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Life stories in research on chemistry teachers: a state of the question

As histórias de vida nas pesquisas sobre professores de Química: um estado da questão

Historias de vida en la investigación sobre profesores de química: un estado de la cuestión

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Abstract

Life stories as a way of doing research have helped to break away from positivist conceptions in research on/with teachers, giving new meaning to what they have experienced. Thus, this study sought to construct a State of the Question on studies dealing with the life stories of chemistry teachers, using articles, theses and dissertations from four sources. Of the 1,296 initial results, only 11 scientific productions were selected, grouped into three analytical categories, which revealed the investigative and training potential of these studies. The majority of the studies are recent, from 2020 onwards, with a predominance of investigations into the life stories of Chemistry teachers in Basic Education or Chemistry undergraduate students, focusing on the construction of their professional identities and their teaching know-how. The studies converge on the potential of the study of life stories for an understanding of the self and the other, in which the personal and professional dimensions are inseparable.

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Keywords: Teacher education. Life stories. Chemical education.

Resumo

As histórias de vida como modo de fazer pesquisa têm contribuído com o rompimento de concepções positivistas na pesquisa sobre/com professores, resignificando o que vivenciaram. Assim, este estudo buscou construir um Estado da Questão sobre pesquisas que abordam as histórias de vida de professores de Química, valendo-se de artigos, teses e dissertações em quatro fontes de consulta. Dos 1.296 resultados iniciais, foram selecionadas apenas 11 produções científicas, agrupadas em três categorias analíticas, que revelaram o potencial investigativo e formativo desses estudos. A maioria dos estudos é recente, a partir de 2020, prevalecendo as investigações sobre as histórias de vida de professores de Química da Educação Básica ou de estudantes da Licenciatura em Química, com foco na construção de suas identidades profissionais e seus saberes-fazeres docentes. Os estudos convergem quanto as potencialidades das histórias de vida para uma compreensão de si e do outro, na qual as dimensões pessoal e profissional são indissociáveis.

Palavras-chave: Formação de professores. Histórias de vida. Educação Química.

Resumen

Este estudio buscó construir un Estado de la Cuestión sobre estudios que abordan las historias de vida de profesores de química, utilizando artículos, tesis y disertaciones de cuatro fuentes. De los 1.296 resultados iniciales, fueron seleccionadas apenas 11 producciones científicas, agrupadas en tres categorías analíticas, que revelaron el potencial investigativo y formativo de esos estudios. La mayoría de los estudios son recientes, de 2020 en adelante, con predominio de investigaciones sobre las historias de vida de profesores de química de la Educación Básica o de estudiantes de licenciatura en Química, centradas en la construcción de sus identidades profesionales y su saber enseñar. Los estudios convergen en el potencial del estudio de las historias de vida para una comprensión del yo y del otro, en la que las dimensiones personal y profesional son inseparables.

Palabras clave: Formación de profesores. Historias de vida. Educación química.

Introduction

The theoretical-methodological focus of investigations based on life stories permeates the view on oneself as epistemic power in the education field (Bragança; Abrahão; Ferreira, 2016), upon valorization of experience and subjectivity, considering what individuals think of themselves and the world and/or how they give meaning to their actions and become aware of their own history (Passeggi, 2010). In the chemical education area, this type of research has contributed to a rupture with positivist knowledge production conceptions by means of adopting a view on authorship, dialogue and enquiry, which consider the teachers as subjects, their education needs, and the social reality around them. These are studies that explore different theoretical categories such as professional identity, teacher's knowledge, professionalization, etc., and as pointed out by Dornelles and Galiuzzi (2016), enable those teachers-narrators to change from their own history during the act of living, reliving and researching moments of education and/or paths leading them to experience.

Taking that into consideration and the fact that the authors of this article are researchers in the chemical education area, who started to develop research using teachers' life stories, we felt the need to carry out a bibliographic survey of the existing production in the area addressing this theme, to know the views and theoretical-methodological approaches contained in research developed by other Brazilian chemical educators. Therefore, we opted for carrying out a state of the question (SQ) survey, guided by the following question: how has research in the field of chemical education approached chemistry teachers' life stories?

The state of the question corresponds to an important moment of epistemological and scientific dive for the researcher, including the registers of the available current scientific knowledge status and "obeys a subjective archeology, specific to the student/researcher when choosing or defining where, how, and mainly with what to start" (Nóbrega-Therrien; Therrien, 2010, p. 39). Regarding this study, the loci of interest are investigations using narratives and/or life stories in the chemistry teaching context due to the growth of this study field in education research, in general, and in teachers' education more specifically, at national and international levels. Therefore, we intend to record the trends in these studies related to chemistry teachers, as well as the pertinence and contribution of such productions to the broadening and/or strengthening of the chemical education area.

