



# Blurred lines: producing the mathematics student through discourses of special educational needs in the context of reform mathematics in Chile

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## Abstract

Are students with special educational needs excluded from the reform promise of “mathematics for all”? This paper explores the discursive production of students with special educational needs in the context of professional development (PD) for collaborative problem-solving teaching. We held interviews with Chilean primary school teachers after their participation in PD and used a post-structural analysis to examine them. We turned to policy and institutional practices to understand the disability discourses that were evident. Teachers called on medical and deficit discourses to produce these students as abnormal and problematic in their learning of mathematics. Yet teachers also blurred the lines of categorisation between and within labels of special needs, including other students in these terms. Simultaneously, the reform PD created space for a counter discourse of ability. We suggest PD should help teachers of mathematics resist deficit discourses and see the ways in which experience may run contrary to them.

**Keywords** Special needs · Disability · Inclusion · Exclusion · Discourse · Reform · Problem-solving mathematics

## 1 Introduction

In 1994, 92 countries contributed to the Salamanca statement: stipulating everyone has a fundamental right to education, acknowledging that every child has unique characteristics and learning needs (UNESCO, 1994). Now, more than two decades later, we might ask which children remain excluded from the mathematics education proposed by reform-based discourses. Research has consistently shown mathematics education marginalises students by

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virtue of their gender, race, class, or membership in other minority groups (Healy & Powell, 2012; Valoyes-Chávez, 2017). However, students identified as having special educational needs (“NEE” for the Spanish acronym “Necesidades Educativas Especiales”) are a marginalised group within mathematics education (Gervasoni & Lindenskov, 2011), which receives less attention than other groups in equity discourses in mathematics education (Borgioli, 2008; Lambert & Tan, 2017; Marcone & Atweh, 2015; Scherer, Beswick, DeBlois, Healy, & Moser Opitz, 2016).

Students with special educational needs may be included in mainstream classrooms, yet are likely to receive a differentiated mathematics curriculum (Scherer et al., 2016). Boyd and Bargerhuff (2009) discuss how research understanding of “best practice” differs in the domains of special education and mathematics education. Specifically, the former advocates “direct instruction,” whilst the latter calls for “learning environments grounded in inquiry and student-centred problem solving” (p. 54), critical tenets of the so-called mathematics education reform. This difference is suggestive of the exclusionary and discriminatory practices of “ableism” (Borgioli, 2008), in which society and educators define and categorise some students as “able” and others as not; “able” students are privileged and those deemed “not able” or “disabled” are marginalised. Such a system raises the question of how policies designed to give *all* children the right to quality education may be differently experienced at the level of the classroom and for particular populations of students.

In Chile, like elsewhere worldwide, policies under the banner of general “educational reform” take steps towards improving quality and access to education by reducing exclusionary practices, and through curriculum change. For example, a law “*Plena Integración de las Personas con Discapacidad*” (Full Integration of Persons with Disability) was passed in 1994, and in 1998, incentives were introduced to further encourage the admission of students with “NEE” into schools (Sánchez Bravo, Díaz Flores, Sanhueza Henríquez, & Friz Carrillo, 2008; Tenorio Eitel, 2005). The *Proyecto de Integración Escolar* (PIE) was an initiative that provided extra funding for schools presenting plans for integrating students with “NEE”, who were later defined in *Decreto #170*, the Differentiated Grant for Children with Special Needs law of 2009 (MINEDUC, 2009). At the same time, other reform initiatives in Chile centred on improving educational quality; for example, the primary mathematics curriculum was re-written with a greater emphasis on problem solving (MINEDUC, 2012), reflecting the international movement termed reform-based mathematics instruction (Valoyes-Chávez, 2018). Teachers in Chile are in a state of almost constant reform (Avalos & de Los Rios, 2013), these reform initiatives sending many arrows towards the target of improved education. We might describe increased inclusion of students with “NEE” as one arrow and increased emphasis on problem-solving mathematics as another. The intersection of these two trajectories is evident internationally in the “mathematics for all” promise (Yolcu & Popkewitz, 2018; Valoyes-Chávez, 2018) according to which reform-based instruction should allow the “inclusion” of all students, and ensure their mathematics success. This article is based at this intersection; specifically exploring teachers’ talk about students with “NEE” in the context of problem-solving mathematics as promoted in professional development (PD).

