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Submitted: 12 Jan. 2022

Accepted: 10 Mar. 2022

Published: 28 Oct. 2022

 10.20396/riesup.v10i00.8663758
e-location: 024006
ISSN 2446-9424

Anti-plagiarism Check



Distributed on



Challenges and difficulties of university professors beginning in the area of Natural Sciences and the formative potential of the teaching internship

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ABSTRACT

Introduction: The teacher preparation process for higher education is complex and little explored. Here, present results of research carried out with university professors (beginners), acting as teacher educators in a Biological Sciences course at a Brazilian public university. **Objective:** aiming to present their representations regarding the difficulties/challenges in relation to teaching. **Methodology:** This is a case study, of a qualitative and quantitative nature, exploratory, based on the legislation in stricto sensu Postgraduate courses that regulates teaching internships and what some renowned authors say about this formative space. From a mixed questionnaire, the social representations of individuals were raised and analyzed using the technique of the Collective Subject Discourse. **Results:** The main difficulties / challenges faced and their suggestions aiming to minimize / remedy them, can be summarized to the following ones: pedagogical, referring to the planning and execution of classes; bureaucratic ones, such as filling in documents and complying with regulations; lack of support / guidance from coordinators; and personal concerns, related to the quality of the education offered and the disinterested behavior of students, among others. **Conclusion:** Although they cannot be generalized, the results indicate that the preparation for teaching, which should be carried out during graduate school, is not yet presented as a training place, despite the intention of the proponents.

KEYWORDS

University teaching. Teaching internship. Teaching knowledge. Professional identity.

Desafios e dificuldades de docentes universitários iniciantes na área de Ciências da Natureza e o potencial formativo do estágio de docência

RESUMO

Introdução: O processo de preparação de docentes para o ensino superior é algo complexo e pouco explorado. Apresentam-se, aqui, resultados de investigação realizada com docentes universitários (iniciantes), atuando como formadores de professores num curso de Ciências Biológicas de uma universidade pública brasileira.

Objetivo: Visa apresentar suas representações no que diz respeito às dificuldades/desafios em relação ao ensino. **Metodologia:** Trata-se de um estudo de caso, de cunho quali-quantitativo, uma pesquisa exploratória, fundamentada na legislação que normatiza os estágios de docência em cursos de Pós-Graduação *stricto sensu* e no que dizem alguns autores de renome a respeito deste espaço formativo. A partir de um questionário misto, as representações sociais dos participantes foram levantadas e analisadas por meio da técnica do Discurso do Sujeito Coletivo. **Resultados:** As principais dificuldades/desafios enfrentados e suas sugestões visando minimizá-las/saná-las, podem ser resumidas às de ordem: pedagógicas, referentes ao planejamento e execução de aulas; burocráticas, como preenchimento de documentos e atendimento de normativas; falta de apoio/orientação por parte de coordenadores, baixos salários; e preocupações de ordem pessoal, relacionadas com a qualidade do ensino oferecido e com o comportamento desinteressado de alunos, entre outros.

Conclusões: Embora não possam ser generalizados, os resultados apontam que a preparação à docência, que deveria ser realizada durante a pós-graduação, ainda não se apresenta como lugar formativo, apesar das intenções dos proponentes.

PALAVRAS-CHAVE

Docência universitária. Estágio de docência. Saberes docentes. Identidade profissional.

Retos y dificultades de los profesores universitarios que se inician en el área de Ciencias Naturales y el potencial formativo de la pasantía docente

RESUMEN

Introducción: El proceso de preparación de profesores para la educación superior es complejo y poco explorado. Aquí, se presentan los resultados de la investigación realizada con profesores universitarios (principiantes), actuando como formadores de docentes en un curso de Ciencias Biológicas en una universidad pública brasileña. **Objetivo:** Objetiva presentar sus representaciones sobre las dificultades/desafíos en relación a la enseñanza. **Metodología:** Este es un caso de estudio cualicuantitativo, exploratorio, basado en la legislación que regula las etapas de la docencia cursos de posgrado en sentido estricto y lo que dicen algunos autores reconocidos sobre este espacio formativo. A partir de un cuestionario mixto se plantearon y analizaron las representaciones sociales de los individuos utilizando la técnica del Discurso Colectivo del Sujeto. **Resultados:** Las principales dificultades / desafíos enfrentados y sus sugerencias para minimizarlos / remediarlos, se pueden resumir en los siguientes: pedagógicos, referidos a la planificación y ejecución de clases; los burocráticos, como la cumplimentación de documentos y el cumplimiento de normativas; falta de apoyo / orientación de los coordinadores; y preocupaciones personales, relacionadas con la calidad de la educación ofrecida y el comportamiento desinteresado de los estudiantes, entre otros. **Conclusión:** Si bien no se pueden generalizar, los resultados indican que la preparación para la docencia, que debe realizarse durante el posgrado, aún no se presenta como un lugar de formación, a pesar de las intenciones de los postores

PALABRAS CLAVE

Docencia universitaria. Pasantía docente. Conocimientos profesionales. Identidad profesional.

CRediT

- **Acknowledgments:** The present work was carried out with support from Pró-Reitoria de Pesquisa da Unesp (SP).
- **Funding:** IC Scholarship
- **Conflicts of interest:** The authors certify that they have no commercial or associative interests that represent a conflict of interest regarding the manuscript.
- **Ethical approval:** Not applicable.
- **Availability of data and material:** Not applicable.
- **Authors' contributions:** Conceptualization, Research development, Data analysis, Text writing - redaction, Methodological design: Writing - revision & editing: Cortela, B.S.C.; Research development, Data analysis, Writing of the text - essay: Gebara, G.O.; Data analysis, Writing of the text - essay: Ferrari, T.

1 Introduction

The research interest of the authors of this article has been the university teaching and the multiple facets that involve the preparation of this professional in post-graduate courses *stricto sensu* and also in their field of action: the locus of their work, that is, the organizational models of the university, pure or hybrid, which reflect different ways of acting and thinking about the social function of the university (SOUZA et al, 2013); the competencies linked to the functions that this professional is called to perform, referring to teaching, research, extension, management, and business (ZABALZA, 2005); about their knowledge (GAUTHIER et al., 1998; TARDIF, 2002); their field of action and professional identity (MARCELO, 2009); the formative possibilities of the teaching internship (HOFFMANN; DELIZOICOV NETO, 2015, 2017), among others. The main purpose of this research agenda is to contribute to the process of building a body of knowledge specific to university pedagogy, especially for those who work with the training of new teachers in the area of Natural Sciences.

