

**ARTICULATION BETWEEN TEACHING, RESEARCH AND EXTENSION: TUTORIAL
EDUCATION PROGRAM (PET) CONTRIBUTIONS
FOR BIOLOGY STUDENTS**

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ABSTRACT

This paper uses the prospect of Association of Craft Fellow applied to teacher training to investigate Tutorial Education Program contributions for Biology students and teachers education. Through a Case Study with members of a group from the Tutorial Education Program at a Brazilian Federal Northeastern university, which uses document analysis and interviews, it was noted that the partaker realize that the actions developed by the group are relevant to their training as future teachers of Biology. Such actions articulated, precariously, through the principle of acting in teaching, research and extension, characteristic of this public policy; besides that, they needs articulation with teacher education, either for Basic Education or for Higher Education.

KEYWORDS

Academic education of teachers. Public policy. Higher education.

**ARTICULAÇÃO ENTRE ENSINO, PESQUISA E EXTENSÃO:
CONTRIBUIÇÕES DO PROGRAMA DE EDUCAÇÃO TUTORIAL (PET) PARA
A FORMAÇÃO DE GRADUANDOS EM BIOLOGIA**

RESUMO

Este trabalho utiliza a perspectiva das Associações de Companheiros de Ofício aplicada à formação profissional específica e docente para investigar as contribuições do Programa de Educação Tutorial para uma concepção articulada entre teoria e prática na área de Biologia. Através de um estudo de caso, com integrantes de um grupo do Programa de Educação Tutorial de uma universidade federal nordestina, no qual se utiliza análise de documentos e entrevistas, notou-se que os participantes percebem que as ações desenvolvidas de forma articulada são importantes para sua formação como futuros docentes de Biologia. Tais ações buscam, de forma precária, integrar ensino, pesquisa e extensão, característica dessa política pública; além disso, carecem de articulação com a formação docente, seja para a Educação Básica, seja para a Educação Superior.

PALAVRAS-CHAVE

Formação de professores. Políticas públicas. Educação Superior.

ARTICULACIÓN ENTRE ENSINO, INVESTIGACIÓN Y EXTENSIÓN: CONTRIBUCIONES DEL PROGRAMA DE EDUCACIÓN TUTORIAL (PET) PARA LA FORMACIÓN DE GRADUANDOS EN BIOLOGÍA

RESUMEN

Este trabajo utiliza la perspectiva de las Asociaciones de Compañeros de Oficio aplicada a la formación profesional específica y docente para investigar las contribuciones del Programa de Educación Tutorial para una concepción articulada entre teoría y práctica en el área de Biología. A través de un estudio de caso con integrantes de un grupo del Programa de Educación Tutorial de una universidad federal nordestina, en el que se utiliza análisis de documentos y entrevistas, se notó que los participantes perciben que las acciones desarrolladas de forma articulada son importantes para su formación como futuros docentes de Biología. Tales acciones, de forma precaria, buscan integrar enseñanza, investigación y extensión, característica de esa política pública; además, carecen de articulación con la formación docente, sea para la Educación Básica, sea para la Educación Superior.

PALABRAS CLAVE

Formación de profesores. Políticas públicas. Educación universitaria.

1 INTRODUCTION

Public policies aimed at professional training are the subject of scientific investigation in Brazil (FRIGOTTO; CIAVATTA; RAMOS, 2005), indicating the relevance of this theme, in pursuance of the articulation between basic training and a civic professional placement. Most of the time, however, we evidence focal and uncertain programs, in a trajectory characterized by intense contradictions. What characterizes professional training programs is “[...] the lack of integration with other policies” (FRIGOTTO; CIAVATTA; RAMOS, 2005, p. 1106, our translation). Thus, we can state that policies concerning Education, more specifically basic professional training, are insufficient in their effective implementation, in the articulation with support actions (including the development of research and studies about policies and strategies for the advancement of that Education approach), on different government levels, in accordance with the National Education Plan (PNE, in Portuguese). In that context, we understand that it is relevant to analyze the development of formative public policies. In this article, we will limit our reflections to initial professional training, in universities.

