PEEKING BEHIND THE CURTAIN: UNBOXING SCIENCE TEACHER EDUCATORS' SUBJECTIVITIES IN CONTINUOUS PROFESSIONAL DEVELOPMENT PROGRAMMES

MIRANDO DETRÁS DE LA CORTINA: DEVELANDO LAS SUBJETIVIDADES DE FORMADORES DE FORMADORES EN LOS PROGRAMAS DE DESARROLLO PROFESIONAL CONTINUO EN CIENCIAS

Paulina de los Angeles Bravo Gonzalez (*)
Pontificia Universidad Católica de Valparaíso
Sergio Ignacio Galdames Poblete
Universidad de Santiago
Chile

Abstract

Several research agrees on the contribution of continuous professional development (CPD) programmes to support curriculum reform. In Latin-America there is growing concern about the university-school relationship, mostly related to the CPD of teachers. In Chile, the relationship university-school is posed in institutional discourses as a desirable professional development goal, yet the importance is less recognised in practice. Considering the teacher educators' subjectivity in higher education is barely explored in the teacher education literature leaves the question of who are those involved in CPD programmes? Taking a qualitative approach and using dialogical strategy, we study the design meetings of a university team/teacher educators leading a CPD programme in science. Findings show salient features of the teacher educators' subjectivity produced around the interaction between the school and the higher education sector, their relationship among themselves, the conditions of the university, and their perception of schoolteachers. Implications to research and practice are discussed.

Palabras clave: Science Education; Teacher Education; Higher Education.

Resumen

Literatura ha señalado la contribución del desarrollo profesional continuo (DPC) en la reforma curricular. En Latinoamérica, existe una creciente preocupación por la relación universidad-escuela, mayormente relacionada con el DPC de docentes. En Chile, esta relación se plantea en los discursos institucionales como una meta deseable de desarrollo profesional, no obstante, es poco reconocida en la práctica. Teniendo en cuenta que la subjetividad de formadores de docentes en la educación superior apenas se explora, surge la pregunta de quiénes son estos/as formadores involucrados en DPC. Con un enfoque cualitativo, y usando análisis dialógico, estudiamos las reuniones de diseño de un equipo de formadores de docentes que lideran un programa de DPC en Ciencias. Los hallazgos muestran características distintivas de esta subjetividad producida en torno a la interacción escuela-educación superior, su relación entre ellas/os, las condiciones de la universidad y su percepción de las/os docentes. Se discuten las implicaciones para la investigación y la práctica.

Keywords: Enseñanza de las Ciencias; formación del profesorado; educación superior.

1. Introducción

A large body of knowledge agrees about the central contribution of continuous professional development (CPD) programmes to support curriculum reform, suggesting these experiences have the potential to enhance teacher and school capacities (Subitha, 2018). However, satisfactory CPD requires funding, time, and talent from the CPD provider (Vaillant, 2016), where the relationship university-school becomes crucial. As pointed out by Tippins, Nichols and Tobin (1993) and Lumpe (2007), the collaboration university-school is conducive to learning for both parties. Yet, CPDs are shaped by power relationships and assumed unquestioned/fixed roles of teachers (university facilitators) and learners (schoolteachers), resulting in no real engagement in mutual learning. Besides, as Couso (2016) stated, researchers within academia do most research regarding professional development.

Similarly, in Latin-America there is growing concern about the university-school relationship regarding CPD programmes (Vaillant, 2019). Vaillant argues that universities have little contact with schools which makes difficult the relationship between theory and practice. In Chile, the university-school relationship is posed in institutional discourses as a desirable professional development goal, but the importance is still less recognised in practice (Tenorio, Jardi, Puigdellívol & Ibáñez, 2020). Considering the teacher educators' subjectivity is barely explored in teacher education literature (Bravo, 2022; Da Silva & Neto, 2016; Montenegro, 2016), leaves the question of *Who is the teacher educator involved in CPD programmes?*

Subjectivity is defined "as the lived and imaginary experience of the subject" (Butler, 1997, p. 122) within a contingent historical and political context (Heyes, 2010) that is shaped by a discursive tension between power and knowledge. Subjectivity emerges within the bounds of power structures, highlighting a socially situated understanding of subjectivity (Acuña, 2020). The question of subjectivity in science education is related to the call to engage/explore sociopolitical discourses rarely studied within the field (Bazzul, 2016). We feel especially called to unpack the teacher educators' subjectivity and reconceptualise the teacher educators'/our own's role in CPD programmes. Thus, this article aims to explore this subjectivity providing evidence to the debate about the often-invisible features of teacher educators' subjectivities and CPD programmes while reshaping the university teacher-schoolteacher relationship.

