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Experiences of Natural Sciences students in Pre-service Teaching: Challenges and Strengths

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Abstract

Objective: To examine the teaching practicum experiences of pre-service teachers in a science teacher training program.

Originality/Contribution: Taking a closer look at classroom management and understanding how future teachers perceive the differences between their teaching beliefs, what they learn in their university courses, and what they observe about management practices in basic education settings, provides a deeper insight into how in-service teachers can encourage pre-service teachers to think critically and reflectively about teaching.

Method: This article draws on hermeneutic studies of documentary analysis and reflective writing by pre-service teachers. It comprises two elements: an analysis of pre-service teachers' perceptions of in-service teachers and an examination of the pre-service teachers' teaching methods. To study these experiences, observational records were kept of the in-service teachers' practices. Additionally, the pre-service teachers completed field diaries, and the in-service teachers filled out evaluation forms.

Results: The results indicate tensions between pre-service and in-service teachers. The three main difficulties experienced by pre-service teachers were a lack of familiarity with classroom reality; a discrepancy between the curricular and pedagogical theories learnt during university courses, and difficulty in managing student behavior within each class. In-service teachers demonstrate their expertise in maintaining control of students; however, the use of activities for lesson development is questionable, highlighting teacher-centered teaching models.

Conclusions: It is evident that there is a need to reconfigure pedagogical practice as a means of understanding and problematizing the reality of schools, in order to question the teaching tasks of both pre-service and practicing teachers.

Keywords: *Pedagogical practice; teacher training; pre-service teachers, history of education.*

Experiencias de los estudiantes de ciencias naturales en la formación docente previa al servicio: retos y fortalezas

Resumen

Objetivo: examinar las experiencias de las prácticas docentes de los futuros maestros en un programa de formación de maestros de ciencias.





Originalidad/Contribución: profundizar en la gestión del aula y reconocer de qué manera lo que piensan los futuros maestros acerca de las discrepancias entre sus creencias acerca de la enseñanza, lo que aprenden en sus cursos universitarios y lo que observan sobre las prácticas de gestión en entornos de educación básica, conduce a una comprensión más profunda de cómo los maestros en servicio pueden apoyar a los maestros en formación en su capacidad para pensar de manera crítica y reflexiva sobre la enseñanza.

Método: este artículo se apoya en estudios hermenéuticos acerca del análisis documental y los escritos reflexivos de los profesores en formación. Se compone principalmente de dos elementos: el análisis de las percepciones que los profesores en formación tienen de los profesores en activo, y, el escrutinio de su propia pedagogía. Para estudiar estas experiencias, se llevaron registros de observación de las prácticas de los maestros en ejercicio. Además, los maestros en formación completaron diarios de campo y los propios maestros en servicio llenaron formularios de evaluación.

Resultados: indican tensiones entre los maestros en formación y los maestros en ejercicio. Las tres principales dificultades de los maestros en formación fueron: la falta de familiaridad con la realidad del aula, la brecha entre las teorías curriculares y pedagógicas aprendidas en los cursos universitarios, y la dificultad para manejar el comportamiento de los alumnos en cada clase. Los maestros en servicio demuestran su experiencia en garantizar el control de los alumnos; sin embargo, el uso de actividades para el desarrollo de las lecciones sigue siendo cuestionable, lo que pone de relieve los modelos de enseñanza centrados en el maestro.

Conclusiones: es evidente la necesidad de reconfigurar la práctica pedagógica como medio para comprender y problematizar la realidad escolar con el fin de cuestionar la tarea docente tanto de los maestros en formación como de los maestros en ejercicio.

Palabras clave: *Práctica pedagógica; formación de maestros; maestros en formación, historia de la educación.*

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Experiências dos estudantes de Ciências Naturais no ensino pré-serviço: desafios e pontos fortes

Resumo

Objetivo: Examinar as experiências práticas de ensino de professores em formação em um programa de formação de professores de ciências.

Originalidade/Contribuição: Aprofundar a gestão da sala de aula e reconhecer como os futuros professores pensam sobre as discrepâncias entre suas crenças sobre o ensino, o que aprendem em seus cursos universitários e o





que observam sobre as práticas de gestão em ambientes de educação básica leva a uma compreensão mais profunda de como os professores em serviço podem apoiar os professores em formação em sua capacidade de pensar crítica e reflexivamente sobre o ensino.

Método: Este estudo baseia-se em estudos hermenêuticos, com base na análise documental e em escritos reflexivos de professores em formação. Compreende principalmente dois elementos: por um lado, a análise das percepções que os professores em formação têm dos professores em exercício; por outro lado, o escrutínio de sua própria pedagogia. Para estudar essas experiências, foram mantidos registros de observação das práticas dos professores em exercício. Além disso, os professores em formação preencheram diários de campo e os professores em exercício preencheram formulários de avaliação.

Os resultados: indicam tensões entre professores em formação e professores em exercício. As três principais dificuldades dos professores em formação foram: falta de familiaridade com a realidade da sala de aula, discrepância entre as teorias curriculares e pedagógicas aprendidas nos cursos universitários e dificuldade em gerenciar o comportamento dos alunos em cada turma. Os professores em serviço demonstram sua expertise em garantir o controle dos alunos; no entanto, o uso de atividades para o desenvolvimento das aulas permanece questionável, destacando modelos de ensino centrados no professor.

Conclusões: É evidente a necessidade de reconfigurar a prática pedagógica como meio de compreender e problematizar a realidade escolar, a fim de questionar a tarefa de ensino tanto dos professores em formação quanto dos professores em exercício.

Palavras-chave: *Prática pedagógica; formação de profesores; professores em formação, história da educação.*

Introduction

This paper presents the results of a study about the experiences of pre-service teachers in the Bachelor's program in Natural Sciences and Environmental Education (so forth BNSEE) at the Universidad Pedagógica y Tecnológica de Colombia.⁵ The pre-service teaching training courses are called Experimental Workshop and Pedagogical Practice (*Taller Experimental* and *Práctica Pedagógica Disciplinar*) and are taken during the eighth and ninth semesters. The pre-service teaching was developed through 15 and 20 hours of teaching in basic education institutions. It prepares students for pedagogical and research practice, and serves as an area of concentration (*profundización*) in the last semester of the program.

5 In this case, pre-service teaching is developed usually in the last two semesters of the Bachelors' dedicated to high school teaching. In other words, pre-service teachers take their training alongside all their regular courses for two semesters. This process is guided by a professor who evaluates the pre-service teachers' work.



In teaching training courses, pre-service teachers are motivated to develop their pedagogical skills. However, in some cases their actions are limited by guidelines or other administrative regulations of the schools, which might hinder their professional development. Such situation shows the need to analyze pre-service teachers learning in order to understand their experiences, identify tensions between pre-service and in-service teachers, and know the suggestions made by the in-service teachers regarding the examination and re-construction of the curriculum of the Bachelor's training courses.