One program available in several undergraduate courses is the Tutorial Education Program (PET, in Portuguese), officially instituted by federal government through Law n. 11.180/2005 (BRASIL, 2005), replacing the former program, denominated Special Training Program, created and implemented in 1979 by the Coordination for the Improvement of Higher Education Personnel (CAPES, in Portuguese).

Nowadays, PET is managed by the Higher Education Secretariat (SESu, in Portuguese), associated to the Ministry of Education (MEC, in Portuguese), and functions as an academic program aimed at students regularly enrolled in undergraduate courses, who are oriented by a tutor in order to develop activities guided by the principle of inextricability between teaching, research and extension (BRASIL, 2005).

Relating to that guiding principle, the program indicates, as a main objective, promoting “[...] broad and academic-quality training for undergraduate students directly or indirectly involved with the program, stimulating values that reinforce civic and social conscience” of participants, besides contributing to improve undergraduate courses (BRASIL, 2005, p. 7, our translation).

Thus, besides undergraduate students, the tutors are also part of PET groups, professors in Higher Education Institutions (IES, in Portuguese) who are responsible for guiding the program’s activities (BRASIL, 2005). According to official documents, PET has 842 groups distributed among 121 Higher Education Institutions (BRASIL, 2016)¹.

The academic and political aspects of program members’ actions deserve to be highlighted. In that regard, we analyzed the last five annals from National Meetings of Groups PET (ENAPET, 2014, 2015, 2016, 2017, 2018). At these events, program members from all over the country presented the work carried out by their groups, had discussions concerning formative aspects, made demands and devised joint action plans for the subsequent years.

At Enapet 2014, 453 research studies on different themes were presented; out of those, only 38 concerned aspects relative to teaching: learning, evaluation, didactics, the development of educational or didactic materials, the use of digital information and communication technologies. At Enapet 2015, that number rose to 465 presented

¹ Available at: <<http://portal.mec.gov.br/pet>>. Accessed on: Feb. 21 2019.

studies, among which 61 concerned themes related to teaching. In 2016, there were 199 studies in different areas at Enapet; 32 of them focused on themes related to teaching. In 2017, there were 300 studies, with 44 concerning educational themes. In 2018, in turn, there were 487 studies, with 68 aimed at teaching.

About the Biology field, which interested us more directly in order to elaborate this paper, we found the following information: at Enapet 2014, out of 15 studies, only 02 concerned teaching; at Enapet 2015, 19 studies in the Biology field were approved, and only 03 approached aspects related to teaching. In 2016, there were 4 studies concerning teaching, among five total. In 2017, among 11 studies presented, 4 were aimed at teaching. In 2018, there were 26 studies in the Biology field, and, among those, 7 concerned teaching.

At every meeting, we identified several studies that discussed the reception of new students – these were disregarded, since, in our analysis, they were not directly related to teaching. Furthermore, in several fields, we found at least one study per area whose theme and/or title indicated the inextricability between teaching, research and extension in certain PET groups – which reinforces the legitimization of that theme by the PET community.

It is relevant to note that some academic papers have also analyzed contributions brought by PET to participants' professional training. In the Nursing field, for example, we can find the research by Cassiani, Ricci and Souza (1998) and by Petrilli-Filho and Martins (2001). The first authors analyzed scholarship holders' representations on the program contributions. Among the results, participants were unanimous on PET's contribution to their personal and professional development through actions that led to the integration of academic training and the future professional activity (CASSIANI; RICCI; SOUZA, 1998).

The study by Petrilli-Filho and Martins (2001, p. 92-93, our translation) indicates that the program seems to be important in the professional training of nurses, since it seeks to:

[...] offer academic training of excellent levels to undergraduate students; encourage enrollment in graduate and postgraduate courses; stimulate the improvement of undergraduate course quality through the development of new pedagogical practices and experiences; multiply activities carried out by scholarship holders with the group of course

students, and the interaction of students in the program with the institution's teaching staff and student body.

