TEACHER TRAINING AND PROFESSIONAL DEVELOPMENT IN THE CONTEXT OF THE SCIENCE CLUB OF THE FEDERAL UNIVERSITY OF PARÁ

FORMAÇÃO DE PROFESSORES E DESENVOLVIMENTO PROFISSIONAL NO CONTEXTO DO CLUBE DE CIÊNCIAS DA UNIVERSIDADE FEDERAL DO PARÁ

FORMACIÓN Y DESARROLLO PROFESIONAL DOCENTE EN EL CONTEXTO DEL CLUB DE CIENCIAS DE LA UNIVERSIDAD FEDERAL DE PARÁ

Cleide Maria Velasco MAGNO[1]
e-mail: cleidevelasco@gmail.com

Terezinha Valim Oliver GONÇALVES[2]
e-mail: tvalim@ufpa.br

How to reference this article:

MAGNO, C. M. V.; GONÇALVES, T. V. O. Teacher training and professional development in the context of the Science Club of the Federal University of Pará. **Revista Ibero-Americana de Estudos em Educação**, Araraquara, v. 19, n. esp. 2, e024070, 2024. e-ISSN: 1982-5587. DOI: https://doi.org/10.21723/riaee.v19iesp.2.18592

| **Submitted**: 14/10/2023
| **Revisions required**: 09/11/2023
| **Approved**: 10/02/2024
| **Published**: 20/07/2024

[1] Federal University of Pará (UFPA), Belém – PA – Brazil. Professor. PhD in Science and Mathematics Education (PPGECM/IEMCI). Works with Narrative Research, Teacher Training and Science Clubs. Member of the (Trans)formation Study and Research Group.

[2] Federal University of Pará (UFPA), Belém – PA – Brazil. Full Professor (PPGECM/IEMCI). Works with Narrative Research, Teacher Training and Science Clubs. Leader of the (Trans)formation Study and Research Group. PhD in Education (UNICAMP).

ABSTRACT: Training in the context of the Science Club of the Federal University of Pará (CCIUFPA) has contributed to Basic and Higher Education. We undertook Narrative Research, discussing testimonies and memories of former teachers, aiming to understand the relationship between CCIUFPA's training principles and teaching professional development. The information was obtained using a Memory Activating Device (DAM) and for analysis we use Discursive Textual Analysis associated with the IRAMUTEQ software. The formative principles were highlighted as the democratic environment, learning by doing, protagonism in learning and personal involvement that reverberate in the development of scientific, pedagogical, and other skills necessary to expand and strengthen the expertise of teachers. However, the teacher needs to be open and willing to adopt new ways of teaching and learning, considering humanistic knowledge, reflection on practice, theoretical bases, attitudes, and self-evaluations as constituents for transformations.

KEYWORDS: Science Club. Teacher Training. Professional development. Narrative Research. IRAMUTEQ.

RESUMO: *A formação no contexto do Clube de Ciências da Universidade Federal do Pará (CCIUFPA) tem contribuído com a Educação Básica e Superior. Assumimos a Pesquisa Narrativa, discutindo testemunhos e memórias de professores egressos, objetivando compreender a relação de princípios formativos do CCIUFPA e o desenvolvimento profissional docente. As informações foram obtidas por meio do Dispositivo Ativador de Memória (DAM) e para análise fizemos uso da Análise Textual Discursiva associada ao software IRAMUTEQ. Foram evidenciados como princípios formativos o ambiente democrático, aprender fazendo, protagonismo na aprendizagem e envolvimento pessoal que reverberam em desenvolvimento de habilidades científicas, pedagógicas e outras necessárias à ampliação e fortalecimento da expertise dos professores. Entretanto, o professor precisa estar aberto e disposto a adotar novas formas de ensinar e aprender, considerando os saberes humanísticos, a reflexão da prática, as bases teóricas, as posturas e autoavaliações como constituintes para as transformações.*

PALAVRAS-CHAVE: *Clube de Ciências. Formação Docente. Desenvolvimento Profissional. Pesquisa Narrativa. IRAMUTEQ.*

RESUMEN: *La formación en el contexto del Club de Ciencias de la Universidad Federal de Pará (CCIUFPA) ha contribuido a la Educación Básica y Superior. Realizamos una Investigación Narrativa, discutiendo testimonios y memorias de exdocentes, con el objetivo de comprender la relación entre los principios de formación del CCIUFPA y el desarrollo profesional docente. La información se obtuvo mediante el Dispositivo Activador de Memoria (DAM) y para su análisis utilizamos Análisis Textual Discursivo asociado al software IRAMUTEQ. Los principios formativos fueron destacados como el ambiente democrático, el aprendizaje haciendo, el protagonismo en el aprendizaje y la implicación personal que repercuten en el desarrollo de habilidades científicas, pedagógicas y otras necesarias para ampliar y fortalecer la experiencia de los docentes. Sin embargo, el docente necesita estar abierto y dispuesto a adoptar nuevas formas de enseñar y aprender, considerando el conocimiento humanístico, la reflexión sobre la práctica, las bases teóricas, las actitudes y las autoevaluaciones como constituyentes de las transformaciones.*

PALABRAS CLAVE: *Club de Ciencias. Formación de Profesores. Desarrollo profesional. Investigación narrativa. IRAMUTEQ.*

Introduction

The context of teacher training refers to the environment, situations and processes involved in preparing and training individuals to be competent and effective teachers. This covers a variety of aspects, from formal education at Higher Education Institutions to continuing education throughout your career.

Teacher training is an important component of the educational system because it directly affects the quality of education provided to students. There are some key points that set the context for teacher preparation. Alves (2007) mentions three aspects: the epistemological dimension, the economic-political dimension and the professional dimension, all intertwined and equally important for teacher training, which is why they must be made explicit in research and the results by programs to achieve the objectives of learning.

Other aspects are key points in teacher training, such as different teaching approaches and techniques, including the use of technology, student assessment and classroom management, essential procedural elements, in addition to supervised internship, which provide students with the exercise of what they learned in real teaching environments, under the guidance of experienced teachers. However, these opportunities are offered to undergraduates, even in most courses, at the end of the training period.

However, there are other educational spaces, considered non-formal spaces, where teacher activity and training take place. Such environments have different specificities depending on the objectives adopted and the timing of the activities (after-school hours, weekends, among others), and can expand the learning possibilities, constituting rich, innovative and integrating experiences, functioning in the interface with the school from the perspective of comprehensive training, such as Science Clubs (Tomio *et al*., 2020).

