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Teaching identity and positions of Biological Sciences students: scientific initiation experiences[1]

Patrício Câmara Araújo[2]
Hilnária Castro Sousa[3]

ABSTRACT

In the present study, the process of teacher identity constitution of Biological Sciences students was analyzed in the narrative of scientific initiation experiences. It is a research with a qualitative approach from the perspective of Bakhtinian dialogism and positioning theory. Four undergraduate students in Biological Sciences at the Federal Institute of Maranhão – Campus Barreirinhas participated in the study. The information was constructed from two individual narrative interviews with each of the participants. Dialogic thematic analysis was used to identify themes and meanings in the narratives. The data was organized in a table and in a semiotic map, which were elaborated from the dynamics of the positions presented. The results of this study suggest that the scientific initiation experience combined with acting in the teaching internship significantly implies the process of teacher identity constitution of students of the Degree in Biological Sciences.

KEYWORDS: Initial formation; Scientific research; Teaching identity; Positions.

[1] English version by Andréia Dellano Mendes Nunes. *E-mail:* andreiadellanomn@gmail.com.

[2] PhD in Human Development Processes and Health. University of Brasília. Professor at the Federal Institute of Education Science and Technology of Maranhão, Campus Barreirinhas, Barreirinhas, Maranhão, Brazil. Orcid. https://orcid.org/0000-0002-4252-1475. *E-mail*: patriciofilosofia@gmail.com.

[3] Degree in Biological Sciences. Federal Institute of Education, Science and Technology of Maranhão, Barreirinhas Campus, Barreirinhas, Maranhão, Brazil. Orcid: https://orcid.org/0000-0003-1738-6678. *E-mail*: hilnariac.ma@gmail.com.

Identidade docente e posicionamentos de estudantes de Ciências Biológicas: experiências de iniciação científica

RESUMO

No presente estudo analisamos o processo de constituição identitária docente de estudantes de Ciências Biológicas a partir das narrativas das suas experiências de iniciação científica. É uma pesquisa de abordagem qualitativa na perspectiva do dialogismo bakhtiniano e da teoria do posicionamento. Participaram do estudo quatro estudantes de Licenciatura em Ciências Biológicas do Instituto Federal do Maranhão - Campus Barreirinhas. As informações foram construídas a partir de duas entrevistas narrativas individuais com cada um dos participantes. Utilizamos a análise temática dialógica com a identificação dos temas e dos significados nas narrativas. Os dados foram organizados em um quadro e em um mapa semiótico, os quais foram elaborados a partir das dinâmicas dos posicionamentos apresentados. Os resultados deste estudo sugerem que a experiência de iniciação científica aliada à atuação no estágio docente implica de forma significativa o processo de constituição identitária docente de estudantes de Licenciatura em Ciências Biológicas.

PALAVRAS-CHAVE: Formação inicial; Iniciação científica; Identidade docente; Posicionamentos.

Identidad y posiciones docentes de los estudiantes de Ciencias Biológicas: experiencias de iniciación científica

RESUMEN

En el presente estudio, se analizó el proceso de constitución de la identidad docente de estudiantes de Ciencias Biológicas en la narrativa de experiencias de iniciación científica. Se trata de una investigación con enfoque cualitativo desde la perspectiva del dialogismo bakhtiniano y la teoría del posicionamiento. Participaron del estudio cuatro estudiantes de pregrado en Ciencias Biológicas del Instituto Federal de Maranhão - Campus Barreirinhas. La información se construyó a partir de dos entrevistas narrativas individuales con cada uno de los participantes. Se utilizó el análisis

temático dialógico para identificar temas y significados en las narrativas. Los datos fueron organizados en una tabla y en un mapa semiótico, que fueron elaborados a partir de la dinámica de las posiciones presentadas. Los resultados de este estudio sugieren que la experiencia de iniciación científica combinada con la actuación en el internado docente implica significativamente el proceso de constitución de la identidad docente de los estudiantes de la Licenciatura en Ciencias Biológicas.

PALABRAS CLAVE: Formación inicial; Iniciación científica; Identidad docente; Posiciones.

