Interdisciplinary Extension Program in Teaching: Challenges, Possibilities, and Unexpected Situations

Marlene T. Fernandes [ID][a]

[a] Universidade Luterana do Brasil, Programa de Pós-Graduação em Ensino de Ciências e Matemática, Canoas, RS, Brasil.

RESUMO

Context: The implementation of curricular extension in Brazilian higher education, driven by the National Education Plan 2014-2024, led to curricular re-adjustment at ULBRA, emphasizing the integration of theory and practice in teacher training. **Objectives:** Promote extension activities that envision the formation of the researcher and the production of knowledge as an academic dimension necessary for future teachers. **Design:** Meetings between the coordinators of the teaching courses at the ULBRA/RS units, the coordinators of the Postgraduate Stricto Sensu programs with the assistance of the Academic Vice-Chancellor's Office and the Community Affairs Directorate. **Environment and participants:** Development of activities in a face-to-face class composed of 26 students who developed 05 projects based on the needs of the investigated communities. **Data Collection and Analysis:** The data was collected throughout the activities carried out in online classrooms and compiled in the final report of the extension project, registered in the virtual environment of the University, enabling the analysis of the projects carried out by the teams. **Results:** Two Interdisciplinary Extension Programs (IEPs) for undergraduate degrees have been defined, consisting of two courses in each IEP, totalling four courses from the curriculum. The described projects were carried out in the Educational Practices course, which is part of the 1st IEP - Educational Practices in Diversity. These guide the extension experiences of the students in the teaching degrees at the university, thus leading to the adjustment of the curriculum matrices of the courses according to the guidelines of the Institutional Development Plan (PDI). **Conclusions:** The strategies used by the project teams proved to be effective for involvement in all stages of the project, as well as commitment to extension actions and activities for responsible and ethical citizenship formation, providing the opportunity to combine theoretical education with practical activities in the training of the teaching students.

Keywords: Education; Sciences; Teacher Training; Undergraduate Degrees; Curricularization.

_____

Marlene T. Fernandes: marlene.fernandes@ulbra.br

RESUMO

Contexto: A implementação da curricularização da extensão no ensino superior brasileiro, impulsionada pelo Plano Nacional de Educação 2014-2024, levou à readequação curricular na ULBRA, enfatizando a integração teoria-prática na formação docente. **Objetivos:** Promover ações extensionistas que vislumbrem a formação do pesquisador e a produção do conhecimento como dimensão acadêmica necessária ao futuro professor. **Design:** Reuniões entre os coordenadores dos cursos de licenciaturas das unidades ULBRA/RS, coordenadores dos programas de Pós-graduação *Stricto Sensu* com assessoria da Equipe da Pró-reitoria Acadêmica e Diretoria de Assuntos Comunitários. **Ambiente e participantes:** Desenvolvimento das atividades em uma turma presencial composta por 26 estudantes que elaboraram 05 projetos a partir das necessidades das comunidades investigadas**. Coleta e Análise dos dados:** Os dados foram coletados no decorrer das atividades realizadas em sala de aula online e compilados no relatório final do projeto de extensão, registrado no ambiente virtual da Universidade, possibilitando a análise dos projetos realizados pelas equipes. **Resultados:** Foram definidos dois Programas de Extensão Interdisciplinar das licenciaturas, composto por duas disciplinas em cada PEI, totalizando quatro disciplinas da matriz curricular. Os projetos descritos foram realizados na disciplina de Práticas Educativas que compõe o 1º PEI – Práticas Educativas na Diversidade. Estas orientam as vivências extensionistas dos estudantes das licenciaturas da universidade, assim houve a readequação das matrizes curriculares dos cursos de acordo com as orientações do Plano de Desenvolvimento Institucional (PDI). **Conclusões:** As estratégias utilizadas pelas equipes dos projetos mostraram-se eficazes para o envolvimento em todas as etapas do projeto, bem como o comprometimento com as ações e atividades extensionistas para uma formação cidadã, responsável e ética oportunizando aliar a formação teórica com atividades práticas no percurso da formação dos licenciandos.

Palavras-chave: Educação; Ciências; Formação de Professores; Licenciaturas; Curricularização.

INTRODUCTION

Brazilian educational legislation, considering the 1988 Constitution and the National Education Guidelines and Bases Law (LDBEN), approved in 1996, has always considered as an important stage of education in Brazil, emphasizing the separability between research and teaching. However, obligation to implement and this stage occurred with the National Plan (PNE)2014-2024 Resolution CNE/CES No 07/2018 which establish deadlines for implementing the curricularization of extension in higher education.

According to the educational institutions are required allocate at least 10 of the course load of undergraduate to the curricularization extension. This

determination aims to promote the integration of theoretical knowledge with practical application, enabling students to and apply the knowledge acquired in the classroom within the community.

During the implementation process of extension programs or projects in undergraduate courses, there was a mobilization of the academic staff of the University to plan and implement 10% of the workload of undergraduate courses for these extension activities.

At ULBRA, the coordinators of the undergraduate courses ULBRA/RS and the coordinators of the Stricto Sensu Programs organized Working Groups (GTs) together with the Course Academic Committee (NDE) of the courses. The purpose was to expand information regarding legal requirements, analyze viable propositions by area of knowledge, develop strategies to adapt the curriculum frameworks from the perspective of an integrated curriculum, and finally, organize the Interdisciplinary Extension Program (PEI) for each course segment or area of knowledge.

The GT meetings began in 2016 and were extremely productive, with the effective participation of coordinators and guidance from the Academic Pro-Rectorate and Community Affairs Directorate. Through this interaction, the organization of the University's PEIs by area of knowledge and didactic-pedagogical affinity of the undergraduate courses was achieved at the end of the process.

In the teacher education courses at ULBRA/RS, the coordinators demonstrated significant engagement by regularly participating in fortnightly study seminars. In these meetings, they presented proposals and actively participated in the reorganization of the curricula, as well as in the organization of the PEIs, in terms of structure and selection of appropriate disciplines in line with the demands and needs of teacher training.

The organization of the teacher education PEIs included institutional guidelines aimed at flexibilizing the teaching and learning process through the development of students' competences, enabling ethical, emancipatory, and socially transformative professional involvement and action (ULBRA, 2023).

