



On the making of a new mathematics teacher: professional development, subjectivation, and resistance to change

Luz Valoyes-Chávez¹ 

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Abstract

Reform-based discourses in mathematics education have fabricated different subjectivities for teachers such as the “traditional” and the “new” teacher. Professional development programs are proposed as effective mechanisms to fabricate the “new” teacher. However, this teacher has proved hard to produce. Thus, the “resistor” teacher has emerged into the field as a way to explain failure within school mathematics reform. In this article, I assume that resistance is a consequential response against particular forms of subjectivation imposed on mathematics teachers. Using conceptual tools from Hall and Foucault, I explore the ways wherein a high school mathematics teacher reinvents meanings of being a mathematics teacher in the context of a professional development program aimed to implement problem-solving instruction. Against the myth of the resistor teacher unwilling to change, what emerges is a process of struggle over meaning. School mathematics reform, considered as an ideological event, becomes a site in which competing meanings about being a mathematics teacher are negotiated, contested, and resisted.

Keywords Professional development programs · Mathematics teacher · Resistance · Subjectivities · Meaning

1 Introduction

Within the context of political, economic, and social changes worldwide, advocates of the school mathematics reform movement have long underscored the need for a “new” model of teaching that renders better student outcomes and alleviates the unequal access to quality mathematics. It is argued that teaching focused on developing computational skills and low-level mathematical thinking is one of the main factors that has prevented achieving the equity promise that “all, regardless of race or class or economic status, are entitled to a fair chance and

✉ Luz Valoyes-Chávez
luz.valoyes@ciae.uchile.cl

¹ Center for Advanced Research in Education, University of Chile, Periodista José Carrasco Tapia 75, Santiago, Chile

to the tools for developing their individual powers of mind and spirit to the utmost” (National Commission on Excellence in Education, NCEE, 1983, p. 115). It is maintained that the implementation of reform-based instruction that centers on the positioning of problem solving as the cornerstone of the mathematical activity at school (National Council of Teachers of Mathematics, NCTM, 1984) is a critical path to close the achievement gap. This new model of effective teaching requires “preparation both in mathematical content and in teaching methods that develop problem-solving activity” (NCTM, 1984, p. 30). It also requires knowledge of curriculum, the relations between culture and mathematics, information and communication technologies (ICT), and student thinking (National Advisory Committee on Mathematical Education, NACOME, 1975). Recently, expertise in teaching mathematics to diverse student populations has been introduced as part of the required knowledge for reform-based instruction (NCTM, 2014). In this context, and mainly prompted by the globalization movement, reform efforts worldwide have aimed to elaborate strategies and mechanisms to materialize mathematics instruction intended to achieve the “mathematics for all” pledge.

One consequence of the school mathematics reform movement eruption has been the emergence of manifold discourses about mathematics teaching fabricating different teacher subjectivities. They structure a space of possibilities of being, feeling and acting as a mathematics teacher. Inside traditional teaching discourses, the teacher is positioned as transmitter of mathematics content usually through direct chalkboard and teacher-centered instruction. This *typical* teacher (Smith, 1998) usually holds troublesome views of the nature of mathematics because of its irrelevance to understand the current complexity of the economic, social, and political world (Klein, 2010) and to act upon it to produce change. Moreover, images of mathematics teaching among typical teachers are usually not aligned to those proposed by the reform movement and become obstacles to implement reform-based instruction (Cross, 2009). It is held that within the context of traditional teaching, the teacher hardly recognizes the importance of culture in mathematics education (Parker, Bartell, & Novak, 2017). The typical teacher lacks knowledge of his/her students’ psychological and cultural backgrounds and “[has] not done as good a job at producing principled understanding, intellectual curiosity, or dispositions in their students towards figuring things out for themselves” (Lambert, 1988, p. 157). Discourses of traditional teaching portray the teacher as unable to adapt his/her pedagogical practices to meet diverse student population needs (Pringle, Milton, Adams, West-Olatunni, & Archer-Banks, 2012) and holding low expectations for minority student populations.

