

Educational procedures guided by emancipatory principles for education on soils in higher education: A proposal

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ABSTRACT: The traditional paradigm of education, although outdated, still supports Soil Educational procedures in several Brazilian universities. However, the strategic documents of these institutions (Institutional Development Plan-IDP, Institutional Political Project-IPP and Pedagogical Projects of Courses-PPC's) support a critical vision of education, which converges with the emancipatory paradigm and with the purpose of Soil Education (SE), which is the formation and transformation of subjects for conscious actions in reality. To overcome this problem, we propose educational procedures guided by emancipatory principles for two disciplines related to the subject of soils in Higher Education (HE) in a traditional paradigm structure, with the objective of meeting the conception of education supported in the strategic documents of a Brazilian public university and achieving the purpose of SE. A bibliographical research and documental analysis of the strategic documents were carried out to form a theoretical and methodological base. In addition, emancipatory principles were considered in the elements that made up the educational procedures in SE. The proposal was analyzed and discussed based on the behavior of these principles in the structure of the disciplines. To verify how the proposal articulates with the conception of education defended by the university, the analysis started from the didactic-pedagogical aspects expressed in the IDP, IPP, PPC's and Teaching Plans of the disciplines involved in the research. We emphasize that it was possible to propose and apply educational procedures on soils with emancipatory principles within a traditional paradigm structure. Some principles were considered in essence, while others could not be considered or were only partially considered, showing that the traditional paradigm limits principles that go against its foundations. The proposal responded more to the concept of critical education defended in the strategic documents than the Soil Educational procedures with traditional principles elaborated and used by professors, since the proposal considered the student's protagonism, the constitution of their autonomy, knowledge as relational, research as an educational principle, interculturality and procedural and continuous evaluation. On the other hand, procedures with traditional principles considered students as passive subjects, knowledge was seen as fragmented and their approach was made in an authoritarian way, disregarding students' knowledge and the evaluation was quantitative. Furthermore, the convergence of educational intentionality between Education in Soils and education with emancipatory principles allows us to state that the emancipatory paradigm was an alternative to achieve the educational and formative purpose in educational processes on soils.

Keywords: educational paradigm, disciplinary structure, critical education, educational process.

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INTRODUCTION

Education in Soils, as an educational process, integrates the subjects' conceptions of culture, territoriality and experiences, and how they perceive and build the data and knowledge about soils (Lima et al., 2020). Its purpose is the formation and transformation of subjects for conscious actions in reality. However, in Higher Education (HE), the educational processes about soils, which is developed through disciplines, are mainly based on the traditional paradigm of education (Hartemink et al., 2014), through lectures, practical laboratory activities, and field (Silva and Ribeiro, 2004; Batista et al., 2016).

In this paradigm, reproductive didactics are used, in which the professor assumes the role of transmitter of content and the student as the receiver, memorizer and reproducer of them (Demo, 2011), an education system called by Freire (1987) "banking". Reproductive didactics does not favor the construction of knowledge nor the transformation of the subject by actions in reality, because education is reduced to instruction (Demo, 2011). This implies that educational procedures (actions intentionally planned by the professor to develop an educational process) based on traditional principles do not converge for the purpose of Soil Education.

The view that education based on the traditional paradigm is outdated and no longer meets the aspirations of today's society is defended by several Brazilian theorists, who present a critical conception of education, aiming at social transformation (Freire, 1987; Behrens, 2003; Demo, 2011; Gadotti, 2017). The theoretical and methodological contributions of critical authors were, over the years, the subject of debate and the formulation of strategic documents (Institutional Development Plan-IDP, Institutional Political Project-IPP and Pedagogical Projects of Courses-PPC's) of several Higher Education Institutions (HEI), even these, for the most part, maintaining the educational structure supported by the traditional paradigm. The conception of education defended in the strategic documents, underlies the construction of the Teaching Plans for the disciplines and, consequently, educational procedures. Therefore, it theoretically and methodologically supports the pedagogical practice of professors, directly impacting the educational process and student training. The emancipatory paradigm is one of the foundations of the critical vision of education contained in these documents, and emerges from a disagreement and the refusal of traditional education made by Freire (1987). In emancipatory education, the student is at the center of the educational process, building their knowledge through constructive didactics (Demo, 1994). In this conception, the educational intention is the subject's emancipation and social transformation (Freire, 1987). And, thus, the focus is on the formation of a conscious and critical subject for intervention in the world.

We propose educational procedures guided by emancipatory principles for two disciplines related to the subject of soils in Higher Education within a traditional paradigm structure, to meet the conception of education supported in the strategic documents of a Brazilian public university and achieve the purpose of Soil Education.

MATERIALS AND METHODS

The study was inserted into the universe of qualitative research (Godoy, 1995) and had as an outline the case study (Gil, 2009). The research context was Soil Education in Higher Education (HE), and involved the proposition and analysis of educational procedures guided by emancipatory principles for the disciplines of Agricultural Ecology and Environmental Management (Agronomy course) and Soils in Basic Education (degree courses in Geography and Biological Sciences), both from the Agrarian Sciences Sector of the Federal University of Paraná (UFPR), in Curitiba, Paraná, Brazil, in the Remote Teaching modality, due to the COVID-19 pandemic.

The proposal of educational procedures guided by emancipatory principles

The proposal for educational procedures guided by emancipatory principles (Table 1) complied using Resolution No. 59/2020-CEPE and Resolution No. 22/21-CEPE, which regulated teaching activities in SE courses at UFPR, in the context of measures of coping with the pandemic, in the year 2021.