For Gonçalves (2000), Science Clubs allow teachers in initial training to practice in advance of teaching, with the assistance and under the eyes of other more experienced teachers, so that they are not intimidated by the challenges encountered, as learning occurs concomitantly with the act to teach collaboratively. In this aspect, with the concern of building knowledge in conditions contrary to the dichotomy of theory and practice, the aforementioned author states that:

> The characteristic that I seek to highlight here is exactly this treatment of the construction of knowledge, which was sought to be provided to the student, when teaching Science, breaking with the theory/practice dichotomy, so common in disciplines, even in university education, which had 'classes'

> practices', often with completely different programs, different teachers, with different subjects, to the point that they could be approved in theory, for example, and failed in practice, or vice versa (Gonçalves, 2000, p. 92, our translation).

In this sense, the training context in Science Club offers an environment rich in practical, collaborative and interdisciplinary learning opportunities, as it is potentially creative and significant in transforming the way science is taught and learned, preparing teachers and students to face challenges of the contemporary world (Gonçalves, 2000; Rosito; Lima, 2020; Faria; Silva, 2022).

Given this outline, we aim to understand the relationship between the CCIUFPA's training principles and teaching professional development. The text is organized as follows: we present a summary regarding the field of teacher training; We seek to show how training occurs in the context of science education and the relationship with professional development. Next, we present the methodological path adopted and the discussion of the results with arguments to answer the research question and achieve the objectives outlined and thus present the final considerations of this text.

Teacher Training and Science Clubs

In Brazilian education, teachers' skills and abilities have continually been indicated as one of the factors of school failure, although there are other aspects of the educational context that contribute to this (Souza, 2006; Imbernón, 2011, 2016; Prioste, 2020). However, school institutions and therefore teachers themselves are immersed in requirements regulated by guidelines with the aim of preparing students for transformations in the scientific and technological world and the diversities increasingly present in their social relations.

The regulation of the Brazilian educational system is the responsibility of the Union, the States, the Federal District and the Municipalities and is governed by the Federal Constitution and the Law of Guidelines and Bases of National Education – LDBEN, Law nº 9,394/96 (Bastos, 2017). However, despite advances in the educational field with regard to teaching quality and equity, with the proposal of education for all, teachers still find themselves in a situation of professional devaluation, as shown in the following excerpt.

> It is considered that the devaluation of education professionals has been another contributing factor to the educational imbalance. These professionals are unmotivated by the lack of appreciation, where many fail to enjoy a policy

> that guarantees the moral and social well-being of the category (Bastos, 2017, p. 3, our translation).

To meet this demand and improve the quality of education offered to students while valuing the teacher, the Ministry of Education, through the National Education Council (CNE), launched the proposal for the Common National Base for Teacher Training in Basic Education (BNC-Training). According to the MEC Portal, BNC-Training must cover three axes: knowledge, practice and engagement (BRASIL, 2018), as established in Article 4 of Resolution CNE/CP No. 2, of December 20, 2019, as per the table 1 below.

Table 1 - Training Axes (BNC-Training)

Axis I – Knowledge	Axis II – Practice	Axis III - Engagement
The teacher must master the content and know how to teach it, demonstrate knowledge about students and their learning processes, recognize different contexts and know the governance and structure of educational systems.	The teacher must plan teaching actions that result in effective learning, know how to create and manage learning environments, be fully capable of evaluating learning and teaching, and conduct pedagogical practices of the objects of knowledge, skills and abilities provided for in the curriculum.	The teacher is committed to his or her own professional development, to student learning and to the principle that everyone is capable of learning. You must also participate in the development of the school's pedagogical project and the construction of democratic values. In addition to being engaged with colleagues, families and the entire school community.

Source: Brazil (2019).

Teacher training for the quality of teaching and learning is essential. Teachers are responsible for the full development of students' knowledge, skills and values. To this end, the requirement for theoretical and methodological depth in the areas of knowledge in which they will work is a fact, in addition to teaching skills and competencies in the planning and execution of their pedagogical activities. Therefore, your adequate preparation must be ensured.

There are, however, some risks related to the quality of education. One of them concerns the reproduction of classes with instructional characteristics, in which the teacher reproduces the information conveyed in the teaching material; Another risk is the deprofessionalization of teachers due to the need for autonomous citizens, with a spirit of initiative, conscious and responsible, required by globalization. This is why institutions stand out in providing teachers just to teach classes without knowing, monitoring, evaluating and truly guiding their students (Nogueira, 2014).

An essential aspect of teacher training is to consider the experiences of practice in real situations, based on the knowledge acquired and under the guidance of experienced

professionals, so that they can experiment with different teaching strategies, and thus, when dealing with real challenges, they have the opportunity to reflect on their practice. Furthermore, the development of socio-emotional skills, empathy and respect for diversity are essential so that they can establish healthy and trusting relationships with students in the future (Freire, 1997).

However, such aspects should not be restricted only to initial teacher training. In-service teachers must also be included through continued training to learn about and make use of new pedagogical approaches and educational technologies in their practices, in order to meet the demands of contemporary society. Therefore, when teachers are encouraged to participate in courses, events, research and other activities that promote their professional development, from their initial training and throughout their career, they prepare themselves to face challenges in the day-to-day life of the classroom. It values the professional, in addition to making the profession more attractive.

The training of teachers who teach science includes the aspects mentioned above, but has its own specificities that are essential for the learning and development of students' scientific skills, as well as promoting interest in science and encouraging critical thinking.

In this sense, science clubs have contributed, as they are training spaces, in which it is possible to resume the fascination with science that has long been considered by society as one that did not bring the expected or vaunted results for solving the problems faced until then, in addition to the exacerbated scientism that prevents and confuses the understanding of the nature of science as relative, changeable and fundamentally human (Faria; Silva, 2022).

Faria and Silva (2022) justify this thought, through concern about the processes of teaching and learning science and scientific dissemination, since contemporary society is still immersed in erroneous and alienating conceptions of science that make it fragile and without conditions to seek compatible and viable solutions, whether at a collective or individual level for the problems they experience.

In this sense, for the authors mentioned above, there is a need for training based on the idea of science that provides changes and inquiries that enable people to be critical based on their own reality, and for this scientific literacy is fundamental, as its objective is to train the individual with the necessary skills to face everyday problems, considering the knowledge specific to science and the methodologies for building knowledge in this scientific field (Sasseron; Machado, 2017). However, for Faria and Silva (2022), this demand is not effectively addressed in Basic Education, as expressed in the following excerpt.

> Basic Education is not meeting society's demands related to scientific literacy, interdisciplinarity and contextualization, as there remains a fragmentation between what students experience in their daily lives and the content taught in the classroom (Faria; Silva, 2022, p. 39, our translation).

This fact is recurrent in educational research, which highlights the lack of interest among students and the concern with teachers portrayed in school reports, institutional documents and research at national and international level, such as, for example, reports of internal and external evaluations or large scale (Basic Education Development Index – IDEB; Basic Education Assessment System (SAEB); National Literacy Assessment (ANA); Prova Brasil (5th and 9th years of public elementary school); Provinha Brasil (2nd year of public elementary education) among others (Brazil, 2023). These programs aim to improve the performance of students and institutions through public policies, programs and projects over time.

