



Who are the actors and who are the acted-ons? An analysis of news media reporting on mathematics education

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Abstract

While there are several studies analysing how mathematics education is portrayed in news media discourses, there has been little examination of the construction of different stakeholders (e.g. teachers, parents, curricula). In this paper, we report our analysis of a corpus of Canadian newspaper reports on mathematics education, focusing on the underlying construction of different stakeholders. Drawing on Foucault's notion of regimes of truth, we show how news media construct a "truth" that portrays different stakeholders as either actors or acted-ons working for or against individual or national mathematical performance. We explain these findings with reference to the general media framing of mathematics education in the corpus.

Keywords News media · Mathematics education · Foucault · Actors · Acted-ons

Introduction

Like many mathematics educators, we pay attention to news media reporting about different aspects of mathematics education. Commonly reported topics include methods of teaching mathematics, the content of mathematics curricula, and the results of international comparisons of children's mathematical performance (see, for example, Barwell and Abtahi 2017; Chorney et al. 2016; Lange and Meaney 2014; Pons 2012). Such reporting tends to portray mathematics teaching and curriculum in particular

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ways. Several recent studies have uncovered a broad prevailing construction of mathematics education in news media reporting in terms of two opposing kinds: *discovery learning* and *back to basics* (e.g. Abtahi and Barwell 2019; Barwell and Abtahi 2017; Chorney et al. 2016; Rodney et al. 2016). Discovery learning and related terms are commonly associated in news media reporting with confusing teaching methods, confused students, and frustrated parents. Back to basics is associated with tried and tested teaching methods used in the past, standardized mathematics methods and algorithms, and the learning of basic facts such as, paradigmatically, multiplication tables. This dualistic media discourse seems to have been around for many years and is connected with the so-called “math wars”, raging in North America for several decades. In the math wars, the debate has been politicized, with discovery learning being associated with progressive political positions and back to basics with conservative political agendas. In academia, similar debates often pit mathematicians against mathematics educators (see Schoenfeld 2004, for a review, or Wright 2012).

Media portrayals of mathematics education do more than construct methods of teaching mathematics. In the process, they construct versions of teachers, students, parents, and other stakeholders. In our recent analyses of media discourses about mathematics education (e.g. Abtahi and Barwell 2019), we became interested in the nature of these constructions. Consider the following brief examples, taken from our corpus of Canadian newspaper reports about mathematics education:

The [mathematical] task is especially challenging when the teachers themselves don't have a particularly strong grasp of mathematical principles. (*National Post*, 5 December 2013)

Parents signing petitions. Governments forced to defend their positions. A declaration that Canada's problem is on the scale of a national emergency. (*The Globe and Mail*, 11 January 2014)

A cursory reading of these examples suggests that the construction of stakeholders in mathematics education is not neutral. The choice of words and grammatical constructions of these examples implies that teachers are part of a problem or challenge, that parents are rising up, that governments are on the defensive, and that an entire nation is in trouble.

Any education system depends on an interconnected set of stakeholders, who each have different knowledge, tasks, and roles to play. Stakeholders in mathematics education might include teachers, students, parents, mathematics education researchers, ministries of education, and governments. Media portrayals of these different stakeholders and the relationships between them are potentially significant in mediating these same relationships. Coverage of PISA results, for example, has been associated with widespread public debate about mathematics teaching methods and curriculum (Pons 2012). Anecdotal evidence (from news reports) suggests that some Canadian parents have reacted to concerns about discovery learning to launch petitions and lobby governments to change mathematics curricula. More generally, media research suggests that media narratives about education do influence how particular events or activities are perceived (e.g. Scheufele and Tewksbury 2007). To understand the political dynamics surrounding mathematics education, therefore, it makes sense to investigate in more detail media portrayals of mathematics education and, in particular, the construction of stakeholders within these portrayals. This was the goal of the study

reported in this paper, for which our main research questions were as follows: (1) Who are the principal stakeholders constructed by Canadian news media reporting about mathematics education? (2) How are these stakeholders constructed?

The paper is organized as follows: first, we review research on the construction of different stakeholders in mathematics education in various domains, including in research discourses and in media discourses. Second, we introduce our theoretical perspective for the study: drawing on Foucauldian concepts, we explore how the notion of a regime of truth can help to understand how news media discourse constructs different stakeholders in Canadian mathematics education. Third, we summarize the corpus-based research design and methods used. We then present our findings, highlighting the construction of a series of stakeholders. In our presentation of the findings, we focus, in particular, on the positioning of stakeholders as either actors or “acted-ons” within the broader discursive field.