For Câmara, Grosseman and Pinho (2015, p. 826, our translation), their study allowed them to identify:

[...] important elements of educational innovation related in literature, and allows us to consider the IPE proposal by PET-Health as a successful educational innovation. Developing the project [...] involved a set of interventions, processes and decisions that sought to change pedagogical attitudes, ideas, cultures, models and practices. Teachers' motivation and commitment were important characteristics, as well as protagonism, understood as the participation of teachers, students and professionals in pedagogical decisions, and appreciation for personal, original and creative production, encouraging more complex and non-repetitive intellectual processes.

Still in the Health field, Caldas and collaborators (2012, p. 33) verified that the actions carried out by one PET group “[...] benefited the teaching-learning of scholarship holders and volunteers; interdisciplinarity; and integration between teaching, research and extension” (CALDAS et al., 2012, our translation). This optimistic point of view concerning the PET Program is shared by Farias-Santos and Noro (2017, p. 1002, our translation), who assert that:

The study revealed that, based on ENADE, PET-Health has contributed to undergraduate students' training in Dentistry, Medicine and Nursing courses, considering the students' improved performance in every analyzed test (global performance, general training, specific knowledge and collective health).

In another professional field, Library Science, the same program seems to be relevant for participants' training through academic research. Ferreira (2011, p. 107, our translation) highlights that “[...] the efforts towards integrating the course through research projects and PET extensions have resulted in the expansion of the volume of research carried out in the course”.

According to Balau-Roque (2012, p. 101, our translation), in a study carried out with PET groups throughout Brazil:

The results found suggested that participants highlighted positive changes promoted by the PET experience. This evidence points to countless advantages generated by the program and indicates the importance of its continuation and, likewise, the need for constant

expansion, especially to other states, since most groups are located in the Southeast.

Moreover, similar accounts are found in the Geography field, as shown by Gomes, Hauresko and Bortoli (2008), who remark that PET activities function as a generator theme for the articulation between theory and professional practice, avoiding a dichotomous point of view that tends to segregate those worldviews.

In the Natural Science field, we have the study by Feitosa and collaborators (2011), in which the authors describe and analyze an activity carried out by a PET group, associated to an incentive for the reactivation of laboratories for practical Science classes in public schools in Fortaleza.

Analyzing the aforementioned studies, we can realize that PET, as a professional training policy, has been a fertile field for investigation. However, there are still few studies about professional training within Biology, whether aimed at bachelor's training or teacher training.

Considering the formative possibilities of the Tutorial Education Program linked to the professional development of undergraduate students, we questioned: how do members of the PET-Biology group from Federal University of Ceará (UFC, in Portuguese) perceive the formative experiences lived in the group, constituted by students in bachelor and teaching courses? This article aims to answer that question.

We can reinforce that PET-Biology has members in both bachelor and teaching training in the Biology undergraduate course. Thus, the objective of this research is to analyze the perception of PET group members, hereafter called "petians", concerning the contributions of activities carried out by PET-Biology for the training, as biologists or teachers, of its members, undergraduate students in the UFC Biology course. We hope that this investigation will contribute to understand this program, which has a federal public policy connotation, through a case study with local focus.

In order to achieve that, this text is divided in the following manner: first there is a brief explanation of the history of the UFC PET-Biology group; then we present the theoretical framework on which the research was based and the methodology used in the case study. Lastly, the investigation results are shown under "Perceptions on PET-Biology".

2 A BRIEF HISTORY OF THE PET GROUP

The group analyzed is constituted by a tutor, twelve scholarship holders and four volunteers (PETBIOUFC, 2015) and is in operation since 1992. Considering that the program orientation is related to the interaction between teaching, research and extension (BRASIL, 2005), analyzing these actions is deemed indispensable.

In a publication associated to the group, their teaching activities are linked to practices that support the undergraduate course, especially the “[...] preparation of new pedagogical projects for the respective courses; the development of classes, workshops, didactic and technical seminars; the reception of new students; support during students’ enrollment in their respective courses” (DIAS; FREITAS, 2006, p. 1, our translation).