Thus, Professor Terezinha Valim's initiative with the creation of CCIUFPA, as one of the longest-running and most important projects in the northern region, assumes outstanding importance as a creative potential for the initial and continued training of teachers for Science Education. Created in 1979, it has been developing, to this day, activities whose results provide the training and professional development of teachers who teach science and mathematics in the Brazilian Amazon, which also reverberate in the social, scientific and technological development of the northern region.

We highlight that, since its foundation, CCIUFPA has sought and still seeks partnerships to develop its training proposal that involves teaching with research, interdisciplinarity, contextualization, the appreciation of students and teachers, actions that have been foreseen since the creation project, in 1979, and are the basis for its activities (Gonçalves, 1981, 2000; Magno; Gonçalves, 2021).

In this context, science clubs work as training spaces that contribute to the teaching and learning of science. Furthermore, the CCIUFPA presents a distinct characteristic – the training of teachers who teach science and, since its inception, also those who teach mathematics with its own principles, that is, the creation of the CCIUFPA was designed to meet the demand for initial training of science teachers, as expressed below.

> It is important that we have the opportunity to practice while being able to receive guidance and *feedback* in our work [...], facing problems and seeking solutions. Therefore, we see in CCIUFPA an opportunity for the science degree student, the master student, to begin practicing the teaching-learning process earlier, planning, guiding and evaluating small scientific research projects [...] to form their philosophy of teaching coherent with educational

> principles that he only really learns if he can practice them and the more the individual himself is involved in the acquisition of new values, the more real the change that may occur in his attitudes will be (Gonçalves, 1981, p. 212, our translation, our translation).

It is worth highlighting that the excerpt already presents the genesis of the training foundations of the CCIUFPA and that it would be maintained in its essence throughout the decades as its own principles, such as: democratic environment – where it is possible to provide adequate training for the master student through training assisted (giving and receiving *feedback*); learning by doing – in which he can exercise the teaching role (planning, executing and evaluating small projects), with personal involvement in the activities so that he is the protagonist of his own learning (Gonçalves, 1981, 2000).

These specificities concern both the scientific knowledge of each discipline (such as physics, chemistry, biology) and teaching methodologies that favor active and meaningful learning. It is clear that scientific content is essential and updates are important and must be included in training programs, so teachers can provide students with an adequate and current vision of science and its relationship with technology and society.

In this aspect, science clubs as training spaces encourage initial and continuing training for teachers, as well as professional development. Science is intrinsically connected to other areas of knowledge, such as mathematics, technology, history, geography, among others. In these spaces, teachers have the possibility of developing practices, establishing relationships between different fields of knowledge with an integrated view of knowledge, in which science is present in different aspects of everyday life, characterized by interdisciplinary teaching (Gonçalves, 2000).

Another characteristic of teaching practices in Science Clubs is that both teachers in initial training and those already experienced have the opportunity to exercise reflective practice, through which they are able to mobilize tacit knowledge in a conscious and reflective way, to make decisions and solve problems based, for example, on Schön's theory.

In this way, essential training elements such as dialogue and sharing of experiences among professionals are highlighted to expand understanding and build collective knowledge, promoting a humanistic culture (Morin, 2003) of constant teaching and learning. For Schön (2000), the reflective professional who emerges from Science Clubs not only seeks effectiveness in their practice, but is also concerned with the ethics and values underlying their actions, questioning and reevaluating their own beliefs, prejudices and way of thinking, so that their practice is based on ethical responsibility.

Methodological Paths

Along this path, we assume Narrative Research that seeks to understand the lived human experience reported, in which the researcher interprets and creates experiences based on the experiences of the participants and the researcher himself. According to Clandinin and Connelly (2015), the elements of narrative research are constituted in a three-dimensional space: interaction (personal and social); continuity (past, present and future) and situation (place).

We highlight that the text is an excerpt from a doctoral thesis, which sought to understand the training movement undertaken by CCIUFPA in 40 years of existence (1979-2019), explaining emergencies that converged on its training principles, which contributed/contribute to the training, identity and professionality of those who pass through there. Furthermore, we situate the time and space of written, oral, audiovisual and other testimonies to reflect and understand the teacher training process in the context of CCIUFPA as a phenomenon, according to Pierron (2010) and, thus, construct a narrative in an experiential dynamic, which allowed coming and going introspectively, extrospectively, retrospectively and prospectively (Clandinin; Connelly, 2015).

Therefore, in this text, we asked the following research question: in what terms do professors who graduated from CCIUFPA express contributions to teaching practice in their formative experiences? To achieve this, we aim to understand the relationship between CCIUFPA's training principles and teaching professional development. We used the testimony of two professors who graduated from CCIUFPA, here called with fictitious names (José and Zeki) who signed the Free and Informed Consent Form (TCLE) to comply with ethical research procedures, based on Resolution No. 510/2016 to investigation of this nature (Brasil, 2016).

José has a degree in Physics, a Masters in Teaching in Science and Mathematics Education and a PhD student in a Postgraduate Program in Science and Mathematics Education. He works as a Physics teacher in Basic Education and in the continuing education of public-school teachers. Research in the area of Psychoanalysis and Education. He served as coordinating professor at CCIUFPA. Zeki has a degree in Physics and Mathematics, a Master's degree in Physics Teaching and a PhD student in a Postgraduate Program in Science and Mathematics Education. He works as a Basic Education Physics teacher in the public school system. Research in the area of Subjectivity and Education. He worked as a trainee teacher and mentor teacher at CCIUFPA.

In the procedure, we adopted the concept of testimony that derives from the Latin etymology testimonium corresponding to the statement made by a person who lived, witnessed

or heard an event or phenomenon; this person is called a witness and the act of declaring what they experienced, saw or heard is called testimony (Pierron, 2010).

In this sense, to obtain and record testimonies, we associated the Cognitive Interview protocol, by Geiselman and Fisher (2014), used in the area of health and justice, associated with the Memory Box, a Narrative Research instrument. The adaptation was made through the creation of a device to access the witnesses' memory, which we call the Memory Activating Device-DAM (Magno; Gonçalves, 2023a). This device helped us to identify possible mistakes in the testimonies and/or discrepancies in the rhythm of the stories told, due to the lack of constitution of our memories and the suspicions that fall on the concept of testimony itself, which could, during the research, make us it will fall into discredit or something of that nature (Pierron, 2010).

To create the textual *corpus* of the research, free (TL) and dialogued (TD) testimonies were obtained with DAM, which were recorded and transcribed for analysis. We adopted Discursive Textual Analysis (ATD) associated with the IRAMUTEQ *software* for this phase (Magno; Gonçalves, 2023b).