Constructing stakeholders in mathematics education

The majority of research on the discursive construction of stakeholders or participants in mathematics education has focused on the construction of teachers or students and has examined discourse data from a variety of domains, including classroom interaction (e.g. Anderson 2009; Esmonde 2009; Herbel-Eisenmann and Wagner 2010; Herbel-Eisenmann et al. 2010; Wood 2013), mathematics education research texts (e.g. Brown 2008; Pais 2016; Valero and Knijnik 2015; Walkerdine 1987), and popular culture (Appelbaum 1995; Epstein et al. 2010; Mendick 2005; Mendick and Francis 2012).

A study by Herbel-Eisenmann and Wagner (2010) provides examples of the construction of students and teachers in mathematics classroom interaction. For this study, Herbel-Eisenmann and Wagner conducted a corpus analysis of 148 transcripts of mathematics classroom talk, focusing on a feature of recurring word patterns known as lexical bundles. Their study was framed by positioning theory, which conceptualizes how relations between participants are constructed and transacted in discourse. In their corpus, they found that students were frequently (pervasively, even) constructed passively, their role being to conduct the business defined and organized by their teacher. Teachers, in turn, were constructed as directors of mathematics classroom activity and of mathematical thinking:

In the first example, the student was positioned as a passive follower of instructions:

[Teacher]: So what I want you to do is don't use these actual numbers. I don't want you to type in the actual numbers, I want you to use, like, go back to the ninety degree. Right? And so AB, this one's your long side, so take this...

Here, the students followed step-by-step instructions from the teacher, who did not give justification for the process, and did not seem to create space for student decisions [...] The second example engaged different storylines though the student still seemed to be positioned as obliged to do the teacher's bidding:

[Teacher]: All right. Look at the number on the board. I want you to look at it. I want you to think about the number. I want you to think about what the number

means, what each place value means. I want you to think about how you would say that number. Don't put your hands up, you're just thinking.

This example shows how a teacher's direction of mathematical processes has both social and mathematical significance [...] The students were doing mathematics under the direction of the teacher, and the teacher made the decisions—controlling the agenda and deciding what actions to take. Students were required to think about what they were doing, and about how they might use this understanding to engage in conversation with someone else (Herbel-Eisenmann and Wagner 2010, p. 53).

Herbel-Eisenmann and Wagner's study highlights a predominant positioning of these two central stakeholders in mathematics classroom discourse. Other constructions of students and teachers are, of course, possible. Esmonde (2009), for example, examined two different forms of mathematics classroom activity and identified several constructions of students as learners, such as expert, novice, and facilitator.

A paper by Brown (2008) provides an example of a study of the construction of stakeholders in mathematics education research. Brown analysed a collection of papers appearing in a special issue of *Educational Studies in Mathematics* on the topic of semiotics in mathematics education research. His attention is on how teachers and students are constructed in research discourse. He argues, for example, that teachers are often constructed as autonomous individuals who interpret government policy and curriculum relatively freely, through a research focus on individual teacher action. He contrasts this construction with an alternative one in which teachers are subject to government policy in a regime of compliance. Brown develops this alternative position with reference to an earlier study of his own:

A key element of this study was that it was the government who determined the constitution of mathematics within a legislated curriculum rather than mathematicians or even mathematics teachers. As such the study sought to show how teachers mediated the policy framework, with a view to examining how policies might be adjusted towards achieving alternative effects. That is, the study demonstrated how teachers were subject to the policy framework and the terminology it employed. Their validity, professionalism and identities as teachers were understood through the filter of their compliance with this regime. The authors, however, were not advocates of this regime but sought to examine how the ideology of the regime was processed by teachers. That is, they sought to understand how mathematics, students and teachers were shaped by this policy initiative. (Brown 2008, p. 255)

Brown therefore highlights how, in mathematics education research discourse, teachers can be constructed both as active agents in the classroom, as well as passive subjects of ideology and government policy. Several other studies have highlighted this latter construction in research discourse, drawing on social theory to argue that mathematics teachers and students are subject not just to government policy, but to broader ideologies circulating in society. Valero and Knijnik (2015), for example, refer to the construction of students in research texts as having the task of becoming “desired, rational, Modern, self-regulated, neoliberal beings, who are to run current societies adequately” (p. 38) (see also Walkerdine 1987).

In the domain of popular culture, several studies have examined the construction of students, teachers, and mathematicians, including several studies of film portrayals, as well as analyses of news media. In his wide-ranging study, Appelbaum (1995) examines different constructions of mathematics teachers, analysing, in particular, the production of stories of “great teachers” in American popular culture. Through examination of the story of Jaime Escalante, an award-winning mathematics teacher who immigrated to the USA from Bolivia, Appelbaum shows how great teachers are constructed in American popular culture as heroic, as patriotic, as legends, and as getting their students to succeed against the odds. This mythical version of the great teacher depends on a particular construction in which teachers:

needed to be given complete control over how, where and when they teach their students. The metaphor cultivated was that of a master craftsman with student apprentices. The students give up all other ties and obligations, and in return, the teacher/master provides training and financial support [...] Because students are not sold into apprenticeship in the United States, the teacher must convince them to voluntarily submit to his or her authority. It is for this reason that Escalante [...] needed to win over his students with his charisma before demanding discipleship of them. (p. 87)

The construction of mathematicians or mathematics students in popular culture has also been investigated, notably by Mendick (2005); Epstein et al. 2010; Mendick and Francis 2012). Her work has highlighted how popular culture intersects with gendered perspectives of mathematical success (Mendick 2005), and with gendered, classed, and racialised conceptions of successful mathematics students (Epstein et al. 2010; Mendick and Francis 2012), through, for example, the recurring trope of the white, male mathematical genius in popular films.

