

The curricularization of extension based on integrative projects in Exact Science teaching degree

A curricularização da extensão a partir de projetos integradores na Licenciatura em Ciências Exatas



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ABSTRACT

The article addresses the challenges faced by universities in implementing the curricularization of extension, as proposed in the National Education Plan (2014-2024). It highlights the initiative of the Federal University of Paraná - Palotina Sector, specifically in the bachelor's degree in Exact Sciences, to integrate extension hours into the course curriculum. Following discussions among the structuring teaching staff, it was decided to organize two integrative project courses. These courses, offered to freshman students and divided between two departments of the Palotina Sector, encompass content on the history and role of university extension, as well as provide hands-on experience with extension activities, in partnership with the collaborative projects and extension programs of the teaching staff. Thus, part of the extension hours of the course is fulfilled in courses that directly interact with the community through participating extension projects. This approach provides students with the opportunity to engage in practical community activities, increasing their involvement with the course and encouraging their continued participation in extension projects, especially when there is an offer of university extension scholarships.

Keywords: National Education Plan. Student engagement. Palotina Sector.

RESUMO

O artigo aborda os desafios enfrentados pelas universidades na implementação da curricularização da extensão, conforme proposto no Plano Nacional de Educação (2014-2024). Ele destaca a iniciativa da Universidade Federal do Paraná - Setor Palotina, especificamente no Curso de Licenciatura em Ciências Exatas, para integrar a carga horária extensionista ao currículo do curso. A partir das discussões do núcleo docente estruturante, optou-se pela organização de duas disciplinas de projetos integradores. Nestas disciplinas, ofertada para alunos calouros, e dividida entre dois departamentos do Setor Palotina, contemplam-se conteúdos acerca do histórico e do papel da extensão universitária, bem como vivenciam as ações extensionistas na prática, em parceria com os projetos e programas extensionistas dos docentes colaboradores. Desta forma, parte da carga horária extensionista do curso é cumprida nas disciplinas em interação direta com a comunidade por meio dos projetos extensionistas

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participantes. Essa abordagem proporciona aos estudantes a oportunidade de participar de ações práticas na comunidade, aumentando seu engajamento com o curso e incentivando sua continuidade na participação em projetos extensionistas, especialmente quando há oferta de bolsas de extensão universitária.

Palavras-chave: Plano Nacional da Educação. Engajamento estudantil. Setor Palotina.

INTRODUCTION

In 2014, the National Education Plan (NEP) was enacted (Act 13.005/2014), valid for 10 years (2014-2024). The NEP was developed as an instrument for planning educational policies for the country. Twenty goals were established to be accomplished throughout its implementation, ranging from early childhood education to postgraduate studies.

Among the goals of the PNE were universal access to early childhood education, improving the quality of teaching, valuing education professionals, expanding access to higher education, and incorporating university extension programs into the curriculum, among others.

The inclusion of extension activities in the curriculum, in the context of the PNE, is contained in strategy 12.7 and refers to the integration of extension activities into undergraduate course curricula, in order to ensure that students have the opportunity to experience and participate in activities that promote interaction between the university and society. This involves not only carrying out practical activities outside the academic environment, but also theoretical and critical reflection on these experiences, contributing to the comprehensive education of students.

Several studies have been produced in recent years to assess the impact of this goal on the curriculum and teacher training, such as the studies by Bezerra, Souza, and Colares (2022), which point out that by incorporating university extension, undergraduate curricula broaden critical and committed teacher training. Furthermore, the work of Souza et al (2023), through an integrative review of the topic, concludes that it is possible to identify in several studies the construction of curricula that promote meaningful initial training, as well as several studies that explain curricular methodological experiences in implementing this legal regulation.

Thus, this work also aims to report on the implementation of two disciplines created especially to contemplate the curricularization of university extension in the Bachelor's Degree in Exact Sciences at UFRP Setor Palotina. In the following section,

we will present some theoretical reflections on the role of extension in higher education and then present the development and consolidation of these courses.

THE IMPORTANCE OF UNIVERSITY EXTENSION

University Extension is a political and intentional action present in higher education around the world. Especially in Latin America, where the emergence of Higher Education was recognized late (Barreto and Filgueiras, 2007), it is strongly linked to popular education (Gadotti, 2017). However, it was more than thirty years ago, at the National Forum of Pro-Rectors of Extension of Brazilian Public Universities, now known as FORPROEX, that this initiative took shape and substance:

For FORPROEX [held in 1987], University Extension was understood as an educational, cultural, and scientific process that inextricably links Teaching and Research and enables a transformative relationship between the University and Society. For FORPROEX, University Extension is a “two-way street” between the University and society. Academic knowledge and popular knowledge came together again. (Gadotti, 2017, p.02, our translation).