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Introduction

Teaching, like society, has been undergoing changes. Currently, in the educational context, teacher training requires trained professionals who are increasingly protagonists, critical and innovative (Bezerra *et al.,* 2014), who promote the teaching and learning of students in the best possible way.

Teacher training is a topic that generates debate in educational institutions, as it is described through the social relationships experienced by the individual, since they undergo various actions, which influence their behavior and their view of themselves as future teachers (Trevisol, 2016). Therefore, teacher identity is understood as something that is not constituted at a particular moment, but rather throughout the experiences lived by the individual in their training process (Araújo; Barros; Barros, 2018; Dassoler; Lima, 2012).

A teacher's identity comes about through how they perceive themselves as a teacher and how they are seen by the social environment (Marcelo, 2009). From this perspective, the knowledge of the profession and the process of teacher identity are fundamental aspects, since it is necessary for the individual to perceive themselves as this professional, in the process of developing their teacher identity constitution (Araújo; Barros; Barros, 2018).

Souza (2012) states that the teaching identity is constituted by the experiences that the individual produces in their life journey, which will imply their way of seeing themselves and reflecting on their relationships with their future professional activity.

During undergraduate studies, one of the student experiences that is related to teaching identity is Scientific Initiation (Santos; Frenedozo, 2013; Cunha; Barbosa; Antunes-Souza, 2021). In initial teacher training, scientific initiation is a topic that has educational relevance, as this practice can stimulate students for their future teaching practice (Trevisol, 2016).

Scientific initiation can contribute to reflection on the point of view of a given phenomenon . Thus, in our study, we asked how do the experiences of undergraduate students in Biological Sciences of scientific initiation imply processes of teacher identity?

With this in mind, studying the constitution of a teacher's identity is fundamental to understanding how individuals become teachers and how the possible teaching strategies they construct reinforce their performance as a teacher-researcher. Contributing to the understanding of the process of teacher identity formation is a way of understanding the formation of being a teacher and how the experiences of scientific research produce meanings that guide this process .

Based on this assumption, this study discusses the contribution of scientific research to initial teacher training. The aim was to analyze the process of teacher identity constitution of Biological Sciences undergraduate students based on the narratives of their scientific initiation experiences.

Training the teacher researcher

Developed by the National Council for Scientific and Technological Development (CNPq), and the Ministry of Science, Technology and Innovation (MCTI), the Scientific Initiation (IC) is a teaching program that seeks to insert undergraduate students into research, promoting knowledge

and encouraging the training of researchers in Brazil (Azevedo; Nascimento; Lopes, 2020). Scientific initiation has been one way in which future teachers are exposed to research during their initial training (Cunha; Barbosa; Antunes-Souza, 2021).

Research focused on teacher training highlights the relationship between research activity and teaching practice with experiences in the context of initial training (Pimenta, 1997; Santos; Frenedozo, 2013; Akkerman; Meijer, 2011). We therefore carried out a systematic review of articles and papers from 2013 to 2021. We selected (6) six studies from the CAPES Periodicals Portal and *Google Scholar* databases, which were closer to the study of this topic, as shown in Table 1 below:

TABLE 1 - Scientific initiation in initial teacher training

Year	Author	Title	Research approach	Database
2021	Cunha, R. C. O. B.; Barbosa, A.; Antunes-Souza, T.	Scientific initiation in undergraduate courses and contributions to teacher training	Bibliography	Periodicals Portal CAPES
2020	Azevedo, T. H. S.; Nascimento, M. B. C.; Lopes, J. B. C.	Initial teacher training: meanings and singularities of scientific initiation as a science policy	Qualitative	Periodicals Portal CAPES
2018	Pesce, M. K. André, M. E. D. A.	Training the teacher researcher from the perspective of the teacher trainer	Qualitative	Periodicals Portal CAPES
2016	Soares, M.	The practice of research in higher education: scientific initiation as a means of meaningful learning	Bibliographic - Qualitative	*Google* Scholar
2016	Trevisol, F.	Scientific initiation in initial teacher training: how far along are you?	Bibliography	*Google* Scholar
2013	Santos, R.; Frenedozo, R. C.	Contributions of scientific initiation to the formative process of perceptions and conceptions of the science, technology and society approach in science and biology undergraduate students	Quali-Quantitative	*Google* Scholar

Source: The authors (2023).