Across these different domains, some patterns emerge. Most notably, in classroom discourse, research discourse and popular culture, mathematics students are often constructed passively, as receivers of their teacher’s instruction(s), or of government initiatives designed to add value to them. Teachers, meanwhile, are often constructed actively as directing students’ learning, in sometimes heroic ways. Set against this pattern, some work has constructed teachers as more passive subjects of government and societal ideologies, required to implement particular kinds of mathematics and mathematics teaching.

Finally, there has been an increasing amount of work examining media constructions of mathematics education. This work has highlighted an established dualism in which two forms of mathematics teaching and curriculum are placed in opposition to each other—progressive approaches, often referred to as discovery learning, and approaches involve a return to supposedly established methods associated with procedures and memorisation, often known as back to basics (Abtahi and Barwell 2019; Barwell and Abtahi 2017; Chorney et al. 2016; Rodney et al. 2016). This work has tended to focus on the contours of the debate; less work has focused on the construction of different participants in mathematics education. One exception is a study by Lange and Meaney (2014), who examined how children were constructed in Australian news coverage of mathematics education. They found, rather depressingly, that children were constructed as commodities largely defined by their scores on mathematics tests, “with mathematics

achievement being the value that can be added to them” (p. 337). Lange and Meaney also noted that this construction was part of a wider discourse in which a conservative (“basics”) approach to teaching and assessing mathematics was taken for granted. In earlier work, we also found that students were constructed in highly passive ways in Canadian news reporting (Barwell and Abtahi 2015; Abtahi and Barwell 2017).

Children, however, are not the only agents portrayed in public news media. In this study, therefore, we investigated how other stakeholders are constructed in news media and what roles, tasks, and knowledge are attributed to them. In this article, we examine the construction of three other principal actors: parents, teachers, and curriculum. We focus on these three agents, as we believe they play the most important roles in the construction of the narrative of a war. To do so, we used Foucault’s notions of discourse and regimes of truth.

Regimes of truth—distribution of what knowledge?

The idea of a regime of truth arose in the context of Foucault’s study of the historical transformation in some forms of knowledge—such as medicine, biology, or psychiatry (1977, 1980). For example, in *The Order of Things*, in analysing historical discourses of medicine, Foucault explains that the establishment of the medical *Clinique* as developed in 1800 was not necessarily an improvement on any preceding medicinal practice, such as by being based on the observation of some new (medical) “truth”. Rather, it was a different representation of a theory of knowledge, inserted within a specific discursive field of the period. He clarifies that the authority of the clinician (i.e. a doctor) relied on a relationship to the prevailing organization of knowledge, and not necessarily on a relationship to an objective reality. He shows that as a result of the gradual change in the discourse of practice (and not the knowledge of practice), an early eighteenth century doctor could observe and assess the same disease in the same human organ as a nineteenth century doctor, with the two doctors coming to different conclusions about what caused the disease and how to treat it. Despite this obvious difference, both accounts would be true, since they were both produced in discourses that considered such statements to be true (Foucault 1977).

Based on his analysis of historical changes in discourses, Foucault states: “These are not simply new discoveries, there is a whole new ‘regime’ in discourse and forms of knowledge” (Foucault 1977, p. 112). He argued that such changes in discourse and in what counts as truth were neither a change of content nor a change of theory; they reflect, instead, a question of “what power” governs statements and the formation of the discourse to then produce “what truth”. Truth in Foucault’s view is not beyond power. He explains:

truth isn’t the reward of free spirits, the child of protracted solitude, nor the privilege of those who have succeeded in liberating themselves. Truth is a thing of this world: it is produced only by virtue of multiple forms of constraint. And it induces regular effects of power. (Foucault 1977, p. 131)

This view of truth led Foucault to then see how each society has its own general politics of truth: “the regime of truth”, understood as the types of discourse which society

accepts and makes function as true. For example, in mathematics education, the work of Walkerdine (1987) uncovered the regime of truth produced by progressive approaches to mathematics education, including the idea of children as rational beings.