1.1. Teacher educators' subjectivity

In professional development, teacher educators' learning is essential yet frequently neglected (Vanderlinde, Smith, Murray & Lunenberg, 2021; Van der Klink, Kools, Avissar, White & Sakata, 2017) where the professional development of teacher educators is a "relatively young and

under-researched area" (Vanderlinde et al., 2021, p. 5). Montenegro (2016) pointed out that the path to becoming a teacher is frequently examined whereas the path to becoming a teacher educator has been barely explored. Vanderlinde et al. (2021), stated that since 2013 there has been an increasing interest across Europe in the professional development of teacher educators; proposing that there is a definition problem definition of who this teacher educator is because the term is "blurred, multidimensional and often context-dependent" (p. 3). Pareja and Margalef (2013) noted that teacher educators presented intra, interpersonal, and external dilemmas related to the time needed for reflection, such as personal beliefs surrounding teaching and learning, and intrapersonal difficulties, such as the frustration of incorporating new strategies. One common issue is the number of tasks asked, time, or lack of resources and management support in the teacher educators' workplace (the university) which can constrain their professional development (Van der Klink et al., 2017). Teacher educators are asked to respond to institutional requirements, many of which are related to becoming more competitive in comparison to other scholars and institutions (for instance, academic publications).

1.2. The Neoliberal University

Universities have been permeated by a neoliberal business-like logic (Fardella, 2020) with managerial understandings related to the production and dissemination of knowledge. Ball (2003) pointed out that the transformation of public education to a market-oriented mindset is underpinned by three policy technologies: "the market, managerialism and performativity" (p. 215). The privatisation of the university is positioning students as consumers, while academic staff have seen their remuneration decreasing as well as their working conditions deteriorating, transforming the university into a 'fast' academia (Gill, 2009). According to Cannizzo (2018), many academic activities are poorly paid or not paid at all; this also has to do with fast academia with a sense of "always-on" availability to respond to the increasing requirements (Gill, 2009, p. 9).

In Chile, the neoliberal model is experienced at the university level with rankings, productivity indices, and the promotion of competition amongst colleagues (Fardella, 2020). Since the time of the dictatorship (1973-1990), universities, as well as other institutions and settings, have experienced a progressive neoliberalisation (Fardella, Sisto & Jiménez, 2017), which has imposed a sense of competition and individualism on how to conduct academic work. Besides, a high percentage of academic staff, nearly 60%, suffer casualisation with "unstable part-time contracts with little institutional support" (Montenegro, 2016, p. 528). In this scenario, the role of the teacher educators regarding their professional development, in science education as well, is silenced by the university's conditions (Bazzul, 2016).

2. Methodology

2.1. Ontology and epistemology

We agreed with the proposition of multiple realities constructed by human beings who experience a phenomenon (Krauss, 2005). Besides, we consider that the multiple teacher educators' and schoolteachers' identities depend on the subject's perspectives and points of view regarding a particular setting, in this case, a CPD programme at the university. This article is rooted in a qualitative methodology. As one of our interests is the production of the subjectivity of teacher educators in the context of a CPD focused on big ideas in science education, we aim to understand the salient aspects shaping the professional identities of these subjects in Chile; therefore, there is an assumption which implies that reality and the social world are not necessarily fixed and also that they are constructed through these social actors as ourselves.

2.2. Context

This study draws data from a recent project funded by the Ministry of Education anonymously called 'National Inquiry-Professional Development' (NIPDE) which runs since 2015 and has been implemented across Chile by several Universities. NIPDE course has four main topics: (1) big ideas of science education, (2) contextualisation to the local territory, (3) community of learning, and (4) scientific inquiry. For this article, we focus exclusively on the work of a teacher educators' team in one University in Chile; particularly we explored the design meetings prior and during NIPDE's implementation from June 2017 to January 2018.

2.3. Participants

The university team was formed by 12 professionals (including one of the article's authors) from different areas related to science education. The team has some institutional features which allowed for an organisation as a non-unified group, for example, seven are formally hired by the university, and five have been hired just for the course. Within the teacher's educators' group, 11 design meetings were held. Four meetings before the course, six during the course, and one after the course. Two of these meetings were focus groups to gain a deeper understanding of the CPD designing process. Meetings were audio-recorded and transcribed verbatim. Specifically, in this article, we focused on three meetings (summarised in table 1) in which we identified 'key events' towards conducting a dialogical analysis.

Table 1

Summary of the design meetings as key moments involved in this article.

Date	Number of people attending	Type of record	Short description
22/09/ 2017	8	Audio record (time: 1.59.48)	First draft of the 11 sessions, products and evaluation
1/12/2017	6	Audio record (time: 1.00.03)	Final organization of the next day's session
21/12/2017	9	Audio record (time: 1.41.55)	First focus group (after the fifth session)

Source: created by the authors.

