

Construção da relação teoria/prática por meio de estratégias para a superação da dicotomia universidade/escola

Construction of the theory/practice relationship through strategies to overcome the university/school dichotomy

Construcción de la relación teoría/práctica a través de estrategias para superar la dicotomía universidad/escuela

Construction de la relation théorie/pratique à travers des stratégies de dépassement de la dichotomie université/école

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Abstract

This article aims to present the practices carried out in the subject Curriculum in Mathematics Education for the insertion of students of the Degree in Mathematics of the Federal University of Pelotas in schools. To this end, it starts with a historical synthesis of Brazilian public policies and their impact on initial teacher education, together with notes about what Nóvoa (2002) designates as dilemmas of the teaching profession, which support the idea that teachers' illnesses can also be considered a dilemma of the work of these professionals. In this way, we reserve a space in the text to expose the proposition that the sociopolitical and economic context and the functioning mechanisms of schools can contribute to teachers' illnesses through educational policies, which are elaborated under the influence of multilateral organizations that disseminate the neoliberal model. Afterwards, we examine the practices carried out by students of the Degree in Mathematics in educational institutions. Next, we expose our understanding that initial teacher education should allow: the construction of pedagogical knowledge; the student's understanding that their craft requires continuous improvement due to constant social, political, economic, cultural and scientific changes; and the development of practices that allow

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prospective teachers to interpret, reinterpret, and systematize their experiences, in order to maintain a continuous process of building their being a teacher.

Keywords: Initial teacher training, Mathematics, University/school dichotomy, Relationship theory/practice, Educational policies.

Resumen

Este artículo tiene como objetivo presentar las prácticas realizadas en la disciplina de Currículo en Educación Matemática para la inserción de los estudiantes de la Licenciatura en Matemáticas de la Universidad Federal de Pelotas en las escuelas. Para ello, se presenta una síntesis histórica de las políticas públicas brasileñas y su impacto en la formación inicial docente, junto con notas sobre lo que Nóvoa (2002) designa como dilemas de la profesión docente, que sustentan la idea de que la enfermedad docente también puede ser considerada un dilema del trabajo de estos profesionales. De esta forma, reservamos un espacio en el texto para exponer la proposición de que el contexto sociopolítico, económico y los mecanismos de funcionamiento de las escuelas pueden contribuir a la enfermedad de los docentes, a través de políticas educativas, que son elaboradas bajo la influencia de organismos multilaterales de difusión. del modelo neoliberal. Posteriormente, presentamos un examen de las prácticas realizadas por estudiantes de la Licenciatura en Matemáticas en instituciones educativas. A continuación, exponemos nuestro entendimiento de que la formación inicial docente debe permitir: la construcción de saberes pedagógicos; la comprensión del estudiante de que su oficio requiere una mejora continua debido a los constantes cambios sociales, políticos, económicos, culturales y científicos; y el desarrollo de prácticas que permitan a los futuros docentes interpretar, reinterpretar y sistematizar sus experiencias, a fin de mantener un proceso continuo de construcción de su ser docente.

Palabras clave: Formación Inicial del profesorado, Matemáticas, Dicotomía universidad/escuela, Relación teoría/práctica, Políticas educativas.

Résumé

Cet article vise à présenter les pratiques menées dans la discipline du Curriculum en Enseignement des Mathématiques pour l'insertion des étudiants de la Licence en Mathématiques de l'Université Fédérale de Pelotas dans les écoles. À cette fin, une synthèse historique des politiques publiques brésiliennes et de leur impact sur la formation initiale des enseignants est présentée, ainsi que des notes sur ce que Nóvoa (2002) désigne comme des dilemmes de la profession enseignante, qui soutiennent l'idée que l'enseignant malade peut aussi

être considéré comme un dilemme du travail de ces professionnels. De cette manière, nous réservons une place dans le texte pour exposer la proposition selon laquelle le contexte sociopolitique et économique et les mécanismes de fonctionnement des écoles peuvent contribuer à la maladie des enseignants, à travers des politiques éducatives, qui sont élaborées sous l'influence d'organismes multilatéraux de diffusion. du modèle néolibéral. Par la suite, nous présentons un examen des pratiques réalisées par les étudiants de la Licence en Mathématiques dans les établissements d'enseignement. Ensuite, nous exposons notre conception selon laquelle la formation initiale des enseignants doit permettre: la construction de savoirs pédagogiques; la compréhension de l'élève que son métier nécessite une amélioration continue en raison des changements sociaux, politiques, économiques, culturels et scientifiques constants ; et le développement de pratiques qui permettent aux futurs enseignants d'interpréter, de réinterpréter et de systématiser leurs expériences, afin de maintenir un processus continu de construction de leur être enseignant.

Mots-clés : Formation initiale des enseignants, Mathématiques, Dichotomie université/école, Relation théorie/pratique, Politiques éducatives.

