Outcome of the Market: The Outdated Mathematics Teacher

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Abstract This chapter seeks, on the one hand, to illustrate the configuration of a mathematics teacher who is always considered to be outdated, and on the other hand, to discuss the circulation of a promise of salvation embodied in the discourses of permanent training. This chapter aims to contribute to the problematization of "what the mathematics teacher must be" and power effects in the fabrication of mathematics teachers' subjectivities. A Foucault-inspired discourse analysis is deployed in order to unpack naturalized truths, as well as forces that govern and control teachers. It argues that current research on mathematics teacher frames teachers within a narrative that is characterized by a continuous enunciation of new repertoire of techniques, practices and knowledge that the teacher should have, to become successful. New social demands and interests are conducting teachers into investing more and more in themselves as the only way to improve and to not become outdated in order to stay in the system.

Keywords Mathematics teacher · Discourse analysis · Power effects
Permanent training

1 Introduction

Nowadays, everybody has something new to say about mathematics teachers and their roles, education, quality, responsibilities and performances, within which performances, seems to establish the idea that the mathematics teacher always has to improve. Studies about the mathematics teacher, for example, those produced by researchers of mathematics teachers and those that support various Organisation for Economic Co-operation and Development (OECD) reports, constantly (re)produce discourses which characterize the effective and successful teacher (see Jacob et al. 2017; OECD 2012). They circulate ideas of how mathematics teachers must be, the

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desired practices, knowledge and outcomes that mathematics teachers should have, as well as what is needed to develop or improve such teachers. They provide a way of thinking and understanding the mathematics teacher, through the (re)production of a network of discourses that are constantly reconfigured in response to social interests, problems, changes and demands.

These studies respond to the social concerns of getting better outcomes and overcoming the problem of failure in school mathematics, through the articulation of new practices, methods or techniques, supported by scientific knowledge. The desired mathematics teacher is articulated through the idea that mathematics is important for the development of persons, society and economy. Nowadays, it is considered that higher education achievement improves opportunities in the labor market and earnings expectations, thus benefiting the individual and their social well-being (OECD 2014a). Likewise, UNESCO (2007) has acknowledged that "mathematics education is a key to increasing the post-school and citizenship opportunities of young people" (p. 6). It is therefore seen as vital to improve the quality of teaching and learning of mathematics, as well as the quality of the people responsible for teaching mathematical knowledge to new generations—mathematics teachers.

Gutierrez (2013) asserted that research on the mathematics teacher seems to have the aim of developing and promoting successful mathematics learning experiences for students. Through this aim, research is set as a means to encourage the improvement of all aspects of the teacher that are considered deficient, producing statements that are established and acted upon as naturalized truths—a contingent effect of relations of force (Ribeiro 2011). The mathematics teacher is configured as a product and agent (Montecino and Valero 2017), in other words, an object of policy that is configured for consuming and promoting valuable knowledge for society: the mathematical knowledge. Montecino and Valero (2017) show how international agencies give evidence of how it is possible to intervene so that the teacher becomes the best version of such product and agent. Moreover, mathematics teacher research constitutes an idea of the desired teacher and what characterizes one, establishing as truth that mathematics teachers must have knowledge and master a repertoire of techniques for their actions and performance, as well as possess personal attributes in accordance with their practices, but teachers are in a social context and have deficits that present obstacles to their effectiveness (Montecino 2017). The competitiveness and effectiveness of the mathematics teacher are constituted as the main focus for promoting ways of understanding and thinking about the teacher (op. cit.). This reduces mathematics teachers to the effectiveness and competitiveness that they have in the educational system, with respect to some standards or desires. Mathematics teachers become professionals, governed and governing themselves by a neoliberal rationality, in which expert knowledge and capitalist logic of consumption influence the becoming of teachers and their productiveness, effectiveness and competitiveness (op. cit.).

The circulating discourses show, on the one hand, how the mathematics teacher has to face new challenges and requirements, through practices, repertoires of techniques and knowledge considered successful and valuable. For example,

society requires that students develop an engagement with mathematics. A study by Skilling et al. (2016) explores secondary mathematics teachers' perceptions of student engagement in mathematics, concluding that it is "important for teachers to assess their personal beliefs about student engagement and consider how their practices in mathematics classrooms may or may not be supportive of students' mathematical engagement and learning" (p. 564). That is, through the development of tools and knowledge in the form of their capacity to reflect on their beliefs and practices, the mathematics teacher will become effective. On the other hand, in their constant search for the effective and competent mathematics teacher, studies reveal how some practices, repertoires of techniques and knowledge become obsolete or less effective, circulating the idea that the mathematics teachers have to be in a permanent process of training and improvement. This process is constantly changing as a function of social interests, demands and ideas of what is desirable. It is established as feared or undesirable for teachers not to reach the expected outcomes or levels of achievement, as well as for them to fail to keep up with rapid social changes and novel demands.