Although the importance of pre-service teacher training has been recognized, deeper analyses are required in order to delve into the role of experience in this process. Indeed, various investigations have sought to understand the teacher training process and the role that pre-service teaching plays in it. Russell⁶, for instance, in his effort to motivate learning from experience with teachers in initial training, indicates that it is necessary to consider the experiences of pre-service teachers, since they allow us to think together about the purpose of any course.

Segall⁷ argues that it is necessary to create experiences in initial training classes that demonstrate the principles to be transmitted to future teachers, since students tend to teach in the same way that they were taught. In this line of thought, Stofflett and Stoddart⁸ argue that the recommendations of how a subject should be taught are strongly influenced by how teachers themselves learned the content in university. Consequently, they tend to project their own way of learning in their students' learning. However, McGarr and McCormack⁹ suggest that formative experiences do provide the foundation of knowledge and beliefs about what it is to be a teacher upon which professional knowledge should be developed. In addition, Soto Arango et al.¹⁰ point out that the pedagogical model for teacher training should foster critical reflection on practice and strengthen the connection between theory, research, and situated experience to consolidate a transformative professional identity.

Regarding the experiences of preservice teachers, it is essential to recognize how they subjectively perceive and experience their work, especially in relation to their well-being, the conditions of the school environment, and institutional demands. According to Castro et al.¹¹, teacher job satisfaction is influenced by extrinsic factors such as salary, the work environment, and institutional policies, and intrinsic factors such as professional recognition, pedagogical autonomy, and a sense of belonging. These elements not only affect preservice teachers' motivation but also shape their professional identity and commitment to the educational process, directly impacting their approach to classroom work and the development of relationships

- 6 Tom Russell, "Práctica en la formación docente: tensiones y posibilidades en la experiencia de aprender a enseñar", *Estudios Pedagógicos* 40 (2014): 224.
- 7 Avner Segall, *Disturbing practice: Reading teacher education as text* (Peter Lang, 2022).
- 8 James Stofflett and Trudi Stoddart, "The influence of pre-service teachers' knowledge on their pedagogical reasoning: Toward a model of teacher development", *Teaching and Teacher Education* 10, n.° 3 (1994): 265.
- 9 Ollie McGarr and Orla McCormack, "¿Reflexionar para conformarse? Explorando los discursos de los estudiantes de magisterio irlandeses en la práctica reflexiva", *Revista de Investigación Educativa* 107, n.° 4 (2014): 268.
- 10 Diana Elvira Soto Arango et al., "Formación de docentes y modelo pedagógico en la Universidad Pedagógica y Tecnológica de Colombia", *Revista Historia de la Educación Latinoamericana* 19, n.° 29 (2017): 45.
- 11 William Rodrigo Castro Avendaño et al., "Satisfacción laboral de los docentes: un análisis desde los factores extrínsecos e intrínsecos", *Revista Venezolana de Gerencia: RVG* 26, no. 5 (2021): 198.

with their students. It is relevant to analyze these characteristics in teacher training programs because, as Hammond-Stoughton¹² states, it is necessary to carry out reflective practices to promote self-awareness as a mechanism to support pre-service teachers in their classroom practices, where incoherence may exist with their own beliefs.

As Martínez Rizo¹³ and Millán¹⁴ assert, teacher training must be understood as a comprehensive process that goes beyond the transmission of content and requires understanding teaching as a situated, social, and reflective practice. In this sense, teaching implies a deep understanding of the complexity of the act of teaching, in which knowledge is collectively constructed. This leads to the need for future teachers to require mastery of the appropriation of disciplinary knowledge, pedagogical competencies, and a critical and ethical attitude toward their work. Together, these perspectives allow us to conceive training practice as a space for transformation, where pre-service teachers not only apply techniques but also generate meaningful connections and actively contribute to the production and circulation of knowledge in the classroom. In this sense, according to Gaete and Camacho,¹⁵ one of the main problems of teaching practice is the lack of articulation of the theoretical-practical dimensions when being in a classroom.

As reported by Espeja et al.,¹⁶ scientific knowledge practices tend to acquire greater prominence in initial teacher training, while aspects related to the pedagogical trajectory, critical reflection, or understanding of the educational context are addressed in less depth. This configuration responds, in many cases, to the influence of the pre-service teachers' prior experience as science students, who tend to reproduce traditional approaches focused on the transmission of content and the authority of scientific knowledge. This vision limits the incorporation of innovative didactic proposals, such as modeling or work based on the collaborative construction of knowledge, which prevents a meaningful connection between scientific knowledge and classroom realities. For this reason, it is necessary to link field practices that allow for an interdisciplinary approach.¹⁷

As can be seen, these investigations suggest that teachers, from the ideal image, and from their role as guides of the pedagogical processes, are constituted as a mediating and training figure and as a subject where tensions of their context and their subjectivity converge. Thus, researching in the field of pre-service teaching might contribute to improving and strengthening it. The teaching role can be consolidated from a deeper disciplinary, practical,

12 Edy Hammond-Stoughton, "How will I get them to behave?: Pre service teachers reflect on classroom management", *Teaching and Teacher Education* 23, n.° 7 (2007): 1024-1030. <https://doi.org/10.1016/j.tate.2006.05.001>

13 Felipe Martínez Rizo, "Aprendizaje, enseñanza, conocimiento, tres acepciones del constructivismo. Implicaciones para la docencia", *Perfiles Educativos* 43, n.° 174 (2021): 176.

14 Irving Camacho Millán, "El desempeño docente y su implicación en la enseñanza", *Formación Estratégica* 6, n.° 2 (2022): 111

15 Marcela Gaete y Johana Camacho, "Experiencias de profesionales de la pedagogía de las ciencias: prácticas de conocimiento científico y pedagógico", *Educação e Pesquisa* 43, n.° 1 (2017): 348.

16 Anna Garrido Espeja et al., "Formación inicial de docentes de ciencia: posibles aportes y tensiones de la modelización", *Enseñanza de las Ciencias. Revista de investigación y experiencias didácticas* 40, n.° 1 (2022): 92. <https://doi.org/10.5565/rev/ensciencias.3286>.

17 Nidia Torres and Elías Francisco Amórtegui-Cedeño, "Salidas de campo y formación inicial docente: un estudio en Colombia", *Encuentros* 20, n.° 1 (2022): 155. <https://doi.org/10.15665/encuen.v20i01.2732>

technological, and investigative knowledge, areas that are developed and energized by didactic pedagogical knowledge. The analysis of these factors can determine the correlation between the discourse promoted by educational institutions and the actions teachers carry out within the classrooms.¹⁸

Now, taking into account the context just presented from the literature, this study sought to answer the following questions: How is pre-service teaching developed in the subjects of Experimental Workshop and Pedagogical Practice? What tensions and opportunities emerge in the development of the pedagogical practices of the students of Bachelor's program in Natural Sciences and Environmental Education? Bearing in mind such questions, this study sought Ricoeur's philosophy about personal identity, since it focuses on the con-figuration and re-figuration of the self, possible through the narrative dimension of human life.