In qualitative research, which is very common in chemical education knowledge production, narratives have drawn attention for enabling a broader understanding of education experiences lived by individuals throughout their personal, academic and professional trajectories. They also promote intersections between each individual's history and objective and structural elements in society, in their cultural, historical, economic, and geographic aspects, among others (Souza, 2006). This allows the attribution of new meanings to the event lived, since reference-memories work, in the present, as themes to enlarge the experiential capital of individuals and direct resignification processes that elaborate what was lived, either at the personal or professional level or even in education (Josso, 2004).

Thus, in the education environment, research based on life stories has been adopted with the purpose of investigating and educating, and they present terminological variation – (auto)biography, biography, life story, narrative research, among others – which, despite originating from the same epistemological root, keep differences between them, and constitute fertile field to broaden the understanding of the school world and the everyday cultural practices of individuals being educated (Souza, 2006). Therefore, narratives have been consolidated as a fruitful methodological option to think about critical, reflective and investigative teachers' education, permeated by intersubjective exchanges and dialectical and understanding perspectives of education narratives (Leite *et al.*, 2024).

Taking all that into account, this article was structured in two sections addressing, respectively, the methodological path followed to present the SQ and its respective results, presented and discussed in four secondary sections, apart from this introduction and final considerations.

The State of Question presentation

Scientific production mapping is fundamental to recognize the ways certain theme has been explored in the national and international literature. This descriptive and analytical study allows us to identify theoretical-methodological trends that emerge from those studies and the existing gaps for investigation, thus becoming “an indispensable step to trigger a process of qualitative analysis of studies produced in different knowledge areas” (Romanowski; Ens, 2006, p. 43).

In this study, we opted for the presentation of a SQ characterized as a type of bibliographic survey, whose mapped studies should reference specifically the existing publications on the theme of interest in the researcher’s area of investigation, either at the local, national or international level. The SQ illustrates, based on the scientific evidence available, the current status of an investigation object and allows the design of a panorama of the scientific knowledge already produced on the specific theme, thus helping to identify the existing gaps and/or the originality of some research (Nóbrega-Therrien; Therrien, 2010).

Taking that into account, this SQ presentation was carried out in three phases and involved a set of decisions, as shown below (Chart 1).

Chart 1 – Phases in the state of the question presentation

Phase	Element	Description
1 st	Setting the theme	Life stories in research on chemistry teachers
2 nd	Sources	Articles: i) <i>Scientific Electronic Library Online</i> (SciELO) Brazil; ii) Portal de Periódicos da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES). Theses and dissertations: i) Biblioteca Digital Brasileira de Teses e Dissertações (BDTD); ii) Catálogo de Teses e Dissertações da CAPES.
	Geographical coverage	National.
	Search descriptors	“Life Story” AND “Chemistry”.
	Time frame	Without specific time frame.
	Inclusion criteria	i) Discussing life stories of chemistry teachers working at any education level, phase or modality; ii) Available for free and in Portuguese for access and full reading; iii) Conceiving life stories as a theoretical-methodological approach in the research.
	Exclusion criteria	i) Discussing life stories of chemistry teachers and teachers of other areas; ii) Unavailable for free or in Portuguese for access and full reading; iii) Not using life stories as a theoretical-methodological approach in the research; iv) Appearing in duplicate/repeated in the sources surveyed.
3 rd	Selection and analysis of the production found	Construction of a priori categories.

Source: The authors (2024).

The sources shown (Chart 1) were selected for allowing the mapping of a variety of productions all over the country, appearing as relevant digital scientific repositories which made the publications available for free. The search applied a combination of descriptors, as follows : “life story” AND “chemistry” to result in greater tracking of studies when compared to the combination “life stories” (plural) AND “chemistry teachers”.

The search for articles was carried out on August 30, 2024, while theses and dissertations were searched on the following day. We decided not to set a time frame since that would limit the results, thus hampering the identification in the sources the time frame of those studies. As illustrated below (Table 1), we identified 1,296 initial publications that contained at least one of the descriptors in the title, abstract, or

keywords, but according to the inclusion and exclusion criteria presented (Chart 1), only 31 were selected for reading.

Table 1 – Number of studies selected

Search source	Initial Results	Selected for reading	Excluded after reading	Selected for the SQ
SciELO BR	0	0	0	0
Portal de Periódicos da CAPES	135	5	3	2
BDTD	917	12	4	7
Catálogo de Teses e Dissertações da CAPES	244	14	12	2
Total	1,296	31	19	11

Source: The authors (2024).

Next, the abstracts of the 31 publications were read, followed by fluctuating reading of the whole text to identify some elements that did not appear in the abstracts, either in relation to methodology, results, or conclusion. This process resulted in the exclusion of 19 studies, which did not investigate exclusively life stories of chemistry teachers, did not see life stories in a theoretical-methodological view, or appeared in duplicate/repeated. Finally, only 11 studies were selected for inclusion in this SQ (Chart 2).