In contrast, within the reform movement discourse, effective mathematics teaching is student-centered and described as instruction that “requires understanding what students know and need to learn and then challenging and supporting them to learn it well” (NCTM, 2000, p. 16). In this view, “the reforms require that teachers reinvent their practices so that teaching and learning are interdependent, not separate functions” (Franke, Carpenter, Levi, & Fennema, 2001). Nevertheless, the proposed “reinvention” of teaching must be circumscribed by scientific knowledge as a path to professionalize teaching (Labaree, 1992). Then, the *new* teacher is positioned as a professional equipped with the abilities to use a distinct, research-grounded knowledge. It allows him/her to deeply and flexibly understand the subject matter to help students develop high-level orders of disciplinary thinking. This professional knowledge also enables the teacher to elaborate challenging mathematics tasks and to create rich environments that support student learning regardless of race, class, or ethnicity. The new teacher is portrayed as thinking “differently about the nature of mathematical knowledge” (Lambert, 1990, p. 32) and adapting instruction to meet students’ needs by effectively building upon their

previous mathematics knowledge and experiences. This teacher holds high expectations for minority students, fostering not only essential skills but also understanding (Bonner, 2014). This is a “reflective” teacher (Chapman & Heater, 2010) able to construct new knowledge and to solve unfamiliar problems through an ongoing process of self-reflection and analysis over his/her practice. The new teacher is presented as a “decision-maker, problem-solver, and a person of values and beliefs that strongly influence practice” (Smith, 1998, p. 200).

Within the reform movement discourse, a critical question is, then, what does it take to produce a highly qualified teacher (National Research Council, 2010), the new teacher able to enact the main principles of the reform-based teaching? (National Academy of Education, NAE, 2009). Assuming that it is feasible to turn the typical teacher into the new one by restructuring mathematics teacher education, and building upon different theoretical perspectives, multiple models of professional development programs (PD) have been designed, implemented, and evaluated (e.g., Koellner, Jacobs, & Borko, 2011). Integral to the design of this body of research is a process-product approach to in-service teacher education according to which the participation in well-designed PDs will produce the new teacher. An underlining assumption is that there exist research-based knowledge and mechanisms to foster reform-based instruction. However, resistances at the institutional and individual levels usually emerge and become obstacle to change. Mathematics reform is portrayed as logical, rational, accumulative, and irreversible (Popkewitz, 1988), a process that simply comprises convincing reluctant teachers to adopt new practices and procedures (Guskey, 2002) and to endorse its fundamental principles. Despite this emergent body of research that sheds light on critical elements of PD leading to the production of the new teacher, the desired change has not taken place and has proved hard to achieve. Accordingly, a second consequence of the school mathematics reform movement eruption is the discursive production of the “resistor teacher” (Zimmerman, 2006) and the emergence of the phenomenon of “resistance to change” as a way to explain and justify the failure in achieving reform-based instruction.

2 The resistor teacher, subjectivation, and forms of resistances

Resistance to change is usually located at the individual level of a teacher portrayed as hostile and unwilling towards implementing effective (mathematics) teaching. Two elements are critical to analyze the phenomenon of resistance to change. The first one relates to identifying the resistor teacher with the traditional/typical teacher. Traditional teachers are represented as reluctant to engage in school reform processes. While there exists a compelling body of scientific knowledge about powerful teaching, it is maintained that “the typical teacher may not be aware of the research dimension that is valuable to professional growth, and may not have ready access or appreciation of its value” (Smith, 1998, p. 201). Chapman and Heater (2010) argue that traditional teachers “are less likely to be open to uncertainty, self-learning and acceptance of tension” (p. 457), critical characteristics involved in any process of instructional change. Despite the existence of objective conditions to implement reform-based teaching, the traditional teacher must acquire ownership over the process of transforming mathematics instruction becoming the architect of his/her change (Chapman & Heater, 2010). However, this rarely occurs. In this way, the traditional teacher becomes the resistor and must be the object of sustained intervention.

The second element relates to the emergence of the individual teacher as *the* problem to be solved (Cohen, 1990) to successfully implement reform-based teaching. Nevertheless,

school reform is considered a complex process involving contextual and institutional variables (Guskey, 2002), the responsibility for its success is assigned to the individual teachers' willingness and efforts. Personal characteristics and dispositions of teachers emerge as critical factors to successfully engender change (Chapman & Heater, 2010). For instance, Smith and Gillespie (2007) argue that motivation to participate in PD as well as teachers' concerns, self-efficacy, reflectiveness, and cognitive styles are related to change and must be considered in any school reform effort. While advising school leaders how to cope with resistances among teachers, Zimmerman (2006) affirms that although "change resistors, like thunder clouds, may make leaders uncomfortable, *they are not always bad*. Many teachers, because of their experiences and frames of reference, have *legitimate reasons for resisting change*" (p. 247, my italics). By categorizing the teachers as "good guys" (the teacher open to change) and the "bad guys" (the change resistor), a moral stance towards school change materializes in discourse and the personal responsibility of teachers for reform failure or success is put forward. Change relies on an ongoing process of learning, awareness, and reflection (Cross, 2009), while resistance to change is associated with individual teachers' willingness and personal characteristics.