ATD as an analytical method allows the analysis and interpretation of materials selected for investigation, seeking, in a broad sense, units of meaning (unitarization) that, organized, generate several levels of analysis categories (categorization) that allow recursive processes of interpretation and production of theoretical abstractions, which give rise to metatexts or the emerging new, that is, the research text itself, which will be constantly reorganized and rewritten (Moraes; Galiazzi, 2016).

The IRAMUTEQ *software* (*R interface for Les Analysis Multidimensionnelles de Textes et de Questionnaires*) is a tool anchored in the R *software and the Python* programming language that allows different processing and statistical analyzes of texts produced in qualitative research, such as classic textual statistics; research into group specificities such as Correspondence Factor Analysis (CFA); Descending Hierarchical Classification (CHD); Similarity (AS) and Word Cloud (NP) Analysis (Salviati, 2017; Camargo; Justo, 2021).

This tool uses the occurrences of words for the statistical basis. In this way, the words are grouped and organized graphically according to their frequency, which makes it possible to identify them, from a single file, called *corpus*, originating from the files selected for the investigation. This *corpus* is divided into text segments (ST), for lexical analysis, identification and quantification of vocabulary according to frequency and position in the file, which is

subjected to statistical calculations for subsequent interpretation by the researcher (Salviati, 2017; Camargo; Justo, 2021).

We emphasize that among the processing possibilities in IRAMUTEQ, we selected the CHD (Hierarchical Descending Classification) to obtain general information (Figure 1) and the *corpus* divided into text segments (STs).

Figure 1 - General Information

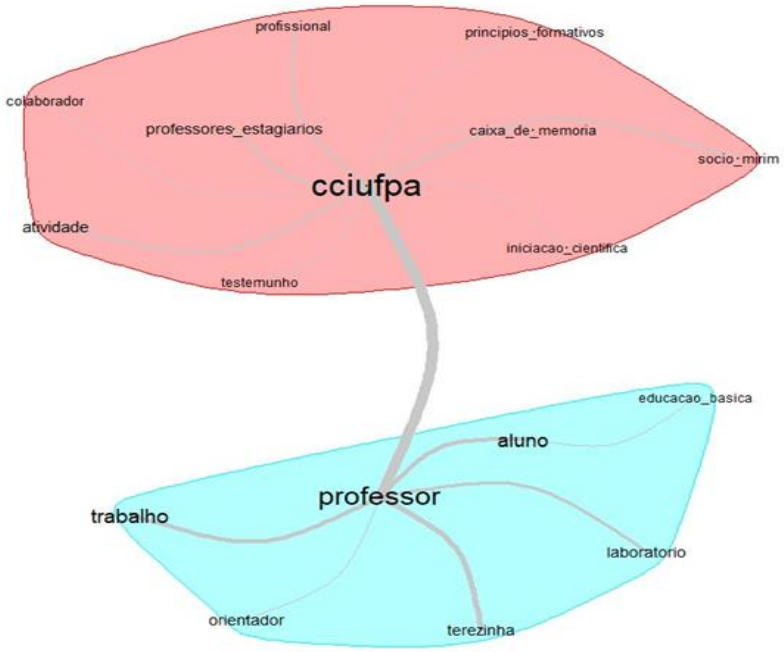
```
+-+-+-+-+-+-+-+-+-+-+
|I|R|A|M|U|T|E|Q| - Wed 13 Sep 2023 01:12:54
+-+-+-+-+-+-+-+-+-+-+
Number of texts: 4
Number of text segments: 804
Number of shapes: 3558
Number of occurrences: 32946
Number of lemmas: 2325
Number of active shapes: 2152
Number of supplementary shapes: 164
Number of active shapes with frequency >= 3: 825
Average shapes per segment: 40.977612
Number of classes: 4
632 segments ranked 804 (78.61%)
#############################
Time: 0h 0m 12s
#############################
```

Source: Processing with CHD (IRAMUTEQ)

The single file (*corpus*) processed was made up of four (4) texts (2TL+2TD), divided into 804 text segments (STs), with 3558 forms, 32946 occurrences, 2325 lemmas, 2152 active forms (nouns, verbs, nouns common and unrecognized words), 164 supplementary forms (prepositions, adjectives, etc.); active forms with a frequency greater than or equal to 3 out of 825, the average of forms per segment of 40.977612, 4 classes and a percentage of use of text segments of 78.61%, which corresponds to good use. The entire processing took 12s;

Another type of processing chosen and used was the Similitude Analysis (AS), which generated, depending on the occurrences and co-occurrences, a similarity graph in the form of colored communities (Figure 2), considering the inventory of information found in the STs and the respective senses/meanings attributed to them.

Figure 2 - Similitude Graph



Source: Similitude Analysis Processing (IRAMUTEQ)

According to the resulting similarity graph, two colored communities (pink and turquoise) were formed, represented by the words CCIUFPA and PROFESSOR, with greater occurrence and greater strength of connection between them and within their communities, according to the co-occurrences, respectively.

In the set of STs created in the *corpus processing*, these terms are colored red when evoked in the word dictionary in the tool, from which it was possible to inventory the information in the testimonies and, according to the ramifications, identify the emergence of categories with ATD. Thus, colored communities were formed with the words/forms and their respective occurrences:

- Pink Community: CCIUFPA (324), intern teachers (35), activity (54), professional (25), collaborator (16), memory box (16), child member (16), training principles (13), initiation scientific (10), testimony (6).
- Turquoise Community: TEACHER (238), work (116), student (94), laboratory (44), Terezinha (36), advisor (31), basic education (13).

We highlight that, in the systematization, we considered the excerpts from the inventory of information found in the STs, which are environments of the words of each community, so

they were identified in the *corpus* as follows: Name+Text Segment (ST)+location number in the *corpus* textual+year (Ex.: José, ST2, 2021; Zeki, St1-5, 2021).

Therefore, from the immersion in the testimonies and with ATD criteria, it was possible to perceive the emergence of two categories: Memories and formative principles in CCIUFPA activities (i) and; Teacher training and scientific initiation of Basic Education students at CCIUFPA (ii), presented below.

Memories and Formative Principles in CCIUFPA Activities

In this category, the narratives of the collaborating teachers demonstrate the training they received at CCIUFPA and which they adopted in their practices. Therefore, Zeki's testimony refers to his experience as a trainee teacher/supervisor. In the following text segments he highlights how remarkable these experiences were:

> This was something that helped me a lot, these relationships that I built at CCIUFPA with the other intern teachers and coordinators. For me, they were very important and helped me a lot, because when I arrived at school to work, it made it easier for me to build dialogues, bridges with my co-workers to form a team or work (Zeki, ST128 -129, 2021, our translation).

Regarding this issue, Zeki also mentions that the assistance of a more experienced teacher gave him security, as he could be right or wrong without fear, but he only realized this when he started working at the school and when he returned to CCIUFPA years later as a supervisor, he made a point to share this practice with your students.