The implementation of PEIs in undergraduate courses took place in 2020, in face-to-face mode, and in 2021, in the distance learning mode. Recently, the Institutional Development Plan (PDI) for 2023-2028 was approved, which reaffirms the interdisciplinary and interprofessional work experienced through extension, "constituting a space for transformative learning and interaction, both for students and for the sectors of society

involved in collectively and collaboratively undertaken actions" (ULBRA, 2023, p. 23).

The characteristics and didactic-pedagogical organization of the face-to-face class of the Educational Practices discipline, which is part of the PEI - Education for Diversity, will be described and analyzed. The class is composed of 26 students from different undergraduate courses. The planned activities, developed projects, and obtained results will be detailed throughout this article. The class took place in the first semester of 2020.

LEGAL ISSUES OF EXTENSION PROGRAMS

The National Education Plan, approved by Law 13,005/2014 for the decade 2014-2024, establishes in goal 12, strategy 7 - that Higher Education Institutions (HEIs) must ensure, at least, 10% (ten percent) of the total required curriculum credits for undergraduate studies, in university extension programs and projects, delegating to HEIs the adaptation of undergraduate courses and implementation of the mentioned percentage (Brazil, 2014). In response to the legal framework requirements for extension activities, Resolution CNE/CES n. 07/2018 is approved, which - Establishes the Guidelines for Extension in Brazilian Higher Education and regulates the provisions of Goal 12.7 of Law no. 13.005/2014.

This resolution stipulates in article 8 that the curricularization of extension can occur in the form of programs, projects, events, and/or provision of services to a specific community. The guiding axis is the development of extension activities, focusing on the theoretical training and knowledge production of the student, combined with practical extension work applied to the student's field of study.

> Other outreach activities such as courses and workshops, events, publications, service provision, art, culture, sports, and leisure activities (as long as they involve the external community) should/could be integrated into the planning of PEIs (with the aim of providing effective social feedback). (Imperatore, 2018, p. 13)

The studies and discussions between the coordinators of the undergraduate programs at the University for the curriculum organization and compliance with legal regulations begin based on the legal prerogatives, supported by Resolution of the University Council No. 048/2016, which

normalizes the integration of extension activities in the undergraduate programs of the University. These discussions and studies are guided by the following objectives (ULBRA, University Council, 2016, article 3):

- Promote the inseparability of extension-research-teaching as a principle and process for meaningful and transformative learning.

- Foster the professional and civic formation of students based on real contexts and demands, through actions related to the professional profile of undergraduate courses.

The theoretical and legal foundation of the discussions and analyses by the participants sought to comply with the guidelines regarding the inseparability between teaching, extension, and research, as stated in Resolution n.07/2018, which provides for: "the articulation between teaching/extension/research, anchored in a unique, interdisciplinary, educational, cultural, scientific and technological pedagogical process" (Brazil, 2018, chap. I, art. 5, inc. IV).

Considering the legal issues and discussions established in the working groups, in order to link extension programs to teaching and research, there was a collective decision to prioritize extension actions, whether projects or programs, as practical activities that trigger teaching and research actions within the University. Then, after planning, the planned activities can return to the communities as extension practices developed by the students.

This approach expands the students' activities beyond the classroom, allowing them to put into practice the knowledge they have acquired and contribute effectively to the solution of real problems in the community. Through this interaction between university and society, students have the opportunity to develop leadership skills, teamwork, and social responsibility.

In this way, the extensionist dimension is expanded by considering it essential for undergraduate students to work in the perspective of a project or program with an emphasis on extension - investigating community needs, returning to the university, researching and planning actions with theoretical and scientific basis, along with teachers and colleagues, with the intention of solving or minimizing the diagnosed needs and later returning to the community for the applicability of the project.

This perspective of an interdisciplinary program that encompasses extension-teaching-research-extension implies an integrated and holistic approach to higher education. In this approach, programs and projects are

structured according to areas of knowledge and are seen as mandatory curricular components. This means that extension, teaching, and research are conceived as inseparable parts of the students' training process and are organized in a way to complement and enrich the knowledge acquired in the classroom. Moreover, this perspective also implies greater integration and interdisciplinary work among teacher training courses.

This approach is described in the Course Pedagogical Project (PPC) of each course, which includes interdisciplinary extension programs as an integral part of the training for teacher candidates. Based on this conception, the integrated curriculum of the teaching programs is organized into common subject areas that provide the opportunity for teacher candidates to experience practical and contextualized educational practices, which contribute to the development of skills and competencies necessary for teaching.

The process of integrating extension activities into the curriculum allows for the future teacher's training to be guided by the understanding that extension activities are intrinsically linked to teaching and research in knowledge production. This means that extension activities are not merely complementary to theoretical subjects, but rather an essential part of the training process.

It is important to emphasize that the extension dimension does not replace the academic dimension, but rather complements it. Through it, students have the opportunity to experience in practice what they learn in the classroom, enriching their education and becoming professionals prepared to face the challenges of the job market. Considering this context, there was a need to replan the curriculum of undergraduate courses based on the concepts of extension and its integration into the curriculum to ensure a broad and engaged education for the students, preparing them for a professional practice committed to teaching.

Thus, in this first stage of discussions and analysis of legal issues, the guidelines of Resolution No. 02/2015 were also taken into consideration, which defined the National Curricular Guidelines for initial education at the higher level (undergraduate courses, pedagogical training courses for graduates, and second teaching licenses) and for continuing education. However, during the meetings and studies of the work groups, new legislation is also approved, such as the National Common Core Curriculum (BNCC) (Brazil, 2017), defined as "a normative document that defines the organic and progressive set of essential learning that all students must develop throughout the stages and modalities of Basic Education" (Brazil, 2017, p. 7).

In December 2019, Resolution CNE/CP No. 02 was approved, defining the National Curricular Guidelines for initial teacher education for Basic Education and instituting the Common National Base for initial teacher education for Basic Education (BNC-Training), which revokes Resolution No. 02/2015. Although it has sparked numerous objections from academia and a large portion of scholars regarding the normative content of the resolution, in terms of scope and extent, it bears similarity to the previous legislation.