Likewise, we find in Dias and Freitas (2006, p. 2, our translation) a description of the activities of extension carried out by the group over the years, whether it was with the academic community, “[...] the community outside UFC, junior high and high schools (profession fairs, workshops, etc.)”. “Profession fairs” are events where undergraduate courses associated to PET programs are introduced to the larger community in the city of Fortaleza, Brazil.

Furthermore, the aforementioned authors advocate that group members develop investigation activities, individually or collectively, associated to research laboratories within the university. This connotation also seems to occur in PET groups of other fields, as shown in studies presented at Enapet (2014, 2015), and in publications by Gomes, Hauresko and Bortoli (2008) and by Ferreira (2011). According to the academic literature, such research education activities constitute formative actions for future professionals in those fields.

It is also significant that, besides those activities, petians also undertake actions of political nature, as highlighted by Dias and Freitas (2006), who reported on INTERPET conferences, i. e., a series of permanent and systematic meetings of PET groups in the state of Ceará. It was evidenced in the Enapet annals (2014, 2015, 2016, 2017), which contain many demands and suggestions for changes in statutes and other documents relative to structure, composition, and evaluation of PET, in the form of “letters” sent to the Higher Education Secretariat (SESu/MEC).

Despite that information, we also believe it is necessary to enter the study and curriculum practice spheres in order to understand the real contributions of the program for the training of future teachers and biologists who are part of it. That is our next discussion.

3 THEORIES THAT REFERENCE WORK

Considering the behavior of PET groups, we decided to analyze their actions based on the perspective of the reflective professional training (SCHÖN, 2000), focusing on the idea of Associations of Craft Fellows, i.e., “[...] in a space-time characterized, predominantly, by a collective interrelation between participating subjects” in a certain group (FEITOSA; LEITE, 2012, p. 40, our translation).

Within that point of view, inside a process that favors the everyday action-reflection with their colleagues, educators create a new reality, experimenting, engineering and rebuilding through the dialogue established with their context. Queiroz (2001) and Feitosa and Leite (2012) add that this theme is a critical reading of medieval craft guilds applied to teacher training. The Association of Craft Fellows theory assumes the existence of different levels of theoretical and practical knowledge among fellows in the association. The most experienced ones have knowledge built in everyday practice, denominated experience knowledge, whereas novices are in pursuit of that knowledge.

Professional training, whether it is specific or teacher training, usually disassociates theory from practice. We seek training that breaks with that dissociative model, as shown by Eisner (2008, p. 9, our translation) in what he calls “art” field, in which the practice is consolidated along with theory, influencing each other:

By the term artist [...] we don't necessarily mean painters, dancers, poets, or drama authors. We mean individuals who developed ideas, feelings, abilities, and the imagination in order to create work that is well provided, skillfully executed, and imaginative, independently of the individual's field of work. The greatest compliment we can pay someone is to say that he or she is an artist, be it as a carpenter, surgeon, chef, engineer, physicist, or teacher [...].

Training curricula, as a general rule, don't address situations that arise during professional practice and which cause doubts, singularities and conflict (SCHÖN, 2000). Thus emerges a need to (re)size those curricula, articulating teaching with research, practice, theory, reflection – considering the student as a subject both hermeneutical (producer of meaning) and epistemic (producer of knowledge for themselves and others), dimensions which are relevant and “[...] inherent to the researcher individual's critical reflectiveness” (TERRIEN, 2011, p. 52, our translation). Said more specifically, we seek to understand the importance of a training based on reflective teaching.

In that line of reasoning, Feitosa and Leite (2012) suppose that teacher training can also function under that articulating and collaborative point of view. In their studies, these authors present evidence that it is possible to envision the teacher's work as a sort of artistic education, taking place within teaching apprentice corporations, that is, formative groups, based on the categories as founding aspects of Associations of Craft Fellows: involvement; search for social transformation; interdisciplinary work; artist teacher; collaboration; individual and collective reflection, as we will subsequently see in greater detail.