Thus, this chapter seeks to show how a mathematics teacher is always configured to be outdated. It is problematizing the constituting of the mathematics teacher, which is framed in a production strategy based on what is desired and on market logic, as well as the promise of salvation that responds to the fear that mathematics teachers may become ineffective or incompetent. Hence, it will propose that consumerism has become configured as the only method that mathematics teachers have for improving and not becoming outdated. In other words, the success of mathematics teachers depends on their investment in and consumption of permanent training. The contention of the chapter is that the mathematics teacher has to consume more and more training to stay in the system, having the constant risk of becoming an inefficient, not useful and valueless teacher. It also contends that the mathematics teacher cannot just be understood as a subject that has the job of teaching mathematics; the mathematics teacher cannot be reduced to a specific set of knowledge and practices useful for teaching.

This chapter is positioned within the study of the cultural politics of mathematics education (Valero et al. 2015; Planas and Valero 2016). Bringing together Foucauldian (e.g., Walshaw 2016) and Deleuzian (e.g., de Freitas 2016) analytical strategies, these studies provide an understanding of the cultural and historical constitution of educational practices in mathematics in a multiplicity of interconnected sites, in order to cast light on how mathematics as part of the school curriculum are technologies of power/knowledge, which shape and govern Modern subjectivities and rationalities. In this chapter, this positioning is present in the theoretical landscape adopted, as well as in the analytical strategies deployed. Thus, 'the mathematics teacher' that is referred to here is not to a specific teacher, but rather a notion of mathematics teacher that circulates and is constituted within a discursive network; the mathematics teacher is here considered as a discursive construction fabricated within rationalities and truths that respond to specific spatiotemporal conditions. The chapter deploys a Foucault-inspired discourse analysis (Arribas-Ayllon and Walkerdine 2008; Jørgensen and Phillips 2002), with which a

reading of ways of governing the mathematics teacher is opened up, based on what is enunciated as desired and the articulation of a certain form of reasoning and arguing. It is navigating through discursive formations and their resonances to identify forces and different regimes of power/knowledge that determine what is considered true and false regarding the mathematics teacher. But, why is the focus put on the discourses? Through discourses are described rules, divisions and systems of knowledge (Arribas-Ayllon and Walkerdine 2008), in which the notion of the mathematics teacher is constituted and the teacher is drawn. Within discourses, what it means to be a mathematics teacher and what characterizes one, as well as the desired mathematics teacher, are traced.

The empirical materials on which the discourse analysis is deployed consist, on the one hand, of research about the mathematics teacher released within the last five years in scholarly journals (*Journal of Mathematics Teacher Education, Zentralblatt für Didaktik der Mathematik* and *Educational Studies in Mathematics*), and on the other hand, of reports published by the OECD, specifically reports focused on mathematics education and the mathematics teacher, as well as those focused on social welfare and development.

The chapter will follow three movements. Firstly, it discusses the spatiotemporal configuration in which the discourses are shaped, where the mathematics teacher is thought of as a self-regulated professional who always needs to improve. The notion of the '*society of control*' (Deleuze 1992) is used to understand the role of expert knowledge in governance mechanisms. Secondly, it examines the dominant discourses about mathematics teachers and shows the circulation of a promise of salvation based on the need or demand for permanent training. It outlines what characterizes the becoming of the mathematics teacher; a becoming that must undergo continuous change and redefinition with the aim of facing new demands and challenges. And thirdly, it problematizes the constituting and configuration of the outdated mathematics teacher, which embody capitalist and neoliberal rationality. Then, it is established that the success of the mathematics teacher depends on his/her investment in and consumption of permanent training, having a particular effect on the mathematics teacher's ways of acting and being, as well as controlling the teacher through the insatiable search for answering social demands and needs for improvement.

2 Society of Control and Discourses on the Mathematics Teacher

In order to understand how the discursive assemblage of social demands constitutes the mathematics teacher and configures a particular kind of teacher, a reading of the present is opened through the notion of the *society of control* (Deleuze 1992). Firstly, the society of control should be understood not as an overlap, but rather as a displacement of Foucault's *disciplinary societies*. Deleuze "seeks to supplement