Chart 2 – Identification of studies selected for the SQ

Author(s) (Year)	Title	Type of production
Ribeiro (2007)	Life stories and chemistry teachers' education	Dissertation
Bonardo (2010)	Professional development and chemistry teachers' life reports: a multiple case study	Dissertation
Brito (2013)	Identity and teachers' education: memories and narratives of graduates of the 1 st chemistry teaching class in a public university in the <i>agreste</i> of Sergipe	Dissertation
Brito, Lima and Lopes (2014)	Reflections on the initial education of chemistry teachers from the teachers' memories	Article
Brito, Lopes and Lima (2017)	Teachers' identity: chemistry teachers' reflections on their academic and professional trajectories	Article
Quimentão (2020)	Between narratives and life stories: the chemistry teaching job	Dissertation
Machado (2020)	Education aspects in a PIBID-UFES sub-project: a look into the initial education of chemistry teachers	Dissertation
Leite (2022)	Metamorphoses of the being-teacher of chemistry: between life, education, and work	Thesis
Silva (2022)	Crossed identities: the crossing between racial and teaching identities of chemistry teachers in the city of Salvador-Bahia	Dissertation
Santana (2023)	Narratives that transform: the influence of the methodological approach of teachers' life stories in the construction of the identity of chemistry undergraduate students	Dissertation
Silva (2023)	Life stories and teachers' professional development of educators in chemistry teaching undergraduate courses: deeds, struggles and perspectives in the context of education reforms	Thesis

Source: The authors (2024).

The 11 studies were analyzed and grouped from a priori categories, previously limited “based on empirical similarities among them, which leads to generalization and the establishment of a category” (Sousa; Galiuzzi, 2017, p. 521). To achieve that, similarities in the general objective of each study were considered, thus resulting in three categories, namely, i) academic-professional education of chemistry teachers; ii) construction of the chemistry teacher’s professional identity; and iii) reflections on the impacts of life stories on the chemistry teaching practice, which are presented and discussed below.

Life stories in chemistry teaching: an analysis of studies

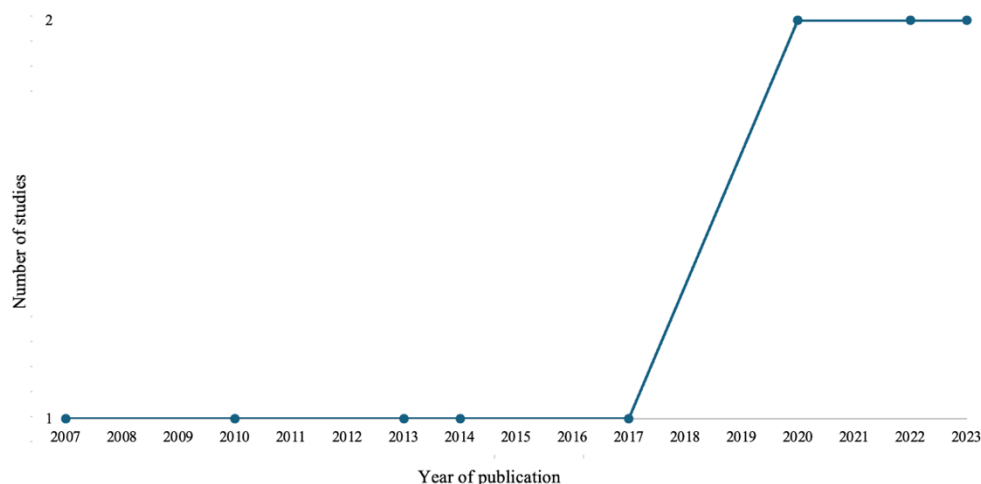
Exploring the SQ is an intellectual craftwork process which requires, according to Nóbrega-Therrien and Therrien (2010, p. 40), intelligence, sensitiveness, creativity, planning and concrete search, alongside conceptual and literature knowledge, competence and text elaboration skills. Such features are the basis for the elaboration of arguments that shape the SQ development and give this scientific artifact each researcher’s specific subjective character, since the same indicators, if handled by other people, would most likely be organized differently, with different narratives (Nóbrega-Therrien; Therrien, 2010).

Considering that, cataloguing and analyzing the mapped studies was thoroughly planned, aiming at contributing to the promotion of a global understanding of the research based on chemistry teachers’ life stories. Therefore, we start with a general overview of such studies followed by a detailed analysis of the categories resulting from the data analysis process.

General aspects of the mapped studies

The set of studies mapped indicates that chemistry teachers’ life stories have been object of scientific investigation, mostly in the last decade, since a leap is identified from 2020 onwards. Therefore, it is still incipient in the chemical education field, since both this scientific field and the use of life stories in its research are also recent in Brazil, even though they have been raising questions since the 1970s and 1980s (Silva, 2024), regarding the questions and tensions about the *knowledge-doing* permeating the chemistry teaching activity, mainly because life stories, even if individually narrated, are reports on social practices of certain group (Spindola; Santos, 2003) – in this case, a group of teachers.