In addition to the bibliographical research, a documental analysis (Bardin, 2011) of the Institutional Development Project (IDP), the Institutional Political Project (IPP), the Political Projects of the Courses (PPC's) and the Teaching Plans (TP's) of the disciplines was carried out to substantiate the proposal of educational procedures with emancipatory principles for Soil Education with the conception of education that UFPR preaches in its documents. The topics analyzed in the documents were: institutional mission (PDP); pedagogical principles, referential attitudes that should guide the relationship between teaching and learning at UFPR and the conception of teaching, research and extension (IPP); training design, curricular organization, methodological aspects and evaluation (PPC's); teaching materials, methodology, teaching and learning relationship, professor's role, student's role and evaluation (TP's).

The proposal was constructed to distance the professor from their routines, habits and didactic vices of the traditional paradigm and to stimulate a state of alert in relation to the emancipatory principles, to contemplate these principles, the following elements were approached: Methodology; Course content; Knowledge itself; Subjects of the learning process; Professor-student relationship; Teaching-learning relationship; Vision of society-culture to be provoked in the process; University vision that the process promotes thinking; Vision of education that the process promotes thinking; Worldwide vision that the process promotes thinking; and Evaluation process, according to Bastos et al. (2022).

The disciplines for which the proposal was elaborated had a workload of 60 h and structured in five modules, which were composed of thematic units. In the modules, individual and team activities were incorporated to be developed in asynchronous and synchronous classes. Module I was designed to present the course syllabus and adapt to the virtual learning platforms. Modules II, III and IV approach the content through the *Alternative Methodology of Problem-Cases* (AMPC) (Bastos et al., 2022). Finally, module V for students and professors to reflect upon their experiences throughout the educational process.

The analysis of the proposed educational procedures guided by emancipatory principles

To verify how the emancipatory principles behave within a disciplinary structure of the traditional paradigm, the proposal of educational procedures guided by emancipatory principles was analyzed and discussed based on the elements that characterize it within the emancipatory principles, as compiled by Bastos et al. (2022) from Cunha (1998) and Mizukami (1983).

In order to verify how the proposal articulates with the conception of education defended by UFPR, in the case of the IDP and the IPP, the analysis started with the institutional mission, the pedagogical principles, the referential attitudes that should guide the relations between teaching and learning and the conception of teaching, research and extension at UFPR; with the PPC's, it started from the conception of training, the curricular organization, the methodological aspects and the evaluation of the Agronomy Courses and Degrees in Geography and Biological Sciences at UFPR; and with the TP's of the subjects, teaching materials, methodology, the relationship between teaching and learning, the professor's role, the student's role and the evaluation of the subjects of Agricultural Ecology and Environmental Management (Agronomy) and Soils in Basic Education (Degrees in Geography and Biological Sciences).

Educational procedures with traditional principles, which were constructed and applied by professors during Remote Teaching as a result of the COVID-19 Pandemic, were also analyzed and served as a reference for the proposal of educational procedures guided by emancipatory principles (Table 1).

RESULTS

What do the institutional documents say?

To formulate the proposal for educational procedures guided by emancipatory principles for Soil Education in Higher Education (SE) (Table 1), it was necessary to identify the conception of education presented in the strategic documents, in order to identify the theoretical and methodological base.

The Institutional Development Plan (IDP) and the Institutional Political Project (IPP) presented aspects that share the emancipatory conception of education. These aspects were present in the institutional mission, pedagogical principles and referential attitudes that should guide the relationship between teaching and learning at the university. The documents, therefore, presented a critical view of education, in the perspective of social transformation, as well as the student's protagonism, more flexible curricula, appreciation of interculturality, procedural and shared evaluation, methodologies that mobilize the creative and critical potential of the subjects of the educational process (professors and students) and shared teaching.

The Political Projects of the Courses (PPC's) of Agronomy, Geography and Biological Sciences also dialogued with the emancipatory paradigm by expressing a conception of the critical formation of students. However, the curricular organization of the three courses was in disciplines, typical of the traditional paradigm.

With regard to educational methodologies, the Agronomy and Biological Sciences courses supported methodological aspects close to the emancipatory principles, such as interdisciplinarity and flexibility, and autonomous reflection and problem-solving, respectively. On the other hand, the Geography course did not present aspects related to educational methodologies that evidenced a specific educational paradigm.

In terms of evaluation, the Agronomy and Geography courses followed UFPR norms, without defending a theoretical conception of evaluation. Only the Biological Sciences course presented an assessment concept, which was understood as a moment of reflection, which is not limited to the aspects of the contents worked, considering the importance of self-assessment and students' prior knowledge.

The Teaching Plans (TP's) that guided the educational procedures with traditional principles in the subjects Agricultural Ecology and Environmental Management and Soils in Basic Education, prepared and used by teachers for Remote Teaching due to the pandemic in 2020 and 2021, presented typical elements of a traditional model of education, such as the tutoring format in the teaching-learning relationship. In addition, the methodology presented in both TP's proposed the performance of individual activities (tasks, forums, glossaries and questionnaires) by the students, in synchronous and asynchronous classes. In this context, the role of the student was to carry out the activities developed by the professor, and the latter, fulfilling the role of tutor, the one who elaborates, monitors and quantitatively evaluates the activities carried out by the students.

In short, the strategic documents (IPP, IDP and PPC's) defend a critical view of education, contrary to traditional education, and closer to the emancipatory conception, although some aspects of the traditional paradigm are still present.