4 METHODOLOGY

This investigation has as a base methodology the case study (YIN, 2005), with a qualitative focus. The case study is a strategy frequently used to examine contemporary events (STAKE, 1995; YIN, 2005). These authors indicate that case studies have a broad history in the Health and Social Service fields and, when they started being used in those fields, their purpose was the clinical study, i.e., diagnosing a patient's problem and proceeding with the clinical/therapeutic recommendation.

This methodology started being applied in the Education field in the 1960s/1970s; however, it presented a restricted context, such as describing an educational unit, whether it was a school, a teacher, a student group, or a classroom. According to Stake (1995), that understanding led to some interpretation errors within the field, aside from research with limited aspects and shallow analyses. After the development and upscaling of qualitative approaches in research, in the 1980s, case

studies resurfaced in Education research with broader contexts, that is, focusing on a specific phenomenon, considering its multiple dimensions and historical context.

Yin (2005, p. 32, our translation) asserts that a case study “[...] investigates a contemporary phenomenon inside its real-life context, especially when the limits between phenomenon and context aren’t clearly defined”, since the case study tackles a technically unique situation where there will be more variables of interest than data sources. Habitually, researchers use several data collection tools in case studies.

In this investigation, we used document analysis and interviews as primary information sources. We began with a document analysis about PET-related legislation (BRASIL, 2005, 2006). Afterwards, we investigated the Pedagogical Project for the Biological Sciences undergraduate course (UFC, 2005), aiming to understand the organization of the course’s formal curricula, and to comprehend how the program relates to the project. Subsequently, information about the group analyzed was obtained through an electronic channel posted on a social network (PETBIOUFC, 2015).

Furthermore, we also interviewed current and former scholarship holders, as well as two professors (one was a PET tutor, and the other was a member of the program), from the teacher training modality of the course.

We interviewed three undergraduate students (out of twelve students who were members of the program) and identified them using gemstone names (thus withholding their real names): Ruby, Sapphire and Amethyst. This denomination elicits the metaphor that our research subjects were jewels, discovered and enhanced through “artistic” work in a formative atelier. These students were selected as representatives for different course semesters: one represented students in the PET program who were between the second and fourth semesters of the course; one represented students in the fifth and sixth semesters; and one represented students in the seventh and eighth semesters. After the categorization through semesters, the students were randomly chosen among those who agreed to be interviewed.

Likewise, we also interviewed three people who graduated from the Biological Sciences course, in the teacher training modality, who were members of the PET-Biology during their training. The selection took place according to answers to our “call”/invitation, sent via e-mail to the last twelve members to graduate. In this process,

we sought to discover these former petians' perceptions on the program's contributions to their initial professional training. These respondents were denominated Diamond, Quartz and Topaz.

The current PET-Biology tutor, who we called Agate, was also interviewed, as well as an acting professor in the teacher training modality recommended to our research by her, who we called Jade.

We can highlight that this interview phase, although there hadn't been a formal request to the university's Ethical Council, took place only after participants granted their approval and consent, documented through an informed consent form containing information and details about the current investigation, as suggested by Stake (1995) and Yin (2005). Still as an integral part of our concern with ethical aspects in the research, the interviews were transcribed and sent via e-mail to the participants, so that they were able to analyze the material and make any changes to the text that they deemed necessary. Any changes and/or suggestions made by the participants were added to the research data. After that moment, the participants could once more approve or refuse their contribution to the research.

Along this text, we maintained the original manner in which participants expressed themselves, seeking to uphold the discourse's precision and intention. We used some aspects that characterize Content Analysis, according to Bardin (1977) and Franco (2005), in order to understand the research findings. Content Analysis considers textual strictness and the need to look beyond appearances contained in official documents and in the discourse of research participants. This analysis can be applied to what is said or written in documents, questionnaires or interviews, what is shown in images of movies, drawings, paintings, signs and other forms of nonverbal communication, as well as behaviors, gestures and postures.

Therefore, we subsequently present the investigation results, analyzing perceptions of members about the program and their training through the Tutorial Education Program, focusing on the most recent group activities.