Foucault's analysis of disciplinary power by defining new mechanisms of control which, it is suggested, have largely displaced the techniques of power described by Foucault" (Patton 2000, p. 26). Secondly, the society of control should be understood in relation to current capitalist society, in which the focus is not on a particular individual, but on a group of individuals, the mass. The societies characterized by confinement, disciplinary societies, in which the "individual never ceases passing from one closed environment to another, each having its own laws" (Deleuze 1992, p. 3), turn open, in order to enter the market, where the control "is short-term and of rapid rates of turnover, but also continuous and without limit, while discipline was of long duration, infinite and discontinuous" (Deleuze 1992, p. 6). There is an abstraction of all social and personal aspects, which become samples or data, where "the science of the state" or "statistics" (Foucault 1991 [1978]) are put into operation to shape governmentality techniques (Foucault 2010). For example, in international comparative studies, such as reports of the Programme for International Student Assessment (PISA), students involved become samples or data that are studied to formulate discourses as a function of their outcomes, such as, "[o]n average across OECD countries, boys outperform girls in mathematics by eight score points" (OECD 2016a, p. 196). The individual is lost; what is relevant is whether the mass, the particular student group or country involved, achieves what is considered necessary for the input or output of certain categorizations or achievement and development levels. The OECD (2016a) asserted that

> [o]n average across OECD countries, only 2.3% of students attain Level 6 [score higher than 669 points in PISA]. More than one in ten students perform at this level in Singapore (13.1%) and Chinese Taipei (10.1%). In B-S-J-G (China), Hong Kong (China), Japan, Korea and Switzerland, between 5% and 10% of students attain proficiency Level 6. In 30 participating countries and economies, between 1% and 5% of students perform at this level, in 21 countries/economies, between 0.1% and 1% of students performs at Level 6, and in 12 other countries/economies, fewer than one in one thousand students (0.1%) performs at Level 6. (pp. 193–194)

On the basis of students' performance on standardized tests, diverse countries formulate new requirements for teachers and schools, enunciating what to do and how to do it, conducting the conduct of mass:

> [M]ore and more countries are looking beyond their own borders for evidence of the most successful and efficient education policies and practices. […] PISA allows governments and educators to identify effective policies that they can then adapt to their local contexts. (OECD 2016b, p. 3)

Currently, the teaching and learning of mathematics is a cornerstone of modernity, social progress and development, since mathematics provides the language of science and technology, as well as a rationality desired for subjects. It is possible to see that mathematical development is the foundation of much of the scientific and technological activity that distinguishes advanced from those less advanced. The value of mathematics is "a result of the formal place mathematics occupies within late capitalism" (Pais 2013, p. 20). In this fashion, it has been enunciated that school-level mathematics is relevant, since it "can enhance

"personal and social capability" by providing opportunities for initiative taking, decision making, communicating processes and findings" (OECD 2015, p. 99). The idea circulates that the proper acquisition of mathematics skills, especially numeracy, is needed for citizens to achieve their full potential and development, enabling them to excel and have better lives. Moreover, it is recognized that "mathematics education inserts children in the great Modern narrative of knowledge for problem solving […, causing] children to see themselves as agents who can bring about change in the world and so contribute to the betterment and progress of society" (Valero and Knijnik 2015, p. 35). But, it is not enough for a person merely to have mathematical knowledge. Rather, he/she has to have the skill to put such knowledge into operation in diverse contexts, what is called *mathematical literacy* (see OECD 2014a).

Research focused on mathematics teachers has been developed from diverse frameworks and approaches. This kind of research has gained relevance in mathematics education:

> As the field of mathematics education grows so too do the research methods used to study the field. In the special area of teacher education, the last decade has witnessed a substantial increase in attention. New perspectives and new methodologies have been constituted and new research techniques established. (Gellert et al. 2013, p. 327)

Literature reviewed by Goldsmith et al. (2013) shows that several lines of research have been developed in the professional learning of practicing teachers of mathematics. They identify several crosscutting themes in the literature, proposing that growth in one aspect of teachers' knowledge and practice may promote growth in other areas. The studies analyzed were clustered into nine categories or areas: teachers' identity, beliefs, and dispositions; teachers' instructional practice; mathematical content of lessons; changes in classroom discourse; promoting students' intellectual autonomy; teachers' collaboration/community; teachers' attention to student thinking; mathematics content knowledge; and curriculum and instructional tasks.

The research has become a mechanism of control. Through research, it is possible to know whether teachers have the quality levels required in their training and practices to ensure certain outcomes. Within research, the teacher's ways of acting and being are directed on the basis of what is enunciated as the desired mathematics teacher and what characterizes this ideal teacher. Through this mechanism, the mathematics teacher is framed in the logic of competition and comparison. Teachers have to compete and be compared against each other, in order to show that they are competent and effective, that they are better than others, and that they have everything necessary for reducing the gap between themselves and the desired teacher. Competence and comparison are configured as important elements of the neoliberal agenda, which are promoted as a means for improvement. Competence and comparison are set as a way of governing the conduct of the mathematics teacher, as well as a way of life and of thinking, constituting truths and discourses regarding what is possible and desired. It is believed that competence and comparison contribute positively to increasing teachers' competitiveness and

effectiveness, since through these they can know their strengths and weaknesses, as well as what they need to improve to become successful and to be regarded as quality teachers.