The PD at the centre of our study was *Activating Problem Solving in the Classrooms* or ARPA (its Spanish acronym), a programme initiated in 2015 and aimed to enhance students’ mathematics learning experiences by promoting problem-solving mathematics teaching. This was a government-funded project developed by mathematicians and mathematics educators at the University of Chile. A central premise of the programme was that all students could learn mathematics in this way, regardless of their supposed mathematical ability. Preliminary

evidence from initial research related to ARPA showed teachers espoused more inclusive beliefs (Cerde et al., 2017), yet at other times drew on deficit discourses about their students (Darragh, 2019), including regarding their status as “NEE”. These initial findings led to our interest in the contradictory discourses about students with “NEE”, specifically regarding their inclusion in practices of problem-solving mathematics. We define as our subject those students labelled as having “NEE” and who are in mainstream education, but this of course constitutes a wide and extremely varied group and may include students who have been labelled with behaviour, emotional, learning, or physical needs (Matus & Rojas, 2015). Whilst we acknowledge their heterogeneity, we group these students together in this article to focus on the similarities in the discursive production of these students within reform mathematics. Specifically, our research question is:

- How are students with “NEE” discursively produced in the context of PD for problem-solving mathematics?

We aim to answer this question by looking at the ways in which discourses about students with “NEE” appear in and circulate in the teachers’ talk.

## 2 Production of special needs and disability in the educational field

Evident within the research literature are two main ways of producing the student with “NEE”; these are often termed medical model or social model (Connor, 2013; Tremain, 2006). The former centres the “problem” on the individual student (Reid & Valle, 2004) and aims to solve poor mathematics achievement of these students. The latter centres the issue with the institution of education in order to solve systemic problems or change the classroom context.

The medical model dominates the research discourse within special education (Lambert & Tan, 2017): “The language of traditional special education is saturated with medical terminology that imbues it with the authority of pseudo-science” (Connor, 2013, p. 497). Literature within special education related to mathematics produces students identified with special learning needs as requiring a different kind of mathematics education. For example, they are depicted as unable to learn mathematics by way of problem solving, needing instead highly structured and narrow procedural instruction (Carnine, 1997; Hudson, Miller, & Butler, 2006; Kroesbergen & Van Luit, 2003). This positioning implies non-routine problem solving is effectively outside the realm of possibility for students with “NEE”. However, some research discusses ways in which students with learning difficulties may participate in mathematics through purposeful inclusion in group work and classroom discussion (Baxter, Woodward, Voorhies, & Wong, 2002; Foote & Lambert, 2011) or by using “anchored” mathematics problems (Bottge, Rueda, Serlin, Hung, & Kwon, 2007). Yet these studies maintain the focus on the individual as a problem that requires fixing.

An alternative perspective is provided by Disability Studies Education (DSE) (Reid & Valle, 2004), outlining tenets of research which include: contextualising disability within political and social spheres, privileging the interests of people labelled with disability, promoting inclusive educational opportunities, and assuming competence and rejecting deficit models of disability (Connor, Gabel, Gallagher, & Morton, 2008). Some mathematics education researchers have taken up this framework (e.g. Lambert, 2015) and, utilising ideas of social justice, it has been adapted into the DSME (Disability Studies in Mathematics

Education) (Lambert & Tan, 2017). Disability studies represent the “social model” opposing the detrimental effects of medical and individual models (Tremain, 2006). Some examples within mathematics education of the social perspective reflexively examine the processes by which the student may be produced as disabled through the teaching or research process. Lambert (2015) provided case studies of two students constructed as having learning disabilities and documented the influence of shifting pedagogies on their narratives of, and resistance to, mathematical disability. Heyd-Metzuyanin (2013) closely examined how the interactions between herself, as teacher-researcher, and a student, worked to construct “Dana” as a disabled mathematics student.

In a recent literature review, Lambert and Tan (2017) found a qualitative difference between the research on problem solving in mathematics education for students with and without disabilities. They argue this difference represents a “research divide”, exacerbated by the fact research related to mathematics and disability is almost exclusively found within the field of special needs education rather than in mathematics education journals. Other reviews (e.g. Bagger & Roos, 2015) similarly differentiate research conducted within and outside mathematics education journals. This research divide helps to perpetuate the notion that students with disabilities should be excluded from problem solving activities whilst other students should be encouraged to learn mathematics through this very methodology (Boyd & Bargerhuff, 2009).