5 PERCEPTIONS ABOUT PET-BIOLOGY

During the analysis of data collected through the document that formalizes the course's curricular structure, it can be noticed that UFC (2005, p. 13, our translation) explicitly remarks that "[...] the Tutorial Education Program (PET) is associated to the College of Undergraduate Studies" and is connected to the students' professional training. In that context, we observe that this program may be part of only a few students' academic career (approximately with a maximum of 12 scholarship holders, possibly admitting volunteer students), a career we call curriculum/path (FEITOSA; LEITE, 2012; QUEIROZ, 2001).

The curricular matrix of the Biological Sciences course, in the teacher training modality, which started in 2006, also maximizes the participation of undergraduate students in activities connected to education in the Science field. For the professor we interviewed:

Compared with the old curriculum, I think in the new one we have an advancement when it comes to students' criticality and participatory attitude, including their interest in research on teaching (education). The need to write a course conclusion paper has also contributed to that. However, I see that activities not on the formal curriculum have greatly contributed to the training of Biology teachers, such as the PIBID groups [Teaching Initiation Scholarship Program] in Biology and Environmental Education, the PET group and LEBIO [Laboratory of Biology Teaching]. (JADE, our translation).

Supporting that professor's point of view, students expressed a similar perception about the relevant role played by "activities not on the formal curriculum" on teacher training. One student from the fourth semester was emphatic at writing that, in addition to classes attended, "*[...] participation in scholarships such as (tutoring, scientific initiation, Pibid) are imperative in training for bringing us [students] closer to the reality outside of university*" (RUBY, our translation). This same thought seems to be, in a way, hegemonic among those in the teacher training modality.

The theme of interdisciplinarity also arises in their assertions about the projects. For example, one student remarks that she was part of interdisciplinary activities during her academic training only in "*[...] out-of-class projects, like PET assignments and similar activities*" (SAPPHIRE, our translation).

Most undergraduate students acknowledge that these programs are an integral part of curricular activity in Biological Sciences, but a minority thinks differently. For example, another student in the fifth semester of the course remarked that she participated in an activity of an interdisciplinary nature that relied on the “*Tutorial Education Program (PET) to carry out an activity in a public school*”. However, she emphasizes that this activity “[...] was a *PET group activity, not a UFC Biological Sciences activity*” (AMETHYST, our translation). We realized that she doesn’t consider that the course curriculum allows for interdisciplinarity. From her point of view, this type of activity can only be achieved when students are part of other projects, like the aforementioned case, in which she experienced “a PET group activity” – and, with that, PET gains prominence in her training.

We invited the tutor to express her opinion about the activities carried out by PET. Thus, Agate began her speech informing that the group consists of twelve undergraduate scholarship holders, a few volunteer petians and “[...] has the collaboration of Ecology [graduate] students”. This relationship was important in the creation of two activities: first, the “[...] *Peteco, which is an environmental education extension project*”; the second is the “[...] *vacation course, which takes place in July, but the scholarship holders plan throughout the year*” (AGATE, our translation).

According to what was observed in that interview, the Vacation Course is an activity conducted with students and teachers from public schools, who are welcomed by PET members to UFC facilities, during school vacation. As per the tutor’s report, since 2012 the activity developed themes concerning environmentalism, such as ecology, environmental education and sustainability.

By explaining how planning for those activities takes place, the teacher emphasizes research and dedication in the construction of material about the content that will be explored with participating teachers and students; but she didn’t mention, for example, didactics aspects, inherent to teacher training. In addition to those activities, the interviewee reported that, through her experience with scholarship holders, she was able to notice some aspects that resulted on improved training for the students that participate in the group’s processes. According to the tutor:

[...] PET is interesting because you see the students evolving. They begin really quiet, not saying a word, kind of shy, then by the end of the semester they are more involved, saying their ideas. So, like, I think that is interesting. (AGATE, our translation).