Thus, shortly thereafter, Article 207 of the 1988 Constitution established the inseparability of teaching, research, and extension. The 1996 Brazilian Education Guidelines and Framework Law (LDB) instituted university extension as one of the core activities of the University.

However, although several decades have passed since these laws were enacted, we can say, as Silva (2020) does, that the concept of university extension is still under construction in our universities. This can be seen, in part, in the specific extension activities themselves, such as the courses and events offered by universities. As Silva (2020) points out, in common sense, extension activities may only have this “practical” dimension of offering something to the community. This aspect has already been widely criticized and elucidated by Paulo Freire in his work *Extension or Communication*, originally published in 1968 during his exile in Chile.

Based on his criticism, the idea that University Extension is not just an action to extend academic knowledge to people is accepted. That is: “The word structure, which, due to its etymology, was initially linked to architecture, underwent a significant extension and came to be used in economics, linguistics, psychology, anthropology, sociology, etc. Pedro is an agronomist and works in extension (emphasis added by the author, Freire, 2013, p. 11).

For Freire, the use of the term extension intrinsically implies the idea that there is: “the need for those who do it to go to the ‘other part of the world,’ considered inferior, to, in their own way, ‘normalize’ it. To make it more or less similar to their world” (Freire, 2013, p.15). In contrast, the author presents the term communication as a more appropriate mediation for the task of the extension educator. This view permeates the current conception of university extension proposed by the National University Extension Policy (2012), which understands that:

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conception of university extension proposed by the National University Extension Policy (2012), which understands that:

University Extension, under the constitutional principle of the inseparability of teaching, research, and extension, is an interdisciplinary, educational, cultural, scientific, and political process that promotes transformative interaction between the University and other sectors of society FORPROEX (2012, p. 27). University Extension, under the constitutional principle of the inseparability of teaching, research, and extension, is an interdisciplinary, educational, cultural, scientific, and political process that promotes transformative interaction between the University and other sectors of society FORPROEX (2012, p. 27, our translation).

In this way, University Extension comes to be understood as a complex process involving interaction, transformation, and communication between the knowledge of the University and the community. In this sense, the extensionist does not “extend” their knowledge outside the walls of the university, but creates bridges between different communities and, therefore, different ways of being and doing in the world. And this has a direct impact on the university curriculum, as we will demonstrate in the following topic.

THE IMPACT OF UNIVERSITY EXTENSION ON THE UNIVERSITY CURRICULUM

The National Education Plan (2014-2024) establishes the curricularization of university extension as a goal to be achieved. According to Steigleder, Zucchetti, and Martins (2019), it is based on goal 12, cited below, broken down into 21 strategies, that the curricularization of university extension is suggested.

Raise the gross enrollment rate in higher education to 50% (fifty percent) and the net rate to 33% (thirty-three percent) of the population aged 18 (eighteen) to 24 years of age, ensuring the quality of provision and expansion to at least 40% (forty percent) of new enrollments in the public sector. (BRASIL, PNE 2014-2024, our translation).

For the authors, there is a strong link between public funding for university places through government programs and the inclusion of university extension as a curricular possibility. As Serva (2020) points out, national policies confer the macro aspect of curriculum development in higher education institutions; however, particular contexts influence aspects of the microcosm that surrounds curriculum practice.

For the author, the curriculum goes far beyond the timetable and the set of subjects offered, in line with Sacristán (2013) when he states that the curriculum “is an instrument that has the capacity to structure schooling, life in educational centers, and pedagogical practices, as it provides, transmits, and imposes rules, norms, and an order that are decisive” (p.18).

In this sense, incorporating extension into the curriculum may be a way to increase the value and recognition of extension activities within each undergraduate and graduate program. This is because, as stated by Gadotti (2017) and Steigleder, Zucchetti, and Martins (2019), the current moment may be potentially positive for extension workers, whose work has long been undervalued in favor of research activities. Education also occurs through the curriculum, in the way subjects are arranged, their schedules, their workload, and even how they are allocated in the course grid. Nothing is exempt from intentionality, whether explicit or not.

Some experiences of curricularization of extension have begun to be disseminated to the scientific community, such as the literature review by Oliveira and Freitas (2020), which points out that institutions were free to organize the best internal policy for crediting extension hours in the undergraduate curriculum. This legal issue led to important theoretical and methodological discussions about extension work at the university.