In this paper, I argue that resistance to change emerges as a consequence of the confluence of different subjectivities imposed by competing discourses inside a field of knowledge. It is not a negative event preventing change but rather a form of individual agency (Sannino, 2010). The subjectivities created by, for instance, systems of classifications are always sites of contestation and negotiation and, as Youdell (2010) states, "as we are made subject by and subject to these classifications we can also interrogate, resist and attempt to imagine outside them" (p. 27). Foucault argued that resistances focus on a systematic question about who we are and emerge as a form of contestation against impositions of subjectivities originated either from science or other social formations. Moreover, "resistances aim at asserting to man [sic] the right to be different" (Foucault, 1982, p. 162). They bring about relationships of power aimed to forge particular subjectivities and their meanings about who the subject is. Individuals have the capacity to contest these forms of subjectivation to the extent that imbricated power relations only act upon an acting subject (Foucault, 1982). By his/her actions, the subject is able to provoke different responses against different forms of subjectivation. One fundamental way to understand mathematics reform is, then, by exploring forms of resistance or the struggles over meanings imposed on the local school cultures about who the teachers are or should be (Leonardo, 2003).

Drawing upon conceptual tools from poststructuralist perspectives that analyze struggles against the imposition of particular subjectivities as constructed by dominant discourses, my goal in this paper is to challenge the resistor teacher myth. I consider the ways whereby representations, connecting meanings and language to culture, allow the production and exchange of meaning in social formations (Hall, 1986). In doing so, this study sheds light on the forms of resistances deployed by teachers during the processes of school mathematics reform. A critical concern within the field relates to the specific mechanisms whereby teachers become subjects within the mathematics education system of practices (Valero, 2007). Although important, less attention has been paid to mechanisms used by teachers to resist and negotiate particular modes of objectification (Foucault, 1982). To understand teachers' resistance, it is fundamental to consider the ways wherein the subject is fabricated within the net of discourses inside a particular social formation in which distinct cultural practices are enacted and defined.

3 The context: fostering reform-based mathematics instruction in Chilean classrooms

Despite improvements in access and student retention, the Chilean educational system is characterized by its deep-rooted inequity (Valenzuela, Bellei, & Allende, 2016). To cope with this issue, since 2009 the Chilean government has introduced different policies aimed to close the achievement gap mainly along lines of class, gender, and ability. As part of these efforts, an ambitious curricular reform was also introduced in 2012. Regarding mathematics, one of its main goals was to introduce problem solving as the core of the classroom activity. To respond to this request, a group of researchers at the University of Chile designed and has been implementing activating problem solving in the Classroom or ARPA (its Spanish acronym), a PD aiming to enhance teacher knowledge and abilities to enact problem solving. ARPA comprises eight workshops developed through the school year. During the PD sessions, the participating teachers engage in solving non-routine mathematics problems as learners. They do so by working in random groups under the guidance of a monitor who models for them a four-step method to implement problem solving in their classrooms (Felmer & Perdomo-Díaz, 2016). The method comprises (i) *launching the problem* or the moment in which students are grouped and get a first sense of the problem to be solved; (ii) *activating* the solution process, or the moment in which the students work on solving the problem with the help of the teacher's good questions; (iii) *consolidating* different responses to the problem, a moment in which the students who solve the problem are given an extension or a simplification to help them solve the original problem; and the final moment (iv) *discussing* students' responses in a plenary.

4 The study

During the 2016 school year, 11 high school mathematics teachers who taught in low-income schools located in Santiago, Chile, voluntarily attended ARPA. Six of the participating teachers' lessons were videotaped with a camera positioned at the back of their classroom to capture the entire group interactions. One of the lessons was recorded at the beginning of the school year to elaborate a baseline of the teachers' regular teaching. Another lesson was filmed the last month of the school year to trace possible changes in their teaching. In the interim, four additional lessons in which the participating teachers implemented problem-solving activities as proposed in the PD workshops were filmed. Two semi-structured interviews were also conducted to explore their experiences implementing problem solving as well as personal and institutional challenges in doing so.

