

Article – Agronomy/Soil Science

Contribution of the Pedagogy of Alternation in Soil Conservation Practices

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HIGHLIGHTS

- Pedagogy of alternation contributes to soil conservation practices.
- In the pedagogy of alternation system, the students are motivated to putting theory into practice.
- Students are meant to be free, autonomous, and emancipated in the relationship between agricultural labor and school education.

Abstract: This study aims to show the efficacy of the pedagogy of alternation in soil practices. A compilation of 1200 alternation notebooks of students from 2022 to 2023 was analyzed. The documentary analysis was based on the qualitative meta-synthesis. It was observed that the vast majority of techniques reported in the notebooks matched the reality of the students' properties. The pedagogy of alternation involving soil management and conservation practices has a positive environmental impact on students' rural properties, which supports the practice of sustainable management, contributing to pedagogical instrument development and in the teaching-learning process. Labor is related to social movements and the education of students. Within this framework, it is important to state that this pedagogical system allows students to be free, autonomous, and emancipated in the relationship between agricultural labor and school education.

Keywords: attributes; conservation management; soil structure; organic matter; alternation notebook.

INTRODUCTION

The pedagogy of alternation emerged in the mid-30s in France and reflected the demand of the peasant people for an education directed to their reality and needs. In this context, in 1935, the first *Maisons Familiaes Rurales* (Rural Family Houses; RFH) were founded [1].

Among the main motivating factors, the farmers' children's lack of interest in the school stands out, mainly due to the distance from the rural context of that community. Thus, with the mobilization of other farmers and the interest of young people in a new teaching method, a training structure was created based on knowledge of everyday life and knowledge found in schools, that is, rooted in the relationship between empirical and scientific evidence [1].

Etymologically, the word alternation originates from the Latin word *alter*, which means another. For the author, the terminology alternation designates an appropriate rhythm to associate general training with professional training under the understanding that the former stimulates the subject's ability to think critically and know how to deal with the challenges and/or problems existing in society [2].

The pedagogy of alternation consists of an educational proposal that contemplates and values the knowledge present in students from public institutions in their sociocultural contexts, considering the school, the family, and the community as spaces for producing, learning, organizing, and disseminating knowledge. From the perspective of rural education, the pedagogy of alternation takes place within the school, family, and community, with pedagogical-didactic instruments elaborated based on the reality of the school and the students [3,6].

The pedagogy of alternation has been gaining ground in discussions about education. It has been studied by researchers and it has proven to be a viable alternative to providing quality education to people living in the countryside. Over the years, the proposal expanded worldwide, initially arriving in Italy in 1961, where characteristics of the region were incorporated and later expanded to other continents [5,7].

The first RFH experiences took place in Brazil in the State of Espírito Santo, brought by Nosella, and later, the proposal reached the Northeastern region in the 1970s [8]. The only Brazilian states that do not have Rural Family Houses or the pedagogy of alternation as a methodology are Alagoas, Paraíba, Pernambuco, and Rio Grande do Norte [3]. With this innovative proposal's arrival, there has been a new attempt to offer teaching directed to the countryside rather than to large urban centers. Currently, several Brazilian schools apply the pedagogy of alternation. The best-known experiences are those developed by the Agricultural Family Schools (AFS) and by the RFH [8,3,8].

In southern Brazil, the experience began in 1987 with the organization of a movement that culminated in the creation of the Association of Rural Family Houses of Southern Brazil (ARCAFARSUL) in 1991, with its principles based on the French experience. It was a long process for the courses offered in this model to be recognized by the Ministry of Education. The movement for Rural Education needed to assume this agenda. Thus, in 2006, the National Council of Education recognized not only the courses but also the pedagogy of alternation as a teaching methodology [9].

The Rural Family House Antônio Augusto Maciel, located in the Municipality of Lidianópolis, was created from this rising movement in southern Brazil to serve the surrounding municipalities. It was born from a regional agenda demanding the training and professionalization of young people from the countryside. Lidianópolis was chosen as the site for constructing the RFH due to its centralized geographical location in relation to the interested municipalities. The building was constructed via a project with the Ministry of Agrarian Development and the local government. The first class began in 2012, offering a technical course in agriculture (the only one in Paraná).

Until 2017, the RFH of Lidianópolis was linked to ARCAFARSUL. In 2018, the Paraná State Department of Education broke the agreement with ARCAFARSUL and signed a technical cooperation agreement with the Municipality of Lidianópolis. Although with numerous conceptual and ideological challenges regarding understanding and effectiveness, the pedagogy of alternation remains a teaching methodology that daily challenges the internal debate between professionals and the school community regarding its applicability. Thus far, it is considered a viable alternative for the professional and social training of young people from the region's countryside.