Resumo

Este artigo visa apresentar as práticas realizadas na disciplina de Currículo em Educação Matemática para a inserção dos discentes da Licenciatura em Matemática da Universidade Federal de Pelotas nas escolas. Para tanto, parte-se é uma síntese histórica das políticas públicas brasileiras e o seu impacto na formação inicial de professores, juntamente com apontamentos acerca do que Nóvoa (2002) designa por dilemas da profissão docente, os quais alicerçaram a ideia de que o adoecimento docente também pode ser considerado um dilema do labor destes profissionais. Desta forma, reservamos um espaço do texto para expor a proposição de que o contexto sociopolítico e econômico e os mecanismos de funcionamento das escolas podem contribuir para o adoecimento dos professores, por intermédio das políticas educacionais, que são elaboradas sob influência dos organismos multilaterais disseminadores do modelo neoliberal. Após, apresentamos um exame das práticas realizadas pelos alunos da Licenciatura em Matemática nas instituições de ensino. Na sequência, expomos nosso entendimento de que a formação inicial docente deve permitir: a construção do conhecimento pedagógico; a compreensão do licenciando de que o seu ofício exige contínuo aperfeiçoamento devido as constantes mudanças sociais, políticas, econômicas, culturais e científicas; e ao desenvolvimento de práticas que proporcionem aos futuros professores interpretar, reinterpretar

e sistematizar suas experiências, para a manutenção de um processo contínuo de edificação do seu ser professor.

Palavras-chave: Formação inicial de professores, Matemática, Dicotomia universidade/escola, Relação teoria/prática, Políticas educacionais.

Construction of the theory/practice relationship through strategies to overcome the university/school dichotomy

On April 12, 2011, the Movimento Todos pela Educação³ (Movement All for Education) launched an advertising campaign with the slogan “A good start, a good teacher”. The movement’s electronic address explicitly states that this non-profit, plural, suprapartisan and independent civil society organization, which does not receive public funds, aims to improve Brazil, boosting the quality and equity of basic education in the country. The motto “A good start, a good teacher” makes it possible to understand that a good teacher is necessary for students to learn.

From the way we interpret the maxim set out in the previous paragraph, we draw the following line of reasoning: “It takes a good teacher for the student to learn, consequently, to be a good teacher, it is necessary to receive good education”. National and international educational public policies defend the idea that promoting quality initial teacher education courses is crucial to provide students with an education of excellence.

Given the relevance of the theme and considering the National Common Curricular Base for Teacher Education⁴ (Base Nacional Comum Curricular - BNCC), which aims to guide the different forms of qualification for teaching in the stages and modalities of early childhood education, elementary school, and high school, this manuscript aims to present the practices carried out in the subject Curriculum in Mathematics Education with a view to the insertion of students of the Mathematics Degree of the Federal University of Pelotas (UFPEL) in schools. We should note that many undergraduates do not have the opportunity to participate in public policies for the insertion of prospective teachers in schools, namely: the Institutional Teaching Initiation Scholarship Program (Programa Institucional de Bolsa de Iniciação à Docência - PIBID) and the Pedagogical Residency Program (Programa Residência Pedagógica).

Our explanations are theoretically based on the works of researchers António Nóvoa and Francisco Imbernón, who are references in the area of education, with numerous publications on the subject addressed in this text. However, contributions from other scholars engaged with teacher education will also be taken into account.

The research on teacher education is broad, divided into initial teacher education and continuing teacher education. We emphasize that the considerations presented in this article will

³Movimento Todos pela Educação has a proposal available through the electronic address: <https://www.todospelaeducacao.org.br/>. Accessed on October 5, 2022.

⁴The document containing the National Common Curricular Base for Teacher Education is available at: <http://portal.mec.gov.br/component/content/article/211-noticias/218175739/72141-formacao-de-professores-sera-norteada-pelas-regras-da-bncc?Itemid=164>. Accessed: October 19, 2015.

focus on the education of prospective teachers from university undergraduate courses. The next section will expose the reflections on Brazilian public educational policies and their impact on initial teacher education.

Historical synthesis of Brazilian public policies and the reflection of these programs in the initial teacher education

In the last decade of the twentieth century, according to Oliveira et al. (1996), the I World Conference on Education for All took place in the city of Jomtien (Thailand), with the purpose of bringing together representatives of governments of countries with significant problems in their educational system. This event was organized by multilateral organizations (UNESCO, UNICEF, UNDP, and the World Bank)⁵. It resulted in the elaboration of the World Declaration of Education for All and its Plan of Action in 1990. The New Delhi Declaration in 1993⁶ influenced the reformulation of educational public policies in several countries, and this information corroborates with the idea of Nóvoa (2007) that, in the 1990s, there were concerns inherent in school organization, its operation, administration, and management.

In the Brazilian scenario, the interference of the documents originating from the Jomtien Conference was shown in the construction of the National Curriculum Guidelines (Diretrizes Curriculares Nacionais - DCNs) and the National Curriculum Parameters (Parâmetros Curriculares Nacionais - PCNs), during the mandate of Fernando Henrique Cardoso (FHC). Cunha (1996) states that FHC's government proposal as a candidate for the Presidency of the Republic already contained Cunha's idea (1996, p. 54) of "centralized maintenance of quality control of teaching, implying a national curriculum and a national system of measurement of learning", based on the model of education implemented in England, by Margareth Thatcher, and in the United States, by Ronald Reagan.