Although Figure 1 shows that the first study on this theme dates back to 2007, there are some time gaps, since in nine specific years – 2008, 2009, 2011, 2012, 2015, 2016, 2018, 2019 and 2021 –, no studies related to theme were found, which reveals a scientific production marked by interruptions and a need for broadening and systematizing these studies. The absence of studies in consecutive or spaced periods might compromise the consolidation of this knowledge production in/for/with chemistry education.

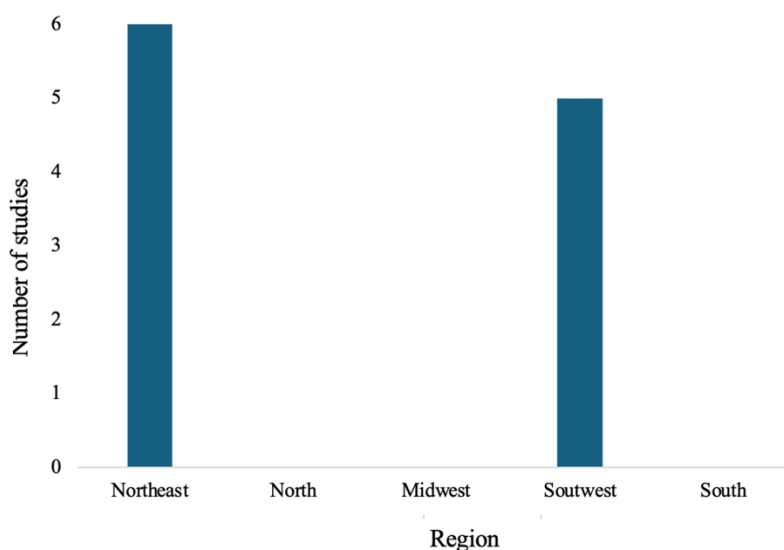
Figure 1 – Time distribution of the mapped studies

Source: The authors (2024).

Chemistry teachers' life stories have been mainly explored in master's dissertations, since only two theses and two scientific articles were mapped, and both articles originated from the same dissertation (Brito, 2013), which was included in this SQ (Chart 2). This scenario evidences a significant concentration of this approach in master's dissertations, with few appearances in doctoral theses, thus suggesting that the theme is still predominantly explored at the initial levels of *stricto sensu* graduate programs. On the other hand, the low number of theses indicates underuse of the potential of life stories as a resource in more complex and broader investigations that could be carried out at the doctoral level in chemistry education.

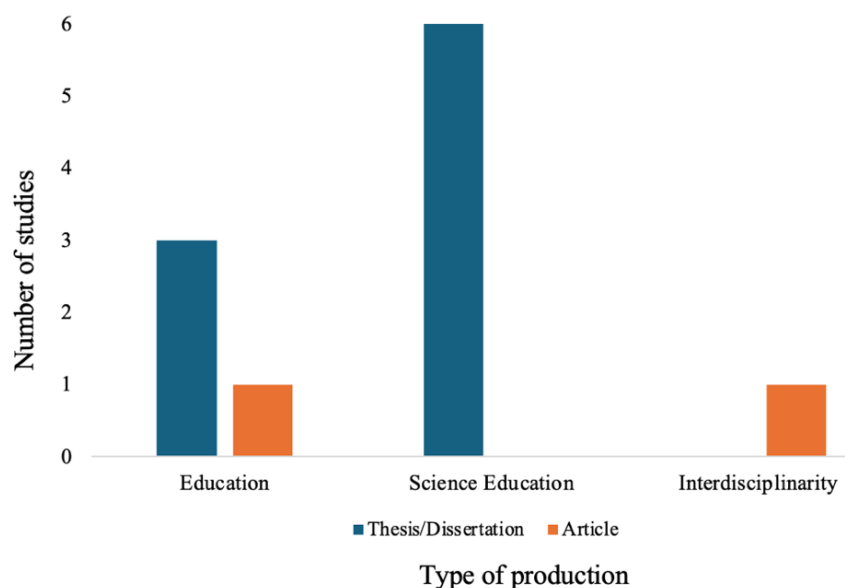
The absence of greater scientific production derivating from such dissertations – considering that the two articles identified originated from the same dissertation – points out a gap in the dissemination of research results in scientific journals. Therefore, the need for greater motivation is observed so that investigations based on chemistry teachers' life stories overcome the limits of this level of research and become a more systematic and robust study at the doctoral level, since we understand and defend that by means of these professionals' life stories "lived experiences are narrated and, therefore, the narratives produced evoke not only the meanings each individual ascribed to the event lived, but also the history of a community, the ideas of a collective – in this case, the collective of educator actors, mainly teachers" (Nacarato ; Passeggi, 2013, p. 290).