Table 1. Proposal of educational procedures with emancipatory principles with the respective characterization by elements that made up the educational procedures for the subjects Agricultural Ecology and Environmental Management (Agronomy course) and Soils in Basic Education (Licentiate courses in Geography and Biological Sciences)

| Element | Proposal for educational procedures with emancipatory principles | Educational procedures with traditional principles |
|----------------------------------|---|--|
| Guiding paradigm | - Emancipatory | - Traditional |
| Methodology | <p>Alternative <i>Methodology</i> of Problem-Cases (AMPC):</p> <ul style="list-style-type: none"> - Considered the socio-historical knowledge of the students, their local context, without disregarding the global; - The students operationalized the steps; - Emphasis on research and investigation for the solution of problem-cases; - Proposed existential situations in relation to the research content that was resignified by students. | <p>Recorded expository lectures, tasks, forums, glossaries, and questionnaires:</p> <ul style="list-style-type: none"> - Content presented through a recorded expository lecture, repetition activities, application and recapitulation of information; - Students were listeners and organizers of the activities; - Emphasis on ready-made models, repetition, and application. |
| Course content | <ul style="list-style-type: none"> - Determined by the professor in the Teaching Plan; - Stimulated reflective analysis by proposing the conceptual construction and re-signification of information, data, arguments and ideas through the construction of text, conceptual map and glossary; - Stimulated and valued curiosity, problematization, questioning, doubt and uncertainty through the resolution of problem-cases in teams; - Doubt and error were integral parts of the learning process and boosted thinking; - Interdisciplinarity was not considered in its essence, but the knowledge was understood in a relational and complex way in problem-cases. | <ul style="list-style-type: none"> - Determined by the professor in the Teaching Plan; - Transmitted by carrying out content activities, reproduction of texts and the professor's speech; - Considered the thought that converges to a single answer and is considered true; - The expansion and deepening of the content occurred via the number of classes. |
| Knowledge itself | <ul style="list-style-type: none"> - There were no recipes or response models, but there were as many responses as there were problem cases. | <ul style="list-style-type: none"> - Finished and decontextualized; - Fragmented, worked from independent activities. |
| Subjects of the learning process | <ul style="list-style-type: none"> - Interactionist approach, in which students and professors were developers and creators of knowledge; - Students and professors as concrete subjects, capable of transforming themselves and the world. | <ul style="list-style-type: none"> - Students are inserted into the world through the information provided; - Student as passive receiver. |
| Professor-student relationship | <ul style="list-style-type: none"> - Horizontal relationship, in which students also decided on methodological referrals; - Valued socio-intellectual skills (ability to work in a team, critical thinking, responsibility, self-assessment, criticality, among others) as much as the contents. - The professor had the role of instigator of students' learning, through individual and team guidance, creator of activity scripts and evaluator of the learning process; - The student was an active subject in the learning process and a knowledge builder. | <ul style="list-style-type: none"> - Vertical relationship, in which the professor was authoritative, holding the decision-making power regarding the methodology, content and evaluation; - The professor was the tutor, responsible for planning, developing, and evaluating the learning system; - The student was responsible for carrying out the activities and learning, becoming a memorizer and reproducer of knowledge. |

Continue

Continuation

| Element | Proposal for educational procedures with emancipatory principles | Educational procedures with traditional principles |
|---|---|--|
| Teaching-learning relationship | <ul style="list-style-type: none"> - Overcame the oppressive relationship, through a problematizing education with essence in dialogue, surpassing the subject-object dichotomy. - The construction of the text, conceptual map and glossary stimulated the student's experience forming a structure that allows the student to act with meaningful learning; - The context of the problem-cases prioritized the subject's activities, considering the insertion of the student into a local/global context; - Understood research as an educational principle. | <ul style="list-style-type: none"> - Learning was considered as an end in itself; - Individual differences were ignored; - Privileged activities that sought to facilitate the reproduction, memorization and transfer of concepts and information; - The student had an insignificant role in the elaboration and acquisition of knowledge; - Did not consider research as an educational principle. |
| Vision of society-culture to be provoked in the process | <ul style="list-style-type: none"> - Collaborative and integrated vision in the educational process, focusing on teamwork; favored dialogue, debate, reflection and confrontation of ideas; - The problem-cases simulated real-world situations, placing the student as a subject in society, culture, history, aiming at developing awareness to demystify reality. | <ul style="list-style-type: none"> - Individualist view of the educational process; - Banking education; - Aimed at perpetuation. |
| University vision that the process promotes thinking | <ul style="list-style-type: none"> - University as a place where the personal growth of professors and students was possible; - The University made possible the autonomy of the students from the salvage of knowledge and socio-historical knowledge, from the individual study of the themes, and from the resolution of problem-case; - Place where teaching, research and extension take place in a fragmented way. | <ul style="list-style-type: none"> - Place where learning and education took place; - Restricted to place for the transmission of knowledge; - Place where teaching, research and extension take place in a fragmented way. |
| Vision of education that the process promotes thinking | <ul style="list-style-type: none"> - Empower students to intervene critically and consciously in reality, whether in the exercise of their profession or in their personal life; - The personal presentation video considered the life stories of the students; - The problem-case scenarios considered the students' life context; - Team activities stimulated the socialization and democratization of relationships, in addition to being a process that stimulated a new comprehension of reality. | <ul style="list-style-type: none"> - Product, models already pre-established; - Lack of emphasis on the process; - Based on quantitative, experimental, objective, generalizable, reductionist and de-contextualized paradigms. |
| Worldview that the process promotes thinking | <ul style="list-style-type: none"> - The practice of solving problem-cases allowed the student to perceive himself as interacting with the world, capable of modifying it and changing himself. | <ul style="list-style-type: none"> - Reality transmitted by the process of education; - It is external to the individual; - Already defined and constructed, the subject is a product of the method. |
| Evaluation process | <ul style="list-style-type: none"> - Processual and continuous qualitative assessment, where the processes were more relevant than the products. | <ul style="list-style-type: none"> - Quantitative assessment; - The means of evaluation presented an end in itself; - The product was more relevant than the process. |

Proposal for educational procedures guided by emancipatory principles for the disciplines of Agricultural Ecology and Environmental Management and Soils in Basic Education

The proposal of educational procedures for the disciplines of Agricultural Ecology and Environmental Management (Agronomy course) and Soils in Basic Education (Graduate courses in Geography and Biological Sciences), presented in table 1, considered emancipatory principles via methodological referrals.