For the teacher, by maximizing diverse experiences, which include the interaction within the group, discussion and collaboration, PET allows a “student evolution”, i.e., their development as people. Thus, Agate sees an interesting formative potential in the aforementioned program. It seems relevant for this investigation, because pedagogical strategies developed in the group suggest that there is space for the development of training that goes beyond technique, making way for the students to reach new educational heights, accompanied by their peers – which brings us back to the Association of Craft Fellows discussion (FEITOSA; LEITE, 2012), in which veteran members recall their experiences, giving them new meaning, along with novice or less experienced members.

With Agate’s speech, we notice that the curriculum developed in PET promotes an experience that goes beyond subjects present in the course curriculum and the cognitive aspects, since it allows the development of human relationships as an integral part of the group’s processes. This perspective recalls what Feitosa and Leite (2012) suggested, in their proposal to educate through cooperation, allowing for collective reflection. We understand that this proposal becomes relevant for the student’s training (either in the teaching or bachelor program) in the natural sciences/Biology field; however, as other authors report (GOMES; HAURESKO; BORTOLI, 2008; QUEIROZ, 2001), this is still a field in which prevails training with emphasis on specific cognitive content of its respective subfields.

Agate’s thought was repeated in the interviews with former PET members who had graduated. For example, two former petians report that the group’s activities are complementary to those developed in the course curriculum subjects, as well as relevant for the training of Biology teachers. In their words:

You learn a lot and it’s not only content, I think it’s a group interaction, group dynamics, having administrative awareness, and everyone kind of does everything, even though there is division of labor. And we have to cooperate always, because without cooperation nothing works. [...] I also think PET contributed to my teaching life. (DIAMOND, our translation).

I can say, with all certainty, that PET was one of the best things I had in university. Because of the very nature of PET, which involves teaching, research and extension. So we worked with the undergraduate course, with teaching and research in and outside of the university. [...] My training process as a teacher, although it is continuing, [...] but the basis started when I began to interact more with other individuals, I started to really build the knowledge in order to transmit that knowledge. (TOPAZ, our translation).

In the above interview excerpts, we can notice that the interviewees attribute to the Tutorial Education Program a relevant contribution to their professional teacher training. In this regard, Topaz explicitly asserts that “[...] *PET was one of the best things I had in university*”. In turn, Diamond argues that the aforementioned program “[...] *contributed to my teaching life*”. However, they didn’t mention anything concerning specific content of teacher training (which includes systematic reflection about planning, didactics, evaluation, student/teacher relationship, among others) – maybe that is a gap to be filled more systematically and consistently, because teacher training, similarly to the bachelor program, has specific subjects, as evidenced by Cunha (2005) and Veiga (2009).

We also highlight the collaborative work by the group of scholarship holders, which, according to the respondents, was relevant to these teachers’ training. This data meets the premise of the Associations of Craft Fellows (FEITOSA; LEITE, 2012) and the propositions by Tardif and Lessard (2009) who advocate that teaching and learning demand human interaction. Therefore, there must be a collective process of reflection about the practice, in order to advance in relation to the individualistic attitudes of teaching.

Still in the group training context, interdisciplinarity is also a theme discussed by the professionals. One of them, Quartz, remarks that PET allowed moments that relate beyond isolated subjects and fields. According to her, the group experience “[...] *had a lot of that interdisciplinarity thing, since we had to get along with people from all fields in the general [PET group] meetings*” (QUARTZ, our translation).

Quartz informed that these “general meetings” functioned as political relationship activities between the groups, where reports were given, collective action strategies were devised, among other activities. She stated that “[...] *sometimes, we*

didn't talk about interdisciplinary stuff, but we got to know other groups' projects" (our translation).

Undoubtedly, the fact that there is interaction "with people from all fields" seems to be beneficial in the training of PET group members. However, we must forewarn that simply talking to groups from different fields of knowledge isn't enough to consider an activity as interdisciplinary. That's because, as stated by Feitosa, Leite and Freitas (2011), interdisciplinarity, as a human action that is effective and interrelated with diverse fields seeking to solve common problems, is often confused with multidisciplinary, i.e., the simple adherence/juxtaposition of different fields of knowledge that interact, but without an effective interrelation (FAZENDA, 2001). Thus, many practices that are considered "interdisciplinary" by their social actors are actually a type of conversation between representatives of disciplinary fields who discuss a common theme.