We came up with nine (9) studies, but with a more detailed refinement, we highlighted those that were directly related to our focus of study. We selected (4) three articles, (1) a doctoral thesis and (1) a course conclusion paper to carry out a systematic review of the literature on research related to scientific initiation in teacher training. This review consists of using criteria to investigate studies and is useful for presenting credible results (Sampaio; Mancini, 2007).

The studies identified had a bibliographic approach (2), a bibliographic and qualitative approach (1), a qualitative approach (2) and a qualitative-quantitative approach (1). We found that very little research focused on issues related to Biological Sciences degrees and, as a result, we opted to include research from other degree courses.

The articles in this literature review show that scientific research provides knowledge that is fundamental to undergraduate teacher training.

The study by Cunha, Barbosa and Antunes-Souza (2021) discusses the contributions of CI in undergraduate courses. The authors point out that this experience favors the practice of the profession and enables undergraduates to face obstacles in the school context. In the conclusion of the study, they emphasize scientific research as a formative experience for obtaining knowledge in the training process.

The research by Azevedo, Nascimento and Lopes (2020) sought to understand the meanings and singularities of CI. The results of the research identified the main contributions to initial teacher training, including the fact that it is a fundamental foundation for a professional career, in which experiences enable specific knowledge for their area.

The authors Pesce and André (2018) sought to understand the process of training teacher researchers. They consider that undergraduate courses should enable teachers to understand the context in which they are inserted and to deal with the constraints of their professional practice. The conclusion of this study highlights that research enables the construction of a reflective and investigative teacher.

In the thesis by Soares (2016), which analyzes the pedagogical impact of scientific initiation and its contributions. It shows that the experience of scientific research can benefit the teaching and learning process, enabling the student to develop an investigative attitude and skills. Its results suggest that CI contributes significantly to teacher training, providing specific qualifications for their day-to-day practice, and that it can also encourage students to take their studies further.

Another study was by Trevisol (2016), who took a look at studies on CI. Her analysis points out that undergraduate scientific research is indispensable for the career path of students, and can provide future teachers with a point of interface between theory and practice, or other qualifications for their profession. In her final considerations, she emphasizes scientific initiation as a form of mediation for the training of science teachers, with a view to seeking knowledge for their professional performance.

In turn, the authors Santos and Frenedozo (2013) set out to carry out an analysis with students on a Science and Biology course. The results indicate that the experience gained from involvement in research benefits the teacher training process, as they start to have more developed perceptions and conceptions about science, technology and society. In the conclusion of this research, the authors draw attention to the need for studies aimed at teaching in a broader way, since the school environment needs teachers who are not merely transmitters of knowledge, but also active and researching teachers.

In view of this, the studies in this review present scientific initiation as a contributory part of the teacher's professional identity and significant in the training of science and biology undergraduates. Therefore, the experiences of undergraduates in the exercise of a relevant activity in their initial training correspond to factors that imply the process of becoming or not becoming a teacher. In this way, these factors can influence the individual's position regarding their future professional teaching career (Mellini; Ovigli, 2020).

Teacher identity and positioning

The constitution of a teacher's identity is investigated through experiences in the individual's life history. In their initial training, Kirsch and Doi (2015) emphasize that students have a point of view about teaching. However, they can change this image of the profession and even have a vision of their future career as a teacher.

Brando and Caldeira (2009) state that teacher identity is constituted through personal and social relationships. The individual is only seen through the environment in which they are inserted. The implications of their experiences can result in the constitution of their professional identity.

According to Akkerman and Meijer (2011), teacher identity is in constant transformation, it is multiple, dynamic and complex, it changes according to the scenario in which the individual is included, because it is a process made up of implications, in which the individual assumes positions through speech, to which they attribute meanings (Davies; Harré, 1990).

Positioning theory is characterized by the individual's discursive practice, which is organized through their life stories. This happens through relationships with themselves and with others. Individuals' narratives about their self-image are related to the way they perceive themselves and want to be perceived in the social context (Harré; Langenhove, 1999).