Nowadays, it is impossible to think about mathematics teachers without considering their social connections or implications. Mathematics teachers and their education have "links and connections to many other fields within and outside mathematics education" (da Ponte 2013, p. 489). Therefore, it has been recognized, within different levels of the social sphere and by different agents, that the teachers play "a unique role as experts who provide opportunities for students to engage in the practices of the mathematics community" (Bleiler et al. 2013, p. 105). Also, navigating through the discourses that circulate about the mathematics teacher, it is possible to see how this teacher is constituted in relation to social interests and demands. For example, a general demand drawn from different levels of social spheres is to improve people's quality of life and well-being. This demand has put into operation dispositives and forces that seek to improve educational achievement, since it is believed that high educational achievement helps to improve the quality of life and the well-being of a person (OECD 2016a, b). Along with this, there is also the demand for an effective and competitive teacher, a highly qualified individual who possesses excellent teacher training and, thus, up-to-date professional knowledge and skills, to address challenges that arise in the search for ways to improve educational achievement. So, the mathematics teacher is constituted as a product of discursive assemblage of social demands and interests, in which the idea is set and circulated that better mathematical achievement will lead to the improvement of living conditions at individual and national levels.

Inside the circulating discourses are deployed a large number of arguments about the things that the teacher must improve to become a "good" teacher, in other words, an effective, competitive and successful teacher. The idea of a "good" teacher promotes, on the one hand, the setting of truths, rationalities, discourses and subjectivities; and on the other hand, defines the space for what is allowed and prohibited, by configuring a network of forces and enunciations to which the mathematics teacher is subjected. However, the circulating discourses are constantly reformulating what is considered a "good" teacher. Over recent decades, there have been great efforts to improve teaching and develop teachers (Huang and Shimizu 2016). Within discourses circulate a long list of qualities and capacities that the teacher needs to develop in order to fulfill different aspects that lead him/her to be recognized as an effective, competitive and successful teacher. There is an emphasis on communication, detecting students' learning, knowledge, tools and skills that the teacher needs, (among others). For example:

> Teachers need to be able to notice children's means of communicating their reasoning in order to respond appropriately to enhance children's reasoning and communication of their mathematical thinking. (Bragg et al. 2016, p. 524)

> Teachers need specific knowledge and affect-motivational skills to diagnose students' learning during class. (Hoth et al. 2016, p. 44)

> The kind of education needed today requires teachers to be high-level knowledge workers who constantly advance their own professional knowledge as well as that of their profession. Teachers need to be agents of innovation not least because innovation is critically important for generating new sources of growth through improved efficiency and productivity. (OECD 2012, p. 36)

> Teachers need to understand (1) the conceptual principles and the development of the ideas underlying a concept; (2) strategies, representations and misconceptions; (3) meaningful distinctions, definitions and multiple models; (4) coherent structure—recognizing that there is a pattern in the development of mathematical ideas as a concept becomes more complex; and (5) bridging standards—understanding that there might be gaps between standards and knowing what underlying concepts are in between to bridge the gaps between the standards. (Suh and Seshaiyer 2014, p. 209)

The enunciations of what the mathematics teacher needs or has to improve, continually expresses the double gestures (Popkewitz 2008b) of hope and fear. Society hopes that the mathematics teacher will become a competitive and effective teacher who embodies ways of thinking and acting, promoting a particular rationality. But, at the same time, it is enunciating the feared mathematics teacher, which society does not desire, a teacher that will hinder society in what it seeks to achieve. Within circulating discourses have constituted that the expert knowledge shapes a promise of salvation based on permanent training, in order that mathematics teachers do not become an undesired and valueless teacher—an outdated teacher. Moreover, within the expert knowledge, a notion of the teacher as a desired, self-regulated and productive teacher is constituted. Then, those teachers, whose subjectivities are adjusted with what is desired, will be saved, while those who do not achieve the desired adjustment, will be outside the system and will be excluded. Within double gestures, the becoming of the mathematics teacher is drawn, revealing the features of the successful mathematics teacher. The becoming of the mathematics teacher is characterized by constant changes, which are a function of the emergence of new social demands and requirements. Nowadays, nothing is finished; in other words, everything is in a state of permanent becoming, and the mathematics teacher is no exception. In the words of Deleuze (1992),

> [i]n the disciplinary societies one was always starting again (from school to the barracks, from the barracks to the factory), while in the societies of control one is never finished with anything—the corporation, the educational system, the armed services being metastable states coexisting in one and the same modulation, like a universal system of deformation. (p. 5)