2.4. Analysis

Dialogical analysis has been described as providing tools to depict subjectivity produced in qualitative research (Sullivan, 2011). As such, drawing on linguistic aspects, dialogic analysis allows one to unpack tensions between different voices, implicit or explicit elements or how individuals are permeated by social or institutional discourses. A dialogical analysis is based on 'key moments' (Sullivan, 2011). Sullivan pointed out that familiarisation with the entire data set is crucial, related to, as in this case, coding the data openly; however, "reduction is necessary for an interpretation and analysis to take place" (p. 8). In this case, conducting a dialogical analysis is related to focusing on 'key moments' or 'key extracts' to achieve that data reduction. Sullivan (2011) maintained that "an utterance is a significant unit of meaning, different from the sentence or the line and is defined by its readiness for a reply/reaction. As a unit of meaning, it can be of variable length" (p. 8). In that light, our use of dialogue was based on selecting these key moments/episodes showing verbatim the extended quotes with a linguistic perspective (Lefstein & Snell, 2013). As the focus of the analysis was the dialogue, a key transcription convention was used (see Appendix 1) adapted from Lefstein and Snell (2013).

2.5. Rigour and ethical considerations

In terms of rigour, one of the most used strategies to represent data is by providing participants' quotations achieved here with the verbatim key moments of dialogue from the design meetings. Credibility was achieved by spending a prolonged time in the field (7 months) and member checking (discussion of the findings with the colleagues' teacher educators). Transferability is reached through thick descriptions (as seen in the analysis). Ethical practices for this article are aligned with the BERA (2018) guidelines. Before fieldwork began,

participants' informed consent was obtained for audio recording the design meetings between teacher educators. Throughout this study, all data were stored on a secure server at UCL Institute of Education anonymously. During the analysis, the real names of the participants were not included in the draft documents or final versions, except for the name of one author of this article. As part of the consent form, the participants were asked if their pseudonymised data could be used for this research.

3. Findings

In this article, from the 'key moments' of the interaction between participants, a series of assumptions emerged, grounded in three themes and seven subthemes (Table 2).

Table 2

Themes and subthemes of the findings

Theme	Subtheme
"We don't know them"	Lack of knowledge
	Level of trust
"We won the Nobel Prize"	We are flexible
	We are knowledgeable
	We are horizontal
"We don't know everything"	Attempt at destabilisation
	Attempt to know the schoolteachers

Source: created by the authors.

3.1. Theme 1: "*We don't know them*"

About two months before the beginning of the course, the teacher educator's team met for the third time to draft NIPDE. At that time, the university team had little information about future participants. *We don't know them* is an in vivo quote which reflects the starting point from which the university team addresses the course. The uncertainty of not knowing who the future participants were, took the shape of two subthemes: one about their lack of knowledge and one about the level of trust.

3.1.1. Lack of knowledge

This critical moment unfolds a dialogue among Esteban, Carla, Karen, Mario, and Paulina discussing the possibility of making questions to be posed to the schoolteachers beforehand.

Karen explained that the requirement for participation in this course – demanded by the Ministry – is to have support from the school administrator. Early in the extract, Esteban vocalised his worries about the expectations of the course that the schoolteachers would bring:

> **Esteban:** The issue related to teachers' expectations seems critical to me
>
> **Karen:** [Mmm
>
> **Esteban:** Once a teacher overcomes the barrier related to institutional support. He somehow sees in it {the course} either an opportunity (.) to be more knowledgeable in inquiry and have tools to make the community of learning
>
> **Karen:** [Yes
>
> **Esteban:** That he has put together thrive, and where he eventually included colleagues of his school who did not participate in the {previous} NIPD with us
>
> **Karen:** [Yes
>
> **Esteban:** And maintaining that lead for good, versus the teacher who as a first timer (.) sees in this course the opportunity to gain more tools
>
> **Karen:** [Ah, sure
>
> **Esteban:** To create the community (.)Then we will be talking *simultaneously* to teachers who have either one or the other expectation (.) that information is crucial for both the design and the type of accompaniment (.) the expectation defines the first methodological basis, and it should be extraordinarily (.hhh) adjusted to their contexts (.) Or of each group [that is key
>
> **Mario:** [{to have a} diversity of language to cover the variety of expectations
>
> **Carla:** I do not know if an initial pre-test is considered?

