

Teacher Perspectives on Pedagogical Documentation in Kindergarten Math

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Discourses of neoliberalism have existed in school systems of capitalist societies since at least the 1980s (Davies & Bansel, 2007). It is thought that the influences of neoliberalism in education are necessary for individuals to be competitive and productive in a global economy (De Lissovoy & Cedillo, 2017). Neoliberalism positions “the child as knowledge reproducer, the parent as consumer, the teacher as technician, and the school as business” (Fielding & Moss, 2012, p. 1) competing in the free market.

Pedagogical documentation is a practice that offers the opportunity