Harré and Langenhove (1999) point out that during an individual's enunciation, they may assume or reject a position. This process is constituted according to how the individual draws up their narrative, considering the structure and plot, associated with assuming positions through their life trajectory.

According to Bruner (1997), narratives produce meanings through the experiences of individuals, in which they take up positions. When the individual positions himself, he articulates himself from the socio-historical process in which he is inserted, since it is at this moment that the dialogical construction of words takes place.

For Araújo and Borges (2020), the individual, in their narrative, reproduces the memories built up in dialogic relationships, which is related to their self-image. The narrative makes it possible to identify associated meanings about their own image, which is linked to the process of their identity constitution.

From Bakhtin's perspective (2011), individuals cannot be heroes of their lives independently of the other, because through dialog and interactions, we shape our understanding of the world, of reality and of ourselves, in which this is a process constituted through "the discourse of the other and the creation of the other" (Amorim, 2006, p. 96).

Bakhtin (2016) defines dialogic relations as the fundamental principles of language, in which meanings are constructed through dialog. Whenever we speak, we produce utterances that respond in some way to previous utterances or dialogues, our own or those of others.

In Bakhtin's understanding of dialogism, utterances have a meaning that makes them ideological signs, which guide individual actions. Signs are therefore forms that act together in the relationship between the individual and reality (Bakhtin, 2011).

Thus, we emphasize that the process of constituting a teacher's identity occurs in interactions with each other and in the activities developed in the aesthetic configuration of the self. Experiences produce meaning from narrated memories (Bakhtin, 2011). Therefore, the aesthetics of the self, as the image that students have of themselves as teachers, is related to the perception of their performance in relationships with others (Borges; Araújo; Amaral, 2020).

Methodological path

The study whose results are discussed here was based on exploratory narrative research using a qualitative approach. According to Clandinin and Connelly (2000), narrative research is a method based on

an individual's life story and is used to understand their experiences in relation to something specific. It seeks to go deeper through a qualitative approach (Minayo, 2012).

To do this, we developed a dialogic thematic analysis of the information based on Bakhtin's dialogism (1895-1975), which analyzes the dialogic interactions of individuals, and we used Harré and Langenhove's positioning theory (1999). We used the narrative interview to gather information, which is an unstructured tool used to capture in more detail the experiences of the research subject in relation to the object of study (Muylaert *et al.,* 2014).

The research followed four stages:

1) Systematic literature review, in order to identify Portuguese-language research, between the years 2013 to 2021, with the search term: scientific initiation in teacher training. The selected studies were organized in table (1) based on year, author, title, research approach and database.

2) Individual narrative interviews, in which 4 (four) undergraduates studying Biological Sciences in the 6th and 8th periods took part Instituto Federal de Educação Ciência e Tecnologia do Maranhão - IFMA /Campus Barreirinhas. As for the selection criteria, they were scholarship holders and volunteers in scientific initiation projects in the field of Education and Biological Sciences. There were 8 (eight) interviews, two with each of the participants, recorded on audio. This stage was guided by the following guidelines: a) preparing the material for recording; b) drawing up an initial topic with the theme "experience in scientific initiation"; c) the interview itself without interruptions or giving opinions, stimulating only with gestures without verbalizing; d) finalizing the recording and taking notes on the participants' interviews (Jovchelovich; Bauer, 2002).

3) Literal transcriptions of the interviews, which were made according to the following signs: brackets for pauses, intonations with reticence and expressions in quotation marks that denoted the speech of another in the participant's narrative. Each transcribed text was then listened to more than

once in order to identify whether any passages, expressions, words or even intonations and silences had been omitted or added, so that they could be readjusted. The information was then analyzed according to dialogic thematic analysis, with a general reading of the transcripts to obtain a view of the audio in written text. This reading looked for the characteristic elements of dialogic thematic analysis, which were: positions, meanings and themes that emerged from the narratives of each participant.