Foucault's ideas are fundamental for us to develop a richer understanding of the knowledge, truth, and power that were constructed as underlying elements, engrained in the media reporting. Foucault's view of the production of truth, through execution of power, adds a layer of political complexity to the portrayal of mathematics education in Canadian news reports: who has the power to produce what kind of knowledge to be considered as whose truth? For example, within media construction of mathematics education, do teachers have power to act and produce a certain kind of truth about mathematics and its education? What about parents or the curricula? Given the long-standing media construction of mathematics education in terms of a binary distinction between progressive methods and back to basics, we assume it operates with a regime of truth. Foucault's view about the interrelationships between the regimes of truth and discursive formation, such as those that frame the news, provides a way to view the distribution of knowledge and power within the dominant discourse of newspaper reports to understand how stakeholders are constructed in news reporting about mathematics education. The goal of the study we report in this paper, then, is to understand the construction of different actors involved in mathematics education within the prevailing regime of truth.

Methods

To investigate news media discourses of mathematics education, our research design follows a broadly critical discourse analytic approach (see, for example, Fairclough 2001, 2003). Mullet (2018) offers a helpful synthesis of the main steps in such a study: select the discourse, locate and prepare data sources, explore the background of each text, identify overarching themes, analyse external and internal relations in the texts, and interpret the data (adapted from Mullet 2018, p. 122). The opening sections of this paper identify the discourse of interest. To locate sources of suitable discourse data, we collected Canadian print news articles on issues related to mathematics education within a six-month period (September 2013–March 2014). We studied three national Canadian print publications, the *Globe and Mail*, the *National Post* (both daily newspapers), and *Macleans* (a weekly publication), to represent a range of national news coverage. We searched for articles using each publication's web archive. We searched for the combination of the following terms: math + curriculum, math + education, math + teaching, and math + learning. In total, we found 53 articles: 39 in the *Globe and Mail*, 11 in the *National Post*, and 3 in *Macleans*. These articles constituted our corpus of discourse data. We read all of these articles several times, which gave us a general sense of the content of the corpus, allowed us to identify the different actors that were mentioned, and led us to notice some broad patterns. In particular, early in the process, we distinguished between actors and "acted-ons", the latter being subject to the actions of others.

To analyse the different actors within the corpus, we first needed to identify references to such actors within the corpus. We used the following procedure. To prepare the data, we converted all the reports to text files and numbered them 1–53. To

each file, we added a start-line (i.e. 01—starts) and an end-line (i.e. 01—ends) to be able to create a searchable data system. We imported the text files to a spreadsheet, sorted by “paragraph” + “cut by end-line”. This organization gave us a database of all the news report articles organized by file number and paragraph number, resulting in a total of 987 paragraphs and 112 pages of data. To search for keywords within the data, we wrote a short program and mirrored the result from each line to a column. For example, to search for instances of the word “teacher”, we used the following program:

```
=IF(ISERROR(SEARCH("start",E3))=FALSE,IF(SEARCH("start",E3)<8,A2+1,A2),A2)
=SEARCH("teachers",E94)
=IF(ISERROR(F1),,1)
=IF(G2=1,E2,IF(K2=1,I2,""))
```

We set up the spreadsheet to produce 6 columns showing for each search the “article number”, “paragraph number”, “all paragraphs”, (if the keyword is in the paragraph) then “the word number”, “number of repetitions of the key word in the paragraph”, and finally “the entire paragraph that contained the keyword”. For example, the following snapshot shows that in article #3, the keyword “teacher” was mentioned once in paragraphs 3 and 5 and 0 time in paragraph 4.

3	3	Robyn Urbac	29	1	Robyn Urback: Ontario gives teacher
3	4	Robyn Urback	#VALUE!	0	
3	5	When I was i	27	1	When I was in Grade 3, my teacher, I

In a second sheet, we mirrored only the two columns “article number” and “the paragraph that contained the keyword”. The following screenshot shows two paragraphs in article 1 and one paragraph in article 2 that contain the keyword “teachers”.

1	While Ontario soon introduced its own similar math program, Quebec, in typical contrarian fashion, specifically mandated that its teachers ignore the Canadian trend in math education.
1	Teachers, instead of being instructors, would be an “architect of learning — one who plans, designs and oversees learning activities.
2	John Mighton, the creator of the highly successful JUMP math program says Ontario needs to ensure the teaching approaches it’s asking teachers to use are grounded in findings from cognitive science research. Teachers also need to have the freedom to try new ways to help their students learn math, which should then be “rigorously” tracked to see if the innovation works or not.

We repeated the same process to extract all the paragraphs in the entire corpus that included the following keywords: “teacher”, “parent” and “mother”, and finally “curriculum”. We created 4 excel files, one for each keyword. In the entire corpus, “parent” was mentioned 114 times, “teacher” 201 times, and “curriculum” 127 times.