The northeastern region is responsible for most of the scientific production included in this SQ (Figure 2), while another part was identified in the southeastern region. No studies were found linked to the other regions of the country. To analyze this geographical distribution, for theses or dissertations, we considered the higher education institution (HEI) to which the graduate program was linked, and regarding articles, the HEI to which the first author of the publication was linked. This data suggests that, although investigations of life stories are widely disseminated in the country, the specific interest in chemistry teachers is restricted to certain places, either due to regional priorities or lack of incentive to approach the theme in other contexts. The broadening of these studies might allow the understanding of the chemistry teacher subject in all their constitutive dimensions, since life stories elect "human experiences as object of study, seeking to give meaning to what was lived and produce broader contextual meanings, since those experiences occur in socially situated contexts rather than in a vacuum" (Silva, 2024, p. 10).

Figure 2 – Geographical distribution of the mapped studies

Source: The authors (2024).

Another relevant characteristic observed refers to the area of concentration of the studies analyzed. For this classification, the areas of concentration linked to each thesis, dissertation, and scientific journal were considered, whose results revealed a predominance of studies related to the area of science teaching, followed by the education area, and we also identified an article published in a journal of the interdisciplinary area (Figure 3). This scenario reflects the historical context of chemistry teachers' education in Brazil, where the teaching and education fields have played a central role in the qualification of chemical educators at the graduate level, unlike chemistry graduate programs, which traditionally focus on scientific research in the area without being concerned with the challenges of teaching or learning the subject (Silva ; Carneiro, 2022).

Figure 3 – Area of concentration of the links of the studies

Source: The authors (2024).

In general, the 11 studies addressed chemistry teachers' life stories in agreement with the view exposed by Passeggi, Souza and Vicentini (2011, p. 370), understanding that they allow researchers:

To identify, in those teachers' trajectories, relevant issues in education research, which include the reasons for their professional choice, specificities of the different phases in the teaching career, gender relations in the teaching activity, the construction of the teaching identity, and the relations between the education action and education policies.

The data analyzed revealed that despite the advances occurred in the last decade, studies on chemistry teachers' life stories still face discontinuity and concentration in research at the master's level, showing the need for greater systematization, geographical expansion, and broader publications, mainly at the doctoral level, to consolidate its contribution to chemical education in Brazil.

Life stories and the academic-professional qualification of chemistry teachers

The first category comprised four studies (Ribeiro, 2007; Machado, 2020; Quimentão, 2020; Leite, 2022), whose scope was the discussion of life stories from personal, academic and professional contributions of chemistry teachers working in basic education or chemistry professors in higher education. Such discussion presents investigative potential because we can hardly interfere in other individuals' education without understanding our own education process, as put forward by Finger and Nóvoa (2014). Therefore, investigating how teachers constituted themselves professionally is important to know the experiences they had throughout their trajectories and how they reflect on them currently. For Nóvoa (1988, p. 128), these experiences unveil the adult person's education. In other words, "more important than thinking about educating an adult individual is to reflect on the way the individual is educated, that is, the way they appropriate their life heritage through the dynamics of retrospective understanding".

Taking that into account, Ribeiro's (2007) dissertation main aim was to revisit the personal and professional life story of three chemistry teachers who graduated in the chemistry special teaching course at the Federal University of Bahia (UFBA), to identify their formative, (de)formative, and transforming experiences that permeated their education process and how those subjects integrated their teaching *knowledge-doing*. The participants had already worked as teachers in basic education, but they entered that course to better master the content in their classrooms. By means of the (auto)biographic method, the researcher used open interviews and the production of written reports to gather data. The life stories were woven in chronological order, from the themes approached by the researcher. The material was analyzed using the categorization process with four categories that permeate themes related to becoming a chemistry teacher: "1. Their first experiences with school life and the path followed to their profession; 2. Their professional trajectory and the workplace; 3. The special teaching course; and 4. The work with their life story" (Ribeiro, 2007, p. 43).

By adopting life stories in the research-education perspective, in dialogue with the discussions proposed by Marie-Christine Josso and Antônio Nóvoa, that study concluded that this reflective work of building up life and education narratives enabled the participants to become more aware of their formative experiences, and allowed them to understand "what they did with the experiences that life provided them with, how they became teachers from those experiences and also to identify the several phases in their career development through their feelings and conceptions expressed in the narratives" (Ribeiro, 2007, p. 98).

Machado's (2020) dissertation analyzed formative experiences of four students in a chemistry teaching course at the Federal University of Espírito Santo (UFES), who take part in the Teaching Initiation Grant Institutional Program (PIBID - Programa Institucional de Bolsa de Iniciação à Docência). Supported by studies reported by Gaston Pineau, Marie-Christine Josso, Christine Delory-Momberger, Maria Izabel Cunha, and Elizeu Clementino Souza, among others. That author adopted the biographical approach and students' life stories in the research-education perspective for believing that "when the subject organizes their ideas

to prepare the report, whether oral or written, they rebuild their experience in a reflective way” (Machado, 2020, p. 85).