The act of labelling a child as being “special needs” or having a “disability” is a political act (Brantlinger, 2004) in that it works power over the individual (or group). Borgioli (2008) critiques the label Learning Disability (LD) within the area of mathematics education and applies a critical pedagogy perspective to exemplify the practices of identification and labelling. She argued the labelling process has social, emotional, educational, and political realities for all those involved and that such practices privilege some at the expense of others. This act is oppressive, a form of “ableism” (Borgioli, 2008; Scherer et al., 2016), and helps to produce the “NEE” student as incapable. For example, McDermott, Goldman, and Varenne (2006) focused on three boys in a mathematics class who each had an LD story. They argued the labels are “cultural work” and that “American classrooms organize occasions for children to look unsuccessful, and then blame their behavior on disabilities inside their heads and/or incapacities brought on by their race, gender, language, or social class” (p. 14). The label of “NEE” or even “low ability” permeates mathematics teachers’ views of their own students (Straehler-Pohl, Gellert, Fernandez, & Figueiras, 2014), forms institutionalised practices (Reid & Valle, 2004), and *hails* these students (Althusser, 1971) as disabled.

To summarise, there is a lack of research attention to students with “NEE”, especially in mathematics education research journals (Borgioli, 2008; Lambert & Tan, 2017; Marcone & Atweh, 2015)—although there are signs that this is changing (Scherer et al., 2016). Research utilising the medical model, and focused on the individual, dominates research about “appropriate” pedagogy for students with “NEE” (Boyd & Bargerhuff, 2009). Finally, literature suggests that practices of labelling contribute to exclusionary and discriminatory practices (Borgioli, 2008).

### 3 Post-structural framing

We use a post-structuralist theoretical framework that considers subjectivity, knowledge, and power as interrelated in the production of truth (Foucault, 1972). Weir (2008) underlines the

historical nature of truth and the need to analyse its practices and effects. Each society establishes particular types of discourses that are accepted and made to function as true (Weir, 2008) by virtue of different power circuits. For example, educational policies, considered as discursive practices (Infante, Matus, & Vizcarra, 2011), construct truths about mathematics disability. Students with disabilities within the field do not exist prior to the constitution of such discourses; rather, discursive practices (in research, policy, and schools) produce the category of disability, the disabled student, and the rules to talk about the notion and the subject. Foucault names these discourses as *regimes of truth*, a notion comprising techniques that allow to separate true and false statements as well as to elucidate the status given to those who speak (Weir, 2008). A regime of truth sets the rules that condition the discursive emergence, existence, co-existence, conservation, and modification of a subject of knowledge. It is in the discursive space that it is possible to think, talk, and act upon the particular subject of knowledge (Foucault, 1972) in ways that objects/subjects are made to appear, come to be represented, and the relation between them and words are formulated. The scientific knowledge produced by the educational field, described in the literature above, produces a regime of truth, the notion of disability. As the notion enters the school discursive space through educational policies, disability is not just a matter of individual teachers' talk but "part of historically constructed ways of reasoning that are effects of power" (Popkewitz & Brenna, 1998, p. 9).

Power acts through discursive practices (Foucault, 1972). It acts on the subject to recognise, categorise, and tie her to her own identity (Foucault, 1982). In this perspective, *labelling* emerges as a technology of power aimed to classify individuals for the purpose of efficient management (Infante et al., 2011). This is a mode of objectification, a "dividing practice" (Foucault, 1982, p. 778) that ends up fabricating distinctions between individuals and producing specific subjectivities. Educational policies, for instance, introduce meanings for "special education needs", creating a discursive space in which two categories of subjects emerge: the "normal" and the "NEE" student. The labelling forged by these discursive practices has an enormous impact on the ways in which students are identified and categorised by teachers and administrators. It leads to diagnoses which produce marginalisation because some positions within the classroom are not available for all students, such as being able to learn mathematics.

Given the above conceptual framing, we wish to note here the difficulties we faced in choosing terminology to refer to the subjects of this study. In giving this group of students a name, we are hailing them into being (Althusser, 1971) and contributing to their fabrication. Additionally, we could not absolve ourselves of responsibility here simply by using terms which appeared in policy documents and in teachers' discourse as we are complicit through our English translation. Consequently, we acknowledge the tensions involved in our choice to refer to the students as being with "NEE" and we remain uncomfortable with the way in which this label seems to deny the social and interactional construction of learning needs, implying it is indeed something an individual can *have* (see also Heyd-Metzuyanim, 2013). We reflect this discomfort through our use of inverted commas for "NEE".