Such principles were contemplated in the constituent elements of the educational procedures, namely: Methodology; Course content; Knowledge itself; Subjects of the learning process; Professor-student relationship; Teaching-learning relationship; Vision of society-culture to be provoked in the process; University vision that the process promotes thinking; Vision of education that the process promotes thinking; Worldwide vision that the process promotes thinking; and Evaluation process (Table 1).

The *Alternative Methodology of Problem-Cases* (AMPC), used for the Methodology element (Table 1), was composed of phases and stages that complemented each other (Bastos et al., 2022). Each AMPC phase had an objective in the student's learning process, and the steps were activities that consider emancipatory principles related to the methodology, namely: Concern with popular culture, students' knowledge and local context, without disregarding the global context; Operationalized by students, based on research (experiences carried out by students); and Proposition of existential situations in relation to content research that will be re-signified by students. However, the curricular structure of the courses in disciplines, with pre-defined contents, made it impossible to insert the principle referring to the proposition of a programmatic content of their own by the students.

The proposal also met three of the four emancipatory principles of the Content element of the discipline, related to the characteristics of the AMPC in providing reflection, construction and conceptual re-signification, as well as the error as part of the educational process, stimulating and valuing curiosity, problematization, questioning, doubt and uncertainty (Table 1). The principle related to the interdisciplinarity of knowledge was not considered in its essence, since the disciplines of the courses were offered in isolation, preventing an interdisciplinary proposal, an aspect that showed the limit of the traditional paradigm for the application of principles of the emancipatory paradigm in its entirety.

For the Content element itself, only the principle that expressed the diversity of possible responses to the same problematization was met through the practice of solving problem-cases in the AMPC (Table 1).

In the element Subjects of the learning process, the principles related to the understanding that both the professor and the students are producers and creators of knowledge were contemplated (Table 1). Therefore, they were concrete subjects, a being of praxis in and with the world. Linked to these principles, all principles of the Professor-Student Relationship element were considered, which supported a horizontal relationship between professor and student; valuing students' socio-intellectual skills as much as content; the professor's role in demystifying and questioning, together with the student, the dominant culture, valuing the latter's language and culture; and the student as an active subject, responsible for building their own learning processes (Table 1).

In the teaching-learning relationship element, three of the four emancipatory principles were met, showing that the proposal of educational procedures for Soil Education overcame the oppressive traditional processes and was based on problematization and dialogicity, valued the students' life experiences, considering them inserted into a local/global context (Table 1). The principle that supports research as a teaching tool and extension as a starting and ending point for apprehending reality was not considered

in essence, as it was possible to include only the research dimension in the educational procedures (Table 1).

Regarding the element Vision of society-culture to be provoked in the educational process, two of the three principles were considered, indicating that the proposal of educational procedures presented a collaborative and integrated vision of the educational process and the student's awareness was a primary condition for them to participate as a subject in society, culture and history. For the principle Culture in systematic and relational acquisition in meaningful human experience, we did not identify any aspect of the proposal that contemplates emancipatory principles.

As for the University Vision element, where the process promotes thinking, two of the five principles were inserted. In this case, the proposal was built with the intention of making the students perceive the university as a place where their personal growth and the constitution of their autonomy were possible (Table 1). However, the principle related to autonomy was not considered in essence due to the structuring of courses in disciplines, which were characteristic of the traditional paradigm.

About the vision of education element and the process that promotes thinking, the principles related to education were contemplated, considering the life stories of students, the context in which it occurs, the socialization and democratization of relationships, in addition to being a process that it stimulated new understandings of reality. These principles were considered in different referrals, namely: in a personal presentation video, made at the beginning of the course, in which the student reported aspects of his life, his professional expectations and the relationship with the course; in the problem-case scenario, which were built considering the students' local context; in collective educational practices, such as Step 7 of the AMPC (Collective Feedback); and in the practice of solving problem-cases, which allowed the demythologizing of any misunderstandings of reality (Table 1).

The two principles of the Worldwide vision element that promote the process of thinking were considered indicating that, in the proposal, the student was understood as a subject who is in interaction with the world, being subject to transformation and at the same time able to transform it (Table 1).

In the element Assessment process, only the principle related to procedural and continuous qualitative assessment was considered. The evaluation took place by module, taking into account the student's participation in the activities and compliance with the criteria of formal quality and education policy (Table 1). However, following the University's strategic documents, it was also necessary to consider the quantitative nature of the evaluation, that is, the professor assigned a grade to the activities carried out by the students.

The principles that were not considered in the proposal of educational procedures for Soil Education were those that could not be inserted into an educational context with a traditional structure. Therefore, these are subject only insertable into educational procedures in an essentially emancipatory context.

DISCUSSION

The proposal for educational procedures guided by emancipatory principles for Soil Education in Higher Education (Table 1) is aimed to guarantee Soil Education that meets the concept of education supported in the university's strategic documents. The educational intention impregnated in the constituent elements of these educational procedures was based on emancipatory principles, on the institutional mission, on the pedagogical principles and on the referential attitudes that should guide teaching-learning relationships, present in the Institutional Development Plan (IDP) and in the Political Project Institutional (IPP).

To present how the proposal met the concept of education defended in the strategic documents, the discussion was organized into three items, dividing the analysis by the elements that made up the educational procedures as follows: 1. Methodology, Course Content and Knowledge itself; 2. Subjects of the learning process, professor-student relationship and teaching-learning relationship; 3. Society-culture vision to be provoked in the process, University vision that the process promotes thinking, Education vision that the process promotes thinking, World vision that the process promotes thinking, and Evaluation process.