The pedagogical instruments are part of the RFH organization. Thus, teachers must handle them to standardize the precepts defended in the pedagogy of alternation, which are articulated, enabling continuous learning for participants. In this way, they characterize the entire organization within the RFH and are indispensable in the teaching-learning process. Considering what was mentioned above, it is relevant to reiterate that understanding the instruments is necessary in developing the teachers' work, who are responsible for guiding and applying them.

To implement the pedagogy of alternation, AFS use pedagogical instruments (study plan, internship, sharing, reality notebook, visits, and alternation notebook) and present elements in their structure that support the integral formation of young people in the movement of alternation, articulating different times and spaces and registering alternative paths [10].

The initially called *cahier d' exploitation familiale* – family reality notebook, here named alternation notebook, consists of a record in which students accumulate knowledge of reality, the systematization of study plans, their reflections and personal insights, in addition to the practices developed on their properties. This notebook acts as a diary of the actions and considerations experienced in the school and family environment [7].

The evaluation of technical knowledge application is carried out by the coordinators during visits to the students' homes, as well as to verify whether the reports described in the alternation notebook are consistent with the reality of the environment in which the students live. By knowing the students' reality, the monitors can deepen the reflection on the socioeconomic problems surrounding the community's daily life and can also evaluate the results of the pedagogical process that they are developing [7].

In view of all that has been presented, this study was carried out to evaluate the contribution of the pedagogy of alternation in management and conservation practices of the soil in the rural properties of the students.

MATERIAL AND METHODS

The study was conducted at the Rural Family House Antônio Augusto Maciel in Lidianópolis, Paraná, Brazil, which offers a technical course in agriculture for approximately 60 students from 10 municipalities in the Vale do Ivaí region. The study was carried out through document analysis of a compilation of 1200 alternation notebooks of students from 2022 to 2023.

Fulfilled and weekly delivered by the notebooks contain the activities' descriptions developed by students in their properties, which correspond to the application of the theory obtained in the scholar field.

The conservationist practices are transmitted to students through expositive and dialogued classes, besides field activities aiming the evaluation and application of the technical management that favor the agriculture soils' conservation. These practices are in consonance to the teaching plan and the syllabus proposed by the Sport and Education Sector of the State of Paraná – SEED/PR.

The alternation notebooks were collected weekly during this period. The documentary analysis was based on the qualitative meta-synthesis by Sarnighausen (2011), which consisted of systematically collecting data, focusing on soil conservation, to verify whether this teaching method (pedagogy of alternation) is valid for this context [12].

Only students residing in rural areas were selected. The notebooks were analyzed and cataloged according to the soil conservation practices developed on their properties and described by the students.

The analysis and selection of the notebooks were based on northern terms related to management techniques applied in students' properties, whose criteria were practices related by them. Some of these terms were: "no-tillage", "soil cover", "cover plants", "straw construction", "terrace renewing", "crop rotation", "soil compaction evaluation", "soil scarification", "erosion", "superficial flow", among others. These terms are correlated to the process of soil conservation in a direct or indirect way, and because of this they were selected.

Considering the logistical aspects to the properties' evaluation, one selection of the students that most cited the conservationist practices' application or recurrent problems of its absence was done.

Aiming to validate the information described in the analyzed alternation notebooks, 150 technical visits were carried out in 50 students' properties, which were registered through the technical visits report.

Three visits took place in each of students' properties which occurred weekly with an average duration of three hours, which consist in the observation of the area with their participation, who report the adopted practices, execution methods, expected results and some attention points, such as signs of erosion processes.

The evaluation of conservation practice implementation was performed through photographic records and spreadsheets, highlighting the type of soil cover, cover crop presence, direct or conventional planting, and the presence of terraces.

The collected data in the field were correlated with the ones described in the alternance notebooks, aiming at confirm or refute what was carried out in practice.

So, the central idea of this article is to discuss the contribution of the alternance pedagogy about the soil conservationist practices and this is a comparative and descript above study.

RESULTS

Through the documentary analysis of the selected alternation notebooks, it was observed that the vast majority of the reports described in the notebooks by the students were actually applied to their properties, which was confirmed by the visits made by the tutors in the students' properties between 2022 and 2023.

Evaluation of alternation notebooks

The alternance notebooks were evaluated by the technical teachers of the Rural Family House “Antônio Augusto Maciel” from Lidianópolis, PR, during the years 2022 and 2023. The evaluation was carried out through the individual reading of the alternance notebooks and their classification.

The notebooks aim at describe the developed activities in the students’ properties and their family members and they reflect the knowledge which is acquired t school.

During the evaluation, we aimed at identify which are the main cited terms that could indicate the effective applied actions in the properties, and through the narratives they would be selected to a later evaluation in loco.

Many narratives were collected about the interest in improving the crops’ productivity, although some factors, according to the students, made it impossible, considering the seeds’ quality, the fertilizing, the pests, illnesses, among others.