3 A Promise of Salvation

The circulating demand of better mathematics teachers, effective and competitive teachers who can overcome new social challenges and requirements and who are always adapting and improving, constitutes a network of discourses in which the becoming of mathematics teachers is shaped. The becoming of teachers is in

perpetual change and their quality has been constantly questioned. From different perspectives, theories and methodologies have enunciated that "teachers are key to increasing educational quality" (Luschei and Chudgar 2015, p. 3), as well as that mathematics teachers have diverse deficits, for example, in their knowledge, resources for teaching or outcomes, among others. Francis (2015) shows that a low sense of efficacy and perceived lack of preparation are two factors that impact how teachers teach and interact with their students. Hence, "teachers in classrooms are the main factor in bringing about improvement in students' outcomes" (Callingham et al. 2015, p. 552). Within discursive formations circulate as truth the notion that the mathematics teacher needs to be in a constant state of improvement with regard to all his/her professional and personal aspects in order to become a successful, effective and competitive teacher. In this vein, it is enunciated that

> teachers should gradually improve their practice over time by engaging in systematic analysis of the effects of instruction on student learning. (Spitzer et al. 2011, p. 68)
>
> [It] highlights the importance of teachers and school and system leaders increasingly taking responsibility for improving the enactment of the sequence, and for drawing on the underlying principles in various aspects of their practice. (Cobb and Jackson 2015, p. 1029)
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> The present study showed that French teacher training in the concepts of attribute and measurement is insufficient and therefore must be expanded. First, it is necessary to improve future teachers' mastery of these concepts, which means developing their attribute/measurement SCK [specialised content knowledge]. (Passelaigue and Munier 2015, pp. 333–334)
>
> Future studies are needed to explore strategies to help teachers improve their pedagogical design capability and flexibility to handle emerging events in the classroom. (Cai et al. 2014, p. 279)

These statements articulate discourses about not only what teachers should improve or change but also about whom they should become, by illustrating the desired teacher that society needs or demands. Moreover, it is recognized that initial teacher education is insufficient to satisfy the new challenges and changes that society sets. There is the fear of failure, as well, that the mathematics teacher becomes outdated. Current social changes happen fast, promoting new demands and requirements that the mathematics teacher has to face. In this context, various aspects of the mathematics teacher run the risk of becoming inefficient, lacking in usefulness or value because they respond to a reality that has already changed. Societal demands draw a network of forces, which delineate and shape what the mathematics teacher must be and do. But, these demands are in movement, constantly (re)forming from new interests, events, needs and opportunities. Consequently, the mathematics teacher is continually redefined, including his/her practices, training and performances. Mathematics teachers must quickly adapt, changing and improving all aspects of themselves that are identified as necessary to be effective and competitive. The outdated aspect(s) of these teachers are constructed as a real problem for society, not just because such teachers could have difficulty in finding or keeping a job, but also because they could hamper the achievement of educational objectives or desired standards.

Studies and discourses about the mathematics teacher seek to put into operation arguments based on the empirical evidence produced by research, to promote the best way of redesigning and re-planning the teachers, their (re)training, practices, and work, delineating what it means to be a mathematics teacher, and what is considered urgent. They contend that "the investigation experience is very intense and has a high transformation and learning potential for the participants" (da Ponte et al. 2017, p. 292). This experience creates opportunities for developing new knowledge and skills, as well as promoting changes in the participants and in their identity, values, beliefs and ways of being, among other respects (op. cit.). Within circulating discourses, practices are constituted, as are repertoires of techniques and knowledge that are considered desirable and those that respond from evidence in the best possible way to social requirements, or that have been shown to be successful. The fabrication of the effective and competitive mathematics teacher, as well as his/her training, has been part of the agenda in recent years of mathematics education research and studies by international agencies, in which it is possible to see how "policy makers put pressure on teachers to perform according to their own pedagogical and curricular demands" (Lerman 2012, p. 188). Cochran-Smith and Villegas (2015) state that current research on the preparation of prospective teachers is based on two broad questions: the policy question, which involves issues of effectiveness as well as accountability; and the learning question, which involves the issue of how (prospective) teachers learn to teach in the 21st century. Regarding the quality of teachers, it is possible to see efforts at various levels, such as the reformulation of mathematics teacher training (see Lerman 2012) or the configuration of international policies to attract the best students to become teachers, retain the best teachers, increase teacher salaries, enhance working conditions for teachers and reward teachers that join schools with the greatest needs, with the aim of securing better-quality teachers (Luschei and Chudgar 2015; OECD 2005, 2012, 2014b). It is acknowledging the central role of teachers for the social and personal development, as well as for a better future.