We agree with Libâneo et al. (2012) when they emphasize the economic standard adopted by international financial organizations and the Thatcher government in the 1970s, and Reagan, in the 1980s, called neoliberalism. This economic policy was undertaken in Brazil in 1994 (FHC mandate) and is still in force.

⁵UNESCO – ORGANIZAÇÃO DAS NAÇÕES UNIDAS PARA A EDUCAÇÃO, A CIÊNCIA E A CULTURA; UNICEF - United Nations Children's Fund (Fundo das Nações Unidas para a Infância); UNDP — United Nations Development Programme (PNUD - Programa das Nações Unidas para o Desenvolvimento).

⁶The World Declaration on Education for All and its Action Plan is available at: <https://www.unicef.org/brazil/declaracao-mundial-over-educacao-para-todos-conferencia-de-jomtien-1990>. Accessed on: November 4th, 2022.

The New Delhi Declaration is available at: <http://www.direitoshumanos.usp.br/index.php/Direito-a-Educa%C3%A7%C3%A3o/declaracao-de-nova-delhi-so-educacao-para-todos.html>. Accessed on: November 4th, 2022.

We base this work on Libâneo et al. (2012) to attest that neoliberalism defends the market economy boosted by private enterprise, the total freedom of the market, and also limited government, the minimum state and the open, competitive society, radically opposing the state policies of university, equality, and gratuitousness of social services, such as health, social security and education. Moreover, this economic model is characterized by the criticism of state paternalism and the increasing nationalization and social regulation that act on the individual's fundamental freedoms through arbitrary interference, endangering political, economic, and social freedom. Furthermore, at the end of this paragraph, we emphasize our agreement with Nóvoa's (2002, p. 12) words: "Education is in the process of being considered a 'commodity', subject to the laws of trade and free competition".

Specifically in education, the guidelines of the neoliberal economic model emphasize private education, appreciate the differentiated/dual school and the formation of intellectual elites, and emphasize an education that meets the demands/demands of the market. These indications are also part of the Jacques Delors Report⁷ of 1998, named "Education, a Treasure to Discover", a product of the UNESCO International Commission on Education for the XXI Century, which stipulated the four major needs of learning, namely: learning to learn, learning to do, learning to live together, and learning to be.

The following question arises from our reflection on these four pillars of knowledge above: "Do teachers have satisfactory professional education to adapt their subjects' curriculum to these principles?" The document in the chapter entitled "Teachers in search of new perspectives" presents some comments on the initial and continuing teacher education for them to teach their classes according to the four essential foundations for learning prescribed by the report. It also gives clues and recommendations for such preparation to be adequate. We will focus on Delors' opinion as a measure to improve the quality of initial teacher education, as the preparation of prospective teachers is the focus of this article. It is up to the initial teacher education

to establish closer links between universities and formation institutes for prospective primary and secondary teachers. In the long term, the aim should be to ensure that all teachers, but especially secondary teachers, have completed higher education and that their education is provided in cooperation with universities or even in university settings. On the other hand, given the role of the future teacher in the development of pupils' personalities, this formation should focus mainly on the four pillars of education. (Delors, 1998, p. 159)

⁷Jacques Delors report available at: http://dhnet.org.br/dados/relatorios/a_pdf/r_unesco_educ_tesouro_descobrir.pdf. Accessed: November 5th, 2022.

The previous quote demonstrates the influence exerted by documents from international institutions with neoliberal economic bias on educational public policies adopted by the Brazilian government because these measures for initial teacher education were part of the goals of the 2001 – 2010 National Education Plan⁸ (PNE 2001 – 2010), with the following text of MEC (2001, p. 67): “Expand, through the collaboration of the Union, States, and Municipalities, formative in-service programs that ensure all teachers the possibility of acquiring the qualification required by the Law of Guidelines and Bases of National Education, observing the guidelines and curricular parameters”.

When referring to initial education, the Delors Report determines that teachers without qualification for teaching at the level they teach and in the modality they teach, i.e., without a diploma, acquire it through higher education –unlike the construction of prospective teachers proposed by Nóvoa (2019), unlike the construction of prospective teachers proposed by Nóvoa (2019), with whom we agree, and who expresses apprehension about the quality of teacher education.

In the article “Os professores e a sua formação num tempo de metamorfose da escola” (Teachers and their education in a time of school metamorphosis), Nóvoa (2019) defends the thesis that it is essential to bring together in the same environment teachers working in basic education, prospective teachers, and teacher educators because, according to him, it is in this space called “common home” that adequate knowledge will be boosted to educate the prospective teachers. This author explains the importance of reconciling scientific, didactic, psychological, and curriculum knowledge to obtain a qualified teacher as a product of undergraduate courses.

There are two educational public policies implemented by the Brazilian government, managed by the Coordination for the Improvement of Personnel’s Higher Education (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - CAPES) that have similarities with Nóvoa’s idea (2019) about the common house: the PIBID and the Pedagogical Residency Program.

The PIBID was instituted through Ordinance No. 38, of December 12, 2007⁹, during the second term of Luiz Inácio Lula da Silva, to stimulate from the beginning teachers’ education (up to half of it), observation and reflection on professional practice in the daily life of public

⁸ National Education Plan 2001 – 2010 is available at: <http://portal.mec.gov.br/arquivos/pdf/L10172.pdf>. Accessed on: November 5th, 2020.

