

# The construction of teacher knowledge in a Biology pre-service program

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## Abstract

This study represents a stage in the already completed mastery research on initial teacher training in the context of PIBID. In this qualitative research, we have tried to answer the following questions: what knowledge of teaching biology students have built, based on their life history, school experiences, PIBID's experiences, and that they still hope to develop at this level in the full course depending on their future career. We have found that undergraduate students have brought with them the experiences produced during the years being students from basic education. It is noticed that during the professional practice developed in the PIBID they learned about the indispensable necessity of managing the class with the scripting of the sequences, and therefore considered the knowledge that the teacher obtains, is regularly built during the entire career.

**Keywords:** *Teacher Knowledge, pre-service program, Biology, medias, school experiences.*

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## Introduction

This study represents a stage in the already completed Master's research on initial teacher training under the PIBID (Institutional Fellowship Program for Teacher Education), a federal program created in 2007 by CAPES. It is a pre-service program that aims contribute to the improvement of the quality of Brazilian public education.

As a federal program, PIBID and its operation has been studied by many Brazilian researchers. For Fetzner and Souza (2012), this program allowed a dialogue between professional practice in the school environment and the theory studied at the university. Other surveys by Vigário and Carmo (2013) have shown that PIBID allows deconstruction of certain stereotypes of teachers. However, the wide coverage of the program in Brazilian territory has admitted a wide variety of subprojects inscribed in the PIBID which clearly need to be further explored.

In this research, we observed and analyzed students participating in the PIBID at the University Federal do ABC (UFABC), located in Santo André, SP - Brazil, in correlation of the announced research questions. The proposal of PIBID / UFABC was to promote an incentive for undergraduate students in biology, based on real experiences of teaching and learning in public schools of basic education. It was essential to situate the epistemological construction with a look of investigation and reflection on the practice of teachers with the scripting and application of didactic sequences (UFABC, 2010).

On the other hand, it is noted that undergraduate students also need to use media such as newspapers, magazines, radio, television and the Internet as teaching aids. In our previous research (Faustino and Silva, 2013), we found that the use of these media in classrooms by undergraduate students was primarily related to the complement or scripting of pedagogical content in biology. We agree with UNESCO (2011) on the idea that the use of media in teacher education is important because teachers should be able to examine and understand how media content and other information are produced, how the information these systems present can be evaluated, and how media and information can be used for different purposes.

Teaching is also a complete professional activity because it requires a diversified knowledge. This means that it is necessary, for future teachers to receive training from a theoretical and practical perspective (Veiga, 2008).

To support discussions on teachers' knowledge, we used the classification presented by Tardif (2011), which defines them as temporal in three ways. First, because much of what teachers know about teaching practices comes from their life history and their school experiences. Temporality is also present in the early years of work experience, generally related to the survival of their careers, as it is during this period that

they establish their work routines and professional practices. Finally, the knowledge of teachers is also of a temporal nature because it will be developed during a full career. The three ways identified and linked to temporality and knowledge according to Tardif are outlined in Figure 1.



Figure 1. The temporality of knowledge from teachers. Adapted from Tardif (2011).

In this research, we sought to answer the following questions: what knowledge specific to the teaching Biology students have built, based on their life history and their academic experiences carried out in the context of PIBID and that, they still hope to develop in the course of their future career.

## Methods

To answer these questions, we conducted a qualitative research that interprets the writer's written documents, speeches, movements or actions (Carvalho, 2006). In this case presented, our research focused on biology students who participated in PIBID / UFABC.

In order to collect data, we developed a questionnaire for undergraduate students and collected experience reports. The experience reports are documents produced by students, in which they include their reflections and situations that have happened while staying at school.

For the framework of observation, we used the content analysis of Bardin (1977). This author considers that any analysis is carried out from a set of documents called corpus. As a result, the corpus of this research was composed of eleven questionnaires and nineteen reports of experience. Undergraduate students developed these documents from August 2010 to May 2013, and for the analysis of the corpus we have selected indicators of analysis, which are partly extracted from the main ideas of the first cycle.

## Findings

The organization of this section follows the three temporal modalities established by Tardif (2011). We will first discuss the knowledge acquired by undergraduate students in their life history and school experiences, then discuss knowledge built in the context of PIBID, simulating the early years of teaching practice, and hope to be realized during a full career.