Ricoeur¹⁹ considers that identity is configured narratively as a product of experiences lived throughout existence; in fact, answering the question who I am requires a story of one's own life, which is possible thanks to the memory of what we are. Memory is, at the same time, a psychic faculty, and a social phenomenon²⁰ since it depends on both the subjective dimension and collective processes. Thus, identity is never static, nor can it be seen in an essentialist way. Rather, it changes over time, the same as life itself and the way it is remembered, since the act of remembering implies giving meaning, which also changes by virtue of the acts of signification and resignification.

In addition, identity is not homogeneous because a subject occupies multiple positions at the same time in the world.²¹ For instance, a white Parisian woman who cannot read or write occupies at least four positions: that of gender, ethnicity, nationality and that of their cultural condition; these positions account for four dimensions of their identity deeply interwoven, (but there might be more) in each of which there are specificities: being a woman, being white, being French and being illiterate. These or other dimensions of an identity must be considered when analyzing the identity of a teacher, which begins to take shape at least from the moment the subject decides to study to be a teacher and continues in the initial training of the future teacher to be developed, changed or sustained throughout his professional practice.

In the end, it is inferred that this identity does not automatically arise as a result of a professional career; on the contrary, it is built through an individual and collective process of a complex and dynamic nature in which there are, implicitly or explicitly, imaginaries and meanings about the teaching profession.²² According to Dubar,²³ a professional identity is a

18 Sandra Torrado, "De las concepciones a las prácticas pedagógicas de un grupo de profesores universitarios", *Revista Internacional de Investigación en Educación* 1 (2011): 395.

19 Paul Ricoeur, "La vida: una historia en busca de un narrador", *Ahora* 25, n.º 2 (2006): 9-22.

20 José Gabriel Cristancho Altuzarra, *Tigres de papel, recuerdos de película: Memoria, oposición y subjetivación política en el cine argentino y colombiano* (Universidad Pedagógica Nacional; La Carreta Editores, 2018).

21 Chantal Mouffe, *El retorno de lo político* (Paidós, 1999). José Gabriel Cristancho Altuzarra, *Transvoluciones. Diálogos filosóficos* (Universidad Pedagógica y Tecnológica de Colombia, 2020).

22 Antonio Bolívar et al., "Investigar la identidad profesional del profesorado: una triangulación secuencial", *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research* 5, n.º 3 (2004). <https://www.qualitative-research.net/index.php/fqs/article/view/563>.

23 Claude Dubar, *Socialización. Construcción de identidades sociales y profesionales* (Armand Colin, 1991).

social construction that is more or less stable depending on the period and that arises from both a historical legacy and a transaction. On the one hand, it deals with the identity that results from the system of relations between participants in the same system of action; on the other hand, of a historical process of transmission between generations, of institutional recognition and individual internalization of the social conditions that organize each biography.

What has been explained up to this point gives a particular epistemological meaning and status to lived experience. Indeed, the experiences lived and the way in which they are remembered are the core that configures a narrative identity. This fact implies expanding the category “experience” established by experimental research, which is limited to assuming it as a controlled experience in the laboratory, to avoid margins of error.²⁴ Thus, this paper assumes a concept of experience related to life, and for this reason it tried to make an approach to the experiences of pre-service teachers to know how the development of the pedagogical practice is carried out and its incidence in the professional practice.

Methods

This research, framed within hermeneutic studies, focuses on the interpretation of the meaning of messages, considering the historical, cultural, and personal context through which knowledge and experience are conveyed. It demonstrates how future teachers connect with knowledge, institutions, learning, and discourse.²⁵

This document describes a classroom experience in two courses called Experimental Workshop and Pedagogical Practice (*Taller Experimental* and *Práctica Pedagógica Disciplinar*) in the Bachelor's program in Natural Sciences and Environmental Education. A micro-practicum is developed with 15 and 20 class hours, respectively, at a basic education institution. The objective is to promote the comprehensive and professional development of future teachers. These courses are developed as part of autonomous and independent work, considering the academic credit structure of the course; this practical immersion serves as preparation for the development of pedagogical and research practice in the final semester of the program. In other words, what is reported here is part of a micro-practicum, focusing on aspects of lesson planning and reflection on classroom experiences. Before beginning their service, future teachers are offered an introduction and orientation to the practice. They are informed that it is necessary to record their experiences in materials such as observation forms, field journals, and evaluation forms. This paper presents the systematization of these instruments registered by the participants, analyzing the following material:

- 121 observation forms completed, where in-service teachers' classes are described.
- 88 field diaries or records on the description of disciplinary aspects and experiences of those developed in each of the classes, recorded by pre-service teachers.

24 Catherine Kohler Riessman, *Métodos narrativos para las ciencias humanas* (Sage, 2008).

25 Laura Quintana and Julián Hermida, “La hermenéutica como método de interpretación de textos en la investigación psicoanalítica”, *Perspectivas en Psicología: Revista de Psicología y Ciencias Afines* 16, n.º 2 (2019): 77.

- 121 evaluation forms filled out by in-service teachers in which they recorded the observations of pre-service teachers.

Participants

During the first and second semesters of 2016 and 2017 and first semester of 2018, 121 people took the pre-service training courses of Experimental Workshop and Disciplinary Practice. The pre-service teachers carried out their service in 25 public and private educational institutions in the department of Boyacá, in Colombia. Sixty in-service teachers participated in the monitoring process of this pre-service teaching development. All of them had the school subject of Natural Sciences (made up of the subjects of Chemistry, Physics and Biology). These educators were about 39 years old and had between 7 and 14 years of professional experience. In-service educators were selected according to their willingness to receive and guide a pre-service teacher: pre-service teachers contacted the educator and asked them about the possibility of carrying out their teaching practicum in one of their school courses. If the educator accepted, all administrative process was arranged.

Description of Methods

Observation Form and Class Planning: Before starting the teaching practice by the pre-service teachers, they were asked to observe one of the in-service teacher's classes, with the objective of immersing themselves in the school context. To guide them in their first exercise, they followed a guideline or observation form, which includes different items to analyze the beginning, development and closing of each class. Based on the information obtained, some challenges and strengths observed during the development of the class were highlighted, such as motivation, previous ideas, group management disposition, and development of the activities presented in the lesson plan.

Field Diary: Corresponds to the pre-service teachers' record logs of every class. These logs include accounts of disciplinary aspects (conceptual management and didactic transposition²⁶), routine aspects, and descriptions of curricular and pedagogical aspects (design of teaching materials and its implementation).

Evaluation Format by In-Service Educators: This form, provided by the course instructor, was designed for pre-service teachers to evaluate the performance of their peers during each class. In this form, observations are described regarding the conceptual appropriation, development of activities, and design of didactic material. All these instruments aimed at collecting and interpreting the lived experience, as well as doing analysis on them.