⁹Ordinance No.º 38, of December 12, 2007 available at: http://portal.mec.gov.br/arquivos/pdf/portaria_pibid.pdf. Accessed on: November 8th, 2022.

schools of basic education. During the program, undergraduates participate in the daily life of schools under the supervision of a teacher of the institution for basic education and also by a teacher of their degree course. Normative N. 38, in the first section, highlights that:

§ 1º The objectives of the PIBID are:

- I - encourage the teacher education for basic education, especially for high school;
- II - value the teaching profession, encouraging students who choose the teaching career;
- III - promote the improvement of the quality of basic education;
- IV - promote the integrated articulation of higher education in the federal system with basic education in the public system to the benefit of solid initial teacher education;
- V - raise the quality of academic actions aimed at the initial teacher education in undergraduate courses at federal institutions of higher education. (MEC, 2007, p. 01)

Unfortunately, the PIBID is being reduced in higher education institutions (HEIs) due to budget cuts that have constantly plagued the MEC, leading to the understanding that education is not on the list of priorities of Brazil's last representatives. These financial constraints affect, in particular, federal public universities and institutes of education, i.e., educational networks that use this program.

The Pedagogical Residency program was established through Ordinance N. 38, of February 28, 2018¹⁰, during the government of Michel Temer, with the purpose of inducing the improvement of practical education in undergraduate courses, promoting the immersion of prospective teachers in basic education schools from the second half of their course. The developers of this program assume that it is essential to ensure graduates with skills and competencies that allow them to be well-prepared professionals to teach. According to Ordinance N. 38 of 2018, the objectives of this teacher education policy are:

- I. Improve the education of undergraduate students by developing projects that strengthen practice and lead the student to actively exercise the relationship between theory and professional teaching practice, using data collection and diagnosis on teaching and school learning, among other didactics and methodologies;
- II. Induce the reformulation of supervised internship in undergraduate courses, based on the experience of pedagogical residency;
- III. Strengthen, expand, and consolidate the relationship between the HEI and the school, promoting synergy between the entity that forms and those that will receive graduates of teaching degrees, in addition to stimulating the protagonism of education networks in teacher education; and
- IV. Promote the adequacy of curricula and pedagogical proposals of initial education courses for basic education teachers to the guidelines of the National Common Curricular Base (Base Nacional Comum Curricular - BNCC). (Brasil, 2018, p. 01)

¹⁰Ordinance No.º 38, of February 28, 2018 available at: <https://www.capes.gov.br/images/stories/download/legislacao/01032018-portaria-n-38-de-28-02-2018-residencia-pedagogica.pdf>. Accessed on: November 8th, 2022.

Both PIBID and Pedagogical Residency are implicitly synchronized with Nóvoa's (2002) conception that "teachers must be trained, not only for a pedagogical relationship with students but also for a social relationship with 'local communities'" (Nóvoa, 2002, p. 24). In addition, we believe that the contact of undergraduates with the routine of their future workspace contributes to at least mitigating what this author calls the dilemmas of the teaching profession, namely: the dilemma of the community, the dilemma of autonomy, and the dilemma of knowledge.

Because we agree with Nóvoa (2002) on these adversities inherent to the teaching profession, we consider it pertinent to close this section of the text by exposing them. However, before reflecting on the dilemmas of the teaching profession, we emphasize that not all students have the possibility of participating in the experiences provided by the programs explained above, and this is due both to issues inherent to the socio-political and economic context of the students, as there are specific aspects of the management of educational public policies, which, as mentioned before, are enduring recurrent budget reductions. We want to emphasize that the participating students shown in a later section are not part of the educational programs for welcoming prospective teachers in basic education institutions.

From this point on, we resume the ideas about the professional problems listed by Nóvoa (2002). Regarding the dilemma of the community, António Nóvoa, in 2002, points out that this obstacle is linked to the need for the teacher to know how to relate and know how to be related, meaning that it is up to the teacher to actively participate not only in pedagogical issues but in political, cultural, and social demands, thus performing work along with the local communities.

Concerning the dilemma of autonomy, Nóvoa (2002) attests that this impasse is related to the fact that teachers must learn to organize and get organized, but for this learning to occur, it is essential to make room for assessment devices, i.e., tests and works, as these mechanisms enable a dialogue between school and society, in addition to being a tool to align pedagogical and professional actions. We emphasize that the idea of assessment proposed by the author in no way resembles those tests designed by the Organization for Economic Cooperation and Development (OECD), which, through the unsatisfactory results (which are already expected) of the tests prepared for students from countries with educational problems, intend to hold teachers responsible for the failure of education.

For the theoretical reference of this essay, António Nóvoa, the only way to solve the dilemma of knowledge is through what he calls the study of activity. We understand that the realization of this enterprise (study) permeates the inevitability of reflection on the teaching vocation. We make our own the words of Nóvoa (2002, p.29) when he points out that "it is

necessary to go beyond ‘surface discourses’ and seek a deeper understanding of educational phenomena. Study. Know. Investigate. Assess. Otherwise, we will remain hostages to demagoguery and ignorance.”