To identify themes, we focused on what roles, tasks, and attributes are assigned to teachers, parents, and curriculum. We began by looking at actors and acted-ons. Actors consist of anyone portrayed in news reporting as doing or influencing mathematics education in some active way. Actors included teachers, government ministers, university mathematics educators, parents, and sometimes students. Acted-ons consisted of

Table 1 References to teachers*, parents**, and curriculum

Keyword	# total paragraph	Actors	Acted-ons
Teachers*	148	45	88
Parents**	95	76	14
Curriculum	46		

*Combination such as of teacher-training, teachers-college, teacher-union, and teacher association are eliminated

**Combinations such as parental neuroses and words such as apparently are eliminated

anyone who was portrayed as subject to mathematics education in some way. Acted-ons included teachers (e.g. subject to the curriculum), parents (e.g. subject to government policy), and students (e.g. subject to teaching). In each file, we read each paragraph carefully, as well as surrounding paragraphs, to see if any role (actor or acted-on) was attributed to the teachers, parents, and curriculum. Table 1 shows the number of references to each actor and acted-on.

In the next stage of analysis, we examined the internal and external relations in all the text relating to teachers across the entire corpus. We did the same for parents and for curriculum. In this stage of the analysis, we were looking for patterns arising in the discourse data, regardless of where it appeared. By looking for patterns, we could build up a picture of the overall regime of truth. In this reading, we looked at external relations, such as what situations each actor was associated with, or was systematically not associated with, or how they were positioned with respect to the math war. We looked at various internal discourse features, such as what words were commonly associated with each actor, or what grammatical tenses were used to write about them. Within these discourse features, we looked at how teachers, parents, and curriculum were constructed in terms of the power they possess (if any) and the power(s) that are acting upon them. That is, we looked at how teachers, parents, and curriculum were portrayed as actors and as acted-ons, and the narratives within which these portrayals were produced. For example, consider statements such as: “Math isn’t hard, but teaching it is. A teacher without a firm grasp of mathematical principles, as well as the tools to explain them, shouldn’t be the one explaining BEDMAS to the class” (*National Post*, 5 December 2013) or “Teachers need to know not just what the prescribed outcomes are for their grade, but what students will need later” *The Globe and Mail*, 9 January 2014a). These statements position teachers as both actors—poor ones too—with no mastery of mathematics, and acted-ons in need of knowledge. We also noted the images or ways of thinking or knowing that were being denied or repressed in these representations. During all our analysis, we were aware that the immediate context of the construction of children in the news was situated within a broader political context often framed as a war. In the rest of this paper, we present the outcome of this analysis and offer our interpretations.

Actors and acted-ons

Our examination of the corpus of news articles revealed multiple agents and actors involved in the production of the war story: agents who act in favour of and actors that

act against the cause of the war. These actors included governments, provinces, ministries of education, ministers, teachers colleges, parents, students, teachers, curriculum, research and researchers, and university mathematics professors. These agents are portrayed both as having power to act and/or as being acted on. Governments, provinces, and ministries are constructed as being powerful actors on one side of the war. Parents seem to be powerful actors on the other side of the war. Teachers and students are predominantly portrayed as being subject to the power of others. The curriculum seems to be the cause of the fight.

We have previously reported on the discourse of a war zone (Barwell and Abtahi 2015)—an extended conflict around reformed mathematics education in which the campaign for back to basics is a “battle that’s been brewing for years”:

The battleground is fractured and the sides aren’t clearly drawn, but at the centre of the debate over so-called discovery learning is this question: should the teacher be a sage on the stage, a guide at the side, or both? (*The Globe and Mail*, 9 January 2014)

Broadly speaking, the battle is raging around the decline in children’s mathematics scores. The news media has portrayed multiple reasons for this battle, and one of the main issues that has been raised is “adopting the Western and Northern Canada Protocol (WNCP) math curriculum, with its ‘discovery learning’ focus” (*National Post*, 30 December, 2013).

Within this battlefield, parents, teachers, and curriculum are strategically positioned and portrayed to act in distinctive ways; to have particular roles, tasks, and knowledge; and, finally, to be acted on by greater powers within the educational and political system. The acted-ons are subjected to mathematics education in some way, such as teachers being subjected to the curriculum, parents being subjected to government policies, and students being subjected to testing systems.

An overarching and highly political narrative is interwoven with positions taken by various agents, including parents, teachers, and curricula. This narrative explains that the reformed curriculum—which is powerfully supported by the governments—is designed in a manner that damages students’ learning of mathematics, thus allegedly generating problematic situations for which teachers are not prepared; as a result, these teachers are said to need to be better trained to teach mathematics. At the same time, many parents are acting strongly against the implementation of the curriculum, and are demanding change. The justifications for the allocation of the particular roles and knowledge to these agents are often connected with the ultimate economic prosperity of the children (i.e. their success in future jobs) and with that of the nation as a whole. For example, one report noted that “student performance in math matters [...] both for academic success and future job prospects” while not performing well would negatively affect “the future of Canadian students and the prosperity of the country” (*The Globe and Mail*, 3 December 2013a).