> I remember that since I was a child I always liked playing with things that aroused my curiosity. At CCIUFPA, I found a space that allowed me to teach while playing or play while teaching, even under the guidance of teachers who worked there. I soon started, with other colleagues from my team of intern teachers, to develop classes that had topics of interest to us and that were possible to implement and even if it didn't work out, we could try as much as necessary (Zeki, ST5-6, 2021, our translation).

Your testimony outlines the CCIUFPA's modus operandi in such a way that it still inspires you to develop your physics classes in Basic Education. His memory of the period he experienced at CCIUFPA is highlighted in the text segment in the following terms:

> Talking about CCIUFPA is always a great pleasure, as these are moments in my life that were filled with happy episodes and a lot of learning. I had two stints at CCIUFPA. The first, as a trainee teacher from 2003 to 2006, the second as a mentor teacher from the end of 2017 to the beginning of 2019.

> Both gave me a lot as a person and professional (Zeki, ST1-2, 2021, our translation).

In view of what Zeki exposed, it is clear that the objective of creating the CCIUFPA, designed to meet the demand for initial teacher training, has come to fruition. The founder of CCIUFPA mentions this subject saying that the objectives are "To provide student teachers with real teaching-learning situations. [...] Offer opportunities to undergraduate students to prepare, execute, guide and evaluate small projects or activity plans for teachers and students, under guidance" (Gonçalves, 1981, p. 213, our translation).

It is worth mentioning that the excerpt presents the genesis of the formative foundations of the CCIUFPA and that it would be maintained in its essence over the decades. Such as: democratic environment – where it is possible to provide adequate training for the master student through assisted training (giving and receiving *feedback*). Learning by doing – in which he can exercise the teaching role (planning, executing and evaluating small projects), with personal involvement in the activities so that he is the protagonist of his own learning (Gonçalves, 1981). According to the author, teacher training at CCIUFPA is configured as:

> Process-product of multiple relationships, involving the creation of shared training spaces with colleagues, teachers and students in primary and secondary education. In the different training opportunities, which begin in advance of the formal professional beginning, the subjects play the roles of trainees and trainers, in a relationship of personal interaction such that they learn and teach, (trans)forming and developing themselves as they go, they develop professional knowledge about their own practice and various values about teaching-learning-knowledge and the teaching profession (Gonçalves, 2000, p. 253-254, our translation).

For José, his testimony emphasizes what it was like to work as coordinator/mentor of intern teachers at CCIUFPA. He is aware that every professional must seek to do something different that motivates students, this is always a challenge for him and that the CCIUFPA with its principles was inspiring for his teaching practice, as highlighted in the following excerpt.

> I had a very rich learning experience at CCIUFPA. As a professional, I realized the possibility that we have to do something different [...]. I have a proposal to work in the classroom and develop in my professional practice. I believe in the work that I learned and developed in this space, as it made things possible that I would never have imagined I could learn and have contact with (José, ST485-487, 2021, our translation).

The work proposal that José refers to concerns the CCIUFPA's modus operandi, which is based on the same training principles mentioned previously - learning by doing, democratic

environment, personal involvement and protagonism in learning, as a product-process of multiple relationships (Gonçalves, 1981, 2000), established since the founding of CCIUFPA in 1979.

José, when talking about his memories, showed enthusiasm and joy, especially when he shared that he introduced performing art to the inaugural classes at CCIUFPA. In the following text segment, he mentions that performing arts helps trainee teachers to be more spontaneous and creative.

> I took over CCIUFPA at the beginning of 2013 as coordinator and I thought and still think that art is something very important [...]. A teacher who will work with children needs to develop scenic issues, work on voice, know how to tell a story, among other things. [...] I dressed up as a clown, [...] so that the intern teachers could also do something different [...] it was interesting, it opened up the possibility for them to think more freely about things. I realized that when the intern teachers planned, [...] art brought spontaneity more strongly and I, the coordinator, dressed as a clown, playing and interacting at that moment was the reference that psychoanalysis says is necessary and so I believe which helped them to be creative and think of new and different things for the classroom (José, ST403-410, 2021, our translation).

The reference he makes about his intervention in the training of trainee teachers based on psychoanalysis, demonstrates how much he had been involved with CCIUFPA activities, because, to motivate the spontaneity and creativity of trainee teachers, he decided to dress up as a clown, emphasizing the importance of the relationship between teacher training and performing arts as a relevant contribution to children's learning.

However, the teaching of Science and Mathematics at the Science Club has been associated with the arts since the 1980s, as recorded by Gonçalves (2000), when referring to a research project for Basic Education students, guided by student teachers, entitled: Sciences, Mathematics, Fun and Art, in which several investigative focuses were the subject of studies, from children's games to the study of the traces of Marajoara ceramics.

However, documents that provide guidance in this direction have been presented over time for Basic Education. The National Common Curricular Base (BNCC) is one of them, despite showing progress in terms of covering the different artistic languages and the integration between them (music, dance, theater and visual arts), it still leaves open ends in the formation of the teacher curriculum, whether the art teacher himself or the general education teacher, as mentioned in the following excerpt.

> The proposal for teaching the arts as expressed by the BNCC is also centered on versatility, in the sense of assigning the teacher the multifunctional task in

> teaching all the contents of the different artistic manifestations, however it does not foresee learning under technical bases, even if we consider the outline intended for each of the arts, as it encourages a fluid and defragmented approach to artistic languages (Cunha, 2020, p. 48, our translation).

Corroborating with the aforementioned author, the BNCC makes demands on the Arts teacher regarding updated, differentiated teaching and that artistic languages are promoted in an integrated and impartial way in the construction of artistic knowledge, which shows from a multipurpose perspective, the inadequacy that exists between professional training in Degrees in specific artistic languages and General Education and what is required of teachers to work in Basic Education.

In view of the above, the set of principles characteristic of the training of/at CCIUFPA expressed in the testimonies highlight that the teacher teaches and learns to do, doing collectively and, therefore, interaction is a factor that must be considered in a light climate and democratic environment for the development of activities. Thus, considering the person as the center (Rogers; Rosenberg, 1977) of training and learning and their potential, as well as the relationship between experienced trainee teachers and those less experienced in the activities is essential, as their interaction with mentor teachers is procedures that encourage personal involvement and lead to protagonism in learning. Such training principles of the CCIUFPA reverberate in professional development during initial training (Imbernón, 2011; Gonçalves, 2000).

Teacher Training and Scientific Initiation of Basic Education Students at CCIUFPA

In this category, the narratives of the collaborating teachers express how the scientific initiation activities carried out are preponderant for teacher training at CCIUFPA. Thus, Zeki's testimony was accompanied by several artifacts that are re-elaborations of materials developed years ago for CCIUFPA activities - an LED solar panel, a spectroscope and a plastic bottle rocket with his scheme.