We also agree with Imbernón (2022) on his idea that

Initial education is very important, since the set of attitudes, values and functions that initial education students give to the profession will be subjected to a series of changes and transformations in line with the socializing process that occurs in this initial education. It is there that certain habits are generated that will affect the exercise of the profession. (Imbernón, 2022, p. 57)

We agree with Nóvoa (2002) on the need to understand the issues inherent to education, and with Imbernón (2022) on the relevance of initial education, as it is at this stage that customs are consolidated that will reverberate throughout the professional career. We believe it is important to add to the set of dilemmas of the teaching profession a theme that is worrying us: teachers’ illnesses caused by work. Thus, the following section will reflect on how the socio-political and economic context and the mechanisms of functioning of schools, through educational public policies, become triggers for teacher malaise and relate this idea to the need for undergraduates to be prepared for professional challenges.

Teaching illness/malaise: one of the dilemmas of the teaching profession

We dedicate this space of the manuscript to reflect on what we consider one of the dilemmas of the teaching profession, teacher illness, for two reasons. Firstly, because this theme has stood out over the years and has become the focus of a series of research works, which is evident through the realization of the state of knowledge. Secondly, we understand that teacher illness should be part of the subjects discussed in undergraduate courses to make students aware of this subject. With this, perhaps we can have in the academy, in the future, psychological support for teachers who get sick because of work.

The purpose of the state of knowledge is to

identification, registration, and categorization that lead to reflection and synthesis on the scientific production of a specific area, in a particular space of time, gathering journals, theses, dissertations and books on a specific theme. One feature to highlight is its contribution to the presence of the new in the monograph. (Morosini et al., 2014, p. 155)

We believe that elaborating on the state of knowledge helps the researcher to know other investigations already carried out on themes similar to his own, thus ensuring the originality of

the work. We emphasize that when investigating academic publications dealing with teacher illness, we obtain evidence of its relevance to the scientific community and the university.

Regarding Morosini et al. (2014), regarding the state of knowledge, we selected the theses cataloged in the Capes Bank of Theses and Dissertations repository, using the descriptors (searched terms): teacher illness and teacher malaise. These terms were chosen because they interrelate with the researched subject.

When researching in the Capes Bank of Theses and Dissertations, through the descriptor *teacher illness*, we found 42 papers (33 master's degree dissertations and nine doctoral theses), of which three theses were selected through the questions listed above. For the term *teacher malaise*, the search resulted in 165 papers (135 master's degree dissertations and 30 doctoral theses), of which two theses were chosen within the selection criteria described in the previous paragraph.

From this point on, we will present ideas about teacher illness that make us believe that it is necessary to discuss the topic in initial teacher education courses. We agree with Esteve (1995, p. 97) when he claims that “an important element in the triggering of teacher malaise is the lack of support, criticism, and dismissal in society regarding educational tasks, trying to make the teacher solely responsible for teaching problems, when these are social problems that require social solutions”. Esteve (1999, p. 99) adds that teacher malaise is “an international phenomenon that reaches all the countries of our cultural context. The first indicators became evident in the early 1980s in the most developed countries.”

He also states that, currently, society commits an injustice by blaming teachers for the failure of education, which has a standardized education system, thus structured with the justification of combating the social, economic and intellectual crisis that prevails in our time. The accountability of teachers for the failure of the educational system contributes to these professionals becoming ill. This idea of the overload of responsibility of the teaching profession converges with the thought of Imbernón (2022) that teachers are responsible for the attributions of other social actors involved in the educational process.

According to Esteve (1999), teacher malaise is related to two factors: primary or main factors and contextual or secondary factors. The primary causes are linked to the lack of resources for acquiring teaching materials, violence against teachers, unemployment that frightens many teachers and, finally, the exhaustion and accumulation of demands on the teacher. Regarding the secondary reasons, these are related to teaching action and linked to changes in the role of the teacher and traditional agents of socialization. For example, there is a transfer of activities from the family and society to the school and the appearance of new

agents of socialization represented by the mass media and cultural consumption that are added today to the teacher's information.

Aguiar et al. (2008) share the thinking of Esteve (1999) regarding teacher accountability for the failure of education. In addition, the authors state that:

The combination of precarious external conditions and the subject's subjective, particular, internal dispositions creates the possibility of illness of the teacher, even leading to the withdrawal of the professional teaching practice. This function can be experienced as a frightening and distressing threat from the school environment. (Aguiar et al., 2008, p. 20)

Agreeing with the authors above, we defend the idea that there are several factors that, together and articulated, can cause teacher illness, among them neoliberalism, precariousness and intensification of teaching work. From these aspects, we built our thesis that the conceptions contained in educational public policies, which are proposed by bodies under the economic aegis of neoliberalism, make precarious and intensify teachers' work, which can cause teacher illness. We do not intend to validate this assertion in this article, as it aims to present the practices carried out in the subject Curriculum in Mathematics Education with a view to the insertion of the mathematics degree students of UFPEL in schools. However, we believe that it can help insert the theme of teacher illness/malaise among the subjects dealt with in undergraduate courses.

After exposing some notes regarding teacher illness, which is one of the dilemmas of the vocation itself, we will then present the central point of this manuscript: the practices carried out by the UFPEL mathematics degree students in schools.