In order to understand how teachers, parents, and curriculum perform within the mathematics education system, it is important to understand how they are constructed as actors and as acted-ons. They were constructed as actors when an action was attributed to them. An example of this characterization occurred when the curriculum was portrayed as the primary factor driving the decline in students’ mathematics scores:

as noted in article 5, mathematics curriculum, “with its ‘discovery learning’ focus, scaling back on testing [...] have been key factors in Alberta’s decline”. On the other hand, agents were constructed as acted-ons when an external system or power attributed an action on or to them. For example, in a report published in the *National Post*, it is stated that “We really do need to work with parents ... so they get what’s going on” (8 January 2014). In this statement, parents are acted-ons. They were portrayed as needing to be “worked on” in order to understand developments in mathematics curriculum.

In the next sections, we elaborate on these positions in relation to teachers, parents, and the curriculum. Drawing on a variety of illustrative examples, we show how the role of these agents is organized in relation to the regime of truth around mathematics education as consisting of two opposing forms of teaching.

Construction of teachers in relation to mathematics and its education

Teachers are constructed as actors who lack important knowledge. As shown in Table 1, 48 out of 145 phrases attribute some element or elements of actor-ship to teachers. Moreover, in the scenarios in which teachers are constructed in the role of actor, they are mostly constructed as being non-knowledgeable and unprepared—for example, they have poor understanding of mathematics or poor teaching skills. They are portrayed as being ill-equipped not only because they are said to lack the academic background and content knowledge to teach mathematics, but also because the foundations of discovery learning are said to have been designed in a manner that makes it very difficult for teachers to know how to proceed. In order to support the assertion that teachers lack the required knowledge, the *National Post* explains that “many would-be educators come from humanities backgrounds and haven’t seen a math text since they themselves were in Grade 11” and that “teachers themselves don’t have a particularly strong grasp of mathematical principles” (5 December 2013). It reports:

Math isn’t hard, but teaching it is. A teacher without a firm grasp of mathematical principles, as well as the tools to explain them, shouldn’t be the one explaining BEDMAS to the class. (*National Post*, 5 December 2013)

Furthermore, within this regime of truth, the problems extend beyond supposed deficiencies in teachers’ mathematics knowledge to include the curriculum of discovery learning which, in addition to its supposed inherent weaknesses, makes the teachers even worse actors. For example, in article 6, it is just as problematic that teachers might have “a strong grasp of the mathematical concepts, but [...] are strangled by curriculum requirements”. Similarly, a report in the *National Post* stated:

The idea with discovery learning is that the teacher doesn’t have any information for students; what the teacher has is an educational experience in which the student is faced with a problem, and by solving the problem they create knowledge (28 February 2014).

Teachers are not always actors. In more than 70% of references to teachers, they are portrayed as acted-ons—agents that, in one way or another, are subject to ministries,

policies, and/or curricula. Teachers are acted upon by the money that is invested in them, specifically by the provincial government, to develop them professionally; this investment is effectuated, for example, through new professional development that is designed to enhance their knowledge of mathematics. The *National Post*, for instance, states that “Ontario gives teachers \$4 million to brush up on province’s shoddy math curriculum” and that “The best way to improve the math test scores of Ontario students is to better train teachers in the subject” (8 January 2014). Moreover, the teachers and their teaching are subject to the demands of the curricula. A report in the *National Post*, explains that “The kids are bright and the teachers are dedicated, but it felt like everybody had their hands tied behind their back [by the content of the curriculum]” (13 September 2013).

In relation to the teachers being acted upon, we further acknowledge the role played by explicit or implicit prescriptive discourse—the things that teachers need to do. As is explicitly noted in article 3, “Ontario teachers don’t need \$4 million to brush up on a curriculum that isn’t working. They need to learn the math before they teach it – in university. They need improved strategies for instruction. And they need to work with a better curriculum” (*National Post*, 8 January 2014). In this excerpt, teachers are the victims of a broken curriculum and again lack suitable content knowledge and teaching strategies.

Construction of parents in relation to mathematics and its education

Parents are constructed as worried and feeling helpless, often because they apparently struggle to understand progressive “discovery” mathematics. In 76 out of 95 references to parents, they were portrayed as actors, although it is important to note that they are often constructed as actors lacking agency. For example, the *National Post* explains that “provinces have moved forward with discovery math programs [...] And parents, never mind children, are having trouble understanding the new concepts” (5 December 2013). Parents are trying to help their children, but they find it difficult: “Besides worrying about students not learning basic math skills, parents trying to pitch in with their children’s homework, were having difficulty helping their young people because they weren’t able to understand it either” (5 December 2013). In these excerpts, parents are actors, but actors who worry and who struggle to help their children. We see this kind of construction as linked to a moral dimension to the regime of truth: that progressive methods of teaching mathematics are causing bad things to happen to children, parents, and the nation (Abtahi and Barwell 2019). As a kind of reaction to this morally problematic situation, parents are “outraged” and demand change, such as through petitions. As the *Globe and Mail* reports:

parents in Alberta, Ontario and British Columbia, for example, launched petitions over the Christmas holidays, calling on their governments to revamp curriculums with a greater emphasis on basic math skills. (11 January 2014)