4) Drawing up table (2) and (1) semiotic map. The themes and meanings were highlighted in certain statements and organized in table (2). We then constructed a semiotic map using *XMind6 software*[4] , with the meanings linked to the themes that appeared in the narratives. The purpose of analyzing the results was to identify the dynamics of the positioning of themes and meanings in relation to the implications of one for the other.

Results and Discussion

The results of this study are based on the scientific initiation experiences of four (4) participants. They carried out research as part of the scientific initiation program at the educational institution, two of which focused on Biological Sciences and two on Education. Three of the participants had experience in the course's supervised internship, in which they taught classes as teachers.

Based on the analysis of the information in the verbatim transcripts, we organized a Chart (2)[5] and a Semiotic Map (1). In this way, the table is organized with the themes, meanings and statements that emerged from the excerpts from each participant's narratives, as shown in Table 2 below:

[4] According to Fenner (2017), XMind is software that aims to create easy-to-interpret mind maps.
[5] In order to preserve the identity of the participants, we have given them fictitious names. This research was approved by the Research Ethics Committee - Report No. 5.558.760.

TABLE 2 - Research experiences in CI for teaching

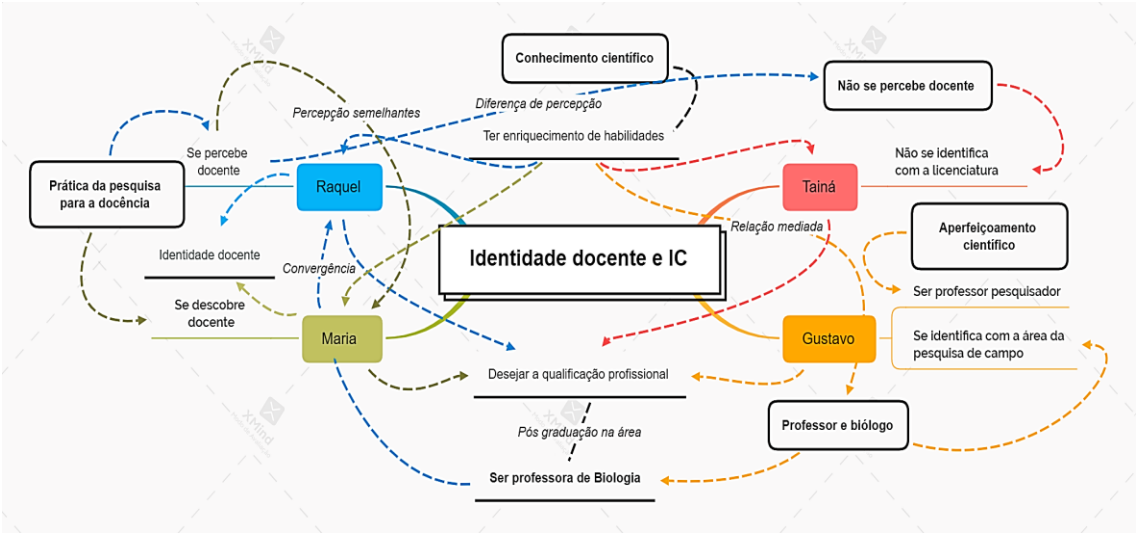
Themes	Meaning	Statements
Scientific knowledge	Skills enrichment	[...] the scientific initiation helped me, because we end up acquiring a lot of knowledge that we didn't have before, of course, and college provides this for us, it's the question of knowing how to research, how to write a good article, how to explain yourself, writing, it helps a lot [...]. (Tainá) [...] it's something that helps the undergraduate in many ways, because it's at this point in the project that he's going to work on a little bit of each, let's say, the writing part, the practical part and [...] the theoretical part. (Gustavo) [...] Yes, the project has really opened up my way of thinking, of reflecting [...] because as well as reading a lot, entering a new world, we learn to write better, we learn to write more scientifically, to think more critically [...]. (Maria) [...] academically speaking, before the project I was one, and after the project I was another, I learned a lot from the project, writing, research, I evolved, I can't tell you how much I evolved. (Raquel)
Research practice for teaching	Perceives himself as a teacher Discovering yourself as a teacher	[...] I joined the research project because the project was studying teacher identity... this realization that I'm going to be a teacher surfaced even more [...]. (Raquel) [...] the research project helped me a lot to discover myself, to know what I really wanted and I can say that today I don't say that anymore, I don't want to be a teacher at all like I said before [...]. (Maria)
Scientific improvement	Being a research professor	And through this project, I was able to bring knowledge about turtles to the classroom, so many students also didn't know that there were species of freshwater turtles [...]. (Gustavo) So, when we work on a scientific initiation project, it's... we're practically working on both sides, both the teacher and the undergraduate and also, let's say, the biologist [...]. (Gustavo)
Teacher and biologist	Identifies with the area of field research	[...] I do intend to continue as a teacher, because I enjoyed working with the students and it was very rewarding, it was good, and combining the scientific initiation project and the internship, I really enjoyed working [...] in the field doing the research looking for the data. (Gustavo)