The permanent training embodies the hope of an effective and competitive teacher, as well as the fears of those who are not seeking to improve their practices or not achieving the desired levels. The narratives of permanent training shape a promise of salvation regarding the failure or incompetence of mathematics teachers. The search for constant improvement entails enunciating the desired and undesired teacher, labeling one as good or bad teacher according to his/her outcomes, what they know to do, and their updated repertoire of techniques and knowledge. Permanent training is configured as a way of facing what are recognized as deficient aspects of the teacher, as well as a mechanism of continuous control of his/her academic and professional development, in order to ensure the quality of the teacher and encourage his/her standardization. Currently, it is impossible to think of the becoming or professional development of the mathematics teacher outside the process of permanent training. The permanent training is the action by which the mathematics teacher becomes "other" while continuing to strive to be "what is", governing the mathematics teacher and his/her desires, fears, attitudes and ways of being, in order to produce the desired teacher:

> The idea of permanent training is a way of maintaining control of a never-ending process for the teacher. The idea of permanent training is operating as part of a dispositive by setting diverse forms of control, discourses, and forces. Consequently, the mathematics teacher is condemned to be incomplete and to have constant deficits to overcome, since society and the market will always be setting new requirements, demands, and urgencies that the teacher must face. (Montecino and Valero 2017, p. 150)

Permanent training becomes the cornerstone for the realization of current effective and competitive teachers, shaping teachers' conduct by inculcating into them new ways of understanding their professional development, work, desires, and ways of acting and being. Socially, it seeks to fabricate a trained teacher who is able to improve through self-regulation and the pursuit of their interests. As Callingham et al. (2015) put it,

> the teachers […] had made a collective decision to focus on and improve their personal numeracy (or quantitative reasoning) in ways that would allow them to challenge their students appropriately. (p. 558)

Consequently, permanent training implies a promise to reshape teachers in such a way that they can address new social demands and changes. The narratives about the competitive and effective mathematics teacher have subjected the teacher to a process of permanent training, in which the shaping of teachers' subjectivities takes place. Permanent training ensures continuous control of academic and professional development and practices of the mathematics teacher. Also, the permanent training, which is a response to urgent needs, is required for providing "quality control" in teaching, and for favoring the standardization of teachers. Within these discourses there seems to be a need for the existence of teachers who fail or do not satisfy what is desired, and in this way, it is possible to keep open and active, a market for permanent training.

4 The Outdated Mathematics Teacher

The search for ways to improve the mathematics teacher has become the central aim of studies that have as their focus the mathematics teacher and his/her training, practices, knowledge, outcomes and other related subjects. According to circulating discourses, it seems that the teacher cannot achieve the quality levels that are desired, which constantly change. Expert knowledge sets and contributes to new regimes of truth about teachers, circulating the idea that all mathematics teachers have opportunities and possibilities for improving through permanent training. There is the constant risk that mathematics teachers become outdated if they are not updated and adjusted in a timely manner.

As a result of constant social changes, demands and interests, the competitiveness and effectiveness of the mathematics teacher are destined to have a limited useful life. For example, the repertoire of techniques that a teacher should currently have, or is currently demanded to have, will be different in the future. This change

is clear with the introduction of new technologies—e.g. calculators, computers, motion sensors—in the classroom since the 1980s. Teachers had to acquire new knowledge and techniques, in order to abandon the exclusive use of the blackboard and to integrate the new technologies into their practices.

Plenty of research has argued about what characterizes a good teacher and what teachers need to improve their practices, knowledge and achievements. For example, Ertle et al. (2016) enunciated that

> teachers must ultimately learn to develop and conduct their own formative assessments. To do this, teachers need to understand their students' development of mathematical knowledge and thinking as well as the techniques (e.g., observation and interviewing) for supporting and assessing children's knowledge in a formative way. (p. 977)

Apparently, all teachers have the same opportunities, access and possibilities for improving. But, access to the permanent training is not for all. In the last years, there has been a turn from demands for obedience on the part of teachers towards demands that teachers be adaptable, flexible, versatile and entrepreneurial.

> So teaching staff nowadays also need the competences to constantly innovate and adapt; this includes having critical, evidence-based attitudes, enabling them to respond to students' outcomes, new evidence from inside and outside the classroom, and professional dialogue, in order to adapt their own practices. (European Comission 2013, p. 7)

The constant enunciation of the new repertoire of techniques and knowledge that the mathematics teacher must have or develop to be considered a successful teacher becomes a form of governing, constituting notions about the mathematics teacher that organize their practices. These notions produce truths and discourses that determine what it is possible to say, do and be, and a form of governing that conducts the mathematics teacher into consumerism and accumulation. The teacher must invest in his/her professional development and consume new training offers to achieve the desired level of effectiveness and competitiveness, accumulating more and more teaching methods, knowledge, achievements, retraining and so on. It establishes that consumerism and accumulation of professional development are the only ways for improving and not becoming outdated, as well as a means for self-regulating and circulating in a society that functions according to the principles of the market. The role of the mathematics teacher seems to be reduced to knowing what to consume to satisfy social demands and needs, while at the same time, it seems that the teacher has developed the desire to possess newer and better techniques and knowledge, in order to be or to stay effective and competitive, since his/her training and preparation are not enough. "Yet despite widespread recognition that teachers need to learn more in order for students to learn more, there is little consensus about what it is that teachers should be learning" (Lewis et al. 2015, p. 448). Constant changes make it more complex to define or establish what it is that teachers should learn, have or develop. The only certainty is that teachers have to improve since they have or will be in deficit.