Article 6 (Brazil, 2019), which deals with the teacher education policy for Basic Education, in accordance with regulatory frameworks, especially the BNCC, outlines the relevant principles of this education. In terms of extent, the resolution acknowledges the need for "the integration of theory and practice in the teacher education process, based on mastery of scientific and didactic knowledge, encompassing the inseparability between teaching, research, and extension" (Brazil, 2019, art. 6, inc. V).

This means that teacher training should go beyond the simple transmission of theoretical knowledge, also including practice and research as essential elements. Teachers should be prepared not only to teach, but also to develop research and extension activities, which are important for innovation and improvement of reflective teaching practice.

CHALLENGES AND POSSIBILITIES OF EXPANSION IN LICENSURE PROGRAMS

The organization of the PEIs for undergraduate programs aims to develop extension projects based on the needs of communities surrounding the University and/or in the communities where the students work. In this sense, the academic policies described in the PDI - 2023-2028, regarding extension, guide the need for University-society interaction in promoting successful extension practices.

> Strengthening the relationship between the University and society through pedagogical practices that enhance the circularity between extension-research-teaching-extension, based on the identification of problem situations in real professional life contexts, with relevance and social significance, allowing learning experiences for students, with an active, creative and investigative approach in proposing alternatives and/or solutions to social needs. (ULBRA, 2023, p. 22)

This organization aims to ensure an integrated and multidisciplinary approach in the development of extension programs, seeking to meet the demands of society and promoting comprehensive student training.

The extension lines of the National Extension Program (PNEX) serve as a reference for the selection and planning of the PEIs of the teaching degrees, as well as the extension activities, covering the areas of formation of the University's teaching degrees. These lines guide the actions of the PEIs, ensuring their coherence with institutional guidelines and promoting alignment with the demands and needs of the communities being investigated.

The thematic research axis is used to guide the research activities carried out within the extension programs. This thematic axis may vary according to the knowledge area of the teaching degree, seeking to promote interdisciplinarity and the articulation between theory and practice. Fazenda (1994) states that establishing interaction between disciplines would be the "fundamental framework of interdisciplinary relationships..." (p.67).

The professional profile of the courses involved also influences the organization of the PEIs of the teaching degrees. This profile considers the competences and skills that professionals graduated from the courses must possess to act in a qualified and ethical manner in their areas of expertise. In this context, the reading of the territory involves the analysis of social, political, economic, environmental, and cultural indicators of the location where the teaching degree courses of ULBRA are inserted and where the extension projects will be executed.

In this context, the territorialization of extension results from human action on a geographic space, therefore, it is a process that seeks to establish a closer relationship between the university and society. This process involves the creation of projects and programs with the objective of understanding the demands and needs of the local community, seeking to promote actions that contribute to the improvement of the quality of life of the investigated population (Imperatore, 2018).

The organization of the PEIs (Extension Education Programs) of the teaching degrees, from an interdisciplinary perspective, considered in the structure of each program the disciplines by area of knowledge and shared among all the courses, aiming for a complete and comprehensive approach to a certain theme or problem. In this sense, interdisciplinarity is configured as a way to overcome the fragmentation of knowledge, promoting the exchange of knowledge and the joint construction of new solutions.

In the context of teaching courses, in which professionals are trained to work as teachers in various areas of education, the relationship between disciplines is extremely important. In this sense, the PEIs of the teaching degrees are organized by common area disciplines, where students from Biological Sciences, Physical Education, Physics, Geography, History, Portuguese Literature, English Literature, Mathematics, Pedagogy, and Chemistry are grouped together in common classes each semester when these disciplines are offered.

To meet this configuration and develop relevant themes for all teaching courses, the option was to plan common disciplines, as well as thematic approaches that were related to current and essential themes in the training of students. Thus, the organizational matrix of the PEIs of the teaching degrees comprises two programs, namely: 1st PEI - Educational Practices in Diversity and 2nd PEI - Teaching and Learning Methodologies, which are structured based on two disciplines for each program with a theoretical and methodological affinity to the generating theme of the PEI, exemplified in Table 1.

Table 1

Organizational Structure of the Bachelor's Degree PEIs.

Interdisciplinary Extension Program	Curriculum Matrix Disciplines	Semesters
1st IEP - *Educational Practices in Diversity*	Diversity, Accessibility and Inclusion	2º
	Educational Practices	3º
2nd IEP - *Teaching and Learning Methodologies*	Educational Projects	4º
	Teaching and Learning Practices and Methodologies	5º

The structure of each PEI is based on academic and community objectives, which serve as guidelines for students' research and practices. The aim of this study is to analyze the extension projects developed in the Educational Practices discipline and in theoretical-methodological continuity of the Diversity, Accessibility and Inclusion discipline based on the concept of

integration with the PEI - Educational Practices in Diversity. Thus, this PEI has the purpose of,

> to establish discussions and analyses, based on a diagnosis of reality with an integrative perspective on the citizenship of differences. A citizen capable of identifying and investigating socio-cultural and educational problems, intervening in complex realities, and contributing to mitigate social, ethnic-racial, economic, cultural, religious, political, gender, sexual, generational, and disability exclusions. (Fernandes, 2019, p. 5)

The discipline of Diversity, Accessibility, and Inclusion, present in the 1st PEI, follows a theoretical approach that seeks to identify and understand the social, cultural, and educational problems existing in society. Through an investigative, integrative, and proactive approach, this discipline aims to contribute to overcoming social exclusions in various areas, such as ethnic-racial, cultural, people with disabilities, genders, sexual diversity, and generational ranges. Its intention is to promote both professional development and citizenship of students, enabling them to act inclusively and consciously in their respective areas of expertise.

The second discipline of the 1st PEI - Educational Practices aims to analyze the different methods, instruments, and techniques used to collect data and conduct research on sociocultural and environmental aspects of education. In this way, it seeks to understand teacher training through a reflective approach in teaching practice, in line with the studies of Alarcão (2003). According to the author, it is essential for teachers to be able to reflect on their actions critically, creatively, and innovatively, instead of simply reproducing ideas and practices imposed on them. "The notion of the reflective teacher is based on the awareness of the capacity for thought and reflection that characterizes human beings as creative..." (p.41).