In the scenario Esteban is posing, the institutional support is resolved, so the concern will be the *"teachers' expectations"* and, at some point, also the university team's expectations. The first situation he raises is the expectations regarding the community of learning. Esteban's suggestion is a concern about the characteristics of the two groups: one group that already has the tools to create a community and will be expected to *"have more tools"*; versus a group *"who as a first-timer"* will gain the tools to create a community. That situation brings unpredictability to the table which should be reduced as a priority according to Esteban. Karen, NIPDE's leader, with her repeatedly intervening *"yes"* during Esteban's point of view is gesturing her clear support of what is said.

For Esteban, the crucial aspect of creating a community of learning is the schoolteacher's tools rather than the institutional support. For that reason, the adjustment and later the pre-test would be implemented to identify these two contested levels of initial knowledge (having or

not having the tools) of creating a community without taking into consideration the conditions, such as the time to meet and work together. Esteban, with Karen uttering approval, mentions that it is crucial to know the expectations the future teacher-participant may have, otherwise *"we will be talking simultaneously"* to schoolteachers positioned in both places. In that scenario of uncertainties and demands on the university team, it is no surprise that Carla asks if there is a *"pre-test considered"* because the message is that the university team should be prepared/to control every possible expectation.

This lack of knowledge about these *others* relates to the concept of *trust,* where teachers educators made a clear distinction between teachers, but also about universities, reinforcing the principles of competition and distance in the higher education sector.

3.1.2. Level of trust

In the following part, the tension will be between Uni1 and Uni3, the latter being the university in another region. The Ministry expects universities to work together in designing the course and, therefore, have shared guidelines about the expected NIPDE implementation.

> **Esteban**: But, going back to the conceptual issue regarding the wording of this joint document with Uni3 (.) I agree with that team – I know several of them – on several points (.hhh) but I think the disagreement is not related to understanding what scientific inquiry means or what its levels are (.) I think it has to do with the level of trust placed in the teachers
>
> **Karen**: [Ahhhh
>
> **Esteban:** I mean, in conversations I have noticed something, I do not want to say *pessimism*, but they believe that an essential starting point is that the teacher (.hhh) is well trained in generating inquiry that he has never done (.) at first, surely is going to be structured inquiry and may:be just maybe in some cases for the *chosen one* (.hhh) they could have the chance to do a somehow more open inquiry (.) so I was thinking about how we get to be respectful and at the same time coherent with our convictions regarding the example you gave of this teacher {referring to what Karen told about one of our alumni making a science fair} he will most likely be putting together a science fair where the children are doing limited or confirmation inquiry
>
> **Karen**: [At best ((laughing))
>
> **Esteban**: And, of course, he is extraordinarily proud of what he has generated (.) then we say to him "brilliant, but that is not the inquiry that we want you to

achieve" ((laughs)) it is most likely that if we spoke frankly (.) he will decide that NIPD is not for him, huh?

Karen: And he changes his interest to arts

Paulina: [And he becomes demoralised

Esteban: Because there are gaps and gaps. There is a gap with respect between the teacher that has just started teaching; and the teacher who had already done many things, that has gone through a catharsis of failure when realising that his practice did not make any difference, therefore, we gave him an answer that meant something totally different to him in comparison to a teacher who had not undergone that experience

The suspicion that Esteban had of Uni3 is not about their expertise in scientific inquiry but in the professional quality of their teachers. Karen's example came just after Esteban's comment "*most likely be putting together a fair where the children are doing limited or confirmation inquiry*". Dropping inquiry, changing to arts, and being demoralised, along with the idea of the teacher being "*extraordinarily proud*" of what he has done, is at the very least condescending to the agency of the teacher as well as his knowledge of scientific inquiry. In this interaction, the mistrust is not just with the former Uni1's students, but also to that university programme.

Mistrust, reservation, scepticism, and speculation are the kind of issues that are at play, given the uncertainty of not knowing the future students. We have ventured to speculate about half of the students we knew previously but also about half of the students we did not yet know, probably because of the sense of competition between universities. In this scenario, the activity with the pre-test seems to function more as a control measure seeking security, which also resonates with having very controlled outcomes and structured sessions in the CPD course. Both, not knowing these future participants and thinking that they would bring the lowest 'level' of understanding, made a fragile initial relationship between teacher educators and teachers filled with rules and structured procedures.

3.2. Theme 2: "*We won the Nobel Prize*"

This theme comes from a direct quote reflecting the differentiated trajectory once NIPDE started explaining the self-expectation of the teacher's educators about the quality of their contribution to the field. The ongoing process with the schoolteachers during the course took the shape of three certainties: flexibility, knowledgeability, and horizontality. This meeting/focus group took place right in the middle of the course. The purpose of the meeting was declared at the beginning as: "*to talk about how the five sessions of the course have been*

*so far, how we saw the schoolteachers' and our own role, and what is happening in the rest of
the course in January*".