The solar panel (LED) was developed for the first time in an activity, in 2006, at CCIUFPA and was assembled with television transistors to transform solar energy into low-cost electrical energy and years later it was developed at school with high school students, but technology had changed, televisions have different technology, but it was possible to replace these transistors with light-emitting diodes, the famous LEDs (Zeki, ST18, 2021).

In another activity, Zeki and his group mates built a spectroscope, so that students could see the dispersion of white light, which is defined as the complete mixture of all wavelengths of the spectrum visible to the human eye (Zeki, ST218, 2021). The first version was developed during a workshop that he taught together with other intern teachers from CCIUFPA. It also highlights the plastic bottle rocket activity in the following text segments.

> The pet bottle rocket activity was developed when I was still a full physics undergraduate student. I remember that since I was a child I always liked playing with things that aroused my curiosity and at CCIUFPA I found a space that allowed me to teach while playing or play while teaching and soon I started with other colleagues from my team of intern teachers to create classes that had topics of interest to us and that it was possible to carry out small experiments, one of which was the construction of a pet bottle rocket (Zeki, ST5-7, 2021, our translation).

In the aforementioned excerpt, it is possible to list several themes. One of them is children's own curiosity that learning/teaching through play provides, as well as collective work to develop small experiments based on the group's interest. These themes are indicative of the training principles of CCIUFPA. One of them is teaching with research, which starts from the child's interest, in which curiosity is stimulated.

For Lampert (2008, p. 140, our translation) “teaching with research covers at least three stages, which are interrelated and complement each other: questioning, argumentation and communication”. Therefore, welcoming curiosity and constantly stimulating students with questions about knowledge, values, ethics and culture is essential, as this is one of the fundamental stages of the teaching process with research developed at CCIUFPA. This helps you form and reformulate concepts, principles, attitudes, skills, values, life perspectives, among other aspects.

According to Gonçalves (1981), in the project to create the CCIUFPA, teaching with research makes it possible to break with the traditional thinking and practice of training teachers who teach science and mathematics, as it allows the teacher to resize the teaching process from a different perspective, in which teacher and student are subjects of the process and not merely objects.

Therefore, the objective of training at CCIUFPA with scientific principles goes beyond the simple teaching and learning process of certain content or practice model. The main focus has always been the integral formation of the individual, so that they are capable of reflecting and acting on their own reality and that of the world in which they live (Gonçalves,1981, 2000).

Another aspect of teaching with research is the possibility of integrating areas of knowledge characteristic of interdisciplinarity and which requires collective work in a democratic environment, where there is freedom to learn, being able to get things right and/or wrong, in addition to respect for individual differences. For Fusari (1993), collective work requires starting and ending points from the teacher with common principles and objectives.

Thus, to face the fragmentation of knowledge as a hegemonic practice, the integration of knowledge constitutes interdisciplinarity as a new worldview and awareness in which the dialogue between disciplinary fields enhances and expands the meaning of school content, contributing to a comprehensive training that prepares the trainee teacher for the profession and for life.

In this sense, interdisciplinary practice enables other ways of understanding knowledge beyond disciplinary limits. However, a change in the teacher's position in relation to knowledge is necessary, that is, interdisciplinarity depends on the teacher's attitude in integrating the areas of knowledge without suppressing their specificities and requires collective work to promote a transformation in knowledge (Fazenda, 2011).

From this perspective, we observe that for Zeki, collective work starts from planning the activity with choosing the topic to be investigated, although they encourage junior members to express what they want to research, all the intern teachers in the group have their own interest, so It is necessary to learn to "negotiate", interacting and dialoguing with colleagues to decide what is best for the group.

Another highlighted point concerns play, which is essential for children, as studies have shown how little ones develop important skills such as: attention, imitation, memory, imagination and interaction that contributes to socialization processes, through rules and social roles experienced during play (Dhome, 2011). This is possible if there is a suitable environment, in which both the students and teachers involved feel confident, whether learning and/or teaching.

In this sense, playfulness as a science that helps the development of children, although there are already studies indicating its benefits, if associated with educational processes, is still neglected in our country, since the predominant emphasis in curricula is established on certain disciplinary contents and Playfulness is considered "not useful" knowledge or is seen and used as a form of pastime at school. Not to mention that, culturally, it has been replaced by electronic games. According to Torres and Corrêa (2020), children have been influenced by the media and electronic toys and no longer have time to play, causing harm to their development.

Continuing, in the following excerpt, José, as coordinator, mentions that CCIUFPA is a Pedagogical Laboratory, however there was confusion in the understanding of trainee teachers when they joined CCIUFPA.

> In Professor Terezinha's work I saw the term "pedagogical laboratory", but what happened (for example) was that the physics student said: professor, I'm thinking about doing a project on the conservation of electrical energy together with the partner. Little. In this intern teacher's mind, what he was going to research within CCIUFPA was something related to the physics course, concepts and physical phenomena and he would guide the junior partner, who was the Basic Education student. So there was this confusion, but they are different phenomena. The undergraduate student, whatever he may be, who arrives at CCIUFPA, his main object of study/research is the didactic-pedagogical relationships within the classroom, that is, for this student the CCIUFPA would be a pedagogical laboratory because he will try different ways of teaching. His experience is about a lesson plan, how to plan and execute an experiment and see what happens, how things are arranged, the question of the interventions he makes, the mediation process and the concept he wants the student to construct. The child or young person in Basic Education studies and researches phenomena at CCIUFPA of another order, in the areas of biology, physics, natural sciences, this is the scientific initiation of junior members (José, ST536-548, 2021, our translation).

José also expresses that he accompanied the intern teachers who were at CCIUFPA with the aim of having them practice teaching that was different from what they knew, whether as students or teachers in initial training. To achieve this, it was first necessary to know the objectives of the CCIUFPA, its principles and consider the person as the center (Rogers; Rosenberg, 1977; Gonçalves, 1981; 2000) in educational processes.

His concern led him, as coordinator, to develop empathy with everyone, value and motivate teams/groups of intern teachers through art. Thankful for the opportunity to participate in CCIUFPA, he also mentioned that you have to dream and believe to carry out your projects.

> Professor Terezinha was a person who more than 40 years ago dreamed of, believed that something different could be done to what was done in education, in teacher training within the university and today, after all this time, I have benefited. I know there were many other people with her, but the dream came from her, so I want to thank Professor Terezinha for that, for having made a professional dream come true too (José, ST376-378, 2021, our translation).

In this way, it was evident in the testimonies of Zeki and José that the CCIUFPA was and continues to be a pedagogical laboratory with an innovative proposal, with creative potential in educational processes, both in the training of teachers and Basic Education students, considering the person, stimulating everyone involved, through teaching with research

characterized by collective work in an appropriate environment, in which they get involved and learn to do by doing with direct participation in the processes, being protagonists of their own learning.