After a preliminary analysis of recorded lessons that showed no evidence of changes in mathematics instruction after a year of his participation in ARPA, I became interested in Matías, a teacher who had been teaching high school mathematics during 8 years. Matías seemed to fulfill all the requirements constructed within reform-based discourses to become the new mathematics teacher through his engagement in ARPA. Matías held an undergraduate degree in mathematics and pedagogy from a Chilean university and had a strong mathematics background. He was a highly motivated teacher who overtly expressed his enjoyment about being a teacher and looked for opportunities to improve his teaching. Because Matías recognized weaknesses in his instruction, he voluntarily engaged in ARPA to enhance his abilities and knowledge of implementing problem-solving teaching. Matías held a positive attitude towards change and enthusiastically attended every PD session. During my school visits, I witnessed Matías' commitment to his

students' mathematics learning: he frequently stayed after work hours in the school to support students struggling with mathematics. He also actively took part in extracurricular activities, leading a robotic project with a group of high school students. Due to this engagement, school administrators regarded Matías as an effective, highly devoted, and responsible teacher who cared about the students and their learning. I also perceived a broad knowledge of his students' social and personal backgrounds as he grew up in a similar neighborhood. Matías did not appear to be a "change resistor." Why, then, did change not take place in his case? Why did not the new mathematics teacher emerge from the PD as expected? It is in this context that I seek to understand and deepen into the phenomenon of resistance to change and to confront what I consider the "resistor teacher myth."

5 Data collection and analysis

For the present study, I focus on the four lessons in which Matías implemented the proposed problem-solving activities with his students. I identified particular class episodes where Matías seemed to be struggling with the enactment of the reform-based activities. These troubling moments, or in Fairclough's words, "moments of crisis" are important to understand resistances against the proposed model of reformed mathematics instruction to the extent that they "show change in process, the actual ways in which people deal with the problematization of practices" (Fairclough, 1992, p. 230). I watched the four recordings to seek episodes in which struggles were expressed by Matías' face portraying annoyance, frustration, surprise, or disappointment. I also selected episodes in which Matías' answers to students' questions comprised long silences, hesitations, repetitions, or sudden shifts in voice tone or volume. I understand all these actions as statements that can be read and interpreted (Hall, 1997). In this sense, the "moments of crisis" became a tool to understand resistance and change.

I identified 42 moments of crisis. They mainly portray episodes in which Matías struggled to answer students' questions without providing answers to the problem. Some episodes show Matías' efforts to promote group work and to engage his students in the activity. Other episodes took place during the plenary and evidence Matías' attempts to motivate rich mathematics discussions among students. After I selected the moments of crisis, I conducted video-stimulated reflection interviews. I selected 15 of the previously identified moments of crisis to debrief Matías. The debriefings were conducted on three occasions; each time five video clips were discussed. To trigger the teacher's impressions and thoughts about the episode, I first asked him whether or not he agreed that the episode comprised a moment of crisis. Matías disagreed with one of the video clips; therefore, no question was put forward about that episode. When the answer was affirmative, I carried on by posing questions such as:

- How would you interpret what is happening in this episode?
- Could you tell me more about your reaction (or response)?
- How did you feel about this episode?
- Why did you feel this way?

During the debriefings, I followed what I considered persistent ideas in Matías' narratives. For instance, during the first debriefing, he systematically used metaphors such as "artist" and "director of orchestra" to refer to himself as a teacher. He used them to explain and justify his reactions and behaviors during the moments of crisis. I then proceeded to pose questions about

his understandings of these metaphors in the next debriefing. I used this method to deepen into the meanings Matías actively constructed about the moments of crisis during the debriefings. The debriefings were recorded and transcribed verbatim and they constitute the data for this article.

I applied poststructuralist discourse analysis (Shah & Leonardo, 2017) to inquire into the interviews. I focused on the construction and reconstruction of meanings in Matías' discursive production. My analysis explored Matías' understandings and elucidations of the moments of crisis as meaningful insights of his subjective construction within discourses of school mathematics reform. The moment of crisis I present in this article was chosen because of the richness of Matías' meaning-making processes, full of metaphors, and representations portraying meanings of his subjectivity as a mathematics teacher in the context of school mathematics reform. The moment is powerful in uncovering the mechanisms deployed by Matías to cope with the multiple and sometimes conflicting meanings about being a "new" mathematics teacher. As I reflect upon Matías' discourses produced within the context of the interviews, I consider the theoretical, political, and cultural circumstances that frame my interpretations as an outsider of the Chilean school culture and as a foreigner in the country.