As Passos et al. (2017) point out, there has been a growth of courses in higher education, not only public ones, because of the Restructuring and Expansion of Federal Universities (REUNI) in Brazil, but also in private universities and colleges, supported by public policies such as the Student Financing Fund (FIES), for example. This expansionist movement puts higher education in check as it signals a movement of democratization of access, but at the same time, it masks the mercantile massification and the decline in the quality of education (BRITO; CORTELA, 2020). This expansion also brings with it a demand for hiring new teachers, and the concern with the process of training/preparation of these professionals has been the target of interest of researchers.

The present article aims at explaining some of the training needs of beginning teachers in higher education, concerning didactic and pedagogical knowledge necessary for professional performance, discussing aspects related to teaching knowledge and the teaching internship carried out in *stricto sensu* graduate courses, both from the perspective of researchers and the legislation. To this end, the answers given by a group of student-fellows who were working as substitute teachers in an undergraduate course in Biological Sciences at a public Brazilian university at the end of 2017 will be presented and discussed here. The analysis methodology is based on the collective subject discourse technique (LEFEVRE; LEFEVRE, 2012), which is based on Moscovici's (2013) theory of Social Representations.

The participants of the research reported here are limited to early career teachers, who work in public universities and undergraduate courses, since thinking about principles and training processes requires considering the scenario and context of their performance. As Almeida (2012) well considers, teachers in private colleges or universities in Brazil are not necessarily dedicated to research and/or management. They are primarily concerned with teaching classes, have little influence in defining the pedagogical directions of the institution where they work, within a certain instability of employment, conditions that are quite different from those of teachers who work in public universities.

Depending on the mission of the institution and the functions assigned to the professors, the types of activities developed by them are also different. We argue that even in public institutions, the statement that all teachers perform with the same commitment and efficiency the activities inherent to teaching, extension, management, and business is not true.

Also, the way in which multiple teaching activities are valued within the university may lead to different choices by professionals, especially those who are newcomers (beginning teachers) or newcomers (those who have teaching experience in other levels and/or higher education institutions and are newly hired). The research activity has been the major focus in the public university, given the institutional demands regarding the production of papers, internationalization, among others. That is, the criteria for evaluating the quality of the university teacher are concentrated, to date, in their academic production, given, among other factors, that it is from it that the same gets funding from funding agencies and, thus, is able to accumulate certain social capital that ensures a prominent position in the field and, consequently, recognition among their peers (BOURDIEU, 2011).

In this sense,

First, it should be noted that professional prestige (social recognition, ability to influence, intrinsic and extrinsic rewards, etc.) is provided exclusively by research activity and scientific production. Thus, a mediocre teaching attitude can be rewarded if the teacher is a good researcher. The opposite case_a good teacher who does not research_would have less institutional recognition and social prestige. (PERES, 1989, apud MARCELO, 1999, p. 244)

It is argued that university professors build what is considered here as sub-identities, based on knowledge acquired because of the different activities they are called to perform, and by their personal interests. And these, together, form a professional identity, which changes throughout the career because of varied factors. It is understood that identity is a set of characters that are specific to a person, that is, what identifies the individual. However, Oliveira (2004) considers that the professional teaching identity involves not only personal aspects, i.e., elements that the subject considers important to him or herself, but also social aspects, those valued socially, in addition to institutional ones.

Professional identity is not a stable, inherent, or fixed identity. It is the result of a complex and dynamic balance where one's image as a professional must harmonize with a variety of roles that teachers feel they must play. (BEJAARD; MEIJER; VERLOOP, 2004 apud MARCELO, 2009, p. 112)

According to Pimenta and Anastasiou (2002), professional identity is also built based on the social meaning of the profession, which changes over time, influenced by historical and political-social conditions. And from the conditions of discourse production, that is, by the meaning that each teacher gives to the activities he or she performs, based on his or her values, life history, and social representations about teaching. Teaching identity is understood as being a "[...] set of representations, put into circulation by speeches related to the ways of being and acting of teachers in the exercise of their functions [...]" (GARCIA; HYPOLITO; VIEIRA, 2005, p. 47).

Thinking about the work locus of the university teacher, as pointed out by Souza et al.

(2013), the redemocratization of the 1980s begins a period characterized by the approximation with neoliberal ideals that brought with it, in universities, a process of teacher evaluation based on academic production, with greater weight on research, but also charging extension and teaching activities.

In this sense, the difficulties in acting within a university model of neoliberal administration, focused on productivity, with a view to the lowest cost, the greatest benefit and in the least time, makes the professional choose which activities to perform with his purposes in mind. The time factor, or rather, the lack of it, favors the rationalization of work, dictating the pace and taking the teaching activities, of intellectual content and that demand reflection for reworking, in the direction of a productivity of often doubtful quality.

[...] in this sense, teaching and research become competing activities and as the second is much more valued, both in terms of academic prestige and management models, teaching ends up being relegated to the background or even to no background at all. (CORTELA; NARDI, 2015, p. 48)

Also, as Almeida (2012) reports, most university teachers have difficulty in admitting and recognizing the importance of didactic and pedagogical dimensions in the act of teaching. The author argues that this resistance stems, among other causes, from the legacy of the hegemonic paradigm of the Exact and Natural Sciences, according to which specific contents have greater importance in initial training than those of a pedagogical nature. Corroborating,

Also, the beliefs to which teachers cling throughout their training seem to be strongly influenced both by certain systematized knowledge and by the operational garb that has commanded the functioning of the school over the generations. (PENIN; MARTÍNEZ; ARANTES, 2009, p. 36)

Considering the aspects reported above, some questions seem relevant: a. how are the *stricto sensu* post-graduation students being prepared to work in higher education? b. how do they face the shock with reality at the beginning of their career? c. what are their challenges/difficulties and how do they try to overcome them? d. how can post-graduation courses collaborate with the pedagogical training of their students?

Questions of this nature make sense as their answers, once found, are likely to be addressed to improve the quality of the actions of these professionals and enable the adoption of continuing education models compatible with the idiosyncrasies experienced.