The organization of each extension program carefully considers the selected disciplines for the development of activities. In the first discipline of each program, the objective is to address the proposed theme with a theoretical workload of 75% of the total discipline, while the remaining 25% is dedicated to practice, which may involve diagnosing a problem situation in the community. In the second discipline of the same program, the theoretical workload is 25%, with the remaining 75% allocated to planning and execution of the project in the researched institution, originating from the first discipline where investigation and diagnosis take place.

This process of reflection on the curricularization of extension and the studies conducted requires the involvement of the entire academic community, whether in planning, implementation, and/or analysis of the results. In this sense, this article discusses the projects developed in the Educational Practices discipline, which took place in the 1st semester/2020, in order to analyze the planned and developed productions by students under the circumstances of social distancing imposed by the pandemic period.

PATHS TRAVELED

The discipline of Educative Practices started in February 2020 in a face-to-face format. The initial meetings of the discipline were dedicated to contextualizing the organization of the institution's PEIs, including the structure of each program, the related subjects, the academic and community objectives, and the methodology that guides the extension practices.

The purpose of the Educative Practices discipline is to organize the activities to be followed through thematic approaches and structured stages. This organization provides a solid foundation for the planning and implementation of educational practices, ensuring an efficient and effective teaching and learning process, based on the following steps:

- Social and cultural problem identification and educational investigative approach.

- Diagnosis of relevant themes/situations in social and educational daily life for the development of research aimed at contributing to the overcoming of social, ethnic-racial, economic, cultural, religious, political, and other exclusions.

- Understanding complex socio-cultural and educational realities from an investigative and interdisciplinary perspective.

- Development of an investigative project with basic elements of the educational/research action outline.

- Proposal of an educational action with the objective of contributing, minimizing, and/or solving the diagnosed problem situation.

- Dissemination of research results to the scientific community - sharing the results within the scope of the course, academic community, and external community.

During face-to-face meetings, the 26 students enrolled in the Educational Practices discipline from the English Literature, Biological Sciences, History, Geography, Chemistry, Mathematics, Physics, and Pedagogy courses formed work teams. Thus, 05 teams were organized composed of different courses. These teams made the initial contacts with the educational institutions in the regions where they reside and around the University. The objective of these meetings was to investigate the community's needs and make themselves available to carry out projects according to these needs.

The integration of the students into the community is done through a formal introduction letter from the University. In this letter, the student's full name, registration number in the institutional academic registry, the enrolled discipline, and the responsible professor are identified. With this document in hand, the student is officially able to present themselves in the institutions.

To contact the management team, there was a need to develop an interview script with the students. The script indicated to the students the need to address issues related to the institution's needs, relevant themes, and/or actions considered indispensable, especially in light of the implementation of social isolation due to the pandemic.

From this first contact, the projects were developed based on the needs identified in the schools, considering the interviews conducted with the management teams. Some interviews were conducted in person, before the period of social distancing, or later, online. In addition to addressing the specific demands that originated the projects, some schools requested assistance in developing activities for the students. In this way, the academics also contributed to the creation of review activities focused mainly on subjects such as History, Geography, and Mathematics.

Starting from the 9th meeting of the discipline, which was previously face-to-face, social distancing was implemented due to the COVID-19 pandemic. The situation of physical distancing and closure of schools and the University brought about a series of changes in the intended educational practices. Face-to-face teaching was replaced by distance learning, using different technological tools to enable the continuity of studies. At ULBRA, there were no difficulties regarding this process, as the students were already

familiar with the Virtual Learning Environment (AVA), specific to the institution, allowing classes to continue normally through synchronous meetings, that is, weekly meetings on the already planned day of the week for face-to-face classes with students and professors connected to the virtual environment.

The needs of educational institutions, triggered by the isolation of students and teachers, required the licensure students to seek new strategies and technological tools that would facilitate the development of extension projects in planning. The demands of the educational institutions, which had previously welcomed our students, now had a new perspective on needs. These needs mainly focused on the organization of didactic and informative materials on content to be worked on in certain grades and review activities, as named by the teachers in charge of the classes being attended.

During development of the discipline online and in response to the requests of investigated schools, the student teams were mainly involved in the development of didactic sequences, organization and creation of activities to review content and informative texts indicated by the school teachers. In addition to these extra activities, the teams continued with the extension projects, previously elaborated, with the necessary adjustments, due to the new administrative and pedagogical demands of the hosting schools. Among the numerous needs of the schools, the formation of teachers in Scientific Literacy and Individualized Study Plan was requested to assist inclusive students. These two formations were developed to meet the specific needs of teachers working with children in Early Childhood Education and the early years of Elementary School.

Table 2 provides a summary of the extension projects, themes and planned actions by the student teams, as well as the composition of these teams in relation to the courses of origin of the academics involved in the project planning.

Table 2

Summary of Student Themes and Courses

Themes	Origin of the students' courses
Transforming the Educational Space in Early Childhood Education	History and Physics
Accessibility and Inclusion	Biological Sciences, Geography, and Pedagogy
Causes and Consequences of School Dropout	English Literature, Biological Sciences, Chemistry, and Mathematics
Individualized Study Plan	Pedagogy and English Literature
Scientific Literacy in the Early Years of Elementary Education	Biological Sciences

During the process of identifying the needs of the institutions, the teams of students started studying the theoretical framework that would serve as the basis for the development of extension projects. To ensure efficient collective planning, the teams found appropriate forms of communication, holding discussions and analysis with the entire class collective and the teacher through weekly online meetings.

ANALYSIS AND DISCUSSION OF RESULTS

Considering the productions elaborated by the teams, the students' capacity for reinvention and adaptation stands out. Many of them utilized technological resources such as video conferencing platforms, recorded and shared videos, and social media to maintain contact with schools and colleagues. The discipline's activities took place through the institutional virtual learning environment (AVA), which the students also used to continue their studies.

Another relevant aspect in the students' productions is their search for creative solutions to overcome the limitations of remote teaching, especially in the researched schools. Some teams developed, in addition to the previously agreed and replanned extension projects, didactic sequences that allowed for the inclusion of educational games, storytelling, readings, and exercises in order to make the educational material more interactive and stimulating. This initiative by the teams demonstrated a collective effort to provide a dynamic and engaging learning environment, despite the constraints of distance learning expressed by the schools.