Pre-service teachers' identification codes were used to preserve their anonymity and quote some of their statements or fragments. As an example, the code BNSEE1 indicates pre-service teacher 1 of the Natural Sciences Degree. This same typology was applied with

26 Didactic transposition refers to the transition from disciplinary knowledge to taught knowledge, which implies the set of transformations and adaptations that the teacher makes so that teachers make to ensure students understand the knowledge.

the in-service teachers, whose code is IT and a number; for instance, IT43. All of the above with the due informed consent and the protection of the identity of the participants, that is, all in-service and pre-service teachers. In the next sections the in-service teachers as well as pre-service teachers are quoted and their words placed between inverted comas. When referring to the participants' verbatim, it is necessary to clarify that the participants' words are translated versions (done by the researchers) of the participants' excerpts because the data was collected in Spanish.

Analysis and Results

All collected information was read, and the narratives were organized by theme. This grouped the challenges and strengths that emerged. This process was done manually in order to contrast what was indicated by the in-service educator and the pre-service teacher. Likewise, it was complemented with group meetings carried out by the Bachelor's advisor. The information was organized into the following topics: Strengths of curricular and pedagogical aspects, challenges of curricular and pedagogical aspects, experiential strengths and challenges.

Experienced Educators

In this first section of findings, the main characteristics of the in-service teachers are presented. These are not necessarily beneficial or problematic procedures or traits of their didactic practices.

According to the observation forms, it was found that 75% of the in-service teachers begin directly the development of the lesson, disregarding motivational activities and avoiding any resources such as previous readings, use of experiments, video observation, or students' previous ideas. For example, BNSEE13 states: "the teacher begins the lesson by asking the students to organize themselves and take the Natural Sciences notebook; then she writes on the board the topic Nutrition in red and asks the students to do the same and begins to dictate the concept of nutrition".

Regarding the development of the lesson, it was found that 72% of in-service educators clearly state the objective of the day. Likewise, the participation of the students in the class is evident, responding to the questions established by the educator. About it, BNSEE 32 indicates: "The teacher constantly asks open, closed and proactive questions." However, the pre-service teachers say that 64% of the educators do not present updated information. For instance, the case of concepts related to the nervous system, research such as plasticity is not taken into account. Similarly, nutrition is taught from very basic concepts, without addressing aspects of energy systems and metabolic pathways. Or, for example, when teaching about genetics emerged some confusion between terms such as gene, allele, and chromosome. There is also evidence of confusion between the concepts of substance and element, real or ideal gases, etc. Thus, it is evident the lack of scientific news and up-to-date information. In this regard, BNSEE 88 affirmed: "The educator bases himself in the guidebook." And BNSEE 31 avers: "The information presented is outdated and many things have already changed."

Regarding experimental or practical activities, it was reported that 86% of the educators do not carry out that kind of activities during their lessons. Only 23% of them use activities such as question-and-answer workshops (which must be answered with the guidebooks that are present in the institution). It is striking that BNSEE121 points out that the educator only dictates from the book. Actually, 90% of educators use the board and the guidebook for the development of their lessons.

It is also described that the great majority of them (80%) have adequate class management. Some of the statements that support it are: BNSEE 23: "the head teacher makes a call for attention, which is enough for the students to behave appropriately." BNSEE 63 indicates "the teacher makes calls for attention with his own name and the student quickly changes his attitude".

The observation form ends with the following question: What aspects would you include in the development of your lessons? In this regard, 87% of pre-service teachers said they would provide feedback on the subject at the end of class since most educators do not. BNSEE35 stated: "(...) before finishing, I would seek to quickly return to the main concepts taught;" BNSEE87: "I would plan and project more activities to make the class less monotonous." At the end of the class, the form refers to the methodological and routine aspects that are carried out to close the session. For example, the educators state to the students the commitments for the following lesson: BNSEE11 said: "The teacher promotes the consultation of concepts, pointing out future topics."

In the pre-service training courses, the emphasis is placed on motivating students. Teachers should create a motivating environment for their students. Motivation makes students willing to participate actively in all school activities, which improves the quality of teaching.²⁷ In the same way, the consideration of previous knowledge allows organizing teaching from the students' own knowledge to better understand and learn new content. It is necessary to reveal the dialectical relationship between teachers and students, repositioning the student in the focus of the pedagogical process and giving them the opportunity to become subjects of the process from their active participation.²⁸

Likewise, the spaces for interaction in the classroom are important. For this reason, the planning of the different activities for direct contact between teachers and students must be taken into account and adequately deepen the knowledge, the modalities and the use of the pedagogical techniques. In the end, these techniques improve the process by creating favorable conditions for effective communication and expanding the possibilities for learning.²⁹

27 Tulio Ramírez and Doris Lilia Torres Cruz, "Una lectura comparativa sobre el nivel de satisfacción laboral de los docentes venezolanos entre 1996 y 2018." *Revista historia de la educación latinoamericana* 22, n.º 35 (2020): 258. Cervera, Noemí Alejandrina Buenaño et al. "Importancia de la motivación para el aprendizaje universitario: una revisión integradora", *Revista de Ciencias Sociales* 29, n.º 4 (2023): 380.

28 Oscar Eugenio Tamayo Alzate, "Interacciones entre naturaleza de la ciencia y pensamiento crítico en dominios específicos del conocimiento", *Enseñanza de las Ciencias* (2017): 521.

29 Claire Ellen Weinstein, *Strategic learning: a conceptual model, instructions and evaluation* (Mcgraw-Hill, 2002).

Pre-Service Teachers' Work

To examine the performance and experience of the pre-service teachers, their field diaries and the observation forms completed by in-service teachers (IT) were analyzed. The findings from each of these instruments are presented below.

The disciplinary, curricular, and pedagogical aspects were analyzed through the identification of challenges and strengths. Table 1 shows the percentage of the type of responses found and some examples of them.

Table 1. Strengths in Disciplinary and Didactic Aspects

Strength	Evaluation by In-Service Teachers (IT)	Descriptions from Pre-Service Teachers (BNSEE) in Field Journals	Examples
BNSEE revisits previously learned concepts to introduce the new topic to students in various academic institutions	45 (37.2%)	38 (43.2%)	BNSEE 11: "Upon entering the classroom, we first reviewed what was learned in the previous class." BNSEE 33: "To introduce the new topic, a diagnostic workshop is conducted based on the students' prior knowledge." IT27: "The student teacher starts the class by reviewing what was taught in the previous session."
BNSEE answers questions during class for students	68 (56.2%)	63 (71.6%)	IT53: "The student teacher adequately addresses the students' questions." IT38: "The student teacher answers each question that arises during class."
According to teacher evaluations, BNSEE seeks to contextualize different concepts	72 (59.5%)	Not recorded in field journals	IT1: "The student teacher uses regional examples during the explanation." IT34: "The student teacher contextualizes each of their examples."
BNSEE identifies, reflects on, and seeks to improve their conceptual errors when teaching	33 (27.3%)	46 (52.3%)	BNSEE 34: "During the repetition activity, we corrected the mistakes made in the first session." BNSEE 41: "Based on the weaknesses identified, methodological changes are made in the next lesson plan, particularly in the way of explaining and researching."
BNSEE demonstrates clear understanding of concepts and uses appropriate and effective examples to explain different topics	89 (73.5%)	67 (76.1%)	BNSEE 54: "Good command of the subject." BNSEE 93: "Good understanding and explanation of concepts." BNSEE 76: "I felt very good with the examples I brought because they facilitated the explanation and made the concepts clear."