2 The preparation of teachers for higher education in Brazil: legal requirements

Cunha (1998, p. 33) states that "[...] the university teacher is the main agent of decisions in the field [...], it is (who) materializes the pedagogical definition and, in the academic power structure, represents the greatest strength". However, even having so much weight in the effectuation of intended changes, the work of the university teacher has not been the target of research, as pointed out by some authors (ALMEIDA, 2012; DELIZOICOV, 2010; PASSOS et al., 2017) and in some surveys already carried out.

The current Law of Directives and Bases of Education (LDB 9394/96) brings in its

Art. 66, in a laconic way, that "The preparation for the exercise of higher teaching will be done at the graduate level, primarily in master's and doctoral programs" (BRASIL, 1996). In other words, the locus of this preparation, which is not training as it would be ideal, should occur in graduate courses. Even considering that those who attend graduate courses have already gone through an undergraduate course, it can be a bachelor's course, in which issues related to teaching are not necessarily addressed.

It is also a fact that the *stricto sensu* graduate programs, even those linked to the teaching area, have as their main objectives research and the production of knowledge, and rarely attend to the aspects related to teaching for teaching. Some authors point out that, in most of them disciplines that focus on themes related to higher education are almost non-existent (OLIVEIRA; VASCONCELLOS, 2016); only student-fellows are required to carry out the teaching internship, as instituted by the Coordination for the Improvement of Higher Level Personnel (CAPES), as of 1999; and that the interns have not produced articles/work that involve subjects related to the internships (HOFMANN; DELIZOICOV NETO, 2017), facts also observed in this article, based on the survey conducted by the authors and that will be addressed throughout this text.

It is argued here that, although the *stricto sensu* post-graduation historically has its focus on the training of the researcher, it can also be a place for the training of future university teachers. As Soares and Cunha (2010, p. 53) point out "[...] the place is constituted when we attribute meanings to the spaces, i.e., when we recognize their legitimacy to locate actions, expectations, hopes and possibilities". Thus, the post-graduation constitutes a formative place of research, since it legitimizes the one who completes it as a producer of knowledge; however, it is still a formative space regarding teaching, since not all graduates are recognized (or recognize themselves) as higher education teachers. For space to be considered a place, it must be demarcated and occupied.

Article 65 of LDB 9394/96 (BRASIL, 1996) points out that teaching practice is not a requirement for higher education teaching. "Teacher training, except for higher education, shall include teaching practice of at least three hundred hours" (emphasis added). From what has been said, one can see what has not been said: that is, that the preparation for teaching in higher education can do without practice, that is, didactic activity with supervision. In this sense, as Morosini (2000, p. 13) points out, "The main characteristic of this legislation about who the university teacher is, in terms of his/her didactic training, is silence".

Despite this gap in the legislation, other elements may favor the post-graduates' didactic formation: presence of didactic-pedagogical disciplines in post-graduation courses, mandatory performance of teaching internships, systematically guided and supervised by teachers of these programs.

2.1 Graduate teaching internship: a space for acquiring/consolidating knowledge and building a professional identity

CAPES circular 028/1999 determines that the teaching internship is mandatory for all students attending master's and doctoral programs, justifying it as a formative space that aims to minimize the impact with the reality of teaching arising from the lack of pedagogical training of bachelors, for example.

It is observed that the ordinance 52/2002 (CAPES), when approving the new regulation of the Social Demand Program, conditions the grant of the scholarship to the accomplishment of the teaching internship, which must be in accordance with the instructions of the 17th article: load superior to 60 hours, duration of one semester for the master's degree and two semesters for the doctorate; and, worrisome, "[...] the higher education teacher who proves such activities will be exempt from the internship" (Art. 17, VIII), that is, it exempts this group of students from performing and supervising/guiding this internship, which would be, in principle, a formative space. It also exempts students who do not have a scholarship from doing it, since it becomes an elective activity for the others.

Feitosa (2002) and Martins (2013) argue that the obligation and exemption of the internship, without further clarifying notes on its purposes and without a proposal for the development of activities in an obvious way, makes students, and their research supervisors and/or internship advisors, not understand this important formative space for teaching. Soares and Cunha (2010) report that many graduate students do not recognize the internship as a space that fosters reflection on the theme of teaching.

In its Art. 84, the current LDB points out the possibility of graduate students being used in teaching and research tasks by their respective institutions, exercising monitoring functions, according to their performance and their study plan. Some Brazilian public universities, in the case of this one, the locus of the research reported here, already hire, on an emergency basis, graduate students to act as regular professors. The participants of the research reported here were performing this type of activity, teaching classes in an undergraduate course in Biological Sciences in 2017. It is inconsistent to see how this is described in circular letter 02/2018, since being a monitor, as indicated by the LDB, is different from acting as a regent, without a supervisor present in the classroom.

In order to preserve the quality of teaching (using scholarship students instead of trained professionals?) and to avoid greater losses (for whom?), the Rector's Office authorizes the University Units to request the services of graduate students to teach undergraduate courses, as Supervised Teaching Internships. (OFFICE 02/2018, p. 1) (emphasis added)

Oliveira and Vasconcellos (2016, p. 4) consider that "[...] graduate courses had little regulation regarding teaching and even less in aspects related to pedagogical aspects of training for teaching". Corroborating this, Costa (2015, p. 32), when dealing with internship, states that "[...] it is an activity that is not yet well structured or standardized, lacking explanations about its purposes and procedures".

Most university teachers working today in Natural Sciences, as students, were submitted to models based on the transmission/reception of knowledge, within the technical rationality, repeating algorithms to solve exercises, in a memoristic way. Research shows that most of the teachers who work in undergraduate courses in the area of Natural Sciences come from bachelor's degrees, with graduate studies in specific areas, researching on topics unrelated to teaching.

Cortela and Nardi (2015), reporting the results of a survey conducted with university teachers, when asked about how they prepare and teach their classes in Physics undergraduate courses at a public university, concluded that

[...] the table revealed that most of the teachers were still working in a traditional way, using methodologies observed at the time when they were still students; using books that they used in their graduation; using the same criteria and evaluation instruments with which they were evaluated. It is the old teaching model being repeated: they do as they have learned to do. That is, in the absence of alternatives that are incorporated into their know-how, they use practices observed when they were still students, even using those they criticized. (CORTELA; NARDI, 2015, p. 66-67)

Even with some criticism, they assume that this has been an efficient model since they got where they are now. Thus, when they are teaching, they tend to repeat the same practices, despite sometimes criticizing them when they were students.