3.2.1. We are flexible

An initial question about the progress of the course was answered by Karen, leading to the
following interaction:

> **Paulina:** Maybe we were too ambitious (.) I think we planned more activities considering
> the timeframe we had in the session (.) sometimes we did not consider the time that
> the schoolteachers would spend to do the activities (.) that happened a lo:t
>
> **Karen:** [Mmm
>
> **Paulina:** That brought frustration to the schoolteachers (.) frustration related to not
> understanding the task whilst we asked them to try to do it anyway (.) at the same time
> I think we were clever reacting and saying "this activity is left-out or this other one will
> have more time"
>
> **Karen:** I don't know how many sessions I went (.) but what I can see is how the thing has
> been working in terms of what is more interesting for us (.) regardless of what is
> happening with the schoolteachers because it should be transferred to other
> universities (.) so the gained insight is the flexibility (.) that is a success. The other thing
> that is a success is that we have been working as a group (.) we are a large group at the
> same time in the session (.) and there is no the question of authorship; there is
> continuity in our work regardless of who is the in the lesson

The first problem presented here relates to the timing and design of learning activities of the
CPD. Sessions were on Saturdays from 10 am to 5 pm during the final term of the year.
Secondly, the frustration that schoolteachers experienced was in relation to the time needed
both to understand and to complete the task. The feeling of frustration appeared in NIPDE's
fifth session uttered by the schoolteacher themselves. In the extract, ambition and cleverness
are characteristics of the university teachers while frustration is a characteristic of the
schoolteachers.

Karen refers to what is interesting for the university teachers *"regardless of what is happening
with the schoolteachers"* which can be useful to the transferability of the course attending to
the Ministry of Education's demand. Karen's answer shows an element that distinguishes this
CPD course from the traditional ones as an *"insight"* which can help to transfer the course. She
realised that an important point is our flexibility to change the sessions according to what is
happening to the teachers. The focus group questions asked about the process lived and its

effects in terms of improvement. Nonetheless, Karen's answer aimed to find the distinctive elements that could be helpful to other universities, shifting the original inquiry towards the contrasting positions uttered. Thus, one person worried about the improvement, whilst the other person – who oversaw the project in the sight of the Ministry – was concerned about its transferability across universities.

3.2.2. We are knowledgeable

The following utterance is about what should be transferred to our colleague universities. It is made a comparison with the helical model of the solar system, after which a possible name for the CPD course appeared:

Jonathan: From the design perspective of the model, what we are experiencing is not described anywhere, and from there we could contribute

Karen: [Write a paper?

Jonathan: Make a paper of it would contribute with a grain of sand because there is nothing written about that (.) about helical formative models, yes?

Dora: [What is that?

Jonathan: Nowadays when you design a model it is established in a single plane (.) in a single level, yes? Many of them are circular or linear (.) he:li:cal model implies that whilst you are turning, these actors are moving towards a goal (.) each actors is moving by a dynamic that is regardless of one another so everyone can carry different dynamics and trajectories

Mario: The circle can be wider

Jonathan: Wider, faster, more helical, shorter, more elongated (.) and then every one of these individuals carries within the model a trajectory and a progression that is specific to each of them (.) if that it is possible to describe (.hhh)

Karen: We {the university teachers} won the didactics Nobel Prize

Everyone: Yes!

Karen: The Chilean helical formative model ((laughing))

Dora: But who is defining this helix-shaped?

Mario: The adequacy is done by us

Dora: I think that it is also defined by the schoolteachers' rhythm, I believe that the teachers are incorporated within these helices (.) into all of this

Publishing the work, modelling, and proposing theories are important tasks in the academic world. The university is constantly asking for that kind of product from their staff. Half of this group held a full-time contract with the university, so they are accustomed to thinking in those

terms. This group sees transferability as a contributing opportunity to the current professional development body of knowledge. Here, it is said, *"What we are experiencing is not described anywhere"*; that 'literature gap' called attention to a language common in the academic world, *"write a paper".* Full-time academics go through a process of 'hierarchisation' inside the university to progress in their careers also means a higher salary. That means demonstrating that they are 'good' researchers and teachers in their specialities. Karen points out that if the model is described, that could result in the university team winning the highest recognition for contribution to the knowledge. *"Won the didactics Nobel Prize"* implies that the contribution will belong to the arena of didactics, bringing back what Jonathan was saying about the gap in the literature on teachers educators in CPD programmes.

3.2.3. We are horizontal

Following the previous conversation, Mario posed the relationship between the National Curriculum and CPD programmes.