Strength	Evaluation by In-Service Teachers (IT)	Descriptions from Pre-Service Teachers (BNSEE) in Field Journals	Examples
BNSEE allows students to construct concepts themselves	Not recorded in IT formats	56 (63.6%)	BNSEE 18: "Through the factory analogy, students constructed the concept of the function of each cell organelle."
BNSEE achieves appropriate student understanding and ownership of the concepts	73 (60.3%)	58 (66%)	BNSEE 17: "All the children answered correctly in the workshop, which shows that they internalized the knowledge." IT89: "The students understood and learned the properties of matter."
The BNSEE uses games, videos, labs, simulators, and experiments as teaching tools and/or strategies	89 (73.5%)	75 (85%)	IT48: "A game was used to conduct the review activity." IT29: "Designed games to support their explanation." IT11: "The pre-service teacher brought various physical models for teaching and explanation in their classes."
BNSEE creates guides that help students recall the concepts learned	98 (81%)	67 (76%)	BNSEE 57: "I created a guide for students to take home to reinforce what was taught in class." IT21: "The student teacher brings various guides to assess students' learning process."

Among the assets, the highest registration by the educators indicates that the pre-service teachers prepare guides to help students remember the concepts they study. This was indicated by 81% of educators, but curiously to a lesser extent by 76%. An educator said: "[pre-service teacher] created a guide for home that allows them to provide feedback on what was taught in class" (BNSEE57); another one stated that "The student teacher brings various guides to assess students" (IT21). A contrast might be found in another asset that consists in the fact that the pre-service teacher uses games, videos and laboratories, simulators, experiments as tools and/or teaching strategy. Indeed, this was indicated by 73.5% of the educators and by 85% of the pre-service teachers' field diaries: "A game was used to conduct the review activity" (IT48) "The pre-service teacher brought various physical models for teaching and explanation in their classes" (IT11).

Additionally, there is almost an equivalent strength about clear management of concepts and a necessary and correct exemplification of different themes by pre-service teachers. This was identified by 73.5% of the educators and by 76.1% of the pre-service teachers: "(...) I felt very good about the examples I brought because they helped explain the concepts clearly" (BNSEE76).

Other strengths identified, but to a lesser extent, were that the pre-service teachers resolve doubts during class, identified by 56.2% of the educators and 71.6% of pre-service teachers: "The student teacher adequately addresses the students' questions" (IT53). The strength lies in the pre-service teachers' ability to help students adequately grasp the concepts, as identified

by 60.3% of the educators and 66% of the pre-service teachers: "All the children answered correctly in the workshop, showing that they internalized the knowledge" (BNSEE17), and "The students understood and learned the properties of matter" (IT89).

In the same way, there is the strength that the BNSEE identifies, reflects on, and seeks to improve conceptual errors during class. This was identified by 27.3% of the educators and by 52.3% of pre-service teachers: "Based on the identified weaknesses, the next lesson plan will include methodological changes, particularly in the way explanations and research are conducting" (BNSEE41). 37.2% of the educators and 43.2% of pre-service teachers identified that pre-service teachers take up previously learned concepts to introduce new themes to students: "To introduce the new topic, a diagnostic workshop is conducted based on the students' prior knowledge" (BNSEE33). AP27 says: "The practitioner begins the class and resumes what was taught in the previous session."

Finally, a group of subjects identified specific strengths. For example, although none of the pre-service teachers recorded it, a significant percentage of the educators (59.5%) noted that the pre-service teachers sought to contextualize different concepts: "The student teacher uses regional examples during the explanation" (IT1); "The student teacher contextualizes each of their examples" (IT34). On the contrary, there are also strengths that educators ignore or fail to identify, but which pre-service teachers identify. For example, BNSEE allows students to construct concepts, as identified by 63.6% of the BNSEE: "Through the factory analogy, students constructed the concept of the function of each cell organelle" (BNSEE18). Thus, these strengths seem innovative or relevant to the educator and perhaps naturalized by the pre-service teachers or vice versa.

Based on this information, it can be inferred that pre-service teachers contextualize concepts, and adapt teaching methods to the students' age, the school context, and grade level. This results in an adequate appropriation of concepts, with an average of about 70% mastery, as corroborated by evaluative processes. In this regard, Barrón³⁰ points out the need to address different learning needs, according to the cultural contexts of school communities. Likewise, the educators describe how the pre-service teachers have a conceptual mastery of the discipline accompanied by other elements that comprise pedagogical content knowledge, such as teacher reflection and the connections teachers make between disciplinary, curricular and pedagogical elements for teaching, which configure their knowledge of the teacher.³¹

It is remarkable how much importance pre-service teachers give to investigating previous ideas and feedback from the previous class, as well as recognizing the construction of new knowledge. This situation facilitates the contextualization of science and allows us to see the usefulness of the theories of Ausubel, Novak and Hanesian.³² Such a contextualization gives way to a better understanding of concepts from the students' perspective, such is the case of the use of analogies.

30 Barrón Tirado, María Concepción, "Docencia universitaria y competencias didácticas", *Perfiles Educativos* 31, n.º 1125 (2009): 79.

31 Lee S. Shulman, "Those Who Understand: Knowledge Growth in Teaching", *Educational Researcher* 15, n.º 2 (1986): 6.

32 David Ausubel et al., *Educational Psychology. A Cognitive Point of View* (Holt McDougal, 1978).

Curricular and Pedagogical Aspects

This section describes the way of teaching, the planning, the use of resources, and the activities carried out during the class. In this regard, it is evident that the pre-service teachers employ multiple resources such as simulators, games, videos, experiments and visits to the laboratory; all the above within the framework of a lesson planning that is presented to the advisory teacher and then to the in-service educator.

76% of the pre-service teachers in their field diaries indicate that they use information and communication technologies (ICT) with the aim of facilitating the understanding of concepts, a resource that is very well received by students. They also elaborate guides that allow students to remember and provide feedback on concepts already studied. For example, BNSEE57 points out: "I prepare a lesson guide for students to fill out at home, so that it allows them to provide feedback on what was taught in class." An in-service teacher, IT21, says that "The practitioner takes different guides to evaluate the teaching process in students."