Relating theory to practice: fieldwork

This section exposes some activities developed in basic education schools by the UFPEL mathematics degree night course, along with the curricular component Curriculum in Mathematics Education. We recall that these students had not yet participated in educational public policy projects for inserting undergraduates in educational institutions, such as PIBID or the Pedagogical Residency.

After three months of organization, development, and presentation in basic education schools, the academics prepared a summary text in the form of experience reports and participated in the 2022 edition of the Salão Universitário da Universidade Católica de Pelotas (UCPEL). The event had a hybrid format (presentations made in person and online). All entries

have been approved, and these reports are published in the proceedings of the event and available on its website¹¹.

As the registrations were confirmed by the institution promoting the event, the academics, newcomers at congresses or seminars, were anxious about the presentations. We realized how all these learnings, not always foreseen in the curricular matrices, are fundamental for prospective teachers' formation. In addition, we believe that this experience, even generating anxieties, is necessary so that, when entering school as their field of work, the beginning teachers know how to act throughout circumstances in which they are exposing their ideas/research and/or perceptions about their professional practice.

Based on Nóvoa (2002), we understand that the teaching career must be built from collaboration/cooperation and dialogue, which occurs through the sharing of thoughts and experiences, requiring courage to externalize reflections/beliefs without fear of being judged/contradicted. Our humanity is going through a troubled moment; we can even say that the world is sick, and one of the pathologies is intolerance between opposing points of view. In the teaching profession, it is no different. Educational professionals disagree about the exercise of teaching. However, this is not the main problem; the issue is the absence of collectivity and interlocution, situations that can enhance teacher illness.

As teachers who defend the need for dialogue in the initial teacher education, we continue our observation and coexistence with the undergraduates, talking about their apprehensions about participating in the event. We had three weeks before the event to prepare PowerPoint presentations, essays, and exhibitions in the classroom to simulate the exposure of practices. We monitored all the academics so that we could dialogue and evaluate the subject Curriculum in Mathematics Education. Among the presenters, we had a work awarded as one of the best of the event.

A classroom meeting we held one week after the event was dedicated to collective reflection on the work proposal throughout the semester. Here, we resume the statement made in the previous section that the problems of educational institutions and the teaching profession, including illness due to work reasons, should be discussed in the environment of initial teacher education, which brings the school closer to the university, and promotes a dialogical relationship between theory and practice. In addition, we believe that the report of experience among academics is also part of the formative process. Then, we highlight below some of the

¹¹Electronic address of the event: <https://salao.ucpel.edu.br/>.

undergraduates' statements that indicate the need to address more intensely the difficulties of preparing to become a teacher and the situations inherent to the school space.

I am ending the semester sure that I want to be a teacher, despite all my insecurities, because I have never participated in an academic event and because I had never spoken in front of a classroom, I trembled a lot, but I was very happy when I realized that the students trusted me and asked questions about the work that was being done; I hope that in our next semester, I can do more work this way. (Reflection of one of the students in the Curriculum in Mathematics Education subject)

As a night study, I was never able to participate in PIBID, so, as we are working on Saturdays, I could participate in all activities in public schools. I enjoyed it a lot, I liked hearing the students calling me 'teacher', I wasn't afraid of not knowing, I talked a lot with the students. It's good to hear questions and – even answer: I can't answer them. And keep being questioned about other things. But a remark I would like to make, as the schoolteachers are very good, the guys know and try very hard. I was even thrilled. (Reflection of one of the students in the Curriculum in Mathematics Education discipline)

I really enjoyed being in the classroom as a teacher, even though I noticed some challenging looks from the students, and I was very tense and afraid that the students would notice my trembling, after a half hour, I could relax, and at the end of the first class, I already felt terrific. In the second meeting, I entered more safely and enjoyed the development of the class. I'd like to do these experiments more often, I think it prepares well for when I go to perform my teaching practice. And when talking to the teachers of the school, I think I understood the difficulties that this profession presents. (Reflection of a student of the Curriculum in Mathematics Education subject)

From this point on, we will show two experiences: “O uso de estruturas com palitos de fósforo na construção e no desenvolvimento de conceitos matemáticos de forma lúdica” (The use of structures with matchsticks in the construction and development of mathematical concepts in a playful way)¹² and “Construindo um conceito para a redução a partir de uma visão piagetiana” (Building a concept for shrinkflation from a Piagetian view). We emphasize that the subject proposes that prospective teachers should idealize and implement educational practices in local public schools to produce an analytical and reflective text, with theoretical support, on the perceptions and experiences that insertion in the school environment has provided them. The activities will be presented below.

¹²**Lúdico** *adj.* (a1958 cf. *MS10*)¹ relating to play, the toy. **2)** any object or activity which is intended more for amusement than for any other purpose [*<observava a criança em seus exercícios l.; corria, saltava, dançava...>*.] *<observing the child in their activities l.; ran, jumped, danced... >*. **3)** that does with gusto with no other aim than the very pleasure of doing it [*<trabalhar com leitura, para eles, era uma atividade l.>*] *<working with literature, for them, was such an activity >*. **4)** PSICN relating to the tendency or manifestation (artistic or erotic) that arises in childhood and adolescence in the form of play. © ETIM *lud(i)- + -'ico*. (HOUAISS, 2001, p. 1789).