The data was generated by means of narrative interviews with the participant students and analyzed using content analysis, thus revealing that the PIBID formative processes were permeated by positive aspects such as the existence of a grant to guarantee their permanence in the chemistry teaching course, and negative ones, such as the tensions when planning actions within the subproject. Although those students’ experience in that program created opportunities to work on their initial education from their own profession, that is, in the theory-practice relationship, some students still saw the teaching activity as a vocational act. However, that author concluded that the program “values the professionals engaged in their own education and those who are entering teaching courses, thus enabling changes in the participants’ postures and conceptions” (Machado, 2020, p. 175).

Quimentão (2020) produced her dissertation aiming to understand how chemistry teachers’ life stories influenced her choices for the teaching profession in that knowledge area. Inspired by the studies put forward by Ivor Goodson about life stories, that author carried out open interviews with three experienced chemistry professors and four undergraduates in a chemistry teaching course who took part in the PIBID and whom she called beginning teachers. The data of the interviews was analyzed as monads, based on the study by the philosopher Walter Benjamin, which understands monads as narrative fragments that gain (new) meaning as they are remembered.

That author realized that “the participants’ narrative portraits [...] evidence how life stories direct the choice for the chemistry teaching career by establishing relationships with family, school, employment, and social justice experiences” (Quimentão, 2020, p. 89). Therefore, chemistry teachers’ life stories reveal the inseparability of the individual and the professional teacher, thus emerging in a narrative that is opposed to curricular requirements and leads to a socially situated practice.

The main aim of Leite’s (2022) thesis was to understand the dialectical relationships of approximation/distancing between education, life, and work of four chemistry teachers working in basic education in Ceará by means of their autobiographical narratives. Following previous studies, that author referred to Josson’s assumptions of research-education aiming at promoting a continuous development space for chemistry teachers, based on the perspective of working towards oneself. The data collected was individual and collective narratives, using pedagogical letter writing (written narratives) and meetings of a Biographical Mediation Reflection Group (oral narratives), respectively.

The biographical mediation was accomplished upon the construction of a horizontal relationship between the researcher and the participant teachers, from the production and discussion of narratives that permeated those teachers’ life, education and professional qualification events. The theoretical base of that study included Francophone, Portuguese and Brazilian authors such as Marie Christine-Josso, António Nóvoa, Mathias Finger, Conceição Passeggi, and Elizeu Clementino de Souza, among others, and the data collected reinforced the understanding that formative proposals that resort to life stories are seen to be promising regarding the insertion of the teacher-subject in the center of the education process, “providing them with autonomy to reflect on themselves, their practice, and the environment where they are inserted” (Leite, 2022, p. 192). That author also concluded that “[...] education, life and work are intrinsically related in the context of each of the teachers involved, thus confirming the understanding that it is not possible to separate teacher’s personal and professional identities” (Leite, 2022, p. 191-192).

The studies analyzed in this category shared the appreciation of life stories as a methodological and formative device, essential for the understanding and improvement of chemistry teachers’ education. They all had in common the emphasis on reflection on personal and professional trajectories as a way to give new meanings to teaching practices, highlighting the inseparability of life (personal aspects) and work (professional aspects). Despite this convergence, the main focus of those works varied since Ribeiro (2007) explored the integration of teaching knowledge by professional teachers, while Machado (2020) investigated the

initial education and PIBID challenges, emphasizing the relationship between theory and practice. Qui-mentão (2020) focused on the influence of lived experiences in the professional choice, associating them with social justice and identity construction, while Leite (2022) deepened the investigation of biographical mediation as a space of continuous education and reflective autonomy. Such approaches indicate that autobiographical narrative places teachers in the center of the formative process, thus promoting self-knowledge, critical awareness and contextualized practices. The studies revealed that understanding and appreciating life stories optimizes teachers' education and strengthens the connection between chemistry teaching personal and professional knowledge in different contexts.

Life stories and chemistry teachers' professional identity construction

The second category included five studies (Brito, 2013; Brito; Lima; Lopes, 2014; Brito; Lopes; Lima, 2017; Silva, 2022; Santana, 2023), which addressed chemistry teachers' professional identity based on their life stories. According to Goodson (2015), experiences lived by the subjects throughout their lives influence directly their identity construction, whether professional or not, and their life stories enable the investigation of how they respond to social and historical changes they are subject to over the period of their lives, because of that life stories have drawn attention when investigating the construction of one's identity.

Brito's (2013) dissertation, in turn, sought to understand the process of (re)building the professional identity of chemistry teachers who had graduated in the first class of the chemistry teaching course in a public university in the *agreste* region of Sergipe. With this purpose, the author selected life stories of seven teachers as the object of study. Such data was generated using interviews guided by a script and analyzed using content analysis.