**Knowledge from the history of life and school experiences**

Some of the selected analysis from these temporal modalities have been presented in table 1.

- a. *I like to draw on the blackboard. I remember that my biology teacher used to do this and I think that helps a lot.*
- b. *Teachers I admire certainly influenced me to want to be good like them.*
- c. *The education changed my life and my reality, so I believe I can change the reality of other people who today do not believe that they can have a better future.*
- d. *I chose an education subject because it fit in my schedule and in the end, I liked.*

Table 1. Indicators of analysis on the history of life and school experiences.

We found that undergraduate students brought the experiences from their basic education student years, and this directly reflected their vision of teaching and actions to be produced in the classroom. Some undergraduate students remembered the moments and actions produced by the teachers they enjoyed during their studies and thus tried to reproduce them in their interventions.

Other students have discovered their vocation during certain courses in the disciplines of education at the university. Tardif (2011) also mentions the knowledge acquired during the university. We studied what content the undergraduate students have chosen as the most important to discuss at the university: biology with controversial topics, assessment and theories of learning. About the practices learned about the subjects they highlighted on practice, class methods and planning a didactic sequence. These results are similar to those described by Fetzner and Souza (2012).

**Knowledge built in subproject of PIBID**

Some of the analyzes selected in relation to temporal modalities have been presented in table 2.

- e. *I also have learned that even though we have a didactical planning, things happen in the classroom, and we have to improvise and rearrange things because time is stipulated.*
- f. *At the next opportunity, I'll use a smaller text or adapt longer texts, moreover, I'll prepare questions and formulate clearer exercises for the student's better understanding.*
- g. *The work of exercising the media critical reading is a ghost in my work so far. I believe this is an ongoing exercise and even for some adults it is difficult.*

Table 2. Indicators of knowledge analysis integrated with PIBID.

Tardif (2011) describes the existence of experience-based knowledge, that is, the knowledge that teachers derive from their errors and successes produced in class. On the other hand, we believe that undergraduate students in initial training have not benefited sufficiently from the experience necessary for the construction of certain knowledge. However, the way in which the author indicates this, it can be observed that students who have taught more than one didactic sequence have used the experience of their first classroom instruction in terms of temporal modality in order to plan other sequences.

It was then possible to identify certain knowledge that was constructed from the experiences of PIBID. The first questioned the appropriateness of planning in a class situation, because there, what was not initially foreseen happens frequently. We also found that undergraduate students still need to work more intensely in the classroom considering the critical reading of the media. And to propose activities that seek to identify what is behind the issues associated with the use of newspapers, magazines, television, etc.

Becker and Pinheiro Filho (2011) consider that critical reading of television programs can help to build a broader view of the central role of today's media and foster a better understanding of the meanings of messages produced on the reality the media themselves as language and way of thinking.

**Knowledge to be developed within na entire career**

Some of the selected analysis from this way of temporality were exposed at table 3.

- h. *We think that the practice will be the main way to overcome difficulties. Only teaching many lessons, we will be able to gain the confidence of being in charge of a classroom.*
- i. *As for the nervousness and difficulty grading, I believe that these difficulties will be overcome only with practice. I seek to improve these aspects so that I would become a good professional.*

Table 3. Indicators of analysis on the knowledge to be developed.

Undergraduate students have acquired scientific knowledge that the teacher gets regularly, this in consideration of the knowledge derived from the lessons learned during their full career as a teacher.

So, after completing their degree, they have realized that their learning assets are incomplete, effectively encouraging them to continue learning over the years as teaching professionals. They also mentioned that over the years, as teachers, they would probably be more confident and would have fewer difficulties about grading.

### Conclusion

Although incumbents still have a long teaching career in perspective, with actual and future knowledge gained from their experiences, to promote the pursuit of their practices, taking into account the learning and knowledge developed in the framework of the PIBID.

It is important to survey all types of teacher knowledge built by the undergraduates to rethink pre-service programs in order to include discussions about preconceptions and ideas that were established before college.

We believe that using the experience reports as an analysis tool was a great way to collect information about expectations, ways of actions and knowledge built by the future teachers.

This research was not limited to this inquiry; more research needs to be done using other contexts in order to obtain a more complete picture of the construction of teachers' knowledge in an initial training program.

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