6 The director of orchestra, the artist, and the invisible man: the multiple meanings of being a mathematics teacher in school reform times

Mathematics reform discourses advocate student-centered teaching. In this teaching model, one principal teacher role is that of a monitor who observes the classroom activity from a distant viewpoint and makes sure that learning is taking place by encouraging rich discussions that challenge students' ideas. Teacher's interventions mainly consist of putting forward relevant questions to facilitate the solving process and to create and keep a safe and engaging environment for every student to actively participate. These practices are bedrocks of ARPA. Within the PD model, the plenary constitutes a decisive moment in which the participating teachers must literally step away from the front of the classroom and assure ongoing mathematical discussions among the students. However, this plenary model is hard for teachers to materialize as revealed in the moment of crisis I present below. The episode took place as follows:

(Matías selected a student to show and explain the solution his group found. However, the student struggles to explain the solution. Matías stands close to the student on the whiteboard)

S: I have to subtract, I mean ... [unfinished idea].

(Looking annoyed, Matías snatches the marker from the student's hand and starts explaining himself the procedure)

M: [finishing the student's idea] to relate ... what he wants to explain is that the seven is going to be a letter and the 5 another one. [Addressing the student with a harsh voice] Explain to them how you got 28 from those two letters.

S: We have here the 7 and we multiply it by 4, because we subtracted 1 from 5 ...

M: [interrupting the student and addressing the entire group] Look at here! There is a 28 and he says they subtracted 1 from ... from 5, so it is very clear, they got 28. Now [explain how you got] 30.

S: Now, instead of subtracting 1 from 5, we did it from 7.

M: [Interrupting the student and addressing the whole group] Look! Pay attention. Instead of subtracting 1 from 5, they did it from 7. In other words, 6 times 5 equals 30.

S: And now, we subtracted from 7 and 5 ...

M: [finishing the student's idea] ... these are 48. You have not explained these ones.

S: Oh! Yes!...and we got ... we got 106.

Matías: Yes, 106.

When asked about this moment of crisis, Matías explained and interpreted it as following:

Well, the difficulty was that I wanted them to explain what they did. But with him [unfinished idea]. Because before [the student came to the whiteboard], I had asked several students [to explain the same exercise]. And then I realized that when they explained [their solutions], what happened? Every student explained his [sic] procedure, so it is boring to explain the same [procedure], like, well, ok, you already explained that. So, it has to do with how I'm going to develop [unfinished idea], how at the end I'm going to be the screenwriter of the final step. So, I realized that when I was observing what they were doing, I thought, ok, I'm going to put this student with this one, like if I was intertwining something this student had with something else another student got. So, at the end they are not telling the same story four times but just one story with a connecting thread until I can select somebody who can say the end of the story. So, it has to do with two things, that the children are not good at going to the whiteboard and explaining, and me that I am not good at making everything flow smoothly.

Matías' interpretation of the moment of crisis evidences the manner whereby a net of discourses emerging from both the school institutional context and the PD provide powerful representations to signify his own sense of self as a mathematics teacher. Likewise, the net of discourses constitutes a space in which processes of self-identification and differentiation from other teachers' subjectivities occur. In this discursive space, competing and contradictory meanings about being a mathematics teacher are incorporated, negotiated, and contested, allowing the processes of positioning and meaning making to take place within the cultural and historical contingencies of the particular school setting.

Moreover, Matías' interpretation reveals the recognition of the difficulties involved in implementing reform-based mathematics teaching. Against the myth of the resistor teacher unwilling to change, what emerges is an ongoing process of negotiation and adaptation of meanings in which Matías, as a mathematics teacher, deploys different mechanisms to position himself within the discursive space. He becomes its subject by assuming the available discourses as if he were the author (Hall, 1983). By introducing a variety of metaphors to signify "being a mathematics teacher," Matías discursively seeks to perform the expected features emerging from competing discourses. He becomes a figure "who 'personifies' the particular forms of knowledge" (Hall, 1997, p. 40) bearing the main attributes of the categories fabricated by such discourses.