Themes	Meaning	Statements
You don't see yourself as a teacher	Doesn't identify with the degree	[...] I don't see myself working as a teacher [...] (Tainá) [...] the project allowed me to look at things from a different perspective, and if I want to, if I think about working in the health sector in the future [...] it would help me a lot, as I said, I acquired a lot of knowledge about it, even more about the health sector [...]. (Tainá)

Source: The authors (2023).

In analyzing the information, we noticed the implications of scientific initiation among the undergraduates. We identified conflicts in the participants' narratives about whether or not they would become teachers, almost always relating their experiences to their own learning in the Biological Sciences. We therefore articulated this information in table (2) on the semiotic map, based on the link between the themes and meanings, with the mutual implications of the narratives. The participants are identified with colors to differentiate them, as shown in the map below:

FIGURE 1 - Semiotic map of the links between meanings and themes



Source: The authors (2023).

In Figure 1, we can see that there is a general distribution of connections on the map; the theme of scientific knowledge is linked by all the participants, as they perceived personal development through CI. The map

indicates a greater flow of connections between Raquel and Maria, with the theme: research practice for teaching, they have a convergence that is directly linked, which is related to their perception of themselves as Biology teachers, based on the scientific practice they have in common, which reinforces these connections used as support for teaching.

Gustavo is another participant whose theme is scientific improvement and that of teacher and biologist; he intends to pursue the profession of teacher, but also to combine it with the profession of biologist. From Tainá's narrative, the theme emerged: she doesn't see herself as a teacher, but this is linked to the participant's desire for a professional qualification, not related to teaching, but to another qualification in the course. Participants Raquel, Gustavo and Maria also want professional qualifications, but directly linked to the field of education (see Figure 1).

We will now begin to discuss the statements highlighted in the interviews. The meaning of enriching skills was linked to the participants' perceptions of their performance during their research. The undergraduates positioned themselves by reporting that this experience made it possible to update new knowledge, exercise writing skills and adopt a critical stance (see table 2, theme: Scientific knowledge).

> [...] the scientific initiation helped me, because we end up acquiring a lot of knowledge that we didn't have before, of course, and college provides this for us, it's the question of knowing how to research, how to write a good article, how to explain yourself, writing, it helps a lot [...]. (Tainá)
>
> [...] it's something that helps the undergraduate in many ways, because it's at this point in the project that he's going to work on a little bit of each, let's say, the writing part, the practical part and [...] the theoretical part. (Gustavo)
>
> [...] Yes, the project really opened up my way of thinking, of reflecting [...] because as well as reading a lot, entering a new world,

> we learn to write better, we learn to write more scientifically, to think more critically [...]. (Maria)
>
> [...] academically speaking, before the project I was one, and after the project I was another, I learned a lot from the project, writing, research, I evolved, I can't tell you how much I evolved. (Raquel)

Scientific writing supports textual production for undergraduates, even when they have no direct connection to continuing teaching. We realize that this experience of a scientific nature benefits students' undergraduate performance skills, contributing to their personal development, making them future professionals with critical attitudes and knowledge assets (Azevedo; Nascimento; Lopes, 2020; Pinho, 2017).