## 4 Methodology

Central to this paper was the ARPA programme of PD (see Felmer & Perdomo-Díaz, 2017), initiated in 2015. It was not designed specifically for teaching students with "NEE". However,

it was delivered to teachers of schools in mid to low socio-economic areas of Chile catering to significant numbers of marginalised students, including those labelled as “NEE”. The aim of the PD was to enhance the mathematics learning experiences of all children through the promotion of collaborative problem solving in randomly assigned groups. Connected to the PD was a large research project that entailed collection of a variety of data, such as belief questionnaires of all teacher participants and, from sample teachers, classroom observations, artefacts, student results, and finally interviews held in the years following their participation. Initial results highlighted a number of relevant findings. For example, results from beliefs questionnaires saw a decrease in teachers’ beliefs that access to mathematics was related to a fixed condition associated with innate ability, gender or ethnicity (Cerdeira et al., 2017). Observations of teachers’ mathematics classes saw teachers’ tendency to create lessons that allowed more access to mathematics and a greater degree of agency for all students when utilising problem-solving methods (Espinoza, Darragh, & Peri, 2016). There were cases of students with “NEE” experiencing much greater inclusion in mathematics due to the PD (Rouleau, Ruiz, Reyes, & Liljedahl, 2019). On the other hand, we also noted teachers expressed deficit views of their students (Darragh, 2019), including reference to their “NEE” status. We wished to interrogate further these results related to access and inclusion in mathematics for students with “NEE” and so we decided to re-analyse the 2016 interview data, and also to follow up on this theme in subsequent interviews.

We aimed to use interview transcripts to answer our research question: *How are students with “NEE” discursively produced in the context of PD for problem-solving mathematics?* However, we recognised the teacher discourse was itself an action available within a discursive space (Tremain, 2006) and so we sought to understand these texts by consulting policy and exploring institutional practices. The interview text provided the data for this study, and the policy text was a means to help with the analysis.

#### 4.1 Researchers and participants

The majority of PD participants taught either in public schools or in privately run government-funded voucher schools, in mid to low socio-economic areas. All participants taught primary school level; some were mathematics specialist teachers (typically teaching grade 5 to 8, students aged 11 to 14) and others were generalist teachers (grades 1 to 4, aged 6 to 10 years). The teachers taught in or near the towns of Santiago, Valparaiso, Concepcion, or Temuco. In 2015, 140 teachers completed the PD and all were invited to participate in further data collection to explore their continued development in the years following PD; 18 teachers in total volunteered to be interviewed about their reflections on change in teaching, students, and teacher identity after PD.

The authors were post-doctoral fellows from New Zealand and Colombia and were members of the ARPA team but did not themselves deliver the PD. Neither of us have been labelled as having “NEE” and we both identify as female, as able-bodied, and as White and Black respectively. We mention these identities here to make clear our positionality and the possible interactive effects this has on the research. It is likely the participants saw us as members of the PD team and this may have affected their responses. Alternatively, our outsider status (including being foreigners in Chile) may have enabled a freedom of expression. At times, we used this deliberately in an interview, positioning ourselves as ignorant of the Chilean education system and positioning the teachers as the experts. This was not artifice; we did need further insider information and this we also sought from our Chilean colleagues.



## 4.2 Interviews

We conducted two different types of interviews, email and in-person interviews. During 2016, Lisa sent five email interviews to 15 volunteer teacher participants at regular intervals. Each contained five questions asking teachers to reflect on their experiences of teaching mathematics problem solving and followed up on earlier responses. Questions included the following: “Tell me about the students in your class this year?”; “Tell me about a problem-solving activity you have done this year - how did the students respond?” We held in-person, semi-structured interviews from late 2016 to early 2017, to follow up on themes from earlier data, and give teachers the opportunity to reflect on change in teaching, their students, and teacher identity. Each were conducted by either one of the two authors, together with a colleague, and ranged from 40 to 75 min in length. Lisa interviewed ten teachers (of the original group of 15) and Luz interviewed five teachers (this constituted two of the 15 and three additional volunteer teachers who did not participate in email interviews of 2016). Questions included the following: “Have you adapted the ARPA problem solving to your teaching?” and “Are there any students for whom the problem solving activity is particularly beneficial?” Towards the end of the interview we asked “How do students with ‘NEE’ respond to the problem solving activity?”; however, teachers typically mentioned students with “NEE” prior to this question.