Calling upon the metaphor of the *screenwriter*, Matías materializes a way to signify the new teacher role. The meanings of the teacher-screenwriter identity highlight someone who still dominates and controls the lesson and the students' behaviors and actions although out of sight. It introduces a representation of the classroom as a scenario in which a theatrical performance is occurring, with the students as the main characters playing roles determined by the teacher who crafts the lesson script albeit "backstage." By bringing about the metaphor

of the screenwriter, Matías negotiates two competing representations about being a mathematics teacher emanating from the PD and the local school culture. On the one hand, the screenwriter surfaces a very rooted and normalized representation of teachers within school settings as the person in control of both the lesson and the students' behavior and thinking. This is the normalized way of being a teacher in Matías' local school culture, a site in which he not only works but also experiences and signifies his role as a mathematics teacher. On the other hand, a representation of the mathematics teacher as an animator of the lesson comes to the fore. The introduction of the screenwriter teacher identity, invisible but still in control of the story, is then one way in which the resistance to abandon a critical, widely accepted, and normalized teacher's role within the school culture is materialized in discourse.

7 Being a “normal” and a “unique” mathematics teacher: The director of orchestra and the artist

Matías' interpretation of the moment of crisis reflects the way whereby subjectivation is a process deeply tied to local school cultures including their social and historical specificities, particular rituals and practices, and normalized and taken-for-granted representations. From this cultural site, Matías negotiates and reinvents meanings about being a mathematics teacher. Nonetheless, reform-based discourses disrupt school cultures by challenging common representations and rituals. For instance, having the students to explain their mathematics thinking is not an ordinary classroom practice:

The most difficult part is to get them explain [their thinking]. And explaining is hard for them because that is not a quotidian activity, it is not quotidian.

In fact, controlling the lesson pace and students' thinking are deeply rooted practices within the Chilean educational system where classrooms are mostly teacher-centered (Radovic & Preiss, 2010) and strongly dominated by the teacher (Araya & Dartnell, 2008). Matías overtly recognizes that being in control is an important teacher identity feature:

I believe it is a teacher's bad habit that when a student explains something we want to reinterpret his [sic] words straight away. We get a desire of saying: 'they did not understand'. And I also believe it is something that every teacher has, it is not just my sickness, like, one starts saying: Ah! What he is saying could be said in this way, it means the same, but in this manner [it is better]. So, one ends up assuming a role that does not belong to you.

Despite the negative aspect of controlling the students' mathematical participation and interactions, the initiation-response-evaluation or IRE pattern (Mehan, 1979) is a typical practice within the classroom. Further, as research in the field evidences (e.g., Zevenbergen, 2010), this is a highly normalized practice in schools mainly attended by low-income and other socially marginalized student populations such as in Matías' school.

By interrupting the school's dominant discursive space, reform-based discourses also generates opportunities for questioning, challenging, and reinventing those normalized ways of being a mathematics teacher, as emerges in Matías' interpretations:

I believe it is our responsibility that from very early ages the students have not had a platform to express themselves; it is like, the teacher absorbs everything. Instead of

allowing them to lead things, based on their own thinking, one, like, wants to make the closing moment, to be the director of an orchestra and highlights their own good thinking. But everything [at school] is designed [to work in this way], it is the model, and the model works and it is difficult, it is the most difficult thing to change.

The metaphor of the director of orchestra represents the classroom as a scenario in which the teacher is on charge of producing a perfect and harmonious artistic piece. He is positioned as a central figure standing on the raised podium, setting the “lesson tempo” and ensuring the correct entrance of the students into “the act.” The metaphor portrays the classroom as a highly synchronized and controlled space in which there is no place for surprises. Further, the teacher exercises his “personal authority” (Wagner & Herbel-Eisenmann, 2014) as he performs the role of a guide for the students. The teacher is, as Wagner and Herbel-Eisenmann (2014) would argue, a figure in authority or someone who “is put into a position of power or responsibility by, for instance, one’s institutional role” (p. 872). Giving up personal authority to institute new rituals and practices in which students are also in authority and responsible for their learning seems to trigger a moment of crisis while implementing reform-based mathematics teaching.

Matías’ metaphor highlights the fact that being part of the school culture implies both accepting and participating in its rituals and practices and also to inhabit the same discursive spaces in which meanings are produced through shared systems of representations (Hall, 1986). The school culture is, thus, a fundamental source for teachers’ identification in which diverse representations are widely shared, deeply rooted, and hard to change. The discursive space comprising webs of statements produced in specific historical epochs and within the school as a cultural institution establishes a language to meaningfully talk and think about the mathematics teacher as a subject (Hall, 1997). Shah and Leonardo (2017) argue that subjects are fabricated through discourses that position and represent them in particular ways. Likewise, they also configure a space of possibilities for individuals to think, feel, and act (de Freitas & Walshaw, 2016). For instance, the net of discourses within the system of mathematics education practices articulate, characterize, describe, and differentiate forms of being a mathematics teacher. It is only inside these discourses that “being a mathematics teacher” is meaningful and made intelligible. Rules that either permit or restrict ways of thinking, writing, enquiring, or speaking about them are also established, so that a sphere of possible actions upon teachers is also created. In general terms, ideas, metaphors, images, and representations of a “mathematics teacher” are constructed and exist *inside* mathematics education discourses and individuals must be subjected to such discourses (Hall, 1997) to become and being recognized as a particular type of teacher. In this sense, discourses are not just ways of representing the social world: they regulate the ways in which subjects can be meaningfully talked and reasoned about, so that knowledge is thus produced and provided. It is precisely from this discursive space comprising normalized discourses inside the school setting as well as reform-based discourses that Matías deals with the process of self-identification.