Rapid social changes are constantly increasing the gap between the actual mathematics teacher and the desired teacher. The mathematics teacher has to work at reducing this gap, by managing his/her training and updates, in other words, the

teacher needs to become a sort of enterprise for him/herself (Popkewitz 2008b), in order to pursue his/her better professional and academic development. Hence, in the words of Popkewitz (2008a), within a neoliberal society, the subject becomes an "individual who is continually pursuing knowledge and innovation in a never ending chase for the future" (op. cit. p. 310), which applies to the fabrication of the mathematics teacher nowadays. Teachers should perceive themselves as 'agents' (Foucault 2009) who are responsible for their own improvement and professional development. Teachers have to manage their professional development and investments, in order to improve and ensure their quality—teachers are responsible for themselves—and to keep up in the system. "[Q]uality is conflated with measurable progress within neoliberalism where national progress (economic growth and competitiveness) is matched with individual progress (personal growth and self-fulfilment)" (Llewellyn and Mendick 2011, p. 56). Circulating the idea that the more mathematics teachers are of quality, the greater the social progress. The individual ambition of the mathematics teacher (the searching for being the best or improving his/her quality) becomes a key element for neoliberalism.

The mathematics teacher is subjected to a market logic based on "individual capitalization" (Foucault 2010), indebtedness and economic investment, that seeks the normalization, standardization and control of all aspects of academic and professional development of the mathematics teacher. Standardization becomes a mechanism for segregation and differentiation since the standards are used as a way to measure the effectiveness and efficiency of the teacher. The mathematics teacher is configured through political, economic and social interests, which are focused on competitiveness, effectiveness and qualifications of the teacher with the aim of satisfying new challenges that the market sets. The market shapes the conditions for the mathematics teacher to become part of the idea of globalization, social progress and the competitive logic of current societies. The market determines what is valid, permitted and desired for the mathematics teacher. In other words, the market determines what must be the academic and professional development of the mathematics teacher, along with his/her training, practices, achievements and knowledge.

For neoliberalism and the society of control, the professional freedom of the mathematics teacher is a function of the market, and all areas of the mathematics teacher are cast in economic terms, namely in terms of costs and benefits. Mathematics teachers are led to act under their own individual interests, having the freedom of choosing what they want to consume with the aim of improving. Hence, the success of the mathematics teacher is a function of his/her capacity to invest and consume wisely. Moreover, the configuration and reshaping of the mathematics teacher are based on market principles; supply and demand promotes the mathematics teacher's ways of being and acting, as well as their constant fear of becoming outdated, losing value and effectiveness.

The permanent training not only promotes continuous updating of mathematics teachers, but also inserts them into continuous practices of comparison and competition. These practices embody capitalist and consumerist ideas, whereby the mathematics teacher is denaturalized of his/her particularities, framing the

becoming of the mathematics teacher as an outdated teacher who is always in debt and lacking something. Teachers are governed and govern themselves in order to optimally satisfy the social demands conducting their ways of thinking and acting. Furthermore, because the mathematics teacher governs others, he/she plays a part in the furtherance of a capitalist rationality and of practices that nowadays are believed essential and natural for achieving personal and social success.

> Governing people is not a way to force people to do what the governor wants; it is always a versatile equilibrium, with complementarity and conflicts between techniques which assure coercion and processes through which the self is constructed or modified by himself. (Foucault 1993, p. 204)

The expert knowledge puts into operation and (re)produces arguments for setting permanent training as the main means for improving and ensuring the quality of the teacher, despite all the evidence which shows that failure is unavoidable. Within research, there is a production of new forms of (re)training and methods for improving the mathematics teacher, each carrying the promise of being the Holy Grail for constituting the successful teacher, promoting in the teacher the desire for consuming it, in order to improve. Currently, mathematics teachers must engage in a constant training and improvement process. They should acquire not only the skills and characteristics of the desired teacher, but also certain ways of acting. In other words, teachers are subjected to practices that shape their conduct to achieve the qualifications needed and to improve, in order to be considered effective and competitive.