After the students’ engagement in the expositive classes and practices related to soils’ conservation, it was perceptible the opinion change related to the unfeasible factors of the productivity increasement, which is much influenced by the conservationist management of the soil.

Given the above, the students started to apply the knowledge in the field and consequently narrating it in the alternance notebooks, which were the focus of this analysis.

After compiling the actions described in the alternation notebooks, the most recurrent management terms were selected, such as the presence of soil cover, erosion, no-tillage, conventional planting, and terraces. There were a considerable number of erosion reports, as shown in Table 1.

In the Table 1, the data referred to the compilation of the cited terms by the students in the alternance notebooks during the period of 2022 and 2023 were presented.

Table 1. Compilation of the reports contained in the alternation notebooks, referred to the principal terms related to applied to the students’ properties during 2022 and 2023.

Recurrent terms	2022	2023
Soil cover	500	600
Presence of erosion	370	250
No-tillage	350	400
Conventional planting	240	130
Presence of terraces	100	300

It is visible in the cited table that three cited terms by students (soil cover, no-tillage and presence of terraces) increased considerably from one year to another. In relation to the other terms (presence of erosion and conventional planting), there was an expressive reduction in the narratives presented in the alternance notebooks.

The data suggest a good use of the acquired knowledge in the methodology of the alternance pedagogy, in a way that the soil cover, the no-tillage and the presence of terraces are contributive techniques to the soil conservation and consequently, the erosion reduction. In contrast, the other terms (presence of erosion and conventional planting) were gradually replaced indicating a change in the students’ conception and a new look to the praxis, sustaining their education as a participative citizen of the sustainable agriculture environment.

Assessing management practices

After analyzing the alternation notebooks in relation to soil conservation practices and paying the visits, it was observed that a considerable portion of the students carried out soil management and conservation practices on their properties, as shown in Table 2. Which is the result of the technical visits’ evaluations.

Table 2. Evaluation of management practices observed during 150 visits carried out in 50 properties during 2022 and 2023.

Recurrent terms	2022*	2023*
Soil cover	40	42
Presence of erosion	35	20
No-tillage	34	39
Conventional planting	8	10
Presence of terraces	30	35

*: Number of properties that carry out management practices.

According to the Table 2, it is possible to observe that the practices, such as soil cover, no-tillage, conventional planting and the presence of terraces presented a timid increase. Although the conventional planting had an increase, it is observed that the “presence of erosion” presented a reduction.

DISCUSSION

Soil management and conservation practices are essential to prevent the loss of surface soil by the action of erosion agents. In the erosion process, soil particles and nutrients are removed from the area, reducing its productive capacity [13].

Comparing the results obtained by evaluating the alternation notebooks and the observations made during the visits, a positive relationship is observed, indicating that the students' reports are consistent.

The pedagogical instruments of the pedagogy of alternation corroborate the social, environmental, and technical practices of the properties, which can be highlighted in terms of soil management and conservation [7].

According to Ribeiro, “the pedagogy of alternation can point to a work-education relation of a new kind, based on cooperation and self-management. Nevertheless, it can also mean forms of controlling social tensions, increasing the possibility of the rural worker remaining on the land, as well as mitigating unemployment by alternating professional education and paid apprenticeships through alliances with companies, turning them into agents of formation” [14].

The pedagogy of alternation is a great way for students to escape violent relations and construct their own professional life, considering the learning process they have experienced. This method allows students to be creative and apply what they have learned in their real-life conditions, expecting to obtain employment from agricultural companies in rural areas [14].

It is essential to demonstrate the importance of soil in meeting primary policy goals such as sustainable development goals [15]. Beyond soil security, some security concepts, such as food security, water security, and energy security, already have wide acceptance among many policy makers worldwide. Therefore, soil security has been viewed as a way to take advantage of this “security” recognition to advance needs within soil science. Additionally, connectivity brings a social aspect to the soil security concept, the idea that people need to connect to the soil to value it. More specifically, connectivity incorporates the knowledge and resources necessary to manage soil properly, and it views soil management as a long-term commitment that involves many generations and raises the demand for soil ethical rules. These connectivity aspects are strongly linked to soil knowledge, which means that they would be supported by well-considered educational strategies [15].

In summary, students need to obtain a good education in soil conservation and other agricultural practices so that they will be able to enter the job market in the near future.

CONCLUSION

The pedagogy of alternation involving soil management and conservation practices has a positive environmental impact on students' rural properties, which supports sustainable management practices, contributing to pedagogical instruments and the teaching-learning process. Labor is related to social movements and the education of students. Within this framework, it is important to state that the pedagogy system discussed here allows students to be free and emancipated in the relationship between agricultural labor and school education. This fact does not dispense their responsibility in facing the process that reconciles theory with practice and the participation of their respective families during professional training.

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