Leonardo (2003) affirms that “identity only exists in relation with others, and this state of difference from an other gives rise to our sense of self” (p. 29). This differentiation signifying who are “we” and “they” is also evident in Matías’ interpretations. Nevertheless, Matías positions himself and his colleagues as “normal” teachers, and he deploys mechanisms to assert his own sense of self as a mathematics teacher. One such mechanism consists of introducing categories to differentiate him from other “normal” teachers, underscoring the conflicting nature of self-identification (Leonardo, 2003). This process of differentiation operates by creating categories of teachers based on their appreciation or lack thereof of the

beauty of mathematics as well as their commitment to teaching socially and economically disadvantaged student populations. In this sense, a hierarchy of teachers along a moral stance is established:

Mathematics is a subject that just few people understand and know well. And I tell them that the percentage of the population that really knows mathematics is low. So, [with mathematics knowledge] we can know things and reach monstrous heights we couldn't before. And I think other teachers [in this school] don't see this beauty in mathematics and its teaching. In fact, they consider the work of teaching like, ah! I did not get paid well enough for this job, and these students are damned.

Foucault (1982) defines “dividing practices” as a form of subjectivation or a process of producing subjects. It operates by creating differentiation or systems of categorization (Youdell, 2010) that permit the emergence of particular categories of subjects or subjectivities. Through it, the subject is “either divided inside himself [sic] or divided from others” (Foucault, 1982, p. 777). As a process that bring into existence subjectivities, these dividing practices fabricate different teacher subjectivities and positions whose meanings are instated inside discourses. Walshaw (2013) states that dividing practices “are instrumental in shaping the way we think about particular teachers and students. Importantly, such practices produce and sustain the meanings that people make of themselves” (p. 105). Dividing practices play an influential role in the processes of identifying and categorizing people within the field. Based on available discourses, the subject also produces her own systems of categorization to reaffirm her identity by taking distance from other possible subjectivities, as evident in Matías' case. In this sense, “identities are constructed through, not outside difference” (Hall, 1996, p.4).

Mathematics emerges as a critical component of teacher identity. In contrast to careless and apathetic teachers at the school, Matías positions himself as an artist who wants to transmit his love of mathematics and reveals its power. The difficulties related to teaching and learning mathematics are encapsulated within the metaphor of a monster. In contrast to the representation of mathematics deployed by the PD as a human product that each student can learn, it is portrayed by Matías as a fearful thing of an extraordinary size that just few people might defeat. Precisely, it is this feature of mathematics that seems to mediate the emergence of the metaphor of the mathematics teacher as an artist. Because of its complicated nature and its out-of-the-world status, teaching mathematics requires an artist whose main endeavor is to capture and keep the students' attention. The ideal mathematics teacher is a performer who stands on the center stage executing an entertaining act that captivates the students:

To bewitch the students. Bewitch them. The teacher has to be an artist to capture their attention. That is difficult, but I love it! Sometimes I realize it and say: Oh! And I look at their faces and say: I am doing well, I am doing well, I've got them, I've got them. That is an important part. And you have to be an artist because mathematics is a monster, you have to be an artist to bewitch the students.

8 Resisting and negotiating meanings: the invisible man

Hall (1983) states that in sites in which there exists struggle over meaning, individuals strive to rearticulate and change common and customary significances by replacing them with a set of

new associations, from negative to positive connotations. This struggle can be considered the individual's efforts to invest a category with a new set of meanings by displacing it within the dominant discursive space. Correspondingly, the school discursive space becomes the main site of struggle over meaning. In this space, Matías tries to reconcile deeply rooted and reform-based meanings of being a mathematics teacher by playing with multiple metaphors that position him in a variety of ways. The invisible man teacher identity summarizes his attempts to reconcile these representations:

The ideal thing would be to stay at the back [of the classroom]. The student has to be the protagonist. And if I am very close to him [unfinished idea]. No, the idea is that [unfinished idea]. Now I understand that I can't interfere when they explain their thinking. We are used to being the protagonist of [unfinished idea]. That is our scenario. So, I have to step down to allow the students to get more engaged. That is the part that I have to improve, I have to be invisible. It is hard to change it. But little by little, I think in one month or so, I am going to leave the classroom. Ah! I'm going to say bye!