Therefore, the development of a consistent theoretical framework required students to have a broad and comprehensive vision of the chosen theme, seeking not only theoretical information but also ways to apply it in practice. Furthermore, providing feedback to the schools was essential for the research conducted by the students to become something relevant and meaningful for all those involved. This not only required presenting the research results but also finding ways to share the acquired knowledge in a way that adds value to the educational context of the school.

In this sense, the organization of the theoretical framework represented not only an academic challenge, but also an opportunity to promote change and contribute effectively to a meaningful learning process. By presenting a consistent and theoretically grounded work, the students demonstrated their commitment and dedication to the subject, thus encouraging debate and reflection in the school environment. Moreira (2021), when discussing meaningful learning, argues that there are two conditions for such manifestation: "adequate prior knowledge and a predisposition to learn" (p. 29). In this context, it is considered that prior knowledge is the knowledge "that the learner already knows, and predisposition, intentionality, the desire to learn, are fundamental conditions for meaningful learning" (ibidem).

In the face of these findings, the organization of the theoretical framework regarding the topics requested by schools has become a strategic task, which required students not only to have knowledge, but also research skills, critical analysis, and efficient communication. With this, the goal was not only to fulfill an academic requirement, but also to contribute to the comprehensive education of students, preparing them to face the challenges of teaching and didactic-methodological adaptations in the face of difficulties.

The intentionality of this study is to describe the projects developed in the Educational Practices discipline, particularly the project that deals with aspects of teaching Natural Sciences. However, it is important to briefly

mention the other projects to illustrate the researched topics, the resources and methodology adopted in project development, as well as the feedback provided to the schools.

The project - *Transforming the Educational Space in Early Childhood Education* (emphasis ours), developed by students from History and Physics courses, met the request of a community school for Early Childhood Education in the municipality of Gravataí/RS. During the visit to the school, the project team had the opportunity to meet with the management in person. It was requested that the academics assist in revitalizing both the internal space of the institution, specifically the toy library, and the external space, the playground. In addition, the inclusion of sensory flower beds was proposed in order to provide a more stimulating and sensory experience for the children. It is clear that the institution is seeking alternatives to develop an efficient and integrative pedagogical service, recommended by the BNCC, providing a space for interaction and meaningful learning.

> Interaction during play characterizes the daily life of childhood, bringing with it many learnings and potential for the integral development of children. By observing the interactions and play between children and between them and adults, it is possible to identify, for example, the expression of affection, the mediation of frustrations, the resolution of conflicts, and the regulation of emotions. (Brazil, 2017, p. 37)

Due to the closure of the school, the initial project, which met the requests of the administration, could not be carried out. In light of this situation, the school administration asked the students to develop alternative resources, such as storytelling and dramatization of children's tales and stories. The activities were carried out through videos, photos, audios, or video calls, and the parents committed to bringing physical activities to the school and taking photos of the children during their completion.

The project - *Causes and Consequences of School Dropout*, was developed by students from English Literature, Biological Sciences, Chemistry, and Mathematics courses. During the initial research process, the team contacted a state high school. Through a phone conversation with the principal, they identified one of the main concerns the institution was facing during the pandemic: the significant increase in school dropout rates. In light of this issue, the administration requested that the students develop informative material that could be made available to the students and their parents, with the aim of preventing potential cases of dropout, which could potentially worsen due to

the school's closure during the pandemic period.

The team dedicated themselves to searching for scientific articles related to dropout rates in Basic Education, in order to develop a consistent theoretical framework. This information was considered essential to support the materials that would be developed and used by the school, aiming to understand and address the main causes and consequences of this educational problem.

The team conducted thorough research on renowned websites, which are recognized for the quality of their scientific publications. In addition, data from the National Institute for Educational Studies and Research Anisio Teixeira (INEP) were collected, focusing on the School Census and high school dropout rates. Based on this information, the team organized a PowerPoint presentation, addressing the main identified topics, to make it available to the school. In addition to the visual material, the theoretical framework that supported the development of the presentation was also sent to the school.

The project on *Accessibility and Inclusion* was developed by academics from Biological Sciences, Geography, and Pedagogy. This team responded to a request from the administration of a municipal school located in Canoas / RS. The interview with the administration took place in person. The needs identified by the administration related to the difficulties that teachers face in attending to inclusive students.

The team then proposed to conduct a diagnosis of the current situation of including children with disabilities in school and to identify possible solutions to improve the service. Research and analysis of documents related to inclusion policies and teacher training in the municipal school system were conducted. Based on this, an action plan was developed that included teacher training regarding the service to parents and students in the Specialized Educational Assistance (AEE) classroom of the school. The entire project was developed online, through meetings and information exchanges via digital platforms.

The project - *Individualized Study Plan* (PIE) was created to meet the demands of a municipal school located in Estância Velha/RS, which needed to guide teachers who work with inclusive students in regular elementary school classes. The project was developed by academics from the Pedagogy and English Literature courses.

The academics of the university's teaching courses interact with inclusive students and are already accustomed to coexisting with peers with special needs in higher education. They are familiar with methods and

evaluation criteria for students who require special attention. Therefore, they did not have difficulties in seeking theoretical references to support the elaboration of the PIE.

However, they expressed concerns regarding the responsibility of implementing a project aimed at training the school's teachers. Consequently, there was an extra effort in searching for theoretical subsidies that could support the elaboration of the PIE. Consultations were made with the Students' Support Center (NADi) of the University in order to obtain as much information as possible to create a tool that meets the school's needs.

The team worked hard to develop a comprehensive theoretical framework that addressed both the issues ensuring specialized care and the evaluation criteria based on the skills demonstrated by inclusive children. This theoretical framework was provided as a subsidy for teachers working with inclusive students in school. In addition, a PIE model was proposed, which would be evaluated and adapted by the school's faculty according to their specific needs.