Further, the *Globe and Mail* explains that:

A grassroots movement of parents and educators is pressing provincial governments across the country to make immediate changes to the way math is being taught. (7 January 2014)

These accounts perpetuate the same narrative—that mathematics teaching need to go back to basics—but this time with an emphasis on the parents’ desires for their role in supporting their children. Despite being frequently characterized as feeling concerned and even helpless about the new discovery learning, parents are, then, broadly portrayed as actors—as agents who demand change by making their voices heard and launching and signing petitions and who achieve change by initiating adjustments to some provincial curricula.

In general, it seems to be a social moral value that an issue that makes parents concerned about their children must be an important issue. A closer look at these discourses reveals that the news reporting draws on this social value in order to create a particular portrayal related to the nature of mathematics education. This portrayal includes the assertions that discovery learning is inherently wrong, that mathematics teaching needs to go back to basics, and that alarmed parents are the active agents who are able to carry us to the right destination.

Construction of curricula in relation to mathematics and its education

The curriculum is another agent that is constructed as playing an active role in the war. It seems that the battle was triggered by the assertion that the mathematics curriculum “is not working”. A *National Post* report noted Manitoba’s adoption of “a dramatic new discovery-math-type curriculum in 2008 with abysmal results” and that “adopting the Western and Northern Canada Protocol (WNCP) math curriculum, with its ‘discovery learning’ focus, scaling back on testing, and the recent Finnish flirtation, have been key factors in Alberta’s decline” (30 December, 2013). The curriculum is characterized as an actor that negatively affects teaching as it is “packed” and “shoddy” and as “its requirements strangle the teachers”. A report in the *Globe and Mail* explicitly explains the connection between the curriculum and teaching:

Fundamentally, education consists of what is taught (curriculum), how it’s taught (methodology) and who teaches it (teacher competence). Each component is crucial to learning. Curriculum and methodology are closely linked, so it’s no coincidence that the decline in PISA rankings follows the introduction of various forms of ‘discovery learning’ in most of Canada (15 December 2013).

In this quotation, curriculum is constructed as an acted-on (since it was “introduced”). Curriculum is similarly constructed as an acted-on, and often as subject to unspecified forces. For example, in article 6, the “good” ways of learning have been taken out of the curriculum and have been replaced by some fuzzy and unreliable methods:

The old ways of learning – rote strategies and ‘math facts’ – have been replaced by so-called ‘discovery math’ and ‘inquiry-based’ teaching methods that focus on word problems, strategies and estimations. (*National Post*, 30 December, 2013)

In this excerpt, the curriculum is acted on, but who or what has made the changes is often implicit or attributed to vague under-specified forces or the government.

In contrast, curriculum is frequently constructed as playing an active role in students’ learning, though it often has a negative influence. The curriculum is said to

hinder students' mathematical learning. For example, a report claims that "frustration and repulsion to math" learning is related to frustration to the allegedly overly convoluted curriculum:

students intuitively know that the curriculum is entangled in overly complicated and convoluted strategies. Every year that goes by with children lost to this new math curriculum is another graduating class with doors closed, choices limited, and dreams unfulfilled. (*The Globe and Mail*, 10 January 2014)

In this excerpt, curriculum is entangled and "loses" children causing the misery of unfulfilled dreams. A particular power is sometimes associated with the curriculum: the curriculum asks students to do certain types of mathematics and not others—with each of the types being perceived as being useful or not useful depending on which side of the battle one stands. For example, the *National Post* reports that the "curriculum asks students to give a real-life example of when you might need to know that 3 groups of 2 is 3×2 " (9 January 2014). The report further explains that:

That's fine (if you can figure out what the question is actually asking), but how about getting students to actually solve 3×2 , before requesting that they explore real-life applications? Absent counting blocks, a calculator or 30 seconds of thinking time, many students can't (*National Post*, 9 January 2014).

In this construction, the key agent is the curriculum itself. In all of the various constructions of the curriculum, the elements are positioned in order to portray a specific picture of the broader political issue of the war. The curriculum is repeatedly given the role of acting on other stakeholders—and these actions most often are characterized as having negative effects. The curriculum is said to hinder teachers' teaching because it is "too fuzzy". At the same time, it is said to hinder students' learning because it does not include the good learning materials—to say the least.