The use of structures with matchsticks in the construction and development of mathematical concepts in a playful way

The academics developed activities based on the use of manipulable materials. To perform tasks, it is necessary to use logical reasoning. They justify the proposition of these questions because they believe that they enable the development of logical reasoning, the understanding of flat figures and their properties, and the dialogue between students for decision-making. The practice described below illustrates undergraduates' idea.

The students of basic education (9th grade of a municipal school) were presented with several structures made with matchsticks, representing mathematical objects, whether geometric figures or numerical expressions. Each structure was accompanied by instructions that must be sequenced to solve the given problem. Seven problem situations were proposed, similar to those in the manuscript sequence. However, in this article, we expose only one of the structures to exemplify the intention of the tasks of prospective teachers.

Figure 1 shows one of the structures, and the problem situation is given from the procedures:

- Identify the mathematical objects portrayed by the structure;
- Move two matchsticks so the structure represents three triangles.

The issue allows for several solutions. One of them is explained in Figure 2.

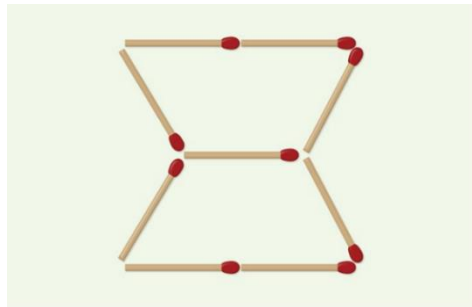


Figure 1.

The structure represents two trapezoids with the same smaller base

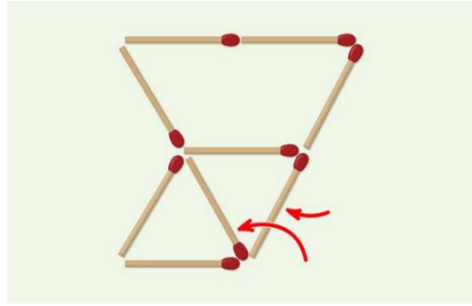


Figure 2.

One of the possible solutions to the issue

The creators of the task realized that it aroused the students' interest in solving the questions because they felt challenged, interacting and talking to each other about the search for strategies for resolution. Additionally, the academics analyzed the various solutions obtained for the problem situation. We believe that by proposing questions that enabled more than one way to reach one of several possible answers, they could demonstrate to elementary school students that mathematics is not subject/science stuck to the canons of accuracy, an idea that was long disseminated by the founders of Modern Science¹³, and which is still widespread in society.

Prospective teachers emphasize that for the best performance in learning mathematical concepts, it is interesting that the proposed activities are aligned with the contents worked in the classroom. Therefore, teaching action is important in relation to teaching planning. It should be noted that the tasks can be applied to revisit contents already worked on and develop learners' logical reasoning.

Practices such as the one described above legitimize our agreement with Imbernón (2022, p. 66) that “practices in educational institutions must favor an integral view of these relationships and must necessarily lead to analyzing the close dialectical relationship between theory and educational practice”. In addition, the realization of the activities of the undergraduates in the institutions of basic education refers us to what Nóvoa (2019) calls professional induction, which is the insertion of undergraduate students in the profession and in schools, which must occur through the dialogical relationship between the academic and school environments. The author believes that in Brazil, the educational public policies PIBID and Pedagogical Residency approach the concept mentioned above.

¹³Among the founders of modern science are Francis Bacon (1561-1626), Galileo Galilei (1564-1642), René Descartes (1596-1650), and Isaac Newton (1642-1727).

Thinking about the active participation of prospective teachers in the daily life of educational institutions, we made our own the words of Imbernón (2022): for them, it is relevant to be immersed in situations that provide them with the analysis and perception of

the great complexity of the educational fact instead of assuming a specific professional culture (this presupposes developing some practices in schools as a component of really reflective education), some skills that allow them and lead them to make decisions, to confirm or modify attitudes, values; in short, to configure the pedagogical option itself. (Imbernón, 2022, p. 64)

We believe that even today, there is a huge distance between the university and schools because they play different roles in teacher education. In academia, undergraduates acquire scientific, cultural, and intellectual knowledge with a view to becoming researchers, that is, the university is dedicated to the theoretical foundations of teaching activity, forgetting that after the completion of the courses, the professional environment of its graduates is different: the schools. Upon entering the school environment, recent graduates are faced with a totally different scenario, where, from the execution of work tasks, they will have contact with the concrete situations inherent to teaching; that is, they will experience the practice of their profession, where they leave aside all the theory learned at the university. Reflecting on our belief exposed at the beginning of this paragraph, we argue that practices such as those described in this article section are essential to overcome the dichotomy between the university and the schools. Next, we will present another activity of inserting UFPEL mathematics degree students into basic education schools.

Building a Concept for Reduction from a Piagetian View

The UFPEL mathematics degree students planned a task. They performed it in a municipal school in the city of Pelotas/RS, having as the target audience elementary school students. The theme they chose was the concept of *shrinkflation*. *Shrinkflation* is a commercial strategy that consists of decreasing the product's quantity, not increasing its price. However, according to the Consumer Protection and Defense Program (Programa de Proteção e Defesa do Consumidor - SSPS/RS), in practice, the product costs the consumer more because they are buying smaller amounts of the product while paying the same amount as the former bigger portion.

