplinarity and contextualization (UFMA, 2014). The second, in which one of the competencies and

skills to be developed during the internship is: "develop teaching-learning activities in an interdisciplinary, dynamic and creative way" (UFMA, 2014, p. 39).

The debate on interdisciplinary pedagogical work does not go beyond these mentions, and the text does not provide elements that allow us to understand how this will be operationalized in the course, nor from which experiences these students will be able to develop interdisciplinary activities in their internships, or even, why these abilities do not also make up the profile of the graduates.

Thus, the three categories presented emphasize relevant aspects of the training of rural educators, while raising questions such as: what is the place of interdisciplinarity in a multidisciplinary teacher training? And, what characterizes or constitutes the curricular proposal of the course as a training by area of knowledge?

6 Final Considerations

Guided by the question *"Which guiding principles of the curriculum are evident in the PPP of the Degree Course in Rural Education — Natural Sciences and Mathematics at UFMA?"*, we present, initially, the history and curricular organization of the course, intending to bring the context in which the LEdoC in focus is inserted, as well as its functioning logic.

Subsequently, through a hermeneutic analysis of the text of the PPP of the LEdoC — Natural Sciences and Mathematics at UFMA, based on the ideas of Paul Ricoeur (1987, 2010) and Terra (2007), we constructed and presented three categories *1) Education as a political act of social transformation; 2) Teacher training in an emancipatory perspective; and, 3) Alternating Cycle as a space for action-reflection-action, presenting them in section 4 of this article in an inter and intraconnected way.*

Both the history of creation and operation of the course, as well as its curricular organization and the categories that revealed the guiding principles of the curriculum, mark the relevance of a Rural Education thought in and for the countryside. An education that takes as context the experience of these people and articulates scientific and traditional knowledge and, thus, provides subsidies for the formation and political organization of these people, so that they have the necessary tools to transform the reality in which they live and society in a broader sense.

The hermeneutic analysis undertaken not only presents the guiding principles

of the curriculum that are shown in the PPP, but also provides indications of the need to promote discussions about the understanding of training by area of knowledge, interdisciplinarity and multidisciplinary teacher training as well as their articulations; explicitness of the rationality model of teacher training that underlies the proposal; evidence of the conception of science and knowledge and its presence in the menus as well as reveals the need for investigations that seek to understand how the ways of overcoming or minimizing the limitations found in the document are shown, which are possibly developed by teachers and students in the course experience.

We hope, therefore, to instigate discussions about the undergraduate courses in Rural Education that train for teaching in Natural Sciences and Mathematics, especially with regard to the meaning and implementation of training by area of knowledge and interdisciplinarity in the curriculum of these courses.

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