The metaphor of the invisible man portrays Matías' attempts to cope with the new mathematics teacher's role introduced by reform-based discourses. The demand of a student-centered classroom in which students are in control of their mathematics learning and the teacher is positioned as an animator of the discussion materializes as a representation in which the teacher becomes invisible for the students and disappears from the classroom. In this representation, the teacher is no longer an important actor and can literally step away from the classroom. The invisible man metaphor communicates the complexity of materializing this new role. With this representation, Matías displaces the mathematics teacher from the main character within the mathematics activity and repositions it in what he interprets is a secondary or invisible role. As reflected in Matías' discursive production, the process of identification does not consist of subsuming a particular and normalized subjectivity into an alternative one. Rather, it is a process of articulation in which resistances to assume out-of-the local culture and imposed subjectivities are forms of agency (Sannino, 2010).

9 Rethinking the myth of the resistor teacher

Hall (1997) holds that “nothing which is meaningful exists *outside discourse*” (p. 30). In this sense, subjectivities are inconsequential and irrelevant for teachers unless they subject themselves to the rules of discourses and to their power/knowledge (Hall, 1997). This is clear in Matías' efforts to signify and re-invent his identity as a mathematics teacher. He has to position within the discursive space of mathematics education system of practices by subjecting himself to its meanings and regulations in such a way that being a traditional or a new teacher is meaningful and makes sense. From these positions, other teachers' subjectivities are also addressed and recognized. Put it another way, the network of discourses (Montecino & Valero, 2017) within mathematics education fabricates teachers' subjectivities. It also creates positions that allow mathematics teachers to signify their own self of sense and other teachers' subjectivities.

Rather than a unified discourse in which a single meaning for being a mathematics teacher prevails, there are intersecting and sometimes conflicting discourses that bring about multiple meanings and open manifold avenues for signifying, resisting, and negotiating particular subjectivities. This network of discourses becomes a space of ideological struggle in which

teachers find their multiple and always unstable subjectivities. It is a terrain of meaning making whereby representations and images about being a mathematics teacher are installed, spread out, resisted, and negotiated. These meanings bear the institutional and historical specificities in which they are produced. The resulting subjectivities “emerge within the play of specific modalities of power, and thus are more the product of the marking of differences and exclusion, than they are the sign of an identical, naturally-constituted unity” (Hall, 1996, p. 4). The “mathematics teacher” subject is in reality the result of these multiple and even clashing discourses emerging from the different institutional settings that comprise the mathematics education network of practices. As Matías demonstrates, teachers’ subjectivities are never totally finished but unstable and surfacing from an ongoing process of meaning making. They are continuously remade.

This holds particularly true during mathematics reform efforts. While implementing educational reform, the local school culture turns into a site of struggle over meanings that limits as well as enables teachers’ action (Giroux, 1981). Yet, designs of PD usually ignore not only rituals and practices within the local school culture with all the contradictions and possibilities for transformation: they also disregard teachers’ social and cultural experiences. As Matías’ interpretation reveals, the local school culture constitutes the ideological terrain in which different representations about being a mathematics teacher are available. Moreover, inside these school cultures and during reform efforts, teachers strive to displace taken-for-granted to unconventional representations of their role. As a social formation, the school setting provides a toolbox of rituals and practices communicating expectations about the role that teachers must fulfill. In this sense, deeply rooted meanings tied to the local context are built and reinvented inside discourses, regulating access to positions through representations of mathematics teachers. Likewise, the net of discourses comprises multiple and contradictory meanings of being a mathematics teacher. Identification is, thus, an ongoing and never completed process. My analysis reveals that against the myth of the resistor teacher, what takes place during the implementation of reform-based mathematics instruction is a struggle over the articulation of meanings. Approaching mathematics education reform as a field of ideological struggle in which teacher identity is the main object of intervention (Gellert, Espinoza, & Barbé, 2013) helps us understand the processes whereby teachers resist and negotiate diverse meanings about “being a mathematics teacher”.

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