Mario: Not officially but everyone has his own curriculum (.) I believe all these teachers have gone through all these cycles and in the end, you do your own curriculum with the purposes you want to achieve (.) I understand the curriculum as the most concrete expression of milestones, options, techniques, purposes, experience

Jonathan: But there is a decision making that is not made by you as a schoolteacher

Mario: Yes, however, it is what is part of the experience of making your own curriculum (.) in the sense that it has your own decisions that are conscious, autonomous, and reflected, right?

Dora: I think here, the issue with the curriculum (.) is shown to the teachers like having everything we need to teach (.) is made like that (.hhh) but here {talking of the CPD course} I think the difference is that the teachers have felt part of the university team (.) it is so vertical the way we work in the sense of being able to create (.)

Karen: [Too horizontal you mean

Dora: yes, forgive me (.) *horizontal* because they are creating their own indicators and ideas of science unlikely other CPD courses (.) you can go to too many trainings but usually there is not this option of teachers suggesting ideas considered by those who are guiding you (.) that is new (.) we are working with the teachers' self-esteem when they dare to say many things

In Chile, there is one official intended National Curriculum, guiding the work of every teacher across subjects. What Mario is introducing is the 'hidden' fact that despite the official curriculum, schoolteachers have their own curriculum. There is a difference between the sense

of ownership of the curriculum versus a curriculum that could be imposed on them. In Chile, the curriculum is presented as a suggestion. The schoolteachers should take it and make it their own in the same vein as what Mario is proposing, a curriculum that reflects the *"expression of milestones, options, techniques, purposes, experience"* of every teacher. However, as Jonathan pointed out, even though it is a suggestion, the decision of what to teach is not made by schoolteachers and that is reflected in the low sense of ownership of the teachers in Chile. Decisions are made by *others,* but teachers can take them and make their own orientation of what to teach in a way that is *"conscious, autonomous, and reflected".* This dialogue between Mario and Jonathan is related to a discussion of the awareness and autonomy that the schoolteachers could have regarding their decisions. Dora's intervention *"is shown to the teachers like having everything we need to teach"*; the 'we' she is referring to is not the 'we' of the university team, rather it is the 'we' of her as a schoolteacher, her, and her schoolteacher colleagues. She is bringing her experience to the school, saying that the curriculum is made to contain everything, so as a teacher you do not need other elements to define your teaching. In that sense, she is criticising the way the curriculum is read by the people who made it. Then she pointed out that in this CPD course, schoolteachers *"felt part of the university team"*, almost saying that in this CPD teachers are treated differently as if they are part of the academic world – *"being able to create"* the knowledge – in contradiction to the way the curriculum treats them where the knowledge is decided by others. In Dora's explanation of why this CPD differs, she had a slip of the tongue, saying that *"it is so vertical the way we work"*. In this case 'we' is the university team. As a knee-jerk reaction, Karen corrected her by saying *"too horizontal you mean"* to which Dora, after asking for forgiveness, kept explaining. She corrected herself; however, the following explanation of the horizontal relationship still sounds like different groups playing inside the course: those who are guiding and those who are being guided and 'dare' to say things. Dora's lapsus linguae can mean two things. On the one hand, the discussion was about the sense of ownership of the curriculum by the schoolteachers, so when Dora said *"vertical"* this could be reflecting the sense of imposition the intended curriculum has. On the other hand, she is talking about the schoolteachers feeling part of the university team; in that sense, the *"vertical"* might be reflecting the hierarchical relationship inside the university team and between the university team and the schoolteachers. Thus, whilst the horizontal relationship was the desire, the vertical relationship was taboo in the CPD course.

3.3. Theme 3: "We don't know everything"

This theme comes from a direct quotation during a meeting on 1st December before the fourth session of NIPDE. It bears noting that the activity in the third session of NIPDE was controversial, as schoolteachers discussed the chaos and frustration on the process they have experienced so far.

3.3.1. Attempt at destabilization

Right before the key moment, there was a discussion about the word 'chaos' uttered by the schoolteachers during one activity in a session, then, Dora asks what can trigger the teachers to be aware of what they are doing in terms of science education:

> **Dora**: I remember this moment of breakdown (.) schoolteachers were feeling unwell (.) but it was necessary (.) it was a shock therapy and I value that (.) however not everyone learns at the same time (.) not everyone can say what they are feeling (.) everyone has different moments of awareness, levels of reflection and so on (.) the schoolteachers are different (.)
>
> **Javier**: [They are different
>
> **Dora**: It was important last session when we {university team} open the space to talk about feelings (.) talk about this shock therapy and everything that is happening because all of them are having some difficulties (.) that is a good thing (.)
>
> **Patricia**: the schoolteachers are putting themselves in the students' place realising that it is difficult
>
> **Dora**: But talking about it, I mean talking about this chaos that is not just in theory because we have seen it in the schoolteachers

Dora is using the words *"breakdown", "unwell"* and *"shock therapy"* which seems to be related to some collapse by schoolteachers. According to her intervention, that kind of feeling was *"necessary"*. Also, she is acknowledging that the schoolteachers are different and learn and express their feelings in particular ways. Apparently, what Dora is posing is the learning process implies some suffering to mediate the awareness. When she says *"all of them are having some difficulties (.) that is a good thing"* she is acknowledging that the suffering was intended. The feeling of frustration and unwellness becomes the best outcome. In Dora's words, the university team *"opens the space, "* *meaning* that the moment was not considered in the lesson plan. However, the people from the university team who were present during that session decided to give the space to talk about what the schoolteachers were feeling.