Final remarks

The teachers' testimonies about the training processes at CCIUFPA showed in the first category: Memories and training principles in CCIUFPA activities that the teacher teaches and learns to do, doing collectively, considering the person and their potential in a light climate and democratic environment for the development of activities. The partnership/interaction of the more experienced with the less experienced in the process is essential, stimulating personal involvement and protagonism in learning, therefore translating into training principles at/at CCIUFPA for professional development.

In the second category, Teacher training and scientific initiation of Basic Education students at CCIUFPA, it was evident that CCIUFPA was and continues to be a pedagogical laboratory with an innovative proposal for educational processes, both in the training of teachers and students of Basic Education, in which the student is the center, gets involved and learns to do by doing, with direct participation in the processes, as the protagonist of their own learning through teaching with research, with playfulness as a strong ally for the development of strategies of teaching that reverberate in teaching professional development even during initial training and in the integral development of Basic Education students.

We understand that play is part of our daily lives, being fundamental not only for happiness, but also for sustaining social relationships and enabling learning, creativity and innovation, in addition to reducing stress, helping to face difficult situations in the world.

Therefore, we conclude that the relationship between the CCIUFPA training principles and professional development for teachers are inseparable. However, the teacher must be open and willing to adopt new ways of teaching and learning, considering that humanistic knowledge, reflection on practice, theoretical bases, postures and self-assessments constitute a process that is essential for transformations.

Therefore, CCIUFPA is a training space, with creative potential, which has its own principles for teaching science and mathematics that reverberate in training and professional development, even during graduation, bringing joy and professional recognition from those who work there.

REFERENCES

ALVES, Wanderson Ferreira. A formação de professores e as teorias do saber docente: contextos, dúvidas e desafios. **Educação e Pesquisa,** São Paulo, v. 33, n. 2, p. 263-280, maio/Aug. 2007. Available at: https://www.scielo.br/j/ep/a/vmVw9dNw3dyZdTb36WMCJVG/?format=pdf. Access: 18 May 2023.

BASTOS, Manoel de Jesus. Organização do Sistema Educacional Brasileiro. **Revista Científica Multidisciplinar Núcleo do Conhecimento**, [*S. l.*], 5ano 02, v. 01, p 277-286, 2017. ISSN: 2448-0959. Available at: https://www.nucleodoconhecimento.com.br/educacao/organizacao-sistema-educacional, DOI:10.32749/nucleodoconhecimento.com.br/educacao/organizacao-sistema-educaciona. Access: 20 Aug. 2023.

BRASIL. **Resolução Nº 510/2016.** Diretrizes e normas regulamentadoras de pesquisa em ciências humanas e sociais. Brasília, DF: Ministério da Saúde, 2016. Available at: https://conselho.saude.gov.br/resolucoes/2016/Reso510.pdf. Access: 13 Nov. 2023.

BRASIL. **Proposta de novas normas para a formação do professor avança**. Brasília, DF: MEC, 2018. Available at: http://portal.mec.gov.br/component/tags/tag/bnc-professor. Access: 16 July. 2023.

BRASIL. **Resolução CNE/CP Nº 2/2019**. Base Nacional Comum para a Formação Inicial de Professores da Educação Básica (BNC- Formação). Brasília, DF: MEC, 2019. Available at: http://portal.mec.gov.br/docman/dezembro-2019-pdf/135951-rcp002-19/file. Access: 13 Nov. 2023.

BRASIL. **Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (Inep)**. 2023. Available at: https://www.gov.br/inep/pt-br. Access: 20 Feb. 2023.

CAMARGO, Brígido Vizeu; JUSTO, Ana Maria. **Tutorial para uso do software IRAMUTEQ**. (*Interface de R pourles Analyses Multidimensionnelles de Textes et de Questionnaires*) Laboratório da psicologia da comunicação e cognição (LACCOS) - Universidade Federal de Santa Catarina. Florianópolis, 2021. Available at: http://www.IRAMUTEQ.org/documentation/fichiers/tutoriel-en-portugais. Access: 10 Jan. 2021.

CLANDININ, Jean; CONNELLY, Michael. **Pesquisa Narrativa:** experiências e história na pesquisa qualitativa. Tradução: Grupo de Pesquisa Narrativa e Educação de Professores ILEEL/UFU. 2. ed. rev. Uberlândia, MG: EDUFU. 2015.

CUNHA, Daiane Solange Stoeberl da. **A Integração das Artes na Formação Docente para a Educação Básica no Brasil e na Espanha**. 2020. 238 f. Tese (Doutorado em Música) – Instituto de Artes da Universidade Estadual Paulista, 2020.

DHOME, Vânia. **Atividades Lúdicas na Educação**: o caminho de tijolos amarelos do aprendizado. 6. ed. Petrópolis, RJ: Vozes, 2011.

FARIA, Samantha Lira Beltrão de; SILVA, Roberto Ribeiro da. **Clube de Ciências:** uma aventura científica na escola. São Paulo: Editora Dialética, 2022. 144p.

FAZENDA, Ivani. **Integração e interdisciplinaridade no ensino brasileiro**: efetividade ou ideologia. 6. ed. São Paulo: Edições Loyola, 2011.

FREIRE, Paulo. **A pedagogia da autonomia:** saberes necessários à prática educativa. São Paulo: Paz e Terra. 1997.

FUSARI, José Cerchi. A construção da proposta educacional e do trabalho coletivo na unidade escolar. **Série Ideias**, São Paulo, n. 16, 1993. Available at: http://www.gestaoescolar.diaadia.pr.gov.br/arquivos/File/sem_pedagogica/fev_2009/construcao_proposta_educacional_trabalho_coletivo.pdf. Access: 04 Apr. 2023.

GEISELMAN, Edward; FISHER, Ronald Philipi. Interviewing Witnesses and Victims. University of California, Los Angeles & Florida International University. To appear. *In:* Yves, Michel St. (ed.). **Investigative Interviewing**: Handbook of Best Practices. Toronto: Thomson Reuters Publishers, 2014.

GONÇALVES, Terezinha Valim Oliver. **Metodologia da Convergência:** Indivíduo, Conhecimento e Realidade - uma proposta para formação de professores de ciências. 1981. 233 f. Dissertação (Mestrado) – Instituto de Matemática, Estatística e Ciência da Computação. Universidade Estadual de Campinas, Campinas, SP, 1981.

GONÇALVES, Terezinha Valim Oliver. **Ensino de Ciências e Matemática e Formação de Professores:** marcas da diferença. 2000. Tese (Doutorado) – Universidade Estadual de Campinas, Campinas, SP, 2000.

IMBERNÓN, Francisco. **Formação docente e profissional:** formar-se para a mudança e incerteza. Tradução: Silvana Cobucci Leite. 9. ed. São Paulo: Cortez, 2011.