Theoretically, the dissertation keeps little dialogue with the literature on life stories, mainly with Antônio Nóvoa, while it is mostly supported by authors discussing teachers' professional identity, especially in the chemistry area. The results pointed out that the professional identity of the participant teachers was marked by a lot of work on teaching activities, research and outreach projects in the chemistry field, which enabled them to reflect on different issues that permeate the teachers' job. Therefore, Brito (2013) concluded that the different experiences reported by the teachers were equally important to shape their professional identities, thus establishing a positive relationship with them regarding their affirmation in the teaching profession.

The articles by Brito, Lima and Lopes (2014) and Brito, Lopes and Lima (2017) originated from Brito's (2013) dissertation and were published in co-authorship with her master's advisors. They sought to understand chemistry teachers' professional identity construction processes. Since the data of both articles were generated and analyzed in the same way as they were treated in the dissertation referred to in the previous paragraph, we opted for presenting its main results together. The articles are supported by theorists of teachers' professional identity and chemistry teaching, and the results of both point out that scientific events and activities of teaching, research, and outreach experienced by teachers when they were undergraduates were the main influences in the construction of their professional identities in chemistry teaching.

Regarding Silva's (2022) dissertation, it sought to understand the interrelations between racial and professional identities of four chemistry teachers, working in basic education in Salvador, two self-declared as black and two as white. A semi-structured script was used to carry out virtual interviews with the teachers, whose data was submitted to deductive thematic analysis aided by the Atlas.ti software. This was the only study employing software to optimize the analyses, although its use is not unusual in narrative research.

The methodological approach of life stories was addressed by Silva (2022) based on Belmira Oliveira Bueno, Franco Ferratorri, and Elizeu Clementino de Souza. That author also referred to Conceição Evaristo to discuss *escrevivências* (writing/living). His study found out that the crossing between professional and racial identities of chemistry teachers was only shaped after they graduated, since up to that point there were

no discussions on racial themes. Furthermore, when black teachers approached their racial identities mirrored in *abebelidade*, recognizing their blackness, mainly when the classes do not have a majority of black students, while the white teachers approached their racial identities in the light of the critical whiteness, but at the same time silenced the recognition of the white privilege.

Santana (2023) developed a dissertation aiming to investigate the influence of chemistry teachers' life stories in the perception and construction of the teachers' identity of students in a chemistry teaching undergraduate course. Although that author cited António Nóvoa and Marie-Christine Josso in the discussion about life stories, her study does not dialogue deeply with the theoretical-methodological foundation of this approach, thus prioritizing authors that discuss teachers' identity and chemical education.

The dissertation data was collected from the recording of 20 lessons of a subject that focused on teaching in the chemistry teaching undergraduate course of the Federal University of Uberlândia (UFU), which resulted in 60 hours of audiovisual material. The material was transcribed and analyzed based on the analysis framework strategy. The results showed that "those teachers' life stories became a bridge between past and future, thus shaping the undergraduates' identity, inspiring them to be more than competent educators and become passionate defenders of the values they embraced" (Santana, 2023, p. 62). That author also presented an education product with reports on chemistry teachers' life stories to inspire other teachers to continue teaching.

The studies analyzed contribute significantly to the understanding of the relationship between life stories and the construction of the professional identity of chemistry teachers but also reveal methodological and theoretical differences that deserve attention. In general, all of them recognize the importance of personal and professional experiences in teachers' education, emphasizing how such experiences shape the chemistry teachers' trajectories and identities. However, the theoretical-methodological approaches varied, which affects the degree of depth in the use of life stories. Brito (2013) and the articles resulting from her dissertation (Brito *et al.*, 2014, 2017) emphasize the influence of academic activities, such as scientific events and outreach projects in the construction of one's professional identity. Despite being relevant, those studies were limited in relation to the dialogue with theoretical background of life stories and prioritize authors that discuss teachers' identity and chemistry teaching. Santana (2023) follows a similar path, which does not deepen theoretical-methodological aspects of life stories, even if she highlights how such narratives inspire beginning teachers.

On the other hand, Silva (2022) integrates life stories in a more robust way, associating them with racial issues and using a diversified reference, including *escrevivências* and thematic analysis with digital support, which evidences the transforming potential of life stories when well founded. Thus, those studies showed that although life stories are recognized as invaluable in the investigation of teachers' identity, there are still gaps in the research that could be filled in with greater theoretical-methodological rigor. A deeper dialogue between the theoretical background of life stories and studies on teachers' identity would broaden reflective and interpretive possibilities and strengthen this investigation field.