These utterances are grounded in what happened in the session; It recognises that the activity in the previous session generated some destabilisation in the schoolteachers, a feeling of frustration, unwellness, and empathy towards the students when they found some CPD activity challenging. This story is not about success and learning but about the difficulties before learning, because pain is a part of learning.

3.3.2. Attempt to know the schoolteachers

In a final moment, the conversation turned to the schoolteacher's individualities. Jonathan started this last part by asking about the behaviour of the group of schoolteachers who had their initial version of the course with Uni2.

> **Jonathan**: I have a question (.) is the level of work of the teachers that come from Uni2 different from the other teachers?
>
> **Paulina**: [I would say no (.) they are aligned brilliantly (.) Patricia was saying that earlier (.) they are willing to work with everyone
>
> **Juan**: At the beginning they have their structure fixed though (.) for example if you ask them to do an activity, they are always thinking about the learning cycle (.)
>
> **Patricia**: Without questioning *"pucha*, I learn this from Uni2 and in here I did not use it"
>
> **Paulina**: I have not felt a difference with them, in fact, I have felt more difference with the group that was trained with us
>
> **Dora**: Yes
>
> **Paulina**: At that table where Pedro, Paloma, Caro, Nicia, and Marita sit together, for me, they are far away from the rest, but the girls from Uni2 not
>
> **Juan**: [But Pedro sits next to
>
> **Paulina**: Caro
>
> **Juan**: Pedro and Caro talk to everyone and push the work
>
> **Javier**: [Yes, though I can see some difficulties as well, but Pedro is engaged
>
> **Dora**: And he has an important level of reflection because he asks what impact he will have on the students; he is always looking at other things
>
> **Juan**: He is always looking

Jonathan brings back the fear of the starting point where the Uni2 schoolteachers, could behave differently in terms of *"level of work"* compared to the former students of Uni1. Juan and Patricia answered Caro's question differently, as the former is referring to the beginning of the course; while the latter replied that they were not questioning or making any comparison between the training with us and the training with Uni2. Similar to the starting point, there is an assumption, demonstrated as a fact in this utterance, about Uni2 having a different approach to scientific inquiry than Uni1. If the schoolteachers are not making any comparison, it is because they are thinking that this version is going beyond the curriculum of the initial training, either with Uni1 or with Uni2. Another aspect is the attempt to know the schoolteachers in terms of how they are seated. The fact that the names of the schoolteachers is not showing-off; rather, it is an acknowledgement of how the teacher educators group can move forward to

make some pedagogic decisions. For example, when Juan asks about Pedro sitting, offers the possibility to talk about Pedro's engagement, because he is seated near Caro, and even though there is some separation of the table from the rest of the course, *"Pedro is engaged"* and he has demonstrated an *"important level of reflection"* and *"is always looking"*. Therefore, the turn of the conversation is less assumption-based and more grounded in what is happening during the sessions.

4. Conclusions

The purpose of this study was to explore university teachers' subjectivity and its shifts in trying to 'unbox' that elusive subject formation in teacher education. The question around knowing the schoolteachers beforehand shaped the initial positionings of the university team which was shifted when the course started. The change in subjectivity can be related to Butler's argument about the subject production, which is not just in one moment; rather, there is a constant production where the subject emerges in the process of being repeatedly produced. The shifting subjectivity, the teacher educators' subjectivity, is indicative of this very idea of repetition where there is a necessity of constantly being rearticulated while remaining, ultimately, inarticulable. Themes 2 and 3, emerging from theme 1, indicate this re-articulation of the experience of being teacher educators in the context of a CPD course.

The salient features of the teacher educators' subjectivity began with the starting point of the university team assuming the schoolteachers were not prepared to create communities of learning. This assumption is manifested in two kinds of discourse, where there is a disruption (in the form of agreement/antagonism) of the unified university team with different identifications within the group. One discourse moves towards a self-recognition with certainties on what the university team knows about scientific inquiry and CPD courses (theme 2: *We won the Nobel*); the other is a contested discourse of realising that the university team does not know everything, which is enhanced by starting to know the schoolteachers (theme 3: *We don't know everything*). The differentiation in both themes was greatly influenced by the institutional conditions and practices of the teacher educators' group, for instance, in attendance at the sessions or contested course aims because of institutional requirements.