Also, in the research by Timm and Groenwald (2018), which presents the potential of extension projects to act as articulators in teacher training courses in the field of Exact Sciences. Similarly, Melo et al. (2023) presents experiences of implementing university extensions in the curriculum of computer science courses at the Federal University of Pampas (Unipampa). Furthermore, the reflections developed in Zanon's thesis (2022) delve more deeply into other issues involved in the curricularization of extension, pointing out that this policy:

[...] It runs up against the definitions of teaching policy, the institution's budget, the availability of time/space for undergraduates in extension practices, and it is not detached from the concept of a disciplinary curriculum (p.33, our translation).

In other words, budgetary and pedagogical challenges are still present in the actions and choices of universities when they deliberate on the curricularization of

extension in their curricula. At the Federal University of Paraná, the discussion on how to incorporate extension into the curriculum involved several actors. Based on actions by the Extension Coordination Office (COEX) and the Dean of Extension and Culture (PROEC), various meetings were held starting in 2018, involving all sectors and campuses of the institution. Finally, in 2020, Resolution 86/20 was instituted, establishing the rules for the accreditation of extension activities at the Federal University of Paraná. This regulation establishes, in its Article 1, that it will:

Create, within the scope of the full undergraduate curricula, both in-person and distance learning, of the Federal University of Paraná (UFPR), Curricular Extension Activities (ACE) as mandatory components of Course Pedagogical Projects (PPC), totaling 10% of the total course load, with the purpose of highlighting the value of extension activities that contribute to the effective inseparability between Teaching, Research, and Extension at the University.

As a result, part of the entire undergraduate curriculum had to incorporate ACE into its subjects. Each course was free to choose how this would be consolidated into its curriculum, taking into account the specificities and demands of each area. In 2023, some changes were made, based on Resolution 83/23 CEPE, which amends the previous resolution (80/20), indicating in greater detail what the extension activities (ACE) would be in the curricula of the University's undergraduate courses, in addition to providing information on the workload for each one and including actions such as the Teaching Initiation Program (PIBID) and the Pedagogical Residency Program (PRP) as possible fields of articulation with university extension curriculum actions. This points to the constant adaptation of the curriculum and the need for constant revisions of the normative provisions within an educational institution.

THE CURRICULUM OF THE BACHELOR'S DEGREE IN EXACT SCIENCES AND EXTENSION

Among the numerous undergraduate courses offered at UFPR, we highlight the Bachelor's Degree in Exact Sciences (LCE). This course has a very interesting feature, as it allows students to choose their major after two years of enrollment. The possible majors are Physics, Mathematics, or Chemistry. This course format is offered at three different campuses of the University. Our focus in this report is on the LCE course offered at the Palotina Campus, located in the western part of the state of Paraná.

Before discussing how the LCE course sought to adapt to the regulations, it is important to note that the course's teaching staff has its own characteristics. Hiring teachers for such an ambiguous course that covers at least four major areas of knowledge, namely Physics, Chemistry, Mathematics, and Teaching, is no trivial task. The teaching staff is divided into specialists in specific areas and research professors in the field of Education and Teaching. However, it is important to note that a large part of the teaching staff, regardless of their original training, is involved in at least one ongoing extension project, in addition to various extension activities.

According to data from the Integrated Management System (SIGA), of the 131 extension projects and actions registered in the system for the period 2020 to 2024, 78 are from professors linked to the LCE course, representing 59.9% of all extension activities in the Sector. These actions have also given rise to practical studies on the curricularization of extension in practical subjects of the course, such as in the work of Santos, Almeida, and Parisoto (2021), as well as reflections on the potential of distance learning tools for teacher training during the pandemic (Bartelmebs, Figueira, 2021). Thus, we realize that extension is already part of the daily lives of teachers and students in the LCE course.

The extension subjects aim to highlight the value of extension activities and contribute to the effective inseparability between the University Triad (UFPR, 2020). According to the current PPC, the LCE course has a total workload of 3,210 hours for the Physics qualification, 3,270 hours for the Mathematics qualification, and 3,210 hours for the Chemistry qualification. Of this workload, 11% were implemented in Curricular Extension Activities (ACE), totaling 375 hours in any of the three qualifications.

To this end, among the various curricular units in the course, two subjects with extended hours were implemented in the first semester of the undergraduate program. One of them is linked to the Department of Engineering and Exact Sciences (DEE) and the other is linked to the Department of Education, Teaching, and Sciences (DEC). In addition to the inclusion of the extension component in the other subjects of the course, especially those focused on training future teachers. In this article, we will present the two integrative project subjects.