Discussion and conclusions

Much like in any story, in this war story, there are characters who contribute to building it by taking on particular roles and/or by doing (and/or not doing) particular things. Our findings show how parents, teachers, and curriculum are constructed as playing particular roles with respect to mathematics education in Canada. Curricula across Canada are often constructed as active agents in the war; despite apparently causing problems for teachers, students, and parents, they are supported by the provincial governments and their respective education ministries. Teachers are mainly constructed as passive (and even at times naïve) acted-ons, who lack sufficient mathematical knowledge and training, who are subject to the demands of governments and curricula, and who are mainly unsure about what to do. In our corpus, there are no heroic mathematics teachers of the kind described by Appelbaum (1995). This is contrary to research that shows teachers as agentive (Brown 2008; Herbel-Eisenmann and Wagner 2010). In contrast to the portrayal of teachers, parents are mainly constructed as active agents who courageously stand up against the government and against morally

undesirable changes to the curriculum. Parents actively contest the curriculum, in a way that teachers seem largely do not (Brown 2008).

These findings show in more detail than previous research some important features of media discourses about mathematics education. A prevailing picture of how mathematics teaching and learning in schools “is – a regime of truth – clearly emerges. Discovery learning curricula are, according to this picture, disturbing the reasonable ways of teaching mathematics. In the face of this curriculum, teachers are somewhat helpless, lost and lacking in knowledge. As a result, children struggle to learn, and parents express their concern that their children will not succeed. With this regime in place, the truth of any new developments will be understood in its terms. Indeed, a recent revision of the province of Ontario’s elementary school curriculum, introduced by the province’s Conservative government, was entirely presented as a back to basics move, obscuring much complexity. Going back to Foucault’s conceptualisation of the role of social discourse in the production of knowledge and truth, we ask what kind of message these discourses are sending, for society to accept and make function as “true” about not only mathematics education but also its different stakeholders?

It is beyond the scope of our analysis to provide a detailed answer to this question, but we can propose some hypotheses. First, of course, it is important to pay attention to the structure of contemporary print news media. Many Canadian newspapers struggle to survive and are constantly under pressure to reduce costs. Print news is also increasingly consumed online, where content is linked to advertising. In simple terms, news reporting needs to attract readers. It is in this climate that the long-standing tendency to structure news reporting around moral narratives is relevant (De Vreese 2005). Stories that have clear “goodies” and “baddies” are particularly appealing, especially if the goodies are everyday people with whom readers can identify. In the context of mathematics education, readers are more likely to identify with parents and children, rather than with teachers or curriculum writers, for the simple reason that most people are parents and all have been children, whereas few are teachers or government officials. There is, therefore, a plausible logic to the production of news about mathematics education which highlights parents’ or children’s struggles.

Teaching and learning mathematics has long been portrayed in popular culture as a difficult endeavour, not just in news media, but in films, in literature, and so on (e.g. Appelbaum 1995). This “truth”, however, is a product of discourses in which mathematics is done by brilliant, lone men, rather than, for example, in collaborative groups (Chestnut et al. 2018). This kind of discourse underpins constructions of teachers as lacking in mathematical knowledge, or of parents as struggling to support their children’s learning of mathematics. It is unreasonable to argue, for example, that parents’ lack of mathematical knowledge is a problem if mathematics is hard to learn. The fault must lie elsewhere.

We must also pay attention to the politics of education, and in particular, to STEM education. Governments now regularly propose projects to attract high-tech industry, and make statements about the shortage of highly qualified STEM graduates. Mathematics here serves as an economic tool—and several of the news reports in our corpus explicitly indexed this economic discourse. Education is, in this neoliberal account, the provider of highly skilled workers, to contribute to economic growth. In this discourse, individual success and individual worth are linked to the economic needs and success of the nation. Thus individual struggles with mathematics are associated with a loss of

future individual worth, as well as a loss of national economic progress and national status (Abtahi and Barwell 2019). Again, these individual struggles cannot be blamed on individual learners or their parents, who by default are assumed to aspire to success for their children, as well as for the nation. Hence, parents are constructed as actors struggling for their children's success, and children are largely acted-ons, the subject of both schooling and of parenting.

To conclude, the social construction of truth surrounding the general portrayal of teachers, parents, and curricula creates structures that control the kinds of knowledge and truth that are produced about mathematics and its teaching and learning in Canadian society. As mathematics educators, we cannot help but notice what we assume to be a mis-speaking of the "truth". The kind discourse around the agency of different stakeholders construct a regime of truth that differs from prevalent understandings about teaching mathematics in our field. As such, the news discourse is representative of neither the complexity nor the challenges of the everyday work of teachers, parents, and students, nor the depth and focus of the research in the field. It is worrisome that through the misleading news-mediated truth and power, social and political decisions are made and social actions are mobilized. For example, Canadian politicians do take advantage of these discourses for social control and policymaking, and parents organize events (i.e. petitions) to confront and condemn curricula and teachers, whereas the problem they are trying to fix might be somewhere else.

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Compliance with ethical standards

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