The proposed PIE model was structured in the form of a registration form, containing the student's identification data in the header, such as name, grade/year, class, as well as the teacher's name, subject, and thematic units/contents to be developed. Then, a table with three columns was created to identify: Goals (1st column) - recording the student's abilities to understand the content to be offered; Methodologies and didactic resources used (2nd column); Assessment (3rd column) - recording significant situations in the student's development. In the composition of the table, in the rows that intersect with the columns, the following observations are seen: Skills and Areas of knowledge, including: Academic Skills (reading, writing, math, etc.); Social Skills (attitudes, behaviors, etc.); Recreational Skills (games, outings, recreation, etc.) and finally, a space to register observations regarding the daily performance of the inclusive student.

In order to address teachers' concerns regarding the support for inclusive students during the pandemic period, the team prepared an informative material that was presented to the school management and to the educators themselves through a live session. During this broadcast, the team members were able to answer the doubts and questions raised by the teachers. Furthermore, it was possible to clarify concerns and establish strategies to support students in the remote learning context in schools.

The formatting of the University's extension programs aims to establish an intrinsic relationship between the disciplines of each program, as exemplified in the previous text. This configuration is resumed at this moment to illustrate that the methodological proposal of the 1st program - Educational Practices in Diversity seeks to combine the theoretical framework of the first discipline with the educational practices of the second discipline in a homogeneous manner, ensuring the integration between the theoretical and practical aspects.

Thus, it is worth noting that the *Accessibility and Inclusion* projects and the *Individualized Study Plan* presented exemplify, in their planning and execution, the methodological proposal of the 1st PEI of the teaching degree programs at ULBRA, from the perspective of a continuous and dialogic process between the planned and executed actions. The structure of the 1st PEI, which addresses Educational Practices in Diversity, not only addresses the legal issues regarding access, inclusion, and retention of all students in school, but also focuses on studying and proposing the integration of teaching degree students in school environments. In this context, extension programs allow students to perceive "the school as a space for learning and inclusive democracy", which should "strengthen the coercive practice of non-discrimination, non-prejudice, and respect for differences and diversities" (Brazil, 2017, p.14).

Scientific Literacy in the Initial Years of Elementary Education was deliberately left until the end of this analysis in order to have the opportunity to discuss the subject further. The theme emerged in the first classroom discussions when the teams were organizing themselves. Coincidentally, only students from the Biological Sciences course were in this team. They immediately showed interest in the topic, which was previously unknown to them. At that moment, still in-person, they began researching the theme to incorporate new knowledge into their education as Biological Sciences majors.

In the context of training future teachers in Biological Sciences, scientific literacy is of utmost importance, as these professionals are also responsible for mediating the process of understanding concepts in a clear and accessible way, arousing interest in science, and stimulating critical thinking. Scientific literacy refers to individuals' ability to understand, apply, and use scientific concepts and principles in their daily lives.

Due to the interruption of in-person classes, the team was unable to physically contact the school. However, by communicating via email with the administration of a school located in Canoas/RS, they had the opportunity to present the theme they were researching. The administration accepted the

team's suggestion as they understood that the topic is also little explored by the school's teachers. The administration set a deadline for them to organize a remote presentation to the teachers of the initial years of elementary education.

The theoretical framework developed by the team aimed to identify relevant aspects of the subject, demystifying and clarifying expressions that could generate doubts or confusion of concepts. Additionally, they focused on exploring concepts and definitions from authors who study the subject, with the intention of comparing different terms used and suggesting activities to promote scientific literacy among students in the early years of schooling.

The theoretical framework addressed topics such as: Differences and similarities between literacy and reading; the importance of scientific literacy and the National Common Core Curriculum (BNCC); definition of concepts and similarities between scientific literacy and scientific literacy; how to promote scientific literacy in the early years of elementary school?; why promote scientific literacy?

It is important to revisit the definitions of these concepts in order to clarify the connotation used by authors who study the subject, bringing to the discussion the particularities of each expression and their meanings. The BNCC (2017) states that throughout elementary school,

> the area of Natural Sciences is committed to the development of scientific literacy, which involves the ability to understand and interpret the world (natural, social, and technological), but also to transform it based on the theoretical and procedural contributions of the sciences. (Brazil, 2017, p. 321)

The definition and use of terms to define teaching and learning in Science has raised some controversies among researchers in the field, especially regarding the employed term and its definition. In order to clarify this issue, Sasseron and Carvalho (2011) conducted a research on the use of the terms "scientific literacy" or "scientific literacy" in Science education. The research investigated the origin and meanings of these terms and the authors who use them, as shown in Table 3.

Table 3

Summary of expressions and authors (Sasseron & Carvalho, 2011, p. 60).

Expressions	Authors

Alfabetización Científica	Membiela, 2007, Cajas, 2001, Gil-Pérez & Vilches-Peña, 2001
Scientific Literacy	Norris & Phillips, 2003, Laugksch, 2000, Hurd, 1998, Bingle & Gaskell, 1994
Alphabétisation Scientifique	Fourez, 2000
Letramento Científico	Mamede & Zimmermann, 2007, Santos & Mortimer, 2001
Alfabetização Científica	Brandi & Gurgel, 2002, Auler & Delizoicov, 2001, Lorenzetti & Delizoicov, 2001, Chassot, 2000, Sasseron & Carvalho, 2011.
Enculturação Científica	Carvalho, 2007

According to the authors, the expression *Alfabetização Científica* is used by Spanish authors because they understand that education aims to promote the "abilities and competencies among students that enable them to participate in everyday decision-making processes" (Sasseron & Carvalho, 2011, p. 60).

In English language publications, the expression. *Scientific Literacy* and in French language productions *Alphabétisation Scientifique* have the same connotation and purpose as the Spanish language. The authors explain that there is a difference in the translation of the terms into Portuguese, noting that the English expression is translated as "Scientific Literacy", while the English and Spanish expressions mean "Scientific Literacy" (Sasseron & Carvalho, 2011).

Considering the semantic plurality, in national literature some authors use Scientific Literacy, while others use Scientific Literacy, and others use the expression Scientific Enculturation, to designate the objective of Science education which to train students for the and mastery of scientific knowledge different spheres of their lives. this sense, the use one term or another translates the same concerns for Science education, that is, "reasons that guide the

planning of this education for the construction of practical benefits for individuals, society, and the environment" (Sasseron & Carvalho, 2011, p.60).