In the participants' narratives, Raquel and Maria had a change in their perception of themselves, from which emerged the meanings of perceiving themselves as teachers and discovering themselves as teachers. They assumed a position of being teachers after carrying out their research into teaching identity. According to Oliveira and Fernandes (2018), scientific research can change the way academics see themselves during their training process (see table 2, theme: Research practice for teaching).

> [...] I joined the research project because the project was studying teacher identity... this realization that I'm going to be a teacher surfaced even more [...]. (Raquel)
>
> [...] the research project helped me a lot to discover myself, to know what I really wanted and I can say that today I don't say that anymore, I don't want to be a teacher at all like I said before [...]. (Maria)

The experience of carrying out a study on teaching identity enabled the participants to see themselves as this professional, by linking the prospect of being a teacher, as they felt even more motivated by the area of training.

However, the participants reported that they had no plans to enter a degree course. They had no intention of training to be a teacher, because their professional focus was different from their area of expertise.

Therefore, the experience of the CI and the supervised internship was what sparked their interest in pursuing the area or not, that is, based on the relationship between theory and practice (Duarte; Maknamara, 2020). Participants Gustavo, Maria and Raquel referred to this moment several times in their narratives, linking the knowledge and influences acquired in the scientific initiation to their work in the internship, which suggests that it was a significant experience.

Gustavo's speech identified the meaning of being a research teacher, in which he took a position by transferring his knowledge acquired from his research on turtles to his students during the internship. According to Santos and Frenedozo (2013), this contact between future science teachers and the content of their curricular component allows them to master the specific knowledge of their area when they are in the classroom (see table 2, theme: Scientific improvement).

> And through this project, I was able to bring knowledge about turtles to the classroom, so many students also didn't know that there were species of freshwater turtles [...]. (Gustavo)
>
> So, when we work on a scientific initiation project, it's... we're practically working on both sides, both the teacher and the undergraduate and also, let's say, the biologist [...]. (Gustavo)

In Maria's statement, she positioned herself as a teacher in her interaction with the students. The experience of scientific research had an influence during her internship. Therefore, these experiences contributed positively to her perception of continuing in this area of teaching and dealing with impasses in the school context.

> [...] I've experienced both sides of education [...] students coming up to me and saying it's time to leave, hugging me and saying "have a good weekend auntie" [...] the other side [...] was challenging [...] having to get attention, feeling like a bad teacher [...]. (Maria)
>
> [...] I believe that I do want to be a teacher, I want to continue and deal with these impasses that happen at school, but which were fundamental to my training [...] as well as the research project I took part in [...]. (Maria)

In Raquel's narrative, she mentions that her involvement in the CI on teaching influenced her intention to continue in this area, in which she positioned herself to be a good teacher for her students when she went to her internship, because the student's research was directly linked to teaching practice. However, the inclusion of research in teacher training enables the conception of reality and helps the autonomy of undergraduate students (Cunha; Barbosa; Antunes-Souza, 2021; Pesce; André, 2018).

> [...] I think that being part of these projects, especially the project on teaching, which was my first research project, influenced my decision to pursue a teaching career. Today, I'm preparing myself to be a good teacher so that in my internship [...] I can play a good role as a teacher [...]. (Raquel)

Participant Gustavo said in his report how rewarding it was to be involved in the CI and the internship. He said he wanted to be a teacher, but that he also enjoyed the experience of carrying out research, which gave rise to the meaning of identifying with the area of field research (see box 2, theme: Teacher and biologist).

> [...] I do intend to continue as a teacher, because I enjoyed working with the students and it was very rewarding, it was good, and

> combining the scientific initiation project and the internship, I really enjoyed working [...] in the field doing the research looking for the data. (Gustavo)

Araújo, Barros and Barros (2018, p. 5) point out that the "image of being a teacher" is idealized by undergraduates during their initial training. By having the experience of working in the classroom, the future teacher can have a vision of their professional activity. However, participant Tainá had no affective bond with teaching. Her experience in scientific initiation didn't allow her to perceive herself as a teacher because it wasn't supported by an internship experience, since she evaluated herself as someone who didn't have a significant, relevant role .