5 Conclusion

The pursuit of improving of each aspect of the teacher has, in large part, become the focus of studies regarding the mathematics teacher, formulating discourses around better practices, knowledge and repertoires of techniques that the teacher must have to achieve successful outcomes, to be considered competent and effective, and to not become outdated—discourses in which truths regarding what characterizes the desired mathematics teacher are (re)produced. The enunciation of new practices, knowledge and repertoires that the mathematics teacher must have or improve upon, become part of the technologies for governing the mathematics teacher. In the context of current societies of control, as Deleuze has pointed out, the rendering of subjects to the myriad of control mechanisms effectively turns people into the perfect subjects/objects of expansive, late capitalist markets. In other words, current technologies of conducting the conduct of individuals and societies bring us all, sometimes subtly and sometimes forcefully, into a world of value, consumption and marketization. Notions of the mathematics teacher—and connected subjectivities—are no exception.

Who would want to be educated by a bad or outdated teacher? Nobody. The desire for good mathematics teachers makes it almost impossible to problematize

and question the intrinsic goodness of the "necessity" for improving teachers. The "necessity" of permanent training feeds the illusion that there is a way for the mathematics teacher to become the desired teacher or at least to come close to it; that the teacher is not alone; that there are people working to help him/her; and that all the teacher's deficits or problems can be fixed through research, constituting new regimes of the production of truth, in which truths are (re)produced from a scientific discourse. But permanent training does not only promote continuous updating of mathematics teachers, it also pushes them into continuous practices of comparison and competition. These practices frame the teacher's possibilities within a capitalist and consumerist logic, since that comparison and competition leads the teacher to think that pursuing his/her personal interest, investing in him/herself through permanent training or any other aspect that can be capitalized will indeed result in added value and will lead to becoming the best possible modified version of a teacher. In the discourse of necessity in the market, the mathematics teacher surrenders to permanent training because he/she desires certain effects, seeking a personal and social benefit.

Nevertheless, the very same logic of societies of control operate that the desire for success often turns into failure. Despite the permanent training, the mathematics teacher is condemned to fail in acquiring new qualifications, and as a result he/she will be doomed to become outdated. The fabrication of the mathematics teacher seems to be framed in a narrative of *planned obsolescence,* since, on the one hand, the mathematics teacher is purposefully destined to become outdated, and on the other hand, the teacher is shaped to always desire the consumption of something new. Nowadays, most technologies and devices are designed with a short useful life, and the mathematics teacher is no exception. Planned obsolescence is the outcome of the decision that a product should no longer be functional or desirable after a predetermined period, determining its intrinsic durability (Cooper 2011). In other words, it is a purposeful strategy of built-in product design that reduces the product's useful life, triggering in consumers the desire for a newer and better product of the same type. Planned obsolescence is one of the great inventions of recent electronic and digital technologies that operate with a high speed of change in products, which consumers perceive as necessary and highly desirable. The mathematics teacher is fabricated within a production strategy, the planned obsolescence, which seeks to stimulate economic activity (Cooper 2011).

In this way, the mathematics teacher becomes a part of a market logic, whereby issues such as professional qualification, effectiveness and levels of success (among others) take on particular relevance since they become control mechanisms, which can be quantifiable, for the identification of those who fulfill the quality requirements or standards. The mathematics teacher becomes a subject who never stops desiring more qualifications and training, since these are perceived as never being enough. The constant interplay between the discourse of salvation and the becoming of the outdated mathematics teacher has an effect of power on his/her ways of acting and being. The mathematics teacher is controlled by the insatiable search for responses to social demands, as well as the search for improvement. And this in itself becomes the very same condition for his/her being professional. It

seems as if the vicious circle between the desire for more qualifications and the fact that qualifications become obsolete creates a kind of illusion about what may be possible for teachers to in fact achieve. Learning to be a teacher whose competence, qualifications and professionalism are always insufficient raises the ethical question of which kinds of teachers are being formed. Is "a teacher in debt" (Montecino and Valero 2017, p. 150) an acceptable and desirable subject?

But at this point, one might ask, what happens with resistance? Are there no other possibilities to envision and conceive of mathematics teachers? According Foucault (1980), where there is power, there is always resistance, and resistance is never exterior to power. Moreover, discourse transmits and produces power, but it also undermines and exposes it (op. cit.). The mathematics teacher freely participates and navigates within mechanisms of power. However, the resistance cannot be total because when the mathematics teachers do not adapt, they become outdated. Thus, within the current configuration of a capitalist model, the mathematics teacher is shaped as product and agent, as well as a professional who must be effective and competitive. The mathematics teacher, as a professional, is required to know how to stay up to date. The resistance is made difficult, since if mathematics teachers do not improve and if they do not consume pursuing their interests, they will become valueless and outdated subjects. Moreover, the capitalist model resignifies all that is considered new, different and feared, including the resistance, in its own terms. Therefore, mathematics teachers are subjected to the flow of their society. Although possible, the cracks that may open opportunities for resistance, seem at the moment, quite difficult to see and from which to make profit.

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