Besides initial training, other facts contribute to the fact that pedagogical knowledge is disregarded for teaching in higher education. Among them, the following stand out there are few graduate courses that offer disciplines that contemplate didactic-pedagogical content for performance in higher education and few are those that have well-regulated activities to be developed in internships (HOFFMANN; DELIZOICOV NETO, 2015; OLIVEIRA; VASCONCELLOS, 2016); also the mere offer of a discipline on the internship does not ensure that this is a formative space/time, although it increases the chances that it is (HOFFMANN; DELIZOICOV NETO, 2017); and there is the possibility of regency occur even during the process of training in graduate school, i.e., without the student does (or has done) necessarily the teaching internship, as provided by Art. 17, VIII, of LDB 9394/96.

In general, the study of the legislation and the few articles presented in scientific journals and important events in the area of Natural Sciences point out that the teaching internship is still poorly delimited with regard to the activities to be developed, the type of supervision that are conditioned, the knowledge that is intended to be developed, and that there are few programs that offer disciplines aimed at teaching in higher education.

As Bourdieu (2011, p. 70) states, "[...] the university field reproduces, in its structure, the field of power whose own action of selection and inculcation contributes to reproduce the structure. And the *habitus*, the generating and structuring principle of practices and representations, contributes to propitiate the predominance of research over teaching activities, also reinforcing in this context, mistakenly, the maxim that knowing the specific content is a sufficient condition for it to be taught.

According to Zabalza (2005), among the competencies expected of university teachers, besides mastering their field of research and specific content, are: offering comprehensible information and explanations, being technologically literate and knowing how to use Digital Communication and Information Technologies as a teaching resource; management skills in relation to teaching methodologies aimed at learning; the ability to relate to students, accompanying and guiding them in their activities; reflecting and investigating on their own teaching; and becoming institutionally involved.

This is a very broad spectrum of activities, some of which can be taught, others resulting from an experiential knowledge (GAUTHIER et al., 1998), built along the practices that the professional undertakes and personal investments in relation to the conducts he adopts. As well considers Pimenta (In: ALMEIDA, 2012, p. 15)

The teaching work is imbued with intentionality [...]. This means introducing explicit goals of conceptual, procedural, and evaluative nature in relation to the contents of the subject that he teaches [...]; select and organize contents according to logical and psychological criteria according to the characteristics of students and the purposes of teaching [...].

According to authors such as Gauthier et al (1988) and Tardif (2002), teaching knowledge is plural by nature and incorporated by subjects throughout life. In this sense, they are also social because they are obtained and modified throughout the teaching career, resulting from a continuous learning process in the search for mastery of their work environment, at the same time that they insert themselves in it, incorporating the rules of actions that are part of their practice.

Even though they are conditioned therein "[...] they are far from being produced by themselves or originating from their daily work" (TARDIF, 2002, p. 19). Some come from the family, others from the school that trained them; from their personal culture; from the educational institution where they work, from training courses after graduation, and so on. In this sense, teaching knowledge is not separated from its conditioning factors or from the context where it is inserted. According to Tardif (2002, p. 11), "[...] knowledge is always the knowledge of someone who works something to achieve goal.

Thus, they are not disconnected from the subject who holds them, from his identity, life experience, expectations in relation to his students and the classes with which he works, and from his peers. Gauthier et al. (1998, p. 28) argue that these professionals resort to "[...] a kind of reservoir which the teacher uses to meet the specific demands of his or her concrete teaching situation", composed of: disciplinary, curricular, educational science, experiential, pedagogical tradition, and pedagogical action knowledge.

Based on the understanding that the teaching identity is made from the acquisition of knowledge and that part of this process should occur during the teaching internships in graduate courses, it is argued that these should provide the acquisition of different knowledge, from the approach of conceptual, procedural, and attitudinal knowledge, developed through organized activities and performed under supervision. Thus, it is relevant to survey and

understand how teacher-fellows, still students of a graduate course in Science Education, but who had already done their teaching internships, report their challenges and difficulties in teaching their classes in a Biological Sciences course.

Huberman's (1992) research on the professional life cycle of secondary school teachers considers that this period can be synthesized into phases, based on the length of their career. Although university teachers perform different activities from basic education teachers (research, extension, management, and business), it is believed that the characteristics, as far as teaching is concerned, may be similar.

There are five stages, discontinuous, in which the aforementioned author found patterns that allowed him to establish some recurrences. Entry into the career (1 to 4 years), the initial phase, a shock with reality, a period of discovery; Stabilization (5 to 7 years), when the consolidation of a pedagogical repertoire occurs, bringing security, enthusiasm, and a certain maturity; Diversification (8 to 14 years), characterized by periods of activism and questioning; Serenity (15 to 22 years), a period of reflection and personal satisfaction; and more than 23 years, a stage marked by two moments: Disenchantment, with affective distancing, marked by conservative practices and disinvestment, and Renewal of interests, with the development of new professional expectations.

The beginning of the career, the phase in which the participants of the research reported here find themselves, is characterized by expressions of the survival and discovery type, indicating at least two non-exclusive profiles. In relation to the first, they refer to the shock with reality, the distance between the ideals learned during training and the school reality; the confrontation with the complexity of the professional situation; with the difficulties in the teacher/student relationship, sometimes too close, sometimes too distant; with the inadequate teaching materials, or even with the absence of them, among others. The main concern becomes oneself, trying to endure/overcome this phase. The discovery, on the other hand, refers to the initial excitement, an enthusiasm to be part of a group of professionals and to be in a position of responsibility. There are also other components, such as those who did not choose that profession and consider it provisional; those who are serene, because they have more experience; and those who are frustrated, overwhelmed by the burdens. Huberman (1992) considers this category as exploitation, limited by the parameters imposed by the institution.

Methodological Approach

This article aims to present and discuss the perspectives of a group of substitute teachers (beginners), three of them still scholarship students of a graduate program, acting as teacher educators in the Biological Sciences course of a public university in 2017, regarding their difficulties/challenges to act as teachers, aiming to understand, from their difficulties/challenges, the formative potential of the teaching internship in which they participated.

This is an excerpt of a larger research, which brings together several investigations, of mixed nature, here called qualitative-quantitative, exploratory (MOREIRA, 2011), from a

case study that, in the conceptualization of Chizzotti (2006, p. 135), aims to "[...] gather relevant data about the object of study in order to achieve a broader knowledge about this object [...]". It consists of a research strategy that analyzes a real phenomenon considering the context in which it is inserted and the variables that influence it. In this case, a graduate program in Science Education, analyzing the different formative spaces made possible for the students. The intention in this type of case study, called instrumental, is to better understand the context to answer the proposed questions and to substantiate others, that is, to guide subsequent studies.

For the study described here, we sought a group of individuals who had in common, in addition to the same workplace, similarities in terms of work conditions, requirements, and training, both initial and continuing. Just as Huberman (1992) did when studying the life cycle of secondary school teachers, we aimed to identify the social representations (SR) of people who had gone through similar formative stages and who worked as beginning teachers in a public university, regarding their professional challenges.

During the second semester of 2017, a consultation was made with the official website of the public institution, aiming to raise the potential participants of the research. The Biology department was composed, at the time, of 17 full professors (10 men and seven women); and five substitute professors (two men and three women), in addition to five substitute-fellow professors (three men and two women), so named because they were still attending graduate school.

As the focus was on early career teachers, the 10 substitute teachers were contacted because they were beginners/newcomers to the university; of these, four volunteered to collaborate in the research, three of them being substitute-fellows. After a face-to-face contact, the data collection tool and the Free and Informed Consent Form were sent by e-mail. These were answered and signed, in Portable Document Format (PDF).

Considering that the participants had already done their teaching internship and that they had finished, or were finishing, their *stricto sensu* post-graduation course, it was assumed that they already had grounded disciplinary knowledge and, to some extent, curricular knowledge and knowledge of the Science of Education (GAUTHIER et al., 1998). As for the experiential knowledge, it was believed that they had not yet acquired it in terms of higher education, but at a basic level.

The instrument for data constitution was a mixed questionnaire composed of 12 questions. These were organized in blocks of interest: questions 1 to 5 were designed to find the professional profile of the participants. They are: 1. what is your current educational level; 2. are you (or were you) a scholarship student during your graduate studies; 4. did you do a teaching internship; if so, in which year, during your master's or doctorate, in which subject, course, and under whose supervision? 5. Have you ever had experience as a teacher before joining this university? If yes, at what level(s) of education (elementary, middle and/or high school) and for how long have you taught? Questions 6 and 7 aimed at finding out their workload and the subjects they taught; questions 8 to 11 aimed at detecting their difficulties/challenges as university professors at the beginning of their careers, how they did to overcome their difficulties, what suggestions they could make to the institution and/or the graduate program to minimize/optimize their professional impasses and how they felt about working in this institution. Question 12 aimed to capture the professional identity constituted

up to that moment, when they were asked about their personal preferences: Among the activities of teaching, research, extension, and management to act, which one (which ones) would you choose and why?

The open questions were analyzed using the technique called Collective Subject Discourse, developed by Lefevre and Lefevre (2012), based on Moscovici's (2013) theory of Social Representations (SR), which proposes the existence of two universes of thought in contemporary societies: the reified and the consensual. The former represents the academic/scientific knowledge, obtained within logical, methodological, and objective rigors. The consensual ones, on the other hand, follow a natural logic, a legitimation of knowledge by intellectual activity shared socially in everyday life, being less objective, credible, and plausible. For the author, SR is "[...] a particular modality of knowledge having the function of elaboration of behaviors and communication between individuals" (MOSCOVICI, 2013, p. 101).

Although this methodological approach is more used when the number of participants involved is much larger than the one presented here, its application aimed to capture the SRs in a more systematized way, aiming at comparisons with later data and that were obtained in other researches, in order to compose a larger spectrum of analysis, allowing the triangulation of results. In this sense, it is agreed that to know the SRs is more than to attribute a meaning to it: it is necessary to describe and reconstruct them, something that is much more complex than the researcher just detecting their presence. That is, "[...] a systematic description of reality and a reconstruction of collective thought as a scientific product" (LEFEVRE; LEFEVRE, 2014, p. 504).

DSC is an analytical technique that aims "[...] to reconstruct such representations preserving their individual dimension articulated with their collective dimension" (LEFEVRE; LEFEVRE, 2014, p. 503). The idea of the DSC is to aggregate qualitative and quantitative aspects, in a perspective called by the authors qualiquantitative, since they understand that people's opinion (SR) contains qualitative and quantitative elements, simultaneously. They are considered to have quality because opinions (SR) are not known a priori and these need to be described before being quantified.

From the authors' perspective, the differential of this analytical technique is the possibility of joining quality and quantity to the SRs obtained, justifying that this data treatment makes it possible for them to be awfully close to the discourses practiced by certain groups about a theme, making it possible to convey, through different DSCs, collective conceptions from the SRs explicit.

Lefevre and Lefevre (2014) consider SRs as sociocognitive schemas. These are obtained from excerpts of the subjects' speeches that, semantically, have the same meaning. These speech clippings are called Key Expressions (KE). These will later be grouped into more synthetic forms, called Central Ideas (CI) and Anchorages, the latter not always being present. This is because it is linked to a theory and/or ideology that the subjects profess in their speeches and that are not always explicit. It is worth noting that the E-Ch "[...] are basically concrete, expressive, descriptive, affective, abundant; in contrast, the CIs are abstract, conceptual, synthetic, cold, and few" (LEFEVRE; LEFEVRE, 2012, p. 77). In short, the E-Ch is how the participant and the CI said it is the synthesization performed by the researcher on what the interviewee said or wanted to say.

Also, according to the authors, after this step, the CIs must be grouped into Categories, which are identified by the researcher aiming to contemplate the questions he intends to answer. Next comes the quantitative stage of analysis, from two parameters: Intensity (I) and Amplitude (A). The Intensity refers to how much the individuals contributed to the CI obtained, from their SHs. The Amplitude quantifies the presence of a particular SR, considering the actors/agents of the researched universe (BOURDIEU, 2010).

[...] agents and groups of agents are thus defined by their relative positions in this space. [One can describe the social space as a multidimensional space of positions, such that every current position can be defined as a function of a multidimensional system [...]. Thus, agents are distributed in it, in the first dimension, according to the global volume of the capital they possess and, in the second dimension, according to the composition of their capital - that is, according to the relative weight of the different species in the set of them

Thus, there are at least four possibilities regarding the quantitative parameters of the DSC: high Intensity, high Amplitude (IA), that is, the SR is very present in the discourse of each element of the group and is also quite shared among the others; high Intensity and low Amplitude (Ia), when the SR has strength in the elements, but is concentrated in certain segments of the field; low Intensity, high Amplitude (iA), the SR has little strength in the elements, but is spread across almost all segments of the field; low Intensity and low Amplitude (ia), indicating isolated representations, which belong only to some groups and are usually very old or very new representations (LEFEVRE; LEFEVRE, 2012).

After these steps of data systematization and analysis, several or a single discourse are found regarding some theme. Then, the DSC are written, in the first person singular, from the extracts of different individual statements, producing "[...] in the receiver, the effect of a collective opinion, expressing itself, directly, as an empirical fact, through the 'mouth' of a single speech subject" (LEFEVRE; LEFEVRE, 2006, p. 517).

Presentation and discussion of results

The analyses arising from questions 8 to 11 will be presented here, which deal specifically with the difficulties/challenges in carrying out teaching activities. The answers to questions 1 to 5; and 12 will be presented aiming to explain the professional profile of the respondents and their professional identity at the time of the investigation. As for the answers to question 10, they aim at pointing out the contributions/suggestions for the graduate courses to help in the constitution of knowledge related to teaching.

As for the professional profile of the participants, the sample was made up of four women between 25-45 years old, all of them with a degree in Biology, three of them were pursuing their doctorate and one had already completed her post-doctorate; and all of them had already done their teaching internship in a stricto sensu post-graduation program, three of them in the same program. As for teaching activities prior to university, the most experienced was a post-doctoral student and had only worked at a higher level (± 7 years); two had taught in pre-university courses (± 1 to 2 years); another had taught in high school and elementary school (± 1 year). Thus, most of them are beginners and newcomers to the university, with some teaching experience.

As for the weekly workload dedicated to undergraduate teaching, most said they had eight hours a week in the classroom. In other words, they did not include, for teaching activities, the time necessary for preparing and correcting them. There may be in this lapse of memory a non-recognition of planning/evaluations as factors inherent to teaching.

Asked about their personal preferences, among the teaching, research, extension, and management activities they might be called upon to perform in higher education, which one (which ones) would they choose and why, it was found that P2, P3, and P4 pointed out that they feel more suited to teaching and research, while P1 stated directly that she was a researcher. In an excerpt taken from her answer, she explains

P1: My profile is that of a researcher. I am shy, introspective and do not know how to deal with the mediocrity of human beings. However, whenever I had the opportunity to give a class, a lecture, someone would come up and praise my "educator" side.

In other words, there is an explicit identification of the professional as a researcher and one senses, from the various answers, a non-recognition of the importance of didactic and pedagogical knowledge and a lack of knowledge of teaching as a specific field that produces knowledge necessary for professional practice. It presents a concept of didactics very close to common sense, as being a way of teaching, something innate or vocational.

This is not a punctual answer, as already shown in the literature (ALMEIDA, 2012; BRITO; CORTELA, 2020; PIMENTA; ANASTASIOU, 2002). The central issue is that university professors, not only in Brazil, have not had the proper pedagogical preparation to act in teaching activities and, for the most part, repeat in the classroom the same formative model they received in their graduations. In other words, the training model, usually adopted in undergraduate courses in the area of Natural Sciences, is based on technical rationality, which favors the use of expository, content-based, memoristic classes and traditional assessment tools, based on written tests and preparation of reports (CORTELA; GATTI; NARDI, 2020), and that are recurrent examples of traditional practices adopted by university teachers in the area and that, in general, end up hindering / preventing beginners / newcomers to escape from the standard adopted and considered correct, or more indicated. Repeating a habitus previously mentioned and that favors the maintenance of the status quo of the university field, as stated by Bourdieu (2011).

These data corroborate those presented by Campos (2012), who sought in a research conducted between 2006 and 2010, to raise the senses and meanings attributed by students from stricto sensu graduate programs regarding the teaching internship in relation to pedagogical training for teaching. To do so, it analyzed answers given by scholarship students (980) from federal higher education institutions, from several areas of knowledge and regions of Brazil, and interviewed 40 of them. The participants admitted that although they thought it was important, they did not master the pedagogical knowledge necessary for teaching practice. Their speeches pointed to a common sense conception that teaching is learned from practices, inspired by former teachers; most of them developed teaching by transmission, often because it was the way they were/were trained. Another important aspect to highlight is

that the participants believed, as pointed out by several authors (CUNHA, 2006; MARCELO, 1999; MASETTO, 2003), that learning to teach is a trial-and-error process, and it is learned through practice. "Experiential knowledge occupies, therefore, a very important place in teaching, as in any professional practice. However, this experiential knowledge cannot represent the totality of teaching knowledge [...] The teacher cannot acquire everything through experience" (GAUTHIER et al., 1998, p. 15).

Furthermore, some of these experiences can directly influence the teaching and training process of new teachers, becoming barriers or even causing them to have limitations regarding the application of different teaching methodologies. Consequently, the teacher may end up choosing to work in a more traditional way and without significant changes, using approaches/methodologies that have been superseded by the literature or are inadequate to the current context of teacher training and performance, for lack of knowledge of other formative models, which one supposes should be worked on during the teaching internship and also in possible subjects to be offered during graduate studies.

From the answers regarding the difficulties/challenges to teach at the university, the CHS were selected, marking with equal colors those that referred to similar CI. These CIs were then grouped into three categories: 1. material; 2. pedagogical; 3. administrative. For each analysis we considered as high intensity the ideas that emerged at least twice in the answers of the participants, as well as high amplitude those that reached values in the two groups of participants detected: three in the initial stage of the career (P2,P3,P4), and one in the stability stage, P1 (HUBERMAN, 1992). The E-Ch detected in the answers of the participants (P1 to P4) were grouped in Central Ideas (CI), these were regrouped by categories and their intensities (I) and amplitudes (A) are registered in the following tables.

Table 1. Difficulties/Challenges regarding material aspects.

Difficulties/ Challenges	Central Ideas (CI)	Part.	I	A
Materials	1 - Lack of laboratory materials	P1, P4	2 x	50%
	2 - Difficulty with transporting students to practical classes	P1	1 x	25%
	3 - Copies of basic books are insufficient	P1	1 x	25%

Source: Prepared by the authors.

It is observed that only P1, the most experienced teacher, is the one who points out the greatest material difficulties, perhaps because she only teaches laboratory activities. In her answer, she reinforces a discourse with high Intensity and low Amplitude, that is, with strength, but restricted to this participant only. Although P4 also teaches laboratory subjects, she only presented the issue of lack of materials. It can be observed that there are few CIs arising from E-Ch in relation to difficulties/challenges of material order in P2 and P3, who taught theoretical subjects.

As far as the pedagogical aspects are concerned, the Ch-ChEs lead to a larger amount of CIs. It was observed that P1 presents only one CI, directly attributing responsibilities to the students.

Table 2. Difficulties/Challenges regarding pedagogical aspects.

Difficulties/ Challenges	Central Ideas (CI)	Part.	I	A
Pedagogical	4- Elaborate teaching plans/lesson planning/teaching practical lessons	P2, P3, P4	3 x	75%
	5- Look for alternatives to the lecture model	P2, P3	2 x	50%
	6- Dimension the time dedicated to each content	P2, P3	2 x	50%
	7- Look for alternative practices, leaving the traditional teaching	P2	1 x	25%
	8- In relation to the choice of sources for content selection	P2	1 x	25%
	9- Finding forms of evaluation that are coherent with the course objectives	P2	1 x	25%
	10- Using very traditional practices, even though we think they are no longer sufficient for the training of new teachers	P2	1 x	25%
	11- Concern with maintaining the level of teaching of the former effective teachers who taught the subject	P4	1x	25%
	12- With the students' disinterested behavior	P1	1 x	25%
	13 - Regarding the concern for training teachers who are innovative	P2	1 x	25%

Source: Prepared by the authors.

P1 and P4 had the fewest challenges/difficulties with pedagogical issues. Coincidentally, those who taught laboratory classes had a bachelor's degree and a doctorate in specific areas of Biology. This fact is in line with Campos (2012), as previously mentioned.

P2 was the one who collaborated the most in all the CIs obtained (8 out of 13), that is, she is the participant who most indicates pedagogical elements to be considered. CI 4 is the one with the greatest Intensity and Amplitude in this aspect for almost all the participants. As the three teachers had already completed their teaching internship in the same program, it is assumed that this training space was not sufficient for the acquisition of the knowledge needed for teaching. What appear most often are concerns related to methodological aspects and also to the relationship with students. In other words, the largest number of arguments are related to issues related to teaching and not necessarily to student learning, pointing to the difficulties teachers themselves have in relation to their didactic and pedagogical knowledge regarding didactic planning, methodological approaches, evaluation instruments and criteria, and time management.

From this, it can be deduced that even though they had at least two teaching internships, since three of the four teachers were pursuing their doctorates at the time, these training spaces were not enough to solve these issues. Another possibility, not exclusive of the first, is that these professionals are more aware of the fact that teaching demands continuous reflection and action in a permanent process of professional learning, and are more inclined to a teaching identity.

It was also possible to detect a great concern of the teachers with their own performance, an insecurity typical of beginning teachers (HUBERMAN, 1992), who are faced with the school context and seek to face dilemmas at different levels of the profession, using as resources the knowledge they have built up so far, much of it coming from

undergraduate or graduate courses, but that are considered, for this sample, as unrelated to the practice, or even to their performance as teachers of basic education. Something that Huberman's (1992) model of professional life had already predicted for beginning teachers at the secondary level, intending that it is not restricted to them.

A positive aspect of the research reported here was to observe, from the answers given, a concern on part of the interviewed teachers with their students and with traditional teaching practices that do not contemplate all students in the classes, arguing that each one presents specificities in relation to learning. For this reason, they emphasized the importance of the teacher keeping up to date, innovating whenever possible, in teaching and in the forms of evaluation.

The interviewed teachers also made it clear that they try to mirror themselves in the guidance counselors and that they turn to them when there are doubts about the behavior of the students and ways to develop the established syllabus. There seems to be a feeling of trust and empathy, normally established in this kind of professional relationship. That is, in the absence of more robust knowledge about teaching, they resort to the teaching models adopted by their teachers, and not to knowledge acquired during their training, at undergraduate and graduate level. They also pointed out that they seek help from the lab technicians, and when more specific doubts arise, they consult books, scientific articles, and reliable websites.

As for out-of-class difficulties, the arguments are systematized in Table 3 below:

Table 3. Difficulties/Challenges regarding administrative aspects.

Difficulties/ Challenges	Difficulties/ Challenges	Part.	I	A
Administrative	14- Difficulty in adapting to the bureaucratic demands of the university	P1, P3, P4	3 x	75%
	15- Lack of direction by the course coordination	P2	1 x	25%
	16- Low remuneration	P1, P2, P3, P4	4 x	100%

Source: Prepared by the authors.

The speeches indicate that issues related to the bureaucratic demands of the university are also recurring challenges for professors at the beginning of their careers. A point that draws attention is the fact that all have pointed out the low remuneration offered. In the words of one of them, [...] *a major complicating factor was the very low remuneration available to grant holders, which does not include any kind of transportation allowance, for example.*

Most of them felt disoriented amidst the many documents and rules required, ranging from entering grades in the computerized system to broader issues, such as the coordinators' expectations regarding their presence in the course. In the words of one of the participants, Sometimes the new professor lacks information on several subjects and I don't know if there is a material for consultation on procedures in several situations [...]. Sometimes they manage to find information and support in more experienced colleagues and even in the secretaries of the departments where they work, in order to solve the doubts in question. They argue that it is necessary for the contact between beginning professors and course coordinators to be more

intense and linear, so that ideas can be discussed and doubts can be solved through the exchange of knowledge, information, and also values.

These arguments lead to another point of discussion: the contributions/suggestions for graduate courses to help in the constitution of knowledge related to teaching, raised from question 10. The participants point out that the graduate course can collaborate with the pedagogical training of their students by providing more dialogues about the challenges postgraduates will face through regular meetings and a closer monitoring of these students with regard to teaching internships, since the program in question already offers, at least, one subject focused on the theme Teaching in Higher Education, attended by two of the participating teachers (P2 and P3).

As for the feeling of belonging to the group of teachers of the course, the participants pointed out that, besides a more present follow-up by the post-graduation course, favoring student-fellows in teaching internships to receive a more systematized and collective work, it is important to create mechanisms to receive substitute teachers, so that they feel included in the teaching staff and can develop a work articulated to the course proposal. They believe that these factors would make the work of the substitute teachers less isolated, contributing to reflection and criticism.

The data found here point in the same direction as Campos (2012), who, when analyzing aspects of the teaching internship, concluded that the preparation provided for in the legislation was not being contemplated, since the results of his research indicated that most students did not participate in disciplines that addressed specific content for teaching in higher education, although some programs offer them; that the preparation of those who received it was light; that the conception of teaching of the participants was still supported by the gift, vocation and repetition of teaching models to which they were subjected. It also considers that pedagogical training is neglected and that there is a gap in the training and professionalization of the higher education teacher, indicating fragility in the construction and constitution of the teaching identity in higher education.

Finally, by jointly analyzing the information organized in the three tables, it is possible to identify two CSDs: one of high Intensity and high Amplitude (IA); another of high Intensity and low Amplitude (Ia), for having strength, but being centered in certain segments of the field, systematized below from excerpts of the texts prepared by the interviewees.

DSC 1 - IA

As for teaching subjects in higher education, the great difficulty is in making the transposition from theory to practice, a moment in which theory is constantly put to the test. I have difficulty with the elaboration of teaching plans, in planning the classes, in working with practical classes. There are tensions related to the necessary coherence between our values and the practice performed, when we elaborate the teaching plans, the lesson plans, the search for alternatives to the model of the lecture class, trying to be coherent in the way we evaluate in order to reach the objectives. I feel challenged for not having models as guides, I have difficulties regarding the sources I should use to select the contents. Mainly in

dimensioning the time of the activities or even reducing the time of the laboratory practices because of the lack of material. Besides the low amount paid to the scholarship holders, who sometimes have to travel from other cities to teach the classes, I see that the university has many demands regarding the administrative part and that there is little guidance in this sense. And the lack of laboratory material is an aggravating factor.

DSC 2- (Ia)

My commitment is to transmit technical, scientific and good quality knowledge. My function is not to indoctrinate, but to awaken in the student a critical sense, the ability to think, to reason in different perspectives. For an undergraduate student, my contribution is to teach knowledge and experience so that they become good teachers, good educators, and who knows, maybe be the seeds to change the education of our country. For a bachelor student, my contribution is to prepare them for the job market, always looking for the application of knowledge, or to prepare them for an academic career, providing a solid base of knowledge and the scientific method, to one day become a good researcher. There is a lack of material for practical classes, books, and the budget is short; also the transportation for practical activities outside the campus is a problem, and the responsibility for the students' departure is exclusive to the teacher responsible for the activity. Another serious problem is the level of the students, which has dropped a lot in the last years. Students that fail by default, that have no responsibility, commitment or empathy for the course; that don't know how to deal with frustration. Students who are at university because their parents are paying for them while they study, who are more concerned with the degree than with their education.

Final Considerations

There are many variables that involve the profession of the university teacher and those related to the teaching activities they perform, in a complex scenario. This article presents some theoretical reflections on aspects related to the formative potential of the teaching internship carried out in graduate courses, on university professors, their knowledge, the locus of their work and their preparation for teaching activities. Complementing this, elements of a case study were presented, carried out with teacher-scholarship recipients, who acted as teacher educators in an undergraduate course in Biological Sciences at a public university.

As for the research data, it was possible to conclude, from the participants' answers, some of the main difficulties/challenges faced during the beginning phase of the teaching career at the university, and also how they deal with them. In general, they can be summarized as follows: i. those related to the planning and execution of classes, activities for which they still do not feel properly prepared; ii. bureaucratic difficulties, such as filling out documents and regulations, pointing out that they do not receive sufficient guidance in this regard; iii. lack of support/guidance on pedagogical and bureaucratic issues by coordinators and managers, receiving support from some more experienced teachers who are more open and close to them; iv. more personal concerns related to the quality of the teaching offered, with the disinterested behavior of students, anguish in contributing/sharing their knowledge

and experiences with future teachers, a certain feeling of not belonging to the teaching staff of the course; v. low salaries.

All these factors corroborate those pointed out by the literature surveyed. As a way of coping, the respondents pointed out that: i. when there is insufficient specific and didactic-pedagogical knowledge acquired, they resort to studying specialized literature, seek help from their advisors and suggest improvements regarding the preparation that takes place at the post-graduation level, especially during the teaching internship; ii. that the manner in which new faculty members are received and oriented by the course coordinators and more experienced professors should be better systematized, as they influence both the way classes are conducted and the sense of belonging and collaboration with the educational process of which they are a part; iii. Undergraduate and graduate courses should find mechanisms to improve the training of their professionals, since the insecurity that is typical at the beginning of any profession could be minimized by the acquisition of knowledge during the training process, but those experienced by the group in question, in this sample, were considered to be unlinked to practice.

We do not postulate the removal from the training of specific knowledge of the area of performance; on the contrary, we defend the possibility of adding to these fundamentals a referential, with its own epistemological field and that includes pedagogical training. It is argued that the teacher's training to work in higher education should articulate what is proper of the teaching function with the work reality of the specific area and, beyond this, allow work situations to simultaneously become training situations, since the understanding of knowledge, how it is produced, to whom it is destined, how it is socialized, as well as the changes it brings about in people's lives should go through the teacher's critical analysis. Because these conceptions must go beyond the scope of their experiences, constituted since before their performance in the classroom and the specific contents of their area.

The studies and results found here, although they cannot be generalized, show that the preparation for teaching, which should be done during graduate studies, is not yet presented as a formative place, that there is no systematic and didactic monitoring of the activities developed during the teaching internships and that their regulation is also lacking. It is understood that it is not enough to demand that the scholarship students carry them out without reflecting on what this experience is, its necessity and contribution to the training of future teachers, respecting the idiosyncrasies of the participants.

It is true that there are some occasional initiatives in this direction, but there is still a lack of consistent educational policies that, in fact, value the initial and continued formation of higher education teachers. We conclude that this period of preparation for teaching are times/spaces that present several problems to be explored, among them, the need to establish frames of reference concerning the challenges/difficulties presented by beginning teachers for the constitution of a professional identity. And these, once made explicit and recognized by the university managers and the course councils (undergraduate and graduate) are likely to be equated and solved, or at least minimized, the weaknesses in the construction and constitution of a teaching identity in higher education.

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