In 23% of the diaries there is evidence of a reflection exercise about the relevance of the activities, and they describe the need to make modifications. For example: "It is necessary to change the activities proposed according to space and time to address the issue" (BNSEE51). In these reflective processes, aspects that influence the development of activities are reported. BNSEE42 describes: "I planned a game to start the class, but the students feel embarrassed to play, so the motivation is not adequately concluded; so, the educator tells me the need to set times and rules for activities."

In general, it shows how pre-service teachers consider different options to carry out their classes. This fact is demonstrated by the variety of resources used to explain the assigned topics and by the activities used before, during, and after developing the lesson. These activities take into account the curricular guidelines of each school grade. It is possible to identify that pre-service teachers employ various resources designed with motivation. However, its proper use in the classroom is not always achieved, an aspect that sometimes leads the pre-service teachers to feel that their lesson was a failure.

Despite the above, the use of these resources indicates the difference from educators' lessons, usually homogeneous, due to the same classroom conditions, low student participation, number of students, and excessive teaching. Similarly, it is acknowledged that designing and planning a lesson requires additional time, a factor that is rarely considered when calculating educators' workloads. In this case, educators request materials designed by pre-service teachers for their future lessons.

This is related to what was stated by Barron,³³ who indicated that everything that the teacher does, as well as the way in which he does it, encourages the student to respond in one way or another, and each response tends to direct the attitude of the teacher. Thus, there is a need to diversify the modalities of work in the classroom through workshops, seminars, laboratories and even more, through the possibility of promoting the pre-service teachers' ability to transfer disciplinary knowledge to a teachable way, that is adequate for the student. But it demands time that in many cases the teachers do not have, as the in-service educators

33 *Ibid.*



affirm. The challenges described by pre-service teachers in the field diary and the evaluations carried out by the educators are presented in Table 2.

Table 2. Challenges Regarding Disciplinary Aspects

Challenges	Evaluation of In-Service Educator No. 121	Pre-Service Teachers Descriptions in their Field Diaries No. 88	Examples
The pre-service teachers describe how the use of technical concepts generates confusion. Therefore, it is evident that the history and/or beginnings of these concepts must be revisited.	Such weakness is not described in the in-service teachers' evaluation forms	65 (73.8%)	BNSEE18: "I needed to investigate the history that led to the discovery of speed and its different equations" BNSEE51: "It was necessary to make an introduction to the different theories of creation"
The lack of group management is described; therefore the objective of the class is dispersed.	72 (59.5%)	65 (73.8%)	BNSEE17: "It is very difficult to guide the class with so much indiscipline" IT32: "He does not make calls for attention, nor does he maintain discipline [good behavior] in the classroom"
Pre-service teachers assume that students understand the concepts before a new topic is introduced. Sometimes they begin addressing the new topic without reviewing the previous concepts in depth.	76 (62.8%)	50 (56.8%)	BNSEE53: "Not all the children knew what the groups, periods, and atomic number were, which made it difficult to explain their properties"
Pre-service teachers do not present terms, concepts, and issues clearly.	32 (26.4%)	21 (23.8%)	BNSEE12: "I got confused when developing the exercises..." IT89: "The practitioner appears nervous, which causes her to forget part of her explanation. She seems confused"
According to the evaluation concept for in-service teachers, some pre-service teachers do not accept suggestions related to concept management.	25 (20.6%)	The students' field diaries do not mention any such weakness.	IT67: "It ignores the indicated corrections and suggestions, which are reflected in the group's mismanagement"

Challenges	Evaluation of In-Service Educator No. 121	Pre-Service Teachers Descriptions in their Field Diaries No. 88	Examples
Pre-service teachers do not contextualize the terms, concepts and topics properly addressed from science.	49 (40.5%)	23 (26%)	IT23: "It is limited to the concept without exemplification" BNSEE19: "I needed to provide examples from the context because they didn't seem to understand the proposed exercises"
Pre-service teachers present difficulty in approaching the concept according to grade and age, making it difficult for the students in charge to learn.	55 (45.5%)	63 (71.6%)	BNSEE81: "It is very difficult to address properties of matter since, in third grade, students lack many conceptual bases" IT98: "The concept remains very superficial since the students have seen the subject in previous years"
In some cases, in-service educators assign classes from other grades without prior notice, which is distressing for the pre-service teachers, because they must improvise.	Such weakness is not described in the IT evaluation formats	60 (68.2%)	BNSEE34: "I had to play games since I hadn't prepared any classes because I didn't know they were going to leave me those two hours suddenly"
Educators do not review the lesson plans carried out by the practicing teachers.	Such weakness is not described in the IT evaluation formats	44 (50%)	BNSEE75: "The tenured teacher does not previously review the lesson plans in advance to adjust or improve them. At the time of class, he draws my attention to something that he did not review"
The different institutions and educators do not allow outings and/or walks during the development of the class.	Such weakness is not described in the IT evaluation formats	65 (73.9%)	BNSEE28: "To carry out a better contextualization, a walk was proposed during class hours, which was not approved by the institution"

From the previous table, it is inferred the difficulty to contextualize the technical language of the sciences, an aspect that is recognized by both the educators and the pre-service teachers. Some educators have noted that pre-service teachers tend to ignore their observations. Such an aspect was confronted with the field diary of the students, and the observation is directed to the fact that the practicing students resist doing teacher centered lessons and of an instructive type, as suggested by the in-service teachers following the textbook. As can be seen, some of the weaknesses described by the educators to the pre-service teachers is the lack of investigation of previous ideas, an aspect that was also found in the classes of the educators.

The main weakness is described as the lack of group management and disruptive behavior, reflecting pre-service teachers' inexperience with large groups and their lack of knowledge about students' aptitudes, socioeconomic conditions, and cultural backgrounds. This situation is also described by Beatriz Álvarez³⁴ in her work on aspects of class management. She indicates that students are interested in everything except the topic of the lesson. She explains that this can occur due to a lack of motivation to learn. Likewise, Gonzalez and Triana³⁵ affirm that teachers must plan their teaching according to the aptitudes of the students to avoid frustration, as well as understand aspects of each stage of the students. In this regard, what the educators expect is that pre-service teachers promote compliance with the rules so that they become figures of authority.

One of the weaknesses described by the future teachers is the lack of advice and review of lesson plans. After all, educators know their classes best and can assess the relevance of lesson plans. When asked why this was not done, the educator indicated that it represented an additional workload and that there were time constraints. Pre-service teachers recognize that they can adequately structure the concepts with the help of the in-service educator: "Being able to count on the educator for lesson planning is the opportunity to improve when guiding the different courses" (BNSEE4).

Ochoa and Cueva³⁶ state that novice teachers often face multiple problems due to their limited experience and the disconnect between the university training process and professional life. This is similar to the situations experienced by pre-service teachers. In this regard, BNSEE2 indicates: "What most hinders the development of practice is the abyss between pedagogical theory and practice in the classroom; one wants to do many things but the conditions do not allow it." This situation reflects the fact that the real conditions of the classroom differ from the planning purposes and the pedagogical and didactic theories seen in a university setting. This aspect draws attention to the role of the in-service teacher, because as Russell points out, based on Kessels and Korthagen³⁷, in many cases teachers are more concerned with the conceptual, rather than determining which are the needs of a student.