## 4.3 Analytical procedures

Our analysis sought to explore how truths about “NEE” students circulate in teacher talk. We looked to unpack the ways wherein discourses, such as medical discourses, discourses of disability, and discourses of ability (evident in the research literature) are reconfigured within the contexts of problem-solving PD, a reform-based discourse that challenges the institutional configuration of the mathematics classroom. During the analysis process, we read and re-read the interview texts both separately and together as we tried to understand which wider social discourses were called upon to produce the subject. First, we examined the statements about students with “NEE” made by the teachers, including instances of labelling. Next, we looked to understand these statements by referring to policy documents within the Chilean educational system. This analysis step gave us insight into how knowledge about “NEE” becomes truth within the educational system, regulating both the institutional practices to deal with “NEE” students and teachers’ behaviours. During the analysis, our conversations were typically in English, while we maintained the Spanish of the text, and we translated subsequently for publication purposes. Due to space restrictions, we report only the translated quotes; the original Spanish transcriptions are available on request by writing to the first author.

## 5 Findings

### 5.1 Producing the (“NEE”) student as problematic: discourses of deficiency

In the data, we saw how students in general were viewed as being a problem. When we asked teachers to predict the challenges they would face as they taught mathematics in general, and non-routine problem solving in particular, teachers spoke more about the students than any other factor as being one of these challenges. Reasons such as lacking knowledge, having low academic self-esteem, being unused to group-work, being fearful to take risks, or coming from

a low socio-economic background were given to explain problems with students. Alongside these problems, teachers also mentioned their students as being with “NEE”. Due to these coinciding comments, we read the student with “NEE” as being seen a problem *by definition*. Maribel’s comment illustrates this:

Sometimes the students do not learn enough because of different characteristics: the home [environment], genetic problems of learning; I have eight children with specific learning needs detected. (Maribel, 5–8th grade, public school, email interview)

It was not only the label of “NEE” that defined the problem; throughout the interview data, we noted how particular learning and/or behavioural needs were given as examples of the problematic nature of students. For example, during her interview Marcela pointed to a number of sheets posted on the wall behind her where students’ names were listed according to broad categories of disability; in the following excerpt, she refers to a number of the names on these lists:

You see, everyone here has difficulties (laughs). In this group are those who have no reading comprehension, are slow, are slow, this one is super slow. She does not understand anything you say, [...] Here we have the same problem as them but with less difficulties, [...]. He has a serious attention deficit, this guy is very sick, now he does not come and Javier has a tremendous distraction, he runs, jumps, plays, and so on. Vicente is a child who is not yet a reader, this guy we tell him that in fourth grade, we learn to read; every day we teach him the alphabet, every day the ABCs, you ask him what letter is it, and he looks at you, he does not know. Here we send him to be evaluated elsewhere, I think this guy is not going to be able to continue here, in fact he was already warned that he cannot pass. (Marcela, 4th grade, public school, interview)

Marcela seemed to use the categories created by law and then modify these to include the majority of the students in her class. In doing this, she drew on the idea of special needs to problematize their learning behaviours. It is illuminating how Marcela conflated issues such as learning and behaviour together, from an inability to read through to playing around and high levels of illness related absences. Eight of Marcela’s students were officially labelled as “NEE” and participated in the project PIE (meaning these individuals received funding for educational support in school), yet she talked about *all* her students as having learning needs.

When pressed to speak of those eight students who had been officially diagnosed, Marcela commented that they were slow, and needed everything to be “very orderly and directed”. A number of teachers similarly expressed the “need” for alternative instruction. Often such comments were made in conjunction with mention of the PIE project, such as withdrawal programmes and extra support personnel in the classroom. These institutionalised practices helped to further the notion that these students needed a different type of instruction from other children.