Sasseron and Carvalho (2011) use the term Scientific Literacy to refer to the concepts and theoretical conceptions developed from studies conducted regarding Science education, enabling students to interact with a new way of seeing the world and its events, being able to modify them and themselves through a "conscious practice facilitated by their interaction surrounded by knowledge of scientific notions and knowledge, as well as the skills associated with scientific practice" (p. 61).

Chassot (2003) advocates that being "scientifically literate means knowing how to read the language in which nature is written" (p. 91). He further states that scientific literacy is having a set of information and knowledge that would facilitate reading the world we live in. According to the author, what characterizes a scientific illiterate is the inability to read the universe.

In light of this brief reflection on the distinction of terms and a synthetic look at the theorists studied by the team, it is important to note that the guiding axis of the work carried out by the academics, with the school teachers, was directed towards the pressing need to work on Scientific Literacy from the early years of elementary school. The emphasis on presenting the theme constantly focused on the importance of scientifically literate students in the early years of schooling, forming conscious and ecologically active citizens with the essential knowledge to care for and preserve their environment.

In addition to the material presented to the teachers, the team of academics developed a document on Scientific Literacy, containing theoretical references to support the teachers in the planning and implementation of classes. They also created a didactic sequence on Homogeneous and Heterogeneous Mixtures. The didactic sequence was organized and made available to the teachers to adapt according to the age group and level of schooling. The didactic sequence was organized based on the flipped classroom methodology, with suggestions of brief videos about mixtures, followed by practical experiments that students could perform at home and send the results to the teacher through drawings or written material.

The realization of this project was significant, both for the team members, trainees of Biological Sciences, and for the welcoming school where it took place. The students had the opportunity to significantly expand their knowledge about Scientific Literacy. Similarly, the school teachers had the chance to participate, even in social distancing, in a live event that provided a

new perspective on Science teaching. Additionally, they received suggestions for activities that can be carried out based on the theoretical material, presentation, and proposed didactic-methodological activities.

FINAL CONSIDERATIONS

The developed in the Educational Practices discipline during the first semester of 2020 were essential for understanding and reflecting on the productions carried out by students amidst the social imposed by the pandemic. The teams demonstrated the capacity for reinvention, the search for creative solutions, and concern for relevant themes for schools in confronting the crisis. The ability to read the scenario allowed for the identification of good practices and challenges to be faced, thus contributing to the improvement of educational strategies in adverse contexts.

The implementation of the Interdisciplinary Extension Program in face-to-face teacher training courses, even with the unforeseen circumstances, was extremely rewarding and significant. It is noticeable that by including extension as a mandatory part of the curriculum, institutions provide students with a citizen formation, developing skills and competencies essential for acting responsibly and committed to society. In line with this aspect, the curricularization of extension allows universities to fulfill their social role, contributing to local and regional development through the implementation of projects and actions that aim at the well-being of the community where the projects will be carried.

In the face of such findings, one of the great challenges for HEIs will be to monitor and analyze the development of extension programs or projects, as the implementation of extension curricularization demands a careful analysis of the results achieved. It is necessary to constantly evaluate whether the proposed objectives are being achieved, whether students are actually engaging with the community, and whether their actions are contributing to solving diagnosed problems. Additionally, the analysis of the results should also include the impact of extension curricularization on student education. It is necessary to verify whether the knowledge acquired during extension activities is being incorporated significantly into the academic and professional education of students, as well as whether they are generating positive changes in the lives of those involved.

It was possible to perceive that the curricular organization of the extension programs in the teaching degrees/ULBRA evidenced satisfactory

results among students, as they understood the methodological proposal and the dynamics of each PEI. They understood the relationship between disciplines and sought, within the circumstances of that moment, to adapt the projects and aspire to the sequence of disciplines as previously planned. In some situations, it was noticed that it was not possible to continue the proposal of the first discipline of the PEI, Diversity, Accessibility, and Inclusion. In light of this, the Educational Practices discipline was adapted in response to the facts and unforeseen events caused by the pandemic during the first semester of 2020.

The potential for execution, analysis, and evaluation of the 1st Program for Interdisciplinary Studies (PEI) allowed for experiencing, both in classroom and online settings, the harmony and integration between teaching courses through the common disciplines within the field. This experience facilitated the promotion of "active methodological practices, in an interdisciplinary dimension that privileges student autonomy and the pedagogical mediation of the teacher..." (ULBRA, 2023, p.22). Furthermore, the relationship between these common disciplines can also contribute to building a stronger professional identity for future teachers, who will have a broader and deeper understanding of the specific content in their field of work. In this way, interdisciplinarity and the connection between common disciplines complement each other, expanding the possibilities for reflective professional training and practice.

By developing reflective skills, teachers are able to question their practices, constantly seeking improvement and personal growth (Alarcão, 2003). Adopting a reflective stance allows for more comprehensive and contextual thinking, considering the diverse realities of students, as well as the needs and challenges of formal and non-formal educational institutions. In this scenario of possibilities, uncertainties, challenges, and unforeseen events, it is possible to recognize a fertile educational field that is conducive to the inclusion of Interdisciplinary Extension Programs.

AUTHORS' CONTRIBUTION STATEMENT

This article was prepared and organized by the author Marlene T. Fernandes, responsible for the theoretical framework and data collection. Marlene T. Fernandes was responsible for guidance on theoretical, methodological approaches, and writing supervision. The results and final considerations were discussed and written by the author.

DATA AVAILABILITY STATEMENT

The author agrees to provide her data upon reasonable request from a reader. It is up to the author to determine whether a request is reasonable or not.

REFERENCES

Alarcão, I. (2011). *Professores reflexivos em uma escola reflexiva*. Cortez.

Auler, D. & Delizoicov, D. (2001). Alfabetização Científico-Tecnológica Para Quê?. *Ensaio – Pesquisa em Educação em Ciências*, *3*(1), 122-134.

Bingle, W.H. & Gaskell, P.J. (1994). Scientific Literacy for Decisionmaking and the Social Construction of Science Knowledge. *Science Education*, *78*(2), 185-201.