> [...] in the first internship I really liked the children, but at the same time that I felt like a teacher during the internship, I couldn't really identify myself as such, you know [...] I also confirmed it in high school, I couldn't develop myself the way I wanted to, I didn't present a good lesson, I didn't identify myself in terms of creativity, of having all the criteria that a teacher needs [...] that really discouraged me, you know? Because I discredited myself [...] I didn't feel competent enough to be there in the classroom [...]. (Tainá)

Also in participant Tainá's narrative, the CI she undertook was not related to teaching, which suggests why she didn't have a link with the future teaching profession, in which the meaning of not identifying with a degree emerged. However, she took on a different professional identity by positioning herself with the intention of working in the area of her research in the future (see table 2, theme: She doesn't see herself as a teacher).

> [...] I don't see myself working as a teacher in the degree area [...]. (Tainá)
>
> [...] the project allowed me to look at things from a different perspective, and if I want to, if I think about working in the health sector in the future [...] it would help me a lot, as I said, I acquired a lot of knowledge about it, even more about the health sector [...]. (Tainá)

Araújo and Borges (2020) point out that the internship contributes to the positioning of the future teacher, as it adds to and enables a perception of the profession. Participants Raquel, Maria and Gustavo, in their narratives, positioned themselves on teaching and showed interest in school work. Through the CI, they were able to reflect on the type of teacher they wanted to become, as well as realizing that, through it, they were able to rethink conceptions about the area of training.

> [...] because I studied teaching, it made me want to become a good teacher, a nice teacher, a teacher that students remember in a positive way thanks to the experience I had on the project. (Raquel)
>
> [...] it's the moment when you go deeper into the area, right [...] because I studied teaching identity, right, so what we can conclude is that not everyone started the course because they liked it, right. So, often it's because it's the only option, and... you can learn to like the area, you can learn to want to be a teacher, to want to teach [...]. (Maria)
>
> [...] the research project, it helped me, let's put it this way... in obtaining more knowledge in the area of biology [...] it's something that adds up [...] gaining this information in the field and trying to work on it in the classroom. (Gustavo)

The meanings that emerged in each narrative made it possible to identify the type of professional each undergraduate wants to become, especially after carrying out scientific initiation and teaching internship

activities during their initial training. Based on the process of analyzing the information, we found that the experience of carrying out scientific research influenced the participants to acquire, in addition to knowledge relating to their training, a positioning of themselves as teachers.

These influences became noticeable when Gustavo became a teacher by translating the knowledge he learned in the CI into his teaching internship. As for Maria, her experience in scientific research and the internship influenced her decision to pursue education, and she intends to teach if she gets the chance. On the other hand, Raquel, even though she hadn't done the internship at the time of the research, already thought of herself as a teacher only through the CI process on teacher identity. Unlike them, Tainá didn't see herself as a teacher. Her research was in the area of health and, even during her internship, her desire to become a teacher didn't emerge. Possibly, Tainá didn't see herself as a professional in this area because the CI wasn't correlated with educational themes, which may have made it impossible for her to directly translate knowledge from scientific research into her work in the internship.

In view of this, the results of the analysis of the participants' narratives suggest that scientific initiation, in the field of Education and Biological Sciences, combined with teaching experiences, led to a significant orientation of undergraduate students when it came to taking up a position as a teacher.

Final considerations

The aim of this research was to analyze the process by which Biological Sciences undergraduate students establish their teaching identity, based on the narratives of their scientific initiation experiences. The academic journey of each participant revealed meanings that were constructed through their experiences to reinforce their teaching performance. Since undergraduate courses encourage students to carry out research, the experience of scientific initiation also contributes to the process of establishing the student's teaching identity.

We recognize that the analysis of the information made it possible to study the understanding of the process of constitution of the teaching identity of the undergraduates. In view of the limitations of this study, we identified the need for more in-depth research on the subject, given that the literature shows a lack of research into the training of teachers in Biological Sciences and scientific initiation. It is therefore essential to develop research that promotes the association between theory and practice, especially in the area of teacher training in the biological sciences.

It is worth pointing out that this is a study that can be taken as a reference for studies on teacher identity in initial training. We suggest that these studies seek to explore the level of potential for generalization in order to try to identify results in other unique cases.

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