Reflections on the impacts of life stories on chemistry teaching

The last category gathered two studies (Bonardo, 2010; Silva, 2023) which addressed the impacts of chemistry teachers' life stories in their teaching practice, that is, in their professional development process, referring to the "continuous and long-lasting Journey through which teachers build their professional identity, changing their work as they reach an understanding of teaching as a critical, political, transforming and reflective activity" (Silva, 2023, p. 129). Considering that, both studies point out that life stories have been used to investigate how chemistry teachers' professional development has been achieved, mainly because they allow individuals to know themselves better and reflect on their (self)education processes (Couceiro, 2022).

Bonardo's (2010) dissertation discussed teachers' professional development with five chemistry teachers in the context of continuous development. The data was collected by recording the lessons of a subject in the graduate course and interviews with teachers. Discursive text analysis was used to analyze the data, supported by António Nóvoa, Gaston Pineau and Pierre Dominicé, among others, to discuss those life stories. That was a multiple case study, and the author verified that the different education and professional experiences lived by each teacher marked their knowledge and doing in teaching, thus echoing in the professional development processes, and making them good teachers.

Finally, the thesis by Silva (2023) investigated the academic-professional career of four renowned university professors in the chemistry teaching area to understand how they have acted in movements defending the quality of chemistry teaching undergraduate courses and how their life stories reflect in their professional development processes. The data was collected by means of document study and narrative interviews with professors working in federal universities in different regions of the country, analyzed using discursive text analysis.

Guided by the studies put forward by António Nóvoa, Marie-Christine Josso, Ivor Goodson, Christine Delory-Momberger, and Maria da Conceição Passeggi, among others, Silva (2023, p. 8) observes that "the narratives found in life stories allowed the educators to reflect upon their academic-professional trajectories until they became prominent Brazilian chemical educators". She also verified that they developed professionally "employing subversion strategies to oppose the *habitus* of the Bachelor of Chemistry degree, becoming chemical educators who see the recent education reforms [...] as damaging to chemistry teaching and teachers' professionalization" (Silva, 2023, p. 8).

The studies by Bonardo (2010) and Silva (2023) emphasize the relevance of life stories to understand the impacts of individual trajectories on the professional development and teaching practices of chemistry teachers. Both agree in evidencing that reflecting upon individual personal and professional experiences promotes continuous self-education, enabling teachers to develop more critical, political and transforming practices, reinforcing the idea that "nobody starts to be an educator on a Tuesday at four in the afternoon. Nobody is born an educator or marked to become one. We make ourselves educators in practice and in the reflection upon our practice" (Freire, 1991, p. 58).

Despite this convergence, both studies present distinct approaches. Bonardo (2010) focuses on continuous education, showing how the education and professional experiences of teachers shape their *knowing-doing*, highlighting the role of life stories in the constitution of teachers recognized by the teaching excellence. On the other hand, Silva (2023) broadens the focus to the university context and examines how prominent Brazilian chemical educators face structural challenges, using their own trajectories to resist to the Bachelor of Chemistry degree model and defend education reforms aligned to teachers' professional education. Such methodological and context differences enrich the field of studies by demonstrating that although life stories are a common base for reflection and development, their impacts vary according to the education objectives and scenarios, thus confirming the importance of their use in research on teachers' practice.

Final considerations

The presentation of this SQ enabled the identification of studies that addressed chemistry teachers' life stories in important Brazilian scientific publication databases. Initially, they revealed adherence to this theme, mainly in master's research in the science teaching area. Although the first study selected is from 2007, the period in which the highest number of publications was found was between 2020 and 2023. The studies were predominantly developed in the northeastern region of the country. Those studies demonstrated how life stories have been explored in the construction of the professional identity, education, and

teaching practice of chemistry teachers, thus revealing the inseparability between personal and professional dimensions, and evidencing that life trajectories influence significantly those teachers' actions.

Those studies focused on chemistry teachers working in basic education and undergraduates in chemistry teaching courses, while the discussion addressing university professors is still incipient. It is worth mentioning that five studies did not include many life story authors and, therefore, did not promote a dialogue of that theoretical background with their results. An emphasis on studies on teachers' identity and their academic education and professional processes was observed, and similar results regarding the potential of life story studies in the understanding of the self and the other, where the personal and professional dimensions are inseparable.

Taking that into account, we would like to emphasize that this survey depicts the national scientific production on the theme of life stories in chemistry teaching. However, we did not aim at exhausting the analysis of studies on the relevant theme, for this reason, only four sources were selected. This is one of the limitations of this SQ.

To sum up, we consider that this framework allowed us to turn an initial look into the theme and might contribute to the development of other studies, since the data categorization evidenced that regarding the construction of professional identity, personal and professional experiences shape teachers' perspectives and practices. In teachers' education, life stories foster a better understanding of the formative process, both in the initial education, for example, the PIBID, and in the continuous development, as observed in the contexts of self-education and biographical mediation. Finally, in teachers' practice, life stories are fruitful in the integration of past experiences and current demands in the context of education reforms.

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