Elements: Methodology, Course Content and Knowledge itself

The paradigm adopted in an educational process defines the methodology used by the professor in their pedagogical practices. Therefore, the proposal for educational procedures is guided by emancipatory principles considering the *Alternative Methodology of Problem Cases* (AMPC) (Table 1), which is also guided by the principles of this paradigm (Bastos et al., 2022).

The AMPC was indicated in the proposal as a unique methodology and used throughout the semester in both subjects, following the IPP's recommendations that educational methodologies should mobilize the creative and critical potential of students and their professors. The AMPC is student-centered, involving it in all its phases and stages, through individual and team activities, which revolve around the resolution of problem-cases, besides contemplating the pedagogical principle of considering the protagonism of students in the learning process (Bastos et al., 2022). The use of methodologies that consider the student's active role for knowledge construction, its local context, socio-historical data and knowledge, and research as an educational principle is an inherent feature of emancipatory educational processes. About this, Freire (1987) warns of the need for the professor to use a methodology that does not contradict liberating education and, in addition to providing the apprehension of the studied theme, allows the awareness of individuals around him.

The use of AMPC in the proposal was in opposition to traditional teaching methodologies (Bastos et al., 2022), used by professors in educational procedures guided by traditional principles, agricultural ecology and environmental management disciplines and soils in basic education (Table 1). These methodologies were made up of recorded expository classes, tasks, forums, glossaries and questionnaires, as demonstrated by TPs, which placed the student as the object in the learning process and not an active subject in knowledge production, an aspect that goes against the pedagogical principle of "*considering the protagonism of students in the learning process*", expressed in the IPP. The use of AMPC also dialogues with the conception of Demo (2011) that the educational methodology should lead the student to creative learning through doubt, challenge, research, curiosity, and the elaboration of knowledge, since the AMPC contemplates all these aspects, as Bastos et al. (2022).

We observe that the traditional paradigm limits the insertion of the principles of the emancipatory paradigm, as was the case of principle "2. *Own Program Content*" of the Methodology Element, which presupposes the construction of a syllabus from the existential experience of students, as occurs in the methodology of Freire's "*generating themes*" (1987). In a traditional disciplinary structure, the educational syllabus is determined by the professor, from the synopsis in the teaching plan, aspect maintained in the proposal, and which according to Freire (1987), can make authentic thinking difficult. In an attempt to minimize this situation, the activities study the themes and problem resolution that make up AMPC steps, were intended to contemplate the principle "4. *Proposes existential situations regarding research content that will be resignified by students*". When you adopt problem-solving for learning, there is an intrinsic association between education and research. In other words, research becomes an educational principle (Demo, 2011),

and learning can become something creative, as the student is subjected to doubt, challenge, the search for problem solutions, and their own elaboration.

In SE, research, besides supporting teaching, is essential for scientific initiation (Libâneo, 2009). Following this aspect of thought, the IDP and the IPP defended the inseparable logic teaching-research-expansion, which must be considered within the scope of educational processes. However, educational procedures with traditional principles did not express this conception because the teaching-research-extent logic was fragmented (Table 1, the University vision element that the process promotes thought), as it was not contemplated in its essence in the proposal of procedures Educational with emancipatory principles, as it was a punctual proposal, with no interactions with other instances of the university.

In the proposal, the research for the study of contents and the resolution of problem-cases by the students was considered an educational principle (Table 1), which required an understanding of learning within the emancipatory conception by professors of the disciplines. With this, the professor came to consider that student learning occurs through their own elaboration and not by memorization and reproduction of information. Thus, we assumed the proposition of Demo (2011) that learning does not occur by imitation, but by research, in the creative sense, an aspect considered a goal in forming students.

The educational methodology adopted by professors in their pedagogical practices reverberates through the educational procedures in general. In the case of the proposal, AMPC guaranteed the insertion of emancipatory principles in all the other elements of educational procedures (content of discipline, knowledge itself, subjects of the learning process, professor-student relationship, teaching-learning relationship, society vision-Culture to be caused in the process, University vision that the process promotes thinking, vision of education that the process promotes thinking, worldwide vision that the process promotes thinking and evaluation process) (Table 1). Hence the importance of using a methodology aligned with the purpose of the educational process (Freire, 1987). If the intentionality of Soil Education is to form a student who knows how to build knowledge and who knows how to use it to transform reality, a class in which he only listens, copies and does examinations is not the most appropriate. It is necessary to go beyond the memorized and copied practice. It is necessary to create conditions for its own elaboration and, above all, "arouse the political actor, capable of creating solutions and intervening in reality" (Demo, 2011).

For the content element of the discipline, principle 5. "*It stimulates reflective analysis by proposing conceptual construction and resignification of information, data, arguments, ideas*" was considered from the proposition of activities such as text reworking, concept map, and glossary (Table 1). These activities, because they are reflective and not a copy of excerpts from books or handouts that usually occurs in traditional educational processes, enabled the confrontation of the content studied with the student's socio-historical knowledge and data. Therefore, we assumed the conception of Gadotti (2017), that the process of knowledge construction is social. That is, knowledge about soils was, in this process, built and rebuilt in the dialogical relationship with the world and with other subjects, in a procedural and continuous movement of what the student already knows and something new.

One of the pedagogical principles of IPP was the "*legitimacy of curriculum organizations that overcome the rigid disciplinary demarcations*"; although the curriculum organization of agronomy, geography and biological sciences was in disciplines, as evidenced by the PPC's analysis. Although interdisciplinarity is intrinsic to universities, in the IPP it was stated that "*the organizational structure by sectors, departments and courses can be a limiting factor for innovative attempts to overcome the rigid disciplinary demarcations*", showing that the traditional paradigm limits principles that deny its essence (UFPR, 2020).