One recurring observation among educators is that the pre-service teachers must anticipate limitations and extensions of time. They must be prepared and clear about the topics that must be covered, according to the school grade curriculum. This shows educator's concern about covering the programmed content. Furthermore, most of pre-service teachers refute the limitation of educational institutions to do field practices and mention that the teaching of natural sciences requires live and dynamic scenarios: "Since the teaching of natural sciences is a practical area, it is required generate field trips within the school context where classroom concepts can be shown directly" (BNSEE73). Likewise, they say that the educators can take advantage of the students' curiosity to take them together to investigative processes that allow

34 Beatriz Álvarez y Elena Hernández, "Representaciones sociales de docentes de secundaria sobre la inclusión de estudiantes sordos en el aula regular", *Revista Virtual Universidad Católica del Norte* 46 (2015): 102-114.

35 Yineida González-Rojas, y Dairo Alberto Triana-Fierro. "Actitudes de los docentes frente a la inclusión de estudiantes con necesidades educativas especiales", *Educación y Educadores* 21, n.º 2 (2018): 200-218.

36 Ligia Ochoa y Alberti Cueva, "Dificultades y retos del profesorado principiante de español como lengua extranjera (ELE)", *Folios* 39 (2014): 5.

37 Jos Kessels and Fred Korthagen, "The Relationship between Theory and Practice: Back to the Classics", *Educational Researcher* 25, n.º 3 (1996): 17-22.

them to consolidate, corroborate and appropriate different topics: "In primary school, children are more curious, which can be used to carry out research processes; they are amazed with the laboratory practices and ask about everything. In my class they always ask me to do a laboratory practice" (BNSEE79). It is inferred that it is important for both pre-service teachers and educators to carry out reflection processes that allow them to identify difficulties and shortcomings as opportunities for improving. This allows them to connect experience with the learning of science concepts.³⁸

In some cases, there was some tension between educators and pre-service teachers, due to educators wanting the lessons to be taught exactly as they had developed them. For example: "There is no evidence of effective teaching of the subject, and students do not understand. Errors in concepts are observed." (AP54). In contrast, a pre-service teacher points out: "I do not believe there is an error in my concepts. The students and educator do not facilitate an effective class due to the teacher's reliance on traditional methodology" (BNSEE72).

Although universities prepare students to develop socio-constructivist environments and design didactic materials, the use of resources, such as those in science, and experimental practices at the beginning of teaching practice can result in failure. It seems that the only effective strategy is to revert to traditional teaching methods. However, due to the following reflections: "I don't want to be like the teachers I see", pre-service teachers resist and improve as they progress. These tensions raise questions about teaching methods and classroom dynamics, since students demonstrate what is and is not favorable.

Twenty-one percent of the evaluation forms indicate that pre-service teachers lack knowledge of the latest studies on different topics. However, corroborating the field diaries, observations of the following type were found: "My problem was limiting the consultation to the guidebook that the educator provided and told me not to use any more books" (BNSEE54). That outdatedness is also described by pre-service teachers in the observation of the educator classes. Likewise, 44% of the educators said that pre-service teachers assume that all students are at the same level of previous conceptualizations, an aspect that is recognized by the pre-service teachers: "The main problem was believing that everyone in the classroom had the same conceptual base" (BNSEE18).

Twenty-eight percent of pre-service teachers indicated that the educators did not clarify the expectations at a conceptual and thematic levels in their explanations: "the main teacher does not clarify what should be taught. She only provides a general theme. Based on that, I created the lesson plan. Then, she told me that it was too much and that the students would not understand such difficult concepts." (BNSEE72).

Description of Aspects of the Experience: Repetition Is Important

This section presents the strengths and challenges of teaching practice, planning and orientation of classes, and interaction with students, the head teacher and the advisor teacher.

38 Torres Merchán and Montenegro Casas, "¿Cómo interpretan los niños prácticas experimentales relacionadas con el concepto de densidad?", 23.

Table 3. Strengths of Experiential Aspects

Strength	In-Service Educators Evaluation to Practitioners	Descriptions of Pre-Service Teachers in Their Field Diaries	Statements of In-Service Teachers (IT) and Pre-Service Teachers (BNSEE)
Pre-service teachers introduce students to the new subject through readings, using news, articles, and videos.	89 (73.5%)	87 (98.8%)	IT45: "As you have progressed, you have demonstrated a better use of class resources."
In practice, as soon as the teaching exercise is generated and the number of oriented sessions increases, pre-service teachers improve their conceptualization, group management, and safety.	87 (72%)	87 (98.8%)	IT53: "The trainee improves notably in the different oriented lessons." IT61: "The pre-service teacher exhibits increasing self-confidence as they take on more responsibility in the group."
When developing the same subject class in different courses within the same grade, pre-service teachers observe opportunities for improvement when repeating the exercise. They then change aspects that they deem necessary for a better execution of the lesson plan.	89 (73.5%)	57 (65%)	IT39: "The pre-service teacher has made notable improvements and changed necessary aspects of the different courses, even when the topic is the same." BNSEE 78: "Since I have the opportunity to teach this topic to another sixth grade class, I can improve my explanations and activities."
Through the different lessons, pre-service teachers improve their group management skills and develop a better understanding of the topics.	47 (39%)	61 (69%)	IT3: "The pre-service teacher progressively improves group management." BNSEE29: "Throughout the different oriented lessons, I have gained a better understanding of the group and my relationship with the students."
Pre-service teachers take on the challenge of teaching students in real- life situations.	4 (3%)	5 (6%)	IT7: "It is favorable that the pre-service teacher takes on the challenge of teaching students with learning barriers in real-life contexts and strives to ensure their understanding."
Pre-service teachers demonstrate notable and favorable adaptations to routine aspects of the institution.	60 (50%)	No records	IT61: "The pre-service teacher easily adapts to the institution and its daily routines."

Strength	In-Service Educators Evaluation to Practitioners	Descriptions of Pre-Service Teachers in Their Field Diaries	Statements of In-Service Teachers (IT) and Pre-Service Teachers (BNSEE)
Pre-service teachers propose reflection exercises regarding student behavior in the classroom.	34 (28%)	No records	IT4: "At the end, the pre-service teacher approaches and reflects on classroom discipline."
By using the same methodology in the work sequence, pre-service teachers make greater use of the activities, methods, and strategies employed, which increases their self-confidence as teachers.	12 (10%)	18 (20.5%)	IT9: "The pre-service teacher has a distinct work method that boosts his self-confidence." BNSEE61: "Using the same strategies and methods in the different lessons makes managing the group easier and boosts my confidence when addressing them."
Pre-service teachers attend and use the educator's suggestions to improve and develop each of their classes.	39 (32%)	No registration	IT73: "The pre-service teacher attends and seeks advice for each of his classes, presenting a class plan responsibly and on time."