In a course there are approximately six to seven children participating in the diagnostic centre [...]. They come, take them out of class, work with them and then return them to the classroom. And there are quite a few children with Attention Deficit Hyperactivity and Attention Deficit Hypoactive, eh, Anger Disorders, for example they have no management of emotions, frustration, intolerance, rather, intolerance to frustration. So they react in a slightly more violent way. These are like pathologies that could be present in a classroom in which I work. (Lucia, 2nd grade, voucher school, email interview)



Lucia's comments show how the "diagnostic centre" may function as the solution simultaneous to defining the problem. The students are withdrawn from the classroom, presumably for "diagnosis", and they are withdrawn for alternative programmes of work. Yet Lucia's examples are all behavioural, the "pathologies" she lists suggest the problem delineated here is actually a problem for the teacher who must maintain discipline and an orderly class. Here, it should be noted that Lucia has a large grade two class with 45 students.

There were many labels available to the teachers via the PIE practices of diagnosis.

In each course there are about 7 children belonging to the PIE group and a similar number with PIE support, that is, they also have special needs (DEA, LIF, LD, Dyspraxia, ADHD), some diagnosed and treated (psychologically and with drugs) and others not, but they are not in the official listings because there are no spaces for them (Maria, 5–8th grade, public school, email interview).

These labels may be familiar throughout the world and demonstrate the predominance of children labelled in such a way, and reveal how medical discourses circulate. They reflect the presence of professionals within the school system who are employed to identify ("diagnose") and work with ("treat") these students. However, even when students were not officially diagnosed, it appeared the labels were nevertheless applicable by the teacher. These labels, such as given in the quote above, refer to very specific needs—and yet the teacher may consider other children as having these same needs. According to Maria, they are not diagnosed simply due to lack of space available in the treatment programme. This idea enables teachers to consider other students in their classes, who perhaps do not respond to traditional teaching in an expected way, and produce them too as having "NEE".

Finally, one comment made by many teachers when discussing mathematics learning of their students with "NEE" was "les cuesta mucho". The English translation, "mathematics learning is hard for them", emphasises the difficulty of the mathematics, whereas the literal meaning (it costs them) speaks more of the students, suggesting there is a (bodily) price they must pay when doing non-routine mathematics. Thus, deficiency residing in the individual student worked as an explanation for their not being able to do mathematics, locating the difficulties of learning mathematics within the child, rather than the teaching or the educational context. This is clearly a deficit discourse, in line with literature and research based on the "medical model".

## 5.2 Collaborative problem solving for all: discourses of ability

In contrast, an alternative discourse of ability was evident when we asked teachers specifically about their actual experiences of implementing problem-solving mathematics and about how the students responded to this activity. Even those teachers who spoke most strongly about their students with "NEE" as being unable to learn mathematics except with alternative instruction spoke about ARPA activity as being "for all".

I believe that everyone is capable. [...] I mention Dana who is borderline and you saw that she was one of those that went forward and [demonstrated her strategy]. That is, for her, an achievement that - and she, she has a severe learning deficit. [...] And you saw that she participated and so how can I obstruct or how can I lock out any child [and say,] "this child cannot work [with problem solving]", no. All are capable (Elycuano, 4th grade, public girl's school, interview).

The term “borderline” (*límitrofe* in Spanish) comes from *Decreto #170*, which defines students with an IQ range of 70–79 into the “borderline” category (MINEDUC, 2009). The teacher later describes this as being a “severe learning deficit”, demonstrating the ways in which these labels may be translated in use. Implicit in the interview response is the idea one would not expect this child to achieve due to this categorisation, and yet she is simultaneously described as being able to participate in the problem solving activity.

The notion all students can engage with collaborative non-routine problem solving was a central tenet of the PD, which emphasised random, heterogeneous grouping. Indeed, one teacher reflected:

One has to learn to stop underestimating. It happened to me in the random selection, and I had four ‘zeros’ left in [one group], and I even thought about dissolving the group and putting [them in other groups, but I didn’t] and they could [do it]. Maybe they didn’t manage the extension or perhaps just did one extension not two, but they tried and they did it (Rosario, 4th grade, voucher school, interview).

The description of students as being “zeros” (“*nulos*”), which highlights Rosario’s lack of expectations and her subsequent surprise, was typical; students whom the teachers had positioned as incapable often surprised during problem-solving lessons. Clearly, teachers had appropriated, to some extent, the reform discourse of *problem solving for all*. Within this context of success in problem solving emerges the discourse of *ability*. This runs contrary to research literature that portrays students with “NEE” as unable to engage with, or learn from problem-solving mathematics.