Although the IPP legitimized interdisciplinarity, which was directly related to principle 8. *“Knowledge is interdisciplinary and relational, attributing meanings of its own to the contents, according to the social and academic objectives”*, the traditional format of courses in disciplines limited an interdisciplinary approach to the proposal. This is because the fragmentation of knowledge is a founding principle of traditional education, which can be perceived in most Brazilian universities by the division of knowledge into areas, courses and disciplines, and its organization into departments (Behrens and Oliari, 2007).

Proposing the principle of interdisciplinarity in a traditional paradigm structure is contradictory, as it goes against its foundation of knowledge fragmentation. However, knowledge in a relational way was adopted in the proposal, when the complexity of knowledge was considered through learning based on the resolution of problem-cases (Table 1), which required students to analyze the connections, relationships, and interactions between the contents, and the integration of different ways of thinking.

In the procedures with traditional principles, the tasks, forums and questionnaires constructed by the professors (Table 1) presented a logic of fragmented knowledge, requiring from the students watertight and decontextualized answers. When considering emancipatory principles in the proposal, knowledge was understood in a relational way (Table 1), a perspective that, according to Behrens and Oliari (2007), implies the search for the contextualization of phenomena and the recognition of recursive causes, without the possibility of explaining the phenomena through simplification. As the AMPC problem-cases represented real-world situations, and the relationships that occurred in them represented the complex perspective of knowledge, the solutions that students should formulate also demanded complexity.

Working on the contents of the disciplines and knowledge from the resolution of problem-cases were related to the emancipatory principles of content 6. *“Stimulates and values curiosity, questioning, questioning, doubt and uncertainty”* and 7. *“Doubt and error are integral parts of the learning process and can boost thinking”*, and that 11. *“There are no recipes or models of answers, but as many answers as there are problematizations, making it possible to find different answers for the same problematization”*.

In the emancipatory perspective of education, curiosity, questioning, doubt and uncertainty are considered necessary for the pedagogy of autonomy (Freire, 1996). Solving problem-cases in educational processes on soils, complied with the previously described principles because they generated concerns, required generating hypotheses, critical thinking, confronting ideas, reframing knowledge and data, formulating answers, a moment of self-elaboration and proposing solutions for a given problem. These aspects are necessary requirements for the political awareness of the subject, because when the subject knows how to *“develop his own project”*, and has the ability to *“read reality critically and creatively, he can design an alternative future”* (Demo, 2005). This corroborates with the conception of training presented in the PPC's of the Agronomy, Geography and Biological Sciences courses.

With this, we emphasize that the emancipatory principles considered in the elements Methodology, Content of the discipline and Knowledge itself of the proposal of educational procedures with emancipatory principles were characterized in a conception of critical education, corroborating with the educational intention expressed in the IPP, in the IPD and in the PPC's.

Subject Elements of the learning process, professor-student relationship and teaching-learning relationship

The role played by the professor and the students in the proposal showed that the emancipatory paradigm was the foundation of the educational processes on soils in both disciplines. This is because we agree with Demo (2011) when he states that the student

takes into life what he elaborates on his own and not what he memorizes. Therefore, the principle 14. *“Interactionist approach, with emphasis on the subject as creator and creator of knowledge”* of the element Subjects of the educational process was considered, the student is always a constructive subject of their knowledge and never as a reproducer of the professor’s knowledge, both in individual activities as well as in team activities, which constituted stages of the AMPC. As the students proposed solutions that could be applied in the real world in solving problem-cases, the educational processes on soils made sense to them, and they perceived themselves as 15. *“Concrete subject: inserted in a historical context, it is a being of praxis (action and reflection on - in and with - the world, with the aim of transforming it)”*. This aspect comprises the *“politicity of the reconstructive process of knowledge”* (Demo, 2005), because, knowing how to think and learn, students have the basic conditions for alternative intervention in reality. In addition, it meets the critical view of education as a transformer of society, present in the IDP, IPP and PPC’s.

In educational processes with traditional principles, with regard to the professor-student relationship, the professor’s role is that of a tutor who prepared, accompanied and evaluated the activities (Table 1), a position of *“who knows everything”*, typical of the traditional paradigm. To overcome this conception, the proposal with emancipatory principles contemplated all the principles of this element, considering that the role of the professor is not that of a master who knows everything and only teaches (Demo, 2011), or as a distributor of ready-made information (Gadotti, 2017), but instigator of student learning and in the process also learns. As it is a traditional educational context with emancipatory principles, it was also the professor’s role to develop activities, make methodological referrals, guide students to solve problem-cases, mediate the socialization stages, and instigate students to think critically, question and reflect on knowledge. This demonstrates a polyparadigmatic educational reality. That is, emancipatory and traditional principles exist concomitantly.

The proposal did not disregard the possibility of the professor intervening with more detailed explanations of the contents if necessary, which is possible in the emancipatory educational processes. An example of this was the proposition of the socialization activity of the resolution of problem-cases by the AMPC teams, in which students were able to present conceptual confusions and misunderstandings. We emphasize that the IPP did not dispense with teaching within the molds of the traditional paradigm. Although the guidance in the document was for the student learning process to be *“supported by shared experiences and relationships, the problems and challenges created and the actions taken”*, it also pointed out that *“teaching can only be carried out through theme approach and oral explanation of content”* (UFPR, 2020). The idea that it is the professor who teaches and the student who learns, although outdated, was still considered by the University.