The subjectivity shifted considering the requirements of the university towards those who have full-time contracts; or the positionality of the teacher educators as denying others' expertise by taking 'preventive' measures such as a pre-test, thereby trying to control some of the uncertainty of not knowing the schoolteachers. Moje (1997) express that the word position "focuses on how people move in and out of positions or are positioned by others as a result of asymmetrical power relationships" (p. 37), is applicable to the teacher educators-

schoolteachers relationship. For example, the purpose of the CPD is to update the schoolteachers on what they do not know. In so doing, schoolteachers are lacking something (knowledge and trust), and the teacher educators are experts with certainties on what they bring to the course (knowledge).

Related to the hierarchies, not knowing the schoolteachers beforehand produced the discourse of assuming that the schoolteachers will not know how to use scientific inquiry, leading the university team to adopt a position of safety to be prepared for diversity among schoolteachers. In this position, the schoolteachers (their knowledge and tools) are a problem to be resolved, disregarding the conditions of the schools or the actions of the Ministry od education. The diversity of languages, knowledge or tools is not something to be amazed at; rather, it is something to control. Moje (1997) illustrates this argument describing the discourses in a chemistry classroom where there was a subjectivity of "the teacher as expert and producer of knowledge, whereas the students took up positions as consumers and demonstrators of knowledge" (p. 35). Moje states that these discourses are invisible to those who are reproducing them, suggesting that for those who were conducting the CPD programme, this discourse of producer/consumer was invisible.

Bazzul (2014, 2020) pointed out that understanding the process of subject formation happens in a particular cultural context (such as the science classroom or the university) which brings forth grounds to reshape how we come to see ourselves and others. Educational institutions are central to the subjectivation processes, having a role in the reproduction of subjectivity (Bazzul, 2016). The discourses of those institutions might determine how people understand aspects of their identity while also validating political orientations and ethical actions. Similarly, the words of those in charge of the CPD disclosed our positions regarding the institutional context inside Uni1 and also regarding other universities, influencing a sense of competition in the team. Part of the State funding to the universities is related to students' enrolment, meaning that the universities are competing for more money bringing the idea of better or worse universities. It is assumed that NIPDE participants have different experiences of training, with those from Uni1 being supposedly better prepared than Uni2 or Uni3, which also influences the two resulting themes. Why is the question of the production of subjectivity important? It is in part because the subjectivity of teacher educators is usually neglected. Montenegro (2016) pointed out that the identity of teacher educators "frequently go[es] unnoticed in the field of teacher education" (p. 527). Similarly, by using the sociopolitical lens, the very notion of hierarchies and asymmetrical power relationships between teacher educators and schoolteachers as hegemonic discourses in science education can be disrupted and challenged (Bazzul & Tolbert, 2019). This disruption is in line with the invitation of Lather

(2012) to embrace both the limits of our own knowing and the affective response to the research work towards the constitution of a *new scientific subjectivity*, arguably opening the possibility to be applied to teacher educators who can challenge the power relations by understanding that knowledge is partial and situated within our experience.

Teacher educators positioned them(our)selves as experts due to preconceived knowledge imbalances between teacher educators and schoolteachers. These subjectivities shifted during the CPD course, resulting in different forms of engagement. There was a disruption of the supposedly unified university team with different identifications within the group related to institutional requirements and practices (*i. e.,* the Ministry, university, contractual conditions). This destabilisation of the 'we'/university team revealed a new 'we' that attempts to position itself similarly to the schoolteachers. This study aimed to unpack these shifting subjectivities considering both the number of teacher educators (12) and the time involved in the experience (seven months).

Researching this long-term experience is a methodological contribution to studies that attempt to understand the context in which subjectivity can change, as opposed to one-shot interventions. This article attempts to expand narrow understandings of teacher educators, whose professional development is usually not considered, restricted to mainly giving the necessary support to guarantee that the curriculum and its changes are 'implemented appropriately'. Lastly, this work underlines the often-dismissed fact that science educators (schoolteachers and teacher educators) are political subjects whose identities should inform the science education field as recursive attempts to reimagine absent possibilities of what it means to be a science person and what the science education is and can be.

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Appendix 1

{text}	Transcriber comment
(.)	Brief pause (under one second)
(1)	Longer pause (number indicates length to nearest whole second)
(( ))	Description of prosody or non-verbal activity
[	Overlapping talk or action
te:xt	Stretched sounds
sh-	Word cut off
Text	Emphasising
(.hhh)	Audible inhalation