However, when teachers spoke of students with “NEE” as successful in problem solving, they nearly always connected this with a discussion about the effect of the group, for example: “Yes, [the problem solving] benefits [students with ‘NEE’]. Especially if they have to work in groups, with pairs that can promote or help them” (Marcela, 4th grade, public school, interview). It appears that the student with “NEE” may be produced as able—but the collaborative group defines the limits of this ability.

## 6 Institutional and policy discourses

Students with “NEE” are produced through medical and deficit discourses as evident in the teachers’ talk. This production originates in research and policy and is reinforced by institutionalised practices. By defining “NEE” students, *Decreto #170* creates a regime of truth in which rules and meanings to talk about and deal with this student population are stated. The law includes a wide range of “NEE” conditions, from visual impairment and autism to specific learning disorders, setting a discursive space in which students can be easily identified, categorised, and labelled as “NEE” by teachers, seen in Lucia’s comments and in Maria’s extending the labels to include other children. The law equates learning disorders to learning difficulties; for instance, having a different reading speed or lagging behind the group become indicators of disability, as seen clearly in Marcela’s comments. *Decreto #170* also establishes a medicalized pedagogical system of evaluative practices to regulate and control “NEE” students. By creating subjectivities to be governed (Infante et al., 2011), the regime of truth set up by the law makes students with “NEE” not only measurable but also intelligible to teachers and administrators.

Drawing on scientific knowledge from psychology and neuroscience, and from more general notions of ability within mathematics education (Straehler-Pohl et al., 2014), the disabled body is positioned as different, abnormal, and marginalised. Medical classifications of disability delineate sharp, bold lines around categories and students are “boxed” (Brantlinger, 2004) into these. Once classified into, and labelled as being, for example, ADHD, or having “borderline” intellectual disability, the child becomes the student with “NEE”. As part of this scientific discourse, the notion of disability and the “NEE” categories are positioned as neutral, apolitical, and ahistorical. The law imposes a system of practices that normalises the use of medicalised and pedagogical interventions to cope with a student population portrayed as in need of intervention and subject of improvement. The use of scientific knowledge in the law to produce categories of subjects fulfils the role of naturalising a socially constructed identity marker (Infante et al., 2011), evidencing how knowledge and power are intertwined in the production of the student with “NEE”.

The Project PIE (which funds schools that integrate students with “NEE”) encouraged admission of previously excluded students and also established in the institutions specialised professional teams to support this integration (Tenorio Eitel, 2005). This situation is reflected worldwide; in schools, there exist a “cadre of professionals” who, in response to the occasion of a child’s failure to learn, apply their scientific tools to identify the child as learning disabled and thus requiring a special education (Reid & Valle, 2004, p. 471). Teachers with PIE support expressed, during interviews, their appreciation for the expertise of the school-based professionals and other accompanying resources (see Maria’s comments for example). The very existence of PIE staff helped normalise a medicalised discourse already introduced by the legislation (Peña, 2013). Students with “NEE” were diagnosed and treated by psychiatrists, psychologists, and educational specialists such as speech therapists. They were given medicine or psychological treatments and in doing so they were *pathologised*; a learning need or behaviour becomes an illness. The regime of truth set up by *Decreto #170* has encouraged a medical approach to otherness and deepened the gaps between what is considered “normal” and “deviant” at school (Peña, 2013). It defines and marks the boundaries of normality. In addition to being rendered incapable, students with “NEE” are rendered abnormal. “Here, rather than the ‘humanity’ of the learner as the legal limit of educational practices, education is used to define the legal limit to humanity” (Ball, 2013, p. 80, italics in original). The students with “NEE” are thus “divided” (Foucault, 1982) out from the normal student population and out from humanity.

Legislative and institutional practices of labelling fabricate the student with “NEE”, and this is a technology of power. Brantlinger (2004) asks who may be served by such labelling and classification processes; we suggest that while a medical label affixes the problem to the individual, withdrawal programmes are a solution to a teaching problem in part generated by very large class sizes, time constraints, and testing inside the Chilean educational system. This “solution” is evident in the way Lucia frames the “problem” of her students. Additionally, the institution is served through the labelling of students with “NEE”; the corresponding influx of funding may encourage “creative demographics” on the part of the institution. The large numbers of students labelled with “NEE” in each class are likely connected to the low socio-economic status of the schools in which the teachers work. There is much research evidence of the ways in which students marginalised in other ways may be more likely seen and “diagnosed” as being with “NEE” (McDermott et al., 2006; O’Connor & De Luca Fernandez, 2006).