IMBERNÓN, Francisco. **Qualidade do ensino e formação do professorado:** uma mudança necessária. Tradução: Silvana Cobucci Leite. São Paulo: Cortez, 2016.

LAMPERT, Ernâni. O Ensino com Pesquisa: realidade, desafios e perspectivas na Universidade Brasileira. **Revista Linhas Críticas**, Brasília, v. 14, n. 26, p. 131-150, jan./jun. 2008. Available at: https://periodicos.unb.br/index.php/linhascriticas/article/view/3439. Access: 10 Nov. 2023.

MAGNO, Cleide Maria Velasco; GONÇALVES, Terezinha Valim Oliver. Princípios Formativos do Clube de Ciências da UFPA: Testemunhos e Memórias de Egressos. p. 149-172. *In*: GONÇALVES, Terezinha Valim Oliver; ARAUJO, Rafaela Lebrego; NUNES, João Batista Mendes (org.). **Clube de Ciências da UFPA**: aprendizagens entrelaçadas de docência e iniciação científica vivenciadas na experiência coletiva. 1. ed. São Paulo: Livraria da Física, 2021. ISBN: 978-85-5563-103-6.

MAGNO, Cleide Maria Velasco; GONÇALVES, Terezinha Valim Oliver. Entrevista Cognitiva Associada a Caixa de Memória: Contribuições Para a Pesquisa Narrativa com o Uso de Testemunhos. **Revista Brasileira de Pesquisa em Educação em Ciências**, [*S. l.*], v.

23, e42922, p. 1-27, 2023a. Available at: https://periodicos.ufmg.br/index.php/rbpec/article/view/43922. Access: 12 Aug. 2023.

MAGNO, Cleide Maria Velasco; GONÇALVES, Terezinha Valim Oliver. O testemunho em pesquisa narrativa e a análise textual discursiva associada ao IRAMUTEQ. **Amazônia (UFPA)**, [*S. l.*], v. 19, p. 18-34, 2023b. Available at: https://periodicos.ufpa.br/index.php/revistaamazonia/article/view/12980. Access: 10 Aug. 2023.

MORAES, Roque; GALIAZZI, Maria do Carmo. **Análise Textual Discursiva.** Ijuí: Ed. Unijuí, 3. ed. rev. e ampl. 2016. 264 p. (Coleção Educação em Ciências).

MORIN, Edgar. **A cabeça bem-feita**: repensar a reforma, reformar o pensamento. Tradução Eloá Jacobina. 8. ed. Rio de Janeiro: Bertrand Brasil, 2003. 128 p.

NOGUEIRA, Lionilda Mágueda Évora de Sá. O ensino de qualidade e as implicações na formação de professores. **Revista Científica Vozes dos Vales,** [*S. l.*], n. 6, 2014. ISSN: 2238-6424. Available at: http://www.ufvjm.edu.br/vozes. Access: 23 July. 2023.

PIERRON, Jean-Philippe. **Transmissão:** uma filosofia do testemunho. Tradução: Luiz Paulo Rouanet. São Paulo: Edições Loyola. 2010.

PRIOSTE, Cláudia. Hipóteses docentes sobre o fracasso escolar nos anos iniciais do Ensino Fundamental. **Educação e Pesquisa**, São Paulo, v. 46, e220336, 2020. Available at: https://www.scielo.br/j/ep/a/SWXzFfpTCnLsHXYDc755gjF/. Access: 12 Aug. 2023.

ROGERS, Carl Ranson. ROSENBERG, Rachel. **A pessoa como centro**. São Paulo: Ed. da Universidade de São Paulo, 1977.

ROSITO, Berenice Alvares; LIMA, Valderez Marina do Rosário. **Conversas sobre Clubes de Ciências**. Porto Alegre, RS: EDIPURCS, 2020.

SALVIATI, Maria Elisabeth. **Manual do Aplicativo IRAMUTEQ** (versão 0.7 Alpha 2 e R Versão 3.2.3): compilação, organização e notas. Planaltina. 2017. Available at: http://www.IRAMUTEQ.org/documentation/fichiers/manual-do-aplicativo-IRAMUTEQ-parmaria-elisabeth-salviati/view. Access: Jan. 2021.

SASSERON, Lúcia Helena; MACHADO, Vitor Fabrício. **Alfabetização Científica na Prática**: inovando a forma de ensinar física. 1. ed. São Paulo: Editora Livraria da Física, 2017. 108p. (Coleção professor inovador).

SCHÖN, Donald. **Educando o profissional reflexivo**: um novo design para o ensino e a aprendizagem. Donald A. Schön. Tradução: Roberto Cataldo Costa. Porto Alegre: Artes Médicas Sul, 2000. 256 p.

SOUZA, Denise Trento Rebello. Formação continuada de professores e fracasso escolar: problematizando o argumento da incompetência. **Educação e Pesquisa**, São Paulo, v. 32, n. 3, p. 477-492, set./dez. 2006. Available at:

https://www.scielo.br/j/ep/a/CNCtVGSSmZCZpcnrfnbByyr/abstract/?lang=pt. Access: 15 Aug. 2023.

TOMIO, Daniela; SCHROEDER, Edson; CONZATTI, Cintia; HAMANN, Bruna; PEDRON, Natalia Bagatolli. Os Clubes de Ciências como contextos de formação inicial docente: contribuições a partir da produção científica de um coletivo PIBID. ***Colloquium Humanarum***, [*S. l.*], v. 17, 397–416. 2020. Available at: https://journal.unoeste.br/index.php/ch/article/view/3674. Access: 26 June. 2023.

TORRES, Luana dos Santos; CORRÊA, Vanisse Simone Alves. A Importância do Brincar na Educação Infantil. **Revista ContempoArtes**, [*S. l.*], 2020. Available at: https://revistacontemporartes.com.br/2020/07/21/a-importancia-do-brincar-na-educacao-infantil/. Access: 20 Jan. 2022.

Recognitions: Coordination for the Improvement of Higher Education Personnel (CAPES); Postgraduate Program in Science and Mathematics Education (PPGECM/IEMCI/UFPA); To the Collaborators of the UFPA Science Club (CCIUFPA).

Funding: Coordination for the Improvement of Higher Education Personnel (CAPES) and the Dean of Research and Postgraduate Studies - PROPESP/UFPA.

Conflicts of interest: There are no conflicts of interest.

Ethical approval: The work respected ethics during the research and is supported by Resolution 510/2016.

Availability of data and material: The historical documentation of the Science Club of the Federal University of Pará (CCIUFPA), in the form of projects and reports, is available in the CCIUFPA collection itself, as well as in academic productions resulting from research in/on the work of teaching and training in this educational space.

Authors' contributions: The authors each had a 100% contribution, as they participated in the research and writing of this text in all aspects.

Processing and editing: Editora Ibero-Americana de Educação.
Review, formatting, standardization, and translation.