The contents of the subjects Integration Projects in Exact Sciences and Integration Projects in Education and Teaching in Exact Sciences are designed to provide students with their first contact with extension and extension activities. These subjects introduce teaching, research, extension, culture, and innovation activities related to the areas of education and teaching, as well as the areas of Physics, Chemistry, and Mathematics.

Both subjects are offered to new students on the course, and half of their workload is dedicated to extension. The course on Integration Projects in Exact Sciences has a workload of 60 class hours and is offered by DEE faculty. The course on Integration Projects in Education and Teaching of Exact Sciences has a workload of 30 class hours and is offered by DEC faculty.

The two courses are offered together on the same evening. The schedule is divided every two weeks, so every 15 days students will have classes in the course offered by DEC and the following week, classes in the course offered by DEE. Both courses deal with similar topics, but with a different focus. The course offered by DEE seeks to cover not only the historical and bureaucratic aspects of university extension, but also research projects. The course offered by DEC covers the practical actions of extension projects in the area of teaching.

Thus, in the first semester of the Bachelor's Degree in Exact Sciences, students can delve deeper into a fundamental subject: Integration of Projects in Exact Sciences. This subject aims to familiarize students with the various types of projects carried out at the university, offering them a comprehensive view of the different areas and possibilities they can explore during their academic journey.

In the course, one of the first topics explored is the classification of the various projects carried out at the university. Students are introduced to different categories of projects, ranging from academic research to extension and innovation initiatives, providing them with a comprehensive understanding of the variety and scope of academic activities in the university environment.

In addition, the importance of understanding the differences between the various existing projects is highlighted, whether they are related to approaches, objectives, methodologies, or areas of activity. This understanding is essential for students to

identify which projects are aligned with their interests and professional aspirations. Thus, from the first semesters of the course, they seek to actively participate in projects related to the degree program.

Another fundamental aspect addressed in the course is the introduction of the faculty members from each of the course's areas of focus, namely Physics, Chemistry, Mathematics, and Teaching/Education, and their respective academic profiles. Students are instructed on how to access the Lattes curricula of the teachers to learn about their academic backgrounds, areas of research, and other projects in which they are involved. This early interaction allows students to become familiar with the teachers and their areas of expertise, facilitating the identification of potential advisors and projects of interest.

This is because, as pointed out by Sousa Neto and Attiki (2005), participating in projects, especially those of an extension nature, enhances the integration of the university institution into the community, allowing students to develop different aspects of scientific knowledge.

During classes, the importance of not waiting to learn about projects related to the course until meeting professors in specific classes is also emphasized. Depending on their chosen major, students may not have contact with various professors throughout the course. Therefore, it is essential that they proactively explore the opportunities for interaction and learning offered by these professors from the beginning of their academic training.

Finally, the course on Integration Projects in Exact Sciences provides students with practical guidance on the elements necessary for preparing an abstract and giving an academic presentation. These activities are carried out in partnership with the course Integration Projects in Education and Teaching of Exact Sciences, aiming to develop essential skills for scientific communication and the dissemination of projects, whether in teaching, research, extension, innovation, or entrepreneurship.

We understand that adjustments are necessary. One of the biggest challenges we face annually is faculty mobility in disciplines, caused by the closure of extension projects. We are aware of the possibility of overloading faculty members who are willing to offer curricularization positions in their extension projects.

However, we understand that the subject of Integration Projects in Exact Sciences plays a fundamental role in the education of students, providing them with comprehensive knowledge about existing projects at the university, different areas of activity, and the skills necessary to actively engage in the academic community.

FINAL CONSIDERATIONS

As we conclude this article, we would like to emphasize how challenging it is to incorporate extension practices into the curriculum of an undergraduate program. Even when a large part of the faculty already has experience with university extension, there are still several challenges to be overcome. However, it is important to highlight the relevance of this initiative that emerged with the PNE (2014-2024), understanding it as an educational movement that can potentially give greater visibility to university extension and also enable a stronger link between the university and the community. We also emphasize that the integration of extension activities into course curricula contributes to a broader education that is more engaged with social demands.

We can evaluate our experience with the creation of integrative project courses as positive. These courses make it possible to cover both theoretical and practical aspects for LCE students to understand university extensions.

We understand the need for continuous adjustments, especially in light of the significant challenges we face. One of the main obstacles lies in faculty mobility across disciplines, resulting from the closure of extension projects, and the potential overload of faculty members who offer places for curricularization in their extension projects. In addition, federal universities continue to face the constant challenge of budgetary constraints, especially considering that community actions often incur costs that are not covered by other sources of funding. These are crucial aspects that demand attention and the search for sustainable solutions in the context of curricularization of extension.

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Received: April 29, 2024.

Accepted: September 03, 2024.