As the pre-service teachers advanced in their practice, the quality of their lessons improved, as recognized by both the educators and the pre-service teachers. Improvements emerged in areas such as coexistence, management of concepts, tone of voice, and classroom layout. These improvements gave the pre-service teachers greater self-confidence when guiding a lesson. These improvements justify the necessity of carrying out pedagogical practices earlier in the career which may allow bachelor students to understand dynamics about curricular guidelines, learning styles, management of discipline in the classroom. In this sense, the experience of guidance practices of repeating classes in various courses reflects a better adaptation of the BNSEE to its role as a teacher. In this case, strong learning is reflected through teaching. This evidence reaffirms Dewey's (as cited by Ruiz) assertion that experience is not only a matter of knowledge, but also a matter of the exchange between a living being and its physical and social environment. For this reason, experience requires living and witnessing situations that call for reflection on given knowledge and reformulation of new positions on the teaching task, as is the case in pre-service teaching.

Pre-service teachers describe experiences with students of learning diversity as part of inclusive and intercultural education practices and claim the need to provide academic training in the university context, since in many cases they receive training only for monological environments, where the diversity of the classroom, and students with some type of disability condition are served by a logic that is merely functional to the system.

The analysis carried out complements what was proposed by Eder Loaiza Zuluaga *et al.*³⁹⁴⁰ According to them, for the majority of teachers, the classroom is a place where they share with the students; it is a space for transformation, research, creation, production and, above all, a significant sharing of knowledge and attitudes in pursuit of human development. This reflection and action are based on starting to achieve a better relationship with others in a framework of humanity and commitment. That is a very positive aspect that stands out in the speeches, but that is not always reflected in the actions of teachers, due to the multiple circumstances that teaching work implies.

It is evident that in conversations between the in-service educator and the pre-service teacher the development of the classes is favored. Likewise, as the development of the classes progresses, the students acquire skills in areas such as group management and gain a better understanding of topics. In addition, at the beginning of the pre-service teaching period, educators require intervention to establish order and gain the students' attention. This is a skill that educators have already mastered, which highlights the value of experience. Students also develop socio-affective relationships with their peers, which allows them to understand their peers and help them learn. Hargreaves and Korthagen explain that the affective dimension is often overlooked because of the technical rationality approach.⁴¹ They point out that learning to teach cannot be separated from student's personal dimensions.

At the beginning of their service, pre-service teachers usually have a vision of students as innocent children and tend to develop strong affective ties with them, an issue that contrasts with the way in which students are perceived by educators, who describe them as willful and in need of authority. In both cases there is an infantilization of students. In one case, childhood is idealized, and in the other, it is viewed as disorder and a lack of something.

Conclusions

After interpreting the collected information, it was found that most pre-service teachers start their lessons highly motivated. They present the development of activities, strategies, and pedagogical tools before, during, and after every topic. They are recognized for their adequate and correct conceptual management; however, they have difficulty with disciplinary management of the class and adapting concepts to students of lower levels (kindergarten through third grade).

In relation to the in-service teachers, they are highly experienced in maintaining order and managing coexistence in the classroom through authoritarian measures. This seems to align with the lack of diverse activities used to develop course topics, which is characteristic of an adult-centric position. They assume that students must submit to these practices and that if they get distracted or bored it is because of their lack of maturity. For this reason, although

39 Eder Loaiza Zuluaga et al., La práctica pedagógica de los docentes universitarios en el área de la salud y su relación con el desempeño académico", *Revista Latinoamericana de Estudios Educativos (Colombia)* 8, n.º 1 (2012): 98.

40 Luz Mayelly Romero, "Prácticas pedagógicas iniciales en la modalidad de educación a distancia. Estado de la cuestión", *Revista Historia de la Educación Latinoamericana* 26, n.º 43 (2024): 145.

41 Andy Hargreaves, "The Emotional Practice of Teaching", *Teaching and Teacher Education* 20, n.º 1 (2004): 79.

control, transmission of information and authority are central to educators, these aspects seem secondary to pre-service teachers. Hammond-Stoughton⁴² has already proposed this idea.

Although pre-service teaching is an important contribution to professional training, there is also evident tension between the in-service educators and pre-service teachers. As shown in the first part, many of the aspects criticized by the educators were also observed in pre-service teachers, but with several questions about them.

In terms of the pedagogical implications of this reflection, it is clear that improving communication between pre-service and in-service educators is necessary. For example, educators should provide clearer feedback on pre-service teachers' lesson plans. Without this feedback, pre-service teachers may make mistakes that result in a lack of self-confidence. Thus, it might be helpful to create spaces for reflection for in-service and pre-service educators so they can identify their shortcomings and implement the necessary changes. Often, educators identify and reflect on their errors while teaching a class, yet the same errors persist when carrying out activities. In the end, a collective effort is necessary among the involved parties because, although pre-service teachers lack the experience of the educators, their enthusiasm and commitment to planning and developing lessons is evident. Therefore, educators should leverage this dynamism to enhance the development of various activities in their classes.

Finally, it is important to consider the power relations and subordination that occur in the pre-service teaching scenarios. It is apparent that the students are subordinated to the educators. Some pre-service teachers found that the best way to maintain good behavior is to use the same strategies as the headlines. In most cases, the educators receive the activities of the pre-service teachers very well, which sometimes causes jealousy, so they insist that the lessons be done in the traditional way.

Therefore, the subordination is mediated by the power relationship that is implicit in the position that the pre-service teacher occupies as a university student. This position implies the construction of a 'surveillance' and 'control' on the part of the educator. However, this relationship does not imply that the pre-service teachers do not innovate or seek to break with traditional teaching methods. They do occur, and it is there when the educators feel threatened their authority.

In this sense, the identity of the teacher, both the pre-service teacher and the in-service educator, is mediated by these positions of power that they occupy, and that need to be problematized. Solidarity and fair practices are required; the latter referred to the contributions that educators can give to pre-service teachers when checking their lesson plans to recognize their competences to planning school lessons. In this process, the pedagogical ideas of teachers, disciplinary knowledge, and pedagogical experience are taken into account.⁴³ Also, experiences of pre-service teachers in the pedagogical practice do not only concerns the teaching of disciplinary aspects, since pre-service teaching provides a vision of a social reality different from that seen in the university environment.

42 Edy Hammond Stoughton, "How will I get them to behave?..."

43 Miguel Ángel Zabalza, *Competencias docentes del profesorado universitario: calidad y desarrollo profesional* (Narcea, 2003).

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Authors' Contributions

Nidia Torres: Research, conceptualization, methodology, visualization; José Gabriel Cristancho: Research, conceptualization, methodology, visualization; Carla Daza: Methodology; Fredy Hernán Prieto Galindo: Writing – review and editing.

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