In a critical proposal of education, according to Freire (1996), it is up to the professor to help the students to recognize themselves as the architects of their own cognitive practice. For this reason, in the proposal, the typical teaching practice of the traditional paradigm was avoided, consequently, breaking with the conception of the student’s role as only carrying out the activities prepared by the professor, present in educational procedures with traditional principles (Table 1). In this sense, the students stopped receiving and reproducing ready-made information from the professor (Gadotti, 2017) and started to learn to build and rebuild knowledge. In other words, a horizontal professor-student relationship was formed, contrary to the authoritarianism of the professor and the tutoring model used in the subjects based on traditional principles (Table 1).

In view of this, the pedagogical principle of the IPP that one should *“consider the role of students in the learning process”* was contemplated in the proposal, in addition to principles 21, 22 and 23 of the element Teaching-learning relationship being considered

in their essence. In other words, the relationship between professor and students was contrary to “*receptive-domesticating positions*” (Demo, 2011), free of any kind of authoritarianism. Therefore, the professor was not the center of the learning process and the content narrator, nor were students understood as objects that listened and copied. Based on Freire’s critique of “*banking*” education, we understand that in educational processes about soil, students must be at the center of learning processes and aware of their role as subjects inserted in the world.

Through documental analysis of the IPP, the teaching-research-extension relationship in the educational processes of the different courses is related to the emancipatory principle 24. “*understands research as a teaching tool and extension as a starting and ending point for apprehending reality*” of the element Teaching-learning relationship was considered, but was not implemented in essence in the proposal. Although the research was understood as an educational principle in the proposal (Table 1), educational procedures were not linked to extensionist practices due to the lack of articulation between disciplines and the university’s teaching-research-extension tripod.

Therefore, in the proposal, the critical conception of education was privileged, above all, because it considered the professor and the students as subjects of the learning process, forming a horizontal relationship, in which the student was the center of the educational process.

Elements: Vision of society-culture to be provoked in the process, Vision of the university that the process promotes thinking, Vision of education that the process promotes thinking, Worldwide vision that the process promotes thinking and Evaluation process

The educational intention of the proposal was to promote educational procedures that culminated in the formation and transformation of the students in relation to soils for conscious actions in reality. In this sense, in the element Vision of society-culture to be provoked in the educational process, the proposal contemplated the principles related to the collaboration and integration of subjects, as well as the development of awareness by students to demystify reality, which were evident in team activities and in the practice of solving problem-cases, simulating real-world situations (Table 1). The strategy of using a methodology in Soil Education, such as the AMPC, which proposes teamwork, allowed us to consider that subjects educate themselves in relation to each other, but without disregarding their individualities, subjectivities and experiential knowledge. This corroborates with the understanding of Demo (2005), who states that it is necessary to develop “*more participatory learning practices, learning to work in teams, without disfiguring the need for individual work, becoming more helpful with colleagues, assuming collective and common tasks*”.

In the proposal, team activities were understood as moments of collaboration, dialogue, debate, reflection, confrontation of ideas among students, and recognition and consideration of the other and others for the construction and reconstruction of knowledge, aspects that did not occur with the educational procedures using traditional principles, since these activities were carried out individually by the students (Table 1).

With regard to the University vision element used in the proposal, we understand that the University is also a place of personal and not just professional growth (Table 1, the element University vision that the process promotes thinking). Thus, we assume the conception of training as a complex process that encompasses data, knowledge and skills for professional practice, but which also considers the students’ individual, subjective and affective issues, and it is essential to consider the narratives of these subjects’ educational experiences to reveal their transformations in the process. According to Passeggi (2010), “*the subject suffers the actions of the environment in his process of socialization, social insertion, affiliation to a group, etc., but he becomes, at the*

same time, an agent of action able to intervene in this environment to change it", we can say that the social interactions in the disciplines allowed the establishment of a dialectical relationship between the students and the educational process, which led to transformations of these and vice versa.

Also, the proposal was intended to ensure, through the University vision element, the understanding of the university as a place that enables the constitution of students' autonomy, an aspect also defended in the IPP and PPC's of the courses of Agronomy, Geography and Biological Sciences. However, structuring courses into disciplines made it impossible to apply the constitution of autonomy in some methodological referrals. An example of this was that students could not be autonomous in choosing the contents or themes of studies since the disciplines presented a ready-made syllabus. However, based on Freire (1996), the educational practice is *"a constant exercise in favor of the production and development of the educator's and students' autonomy"*, the proposal considered other ways of enabling, favoring and valuing student autonomy in Soil Education. Three activities that constitute stages of the AMPC contemplated the principle of autonomy, namely: rescue of knowledge and socio-historical knowledge, individual study of themes, and problem-case resolution (Table 1).

According to Freire (1996), to rescue what the student already knows is to respect the autonomy of his being. Furthermore, the *"valuation of interculturality in the production of knowledge"* is one of the pedagogical principles that was presented in the IPP. Due to this, the rescue of the students' individual knowledge was proposed to deepen the study of the contents, aiming at the construction of authentic knowledge. It corresponds to an attempt to provoke students *"to assume themselves as socio-historical-cultural subjects within the act of knowing"* (Freire, 1996). Regarding the individual study of the themes and the resolution of problem-cases, the principle of autonomy was linked to the capacity for research and personal elaboration, presented by Demo (2005), and according to the IPP *"free access to databases has contributed so that students and professors, individually or collectively, insert themselves as autonomous subjects into the processes of learning and knowledge production"* (UFPR, 2020).

With regard to the element, vision of education element that the process promotes thinking, the principles that dialogue with a liberated education (Freire, 1987, 1996) were considered, although it has not constituted liberating, since there was no rupture with the traditional paradigm or intention of installing the emancipatory paradigm in the university. The proposal intended to develop educational processes that contemplate the conception of education defended by this university and that would allow the understanding of issues related to soils, empowering students to intervene critically and consciously in reality, whether in the exercise of the profession or within the scope of their personal life (Table 1).