Brandi, A.T.E. & Gurgel, C.M.A. (2002). A Alfabetização Científica e o Processo de Ler e Escrever em Séries Iniciais: Emergências de um Estudo de Investigação-Ação. *Ciência & Educação*, *8*(1), 113-125.

Brasil. (1988). *Constituição da República Federativa do Brasil.* Texto Constitucional promulgado em 05 de outubro de 1988. Senado Federal, Subsecretaria de Edições Técnicas.

Brasil. (1996). *Lei n.9394/96. Lei de Diretrizes e Bases da Educação Nacional.* Estabelece as diretrizes e bases da educação nacional. https://www.planalto.gov.br/ccivil_03/Leis/L9394.htm

Brasil. (2014). *Lei n.13.005, de 25 de junho de 2014.* Aprova o Plano Nacional de Educação – PNE e dá outras providências. Diário Oficial da União, Seção 1, p. 1, Ed. Extra, Brasília, DF. https://bd.camara.leg.br/bd/handle/bdcamara/20204#!

Brasil. (2015). Ministério da Educação. *Resolução CNE/CP n. 1, de 01 de julho de 2015*. Define as Diretrizes Curriculares Nacionais para a formação inicial em nível superior (cursos de licenciatura, cursos de formação pedagógica para graduados e cursos de segunda licenciatura) e para a formação continuada. http://portal.mec.gov.br

Brasil. (2017). Ministério da Educação. *Base Nacional Comum Curricular*. BNCC. http://basenacionalcomum.mec.gov.br/

Brasil. (2018). Ministério da Educação. *Resolução CNE/CES n. 7, de 18 de dezembro de 2018* - Estabelece as Diretrizes para a Extensão na

Educação Superior Brasileira e regimenta o disposto na Meta 12.7 da Lei nº 13.005/2014, que aprova o Plano Nacional de Educação - PNE 2014-2024 e dá outras providências. http://portal.mec.gov.br

Brasil. (2019). Ministério da Educação. *Resolução CNE/CP n. 2, de 20 de dezembro de 2019.* Define as Diretrizes Curriculares Nacionais para a Formação Inicial de Professores para a Educação Básica e institui a Base Nacional Comum para a Formação Inicial de Professores da Educação Básica (BNC-Formação). Brasília, DF. http://portal.mec.gov.br/docman/dezembro-2019-pdf/135951-rcp002-19/file

Cajas, F. (2001). Alfabetización Científica y Tecnológica: La Transposición Didactica Del Conocimiento Tecnológico. *Enseñanza de las Ciencias, 19*(2), 243-254.

Carvalho, A. M. P. de. (2007). Habilidades de Professores Para Promover a Enculturação Científica. *Revista Contexto & Educação*, *22*(77), 25–49. https://doi.org/10.21527/2179-1309.2007.77.25-49

Chassot, A. (2000). *Alfabetização Científica – Questões e Desafios para a Educação*. Unijuí.

Chassot, A. (2003). Alfabetização Científica: uma possibilidade para a inclusão social. *Revista Brasileira de Educação, 22*, 89-100. https://doi.org/10.1590/S1413-24782003000100009

Fazenda, I. C. A. (1994). *Interdisciplinaridade: história, teoria e pesquisa*. Papirus.

Fourez, G. (2000). *L'enseignement des Sciences en Crise*. Le Ligneur.

Fernandes, M. T. (2019). Delineando Práticas e Projetos de Extensão. [e-book]. *In*: Fernandes, M. T., Geller, M., & Santos, L. G. *Práticas Educativas*. Universidade Luterana do Brasil.

Gil-Pérez, D. & Vilches-Peña, A. (2001). Una Alfabetización Científica para el Siglo XXI: Obstáculos y Propuestas de Actuación. *Investigación en la Escuela*. *43*(1), 27-37.

Imperatore, S. L. B. (2018). *Curricularização da Extensão na Universidade Luterana do Brasil:* Subsídios teórico-metodológicos. [e-book]. Pró-reitoria Acadêmica.

Laugksch, R.C. (2000). Scientific Literacy: A Conceptual Overview. *Science Education, 84*(1), 71-94. https://doi.org/10.1002/(SICI)1098-237X(200001)84:1%3C71::AID-SCE6%3E3.0.CO;2-C

Lorenzetti, L. & Delizoicov, D. (2001). Alfabetização científica no contexto das séries iniciais. *Ensaio – Pesquisa em Educação em Ciências, 3*(1), 37-50. https://doi.org/10.1590/1983-21172001030104

Mamede, M. & Zimmermann, E. (2007). Letramento Científico e CTS na Formação de Professores para o Ensino de Física. *Anais do XVI SNEF – Simpósio Nacional de Ensino de Física*, https://fep.if.usp.br/~profis/arquivo/encontros/snef/XVII_SNEF_programa_e_resumos.pdf

Mambiela, P., (2007). Sobre la deseable relación entre comprensión publica de la ciência y alfabetización científica. *Tecné, Episteme y Didaxis: TED,* (22), 107-112.

Moreira, M. A. (2021). Aprendizagem Significativa em Ciências: condições de ocorrência vão muito além de pré-requisitos e motivação. *ENCITEC - Ensino de Ciências e Tecnologia em Revista. 11*(2), 25-35.

Norris, S.P. & Phillips, L.M. (2003). How Literacy in Its Fundamental Sense is Central to Scientific Literacy. *Science Education*, 87(2), 224-240. https://doi.org/10.1002/sce.10066

Santos, W.L.P. & Mortimer, E.F. (2001). Tomada de Decisão para Ação Social Responsável no Ensino de Ciências. *Ciência & Educação*, *7*(1), 95-111. http://dx.doi.org/10.1590/S1516-73132001000100007

Sasseron, L. H. & Carvalho, A. M. (2011). Alfabetização Científica: uma revisão bibliográfica. *Investigações em ensino de Ciências, 16*(1),

Universidade Luterana do Brasil. (2016). *Resolução Conselho Universitário (ConsUn) n. 048, de 08 de dezembro de 2016.* ULBRA.

Universidade Luterana do Brasil. (2023). *PDI ULBRA: Plano de Desenvolvimento Institucional 2023-2028.* ULBRA.