The task was to put several containers with capacities between 200 ml and 400 ml on a table. Each student was given two bottles of 200 ml of coloured water. The participant should

find the container with the same volume as the bottle. For that, the participant had three chances. Figures 3 and 4 illustrate the execution of the activity.



Figure 3

Presentation of the activity to students



Figure 4

Students performing the task

After all the participants performed the practice, academics and students discussed their perceptions when performing the task. At this moment, one of the students reported that, before he participated in the activity, the concept of very different containers storing the same volume did not make sense, which generated several comments from the participating students, for example, that the concept of volume learned in the classroom had not developed in them the understanding that this task provided.

The elaborators of the practice believe that its realization provided dialogue and exchange of experience among the basic education students, in addition to the understanding that the concrete material is a facilitator in the introduction of content, making students assimilate the subject better. It also contributed to the resumption of concepts, as their learning occurred without the need to memorize formulas and definitions.

Practices similar to those reported in this subsection of the manuscript are appropriate for initial teacher education that, according to Imbernón (2022), aims to equip teachers with intellectual tools that enable the knowledge and interpretation of complex situations inherent to

the school environment. In addition, we also agree with the author's idea that activities, which bring academics into educational institutions allow, according to Imbernón (2022, p. 44), "to give schooled education the dimension of a link between intellectual knowledge and social reality, with which it must maintain close relations".

A note by Nóvoa (2001) referring to the teaching practice in undergraduate courses here is fundamental, and for us, it is also relevant to other ways of bringing prospective teachers closer to their supposed work environment. For the Portuguese researcher, the students must examine the processes of organization of school work, class and classroom management, as well as the ways of using teaching methods and the ability to respond to unexpected situations, in addition to individual and collective skills, to carry out this analysis.

We agree with Nóvoa (2001), and we understand that it goes against the idea of Imbernón (2022) that

prospective teachers should also be prepared to understand the transformations that are emerging in different fields and to be receptive and open to pluralistic conceptions, able to adapt their actions to students' needs in each time and context. For this, it is necessary to apply a new methodology and, at the same time, to carry out constant research (the teacher can generate pedagogical knowledge in his practice) that does more than provide them with a heap of formal knowledge and pre-established, static, and fixed cultural forms, instilling in them an attitude of investigation that considers both the theoretical and practical perspective, observation, debate, reflection, the contrast of points of view, the analysis of social reality, alternative learning by case study, simulations and dramatizations. (Imbernón, 2022, p. 64)

We conclude this part of the article dedicated to showing the practices developed and carried out by UFPEL mathematics degree students in public schools, defending our position that initial teacher education should be based on a dialogical relationship between theory and practice. As long as they are not planned to overcome the barriers that distance the academy from school institutions, through the professional constitution supported by the intertwining of praxis with theory, with a curriculum whose purpose is the development of the capacity of teaching thinking about the practice itself, to learn to interpret, understand, and reflect on the social reality and their profession, the formative courses will be incomplete, as they will give a theoretical foundation to their students without articulating it to the daily life of the profession. Next, we present our final considerations.

Final considerations

To achieve the objective of the text, which was to present the practices carried out in the subject Curriculum in Mathematics Education to insert UFPEL (Federal University of Pelotas)

mathematics degree students in schools, we traced a path that began with a historical synthesis of Brazilian public policies and the reflection of these programs in the initial teacher education, where we wove reflections on PIBID and Pedagogical Residency. To us, these programs are an important initiative to overcome the dichotomy between theory and practice in teacher education. However, we emphasize that in the last administrations of the federal government, these public policies have been losing space due to successive budget cuts, resulting in decreasing participation of undergraduates.

We also thought about what António Nóvoa calls *the dilemmas of the teaching profession*. From this, we dared to add to the set of these dilemmas teachers' illnesses caused by the teaching profession. The notes arising from this idea allow us to affirm two things: first, the socio-political and economic context and the mechanisms of functioning of schools, through public educational policies, become triggers for teacher malaise; second, due to its importance, this topic must be debated in the university, more precisely, in undergraduate courses.

In the last section of the text, we emphasized the activities developed and implemented by the academics in basic education schools, with the participation of the students of these institutions. These tasks were intended to relate the theoretical and practical foundations from the insertion of the undergraduates in their future work environment so that they, from the initial formation, could have an overview of the daily life of the schools. We believe that the UFPEL mathematics degree students could experience situations that modified their conceptions and/or beliefs about work intrinsic to the school context.

Analyzing and meditating on the performed integration movement (university/school), which was raised by the practices presented in this article, we state that we are in favor of an initial teacher education that allows: the construction of pedagogical knowledge whose enterprise is only carried out through the theory/practice relationship, the students' understanding that their profession requires permanent formation due to constant social, political, economic, cultural, and scientific changes, whose qualification can come from a professional investigative posture, and the development of practices that help prospective teachers to interpret, reinterpret, and systematize their experiences to maintain a continuous process of building their "being a teacher".

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