As we understand education as a process that provokes changes in the subjects, the proposal presented activities capable of leading students to identify these changes in themselves, such as Step 6 (construction of a report narrating the experiences and transformations perceived during the module) and Step 7 (Collective feedback of experiences in the module) of the AMPC (Bastos et al., 2022). In procedures with traditional principles, these changes were disregarded, as the focus was on identifying whether the student was capable of accumulating and reproducing information (Table 1). In Soil Education, self-change can be perceived through the theoretical understanding of content, the redefinition of values and the change in behavior and actions in reality, an aspect related to the element, Worldwide vision that the process promotes thinking. In this case, for students to realize that their worldwide vision is not a given and finished product, it was proposed to build a narrative of the experience at the end of the disciplines share the experience of the entire educational process. The experience narrative was understood in these procedures as a research-training device (Passeggi, 2016), which at the same time constitutes an object of research and student training practice.

Like any educational process, soil education is not neutral, as education is essentially political (Freire, 2001). Hence, the importance of students' critical awareness of the intentions of the educational process they are experiencing. Reflecting on how this process generated changes in itself allowed us to rethink certainties, beliefs, values and behaviors in life. For this, the students considered their data and knowledge, their subjectivity, their identity, their emotions, in a constant movement about who they were before the process, how they perceived themselves in the present and how they projected themselves into the future. Through this type of reflection, the subject understands that his worldwide vision is neither fixed nor determined, but dialectically reconstructed as they rebuild themselves, with the educational process in soils being an opportunity for this reconstruction.

In the element Evaluation process, the proposal was against content evaluations, used in educational processes with traditional principles (Table 1). We adopted a qualitative assessment, in which the processes are more relevant than the products, based on Demo (1999, 2005), and following the IPP guidelines of "*promoting procedural assessment practices*" which "*provide opportunities, accompany and reveal the different ways of learning academic knowledge*". As the proposal was elaborated for a traditional educational context, in which the evaluation is carried out through punctual activities, considering the essence of the procedural and continuous character of the qualitative evaluation was challenging. However, structuring disciplines into modules, which have a beginning, middle and end, allowed us to perceive and evaluate each module as a process.

As a result, the evaluation took place module by module, considering the student's participation in the activities and compliance with the criteria of formal quality and education policy, proposed by Demo (2005). In the evaluation system defined by the University, meeting the quality criteria could not define approval or failure in a discipline, so it was necessary to transform the evaluation criteria into quantitative parameters so that professors could assign grades to students for each module. In view of this, we emphasize that when it comes to procedural and continuous qualitative assessment, the traditional paradigm is a limiting factor, since even evaluating the student through the process of modules, the quantitative character will be privileged within a traditional system.

We emphasize that it is possible to consider emancipatory principles in a proposal of educational procedures within a traditional educational context, but some lose their essence. The emancipatory principles that were not discussed in this article are those that transcend the restricted space of the disciplines, encompassing an entire conception of university education. That is, they are principles that can only be implemented if the institution adopts the emancipatory paradigm as the foundation of its educational structure. Still, it is possible that other principles can be identified in the long term, since the educational and training process occurs throughout life.

In short, it was evident that the proposal of educational procedures with emancipatory principles met more the conception of critical education defended in the strategic documents (IDP, IPP and PPC's) than the educational procedures with traditional principles. For this reason, we emphasize that the educational processes on soils must be in accordance with the educational and didactic-pedagogical conceptions that the university's strategic documents defend. Thus, with coherence between the intentionality and the pedagogical practice of Education in Soils, it will be possible to carry out educational processes capable of forming and transforming subjects for conscious intervention in reality. However, it is necessary to break with the traditional paradigm that has long since become obsolete and no longer meets the training needs that today's society requires. In other words, it is necessary to seek other paradigms to promote the purpose of Soil Education in Higher Education, with the emancipatory paradigm being a potentially relevant alternative.

CONCLUSIONS

In the context of Soil Education in Higher Education, it was possible to propose and apply educational procedures guided by emancipatory principles within a disciplinary structure of the traditional paradigm, via methodological referrals. Among the principles adopted in the proposal for the disciplines of Agricultural Ecology and Environmental Management and Soils in Basic Education at the Federal University of Paraná, we highlight that not all of them could be considered in their essence, as the traditional paradigm was a limiting factor.

The proposal of educational procedures on soils guided by emancipatory principles was more articulated with the critical educational conception defended by the Institutional Development Plan, in the Institutional Political Project-IPP and in the Pedagogical Projects of the Courses-PPC's than the traditional educational procedures used by the teachers of Agricultural Ecology and Environmental Management and Soils in Basic Education.

In addition, since emancipatory education proposes the formation of subjects capable of social transformation and that Education in Soils is a process that must promote the formation and transformation of subjects for conscious actions in reality, we understand that the emancipatory paradigm is a theoretical and practical conception capable of achieving this purpose, due to the convergence of educational intentionality. Due to this, the proposal of educational procedures on soils guided by emancipatory principles made it possible to achieve the purpose of Education in Soils.

Furthermore, we point out that the divergence between the purpose of Soil Education and the educational procedures developed in Higher Education cannot be resolved just by changing the educational methodology or adopting some emancipatory principles, without completely breaking with the traditional base. It is necessary that the institution and the professors question which subject they want to educate, and from there, analyze whether the paradigm that underlies the pedagogical practices allows this education. If not, it is necessary to seek other paradigms to promote the educational processes on soils.

APPENDIX A. SUPPLEMENTARY DATA

Supplementary data to this article can be found online at https://www.rbcjournal.org/wp-content/uploads/articles_xml/1806-9657-rbcs-47-e0230025/1806-9657-rbcs-47-e0230025-suppl01.pdf.

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