## 7 Blurred boundaries

Whilst Brantlinger (2004) describes sharp, bold lines around categories of students, our analysis shows the way in which teachers break the diagnosis rules and redraw the limits by attributing special needs to other children in their classes (evident for example in comments by Marcela and Maria). This suggests that, in addition to producing the student with “NEE”, the rules of medicalised discourse create the space in which to construct all students as problematic. Here, there is a blurring of boundary lines between categories, in that teachers talk about all students with “NEE” together, as if their needs are not special at all, rather the homogenous “not normal”. Lines are also blurred in the teacher diagnoses of other students into the same categories defined by the medical professionals. The once sharply delineated classifications are blurred to include more students in the realm of abnormality.

However, within the disability regime of truth imposed in the school system, the PD emerges as a counter discourse of ability that seems to disrupt deficit views. It opens possibilities to reimagine disability and to produce new significations and representations for students with “NEE”. For instance, teachers were surprised by their students’ ability to engage with problem-solving mathematics. The teachers’ surprise not only evidences the strength of the deficit views introduced by policy and reproduced in institutional discourses about students with “NEE” potential to engage in problem solving; it also demonstrates the confluence within school of opposite discourses of ability that challenge such deficit views. The regime of truth produced by the policy is thus open to contestation and resistance. It is precisely in these contested spaces of significations that it seems possible to rearticulate new meanings about students with “NEE” in relation to mathematics ability and identity. Although more research is needed, the PD seems to be an important space to challenge deficit discourses.

## 8 Limitations and opportunities

In this study, we explored teachers’ talk to understand the discursive production of students with “NEE” in the context of reform mathematics PD. We suggest a key area for future research is to focus on students, for example to consider how students (with “NEE”) in Chile might self-author their mathematical identities in problem-solving contexts. A key tenet of DSE research is that the interests of persons with disability are promoted and this requires an attention to what they themselves describe as their interest. Relatedly, in this paper, we have not attempted to ascertain the actual change in level of inclusion or access afforded the students with “NEE”. Case studies about the experiences of the problem solving activity from the perspective of the students with “NEE” are another area of future research.

We did not find out from teachers *which* of their students they labelled with “NEE”. It is possible these students were disproportionately members of other marginalised groups. This has foreclosed for us the possibility of examining issues of intersectionality (Leyva, 2016) in the “NEE” production of these students, but again this provides an opportunity for further research, and is an important avenue to explore in light of the Salamanca statement.

## 9 Implications and conclusion

Whilst set in Chile, our findings are likely to be of international interest, given the parallels in policy and institutional practices of many countries. We expect our contribution demonstrates

that students with “NEE” should not automatically be excluded from problem-solving mathematics, nor from research about problem-solving mathematics. Whether or not one ascribes to reform notions that problem solving constitutes a superior form of learning mathematics (c.f. Lundin, 2012), we find it curious that an arbitrary line (Healy & Powell, 2012) may demarcate those who can learn in this way and those who supposedly cannot. This is particularly curious given the line may be easily blurred and shifted to include more students from the other side as desired. Additionally, we suggest that by stipulating: “problem solving *for all*” as a key tenet of the PD programme, space was created for teachers’ use of counter discourses of ability regarding their students labelled with “NEE”. However, the strong evidence of deficit discourses producing this group of students, not only in teacher talk but also in institutional practices and policy, demonstrate more is needed. We do not wish to lay blame with the teachers—we reiterate they speak that which is available within the wider discursive space (Tremain, 2006). Specifically, we suggest PD programmes do more than provide space for counter discourses; they need to help teachers confront the truth regimes upon which particular student populations are produced as problematic and in need of specific and differential pedagogical interventions. In other words, PD programmes must provide learning experiences for teachers to unlearn prejudiced and stereotypical representations of students. Finally, these learning experiences must also help teachers actively reconstruct discourses and ensure they (in addition to policy makers and researchers) are aware of both the deficit discourses and the ways in which experiences may run contrary to them.

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