In a discussion about PET's proposal to articulate teaching, research and extension, we observe a still incipient action. One student (Amethyst) reported that, for her, the program is relevant for professional training, because in it "*[...] we are directly in practice*" (our translation), that is, they carry out activities and experiences that go beyond theory and beyond the classroom. Mentioning a few examples, the student asserts that scholarship holders can act "*[...] as tutors, as listeners, as lecturers, we ourselves teach a class, we participate. Here we don't just sit around listening to the professor's lecture, we are active*" (AMETHYST, our translation).

Another question we can raise is: when it comes to teaching, is it enough to have the specific subject knowledge in order to be a good teacher? We believe the answer is "no". It is necessary, then, to seek theoretical and practical references about the act of teaching, as we explained previously; besides, and regarding our concern since the article's title, we evidence the need for further research about the affirmation of the university paradigm (teaching – research – extension purposes), which must promote and produce knowledge and effectively make them accessible to every segment of society.

6 CONCLUDING REMARKS

Analyzing the findings of this reflective investigation, we notice that investment on training classes and activities, such as the Tutorial Education Program, leads to many effects on students' professional training, including group learning, through teaching, research and extension actions.

According to the point of view introduced by Feitosa and Leite (2012), we find some similarities between the group investigated here and what the authors called Association of Craft Fellows, among which we can highlight: cooperation, diversity, interdisciplinary work and the pursuit of social transformation, mentioned by respondents as relevant to their professional training, whether as teachers or biologists. Therefore, we indicate that the PET group seems to be an example of artist-professor proposition.

For the professionals whom we interviewed, the activities developed in the PET-Biology group were important in their careers, according to their own reports. Thus, we believe that choosing to invest public resources into programs such as PET suggests government concern with professional training at the Higher Education level. However, we emphasize that these projects, although representative, do not encompass all students. Furthermore, we understand that it is necessary for this program to relate more closely to other social/cultural inclusion policies (FRIGOTTO; CIAVATTA; RAMOS, 2005).

The results we found corroborate studies by other authors, who suggest that group activities can contribute positively to professional training (FEITOSA; LEITE, 2012; QUEIROZ, 2001).

Research and extension activities may be supported by theory, even if not clarified, but an increase is necessary, because, nowadays, swift changes bestow upon universities the challenge of carrying out integrated teaching, research and extension actions, beyond (re)systematized knowledge, in order to overcome social and regional inequality, with (inter)national quality and cooperation, although we don't deny their relevance. It doesn't consist of denying the importance and relevance of teaching, extension and research by themselves, but understanding teaching, extension and research activities, in an interconnected manner, as vital resources to teaching and

learning processes. This requires, in turn, a professional training proposal highly integrated to the experience of real situations in a dialectical relationship between theory and practice.

This perspective demands, besides educators affiliated to investigation and interrogations concerning society's path and who adopt or (re)create new pedagogical practices, a different curricular design, interdisciplinary, more susceptible to current social changes, favoring the theory-practice connection in the student's integral training (DIAS, 2009). The same happens with the teaching practice, which is still carried out more intuitively than scientifically. In the case of teacher training, however, greater involvement with the profession and its technical, didactic, scientific aspects is necessary, since, like any other profession, teaching requires specific knowledge (and that, from our point of view, still needs to be practiced in PET groups).

There is no specific training for teaching at a Higher Education level: the Law n. 9394/96, in its article 66, indicates that "Preparation for Higher Education teaching will take place at graduate level, primarily in Masters and Doctorate programs" (our translation).

We consider that simply "preparation" isn't enough – training is necessary –; and training implies giving pedagogical content the same weight and importance given to specific content of the field (Biology, for example). Therefore, the same rationale must underline every program, project, policy and action aimed at Higher Education, even the ones aimed solely at bachelor programs, because agronomists, physicians, engineers, psychologists and other professionals also have an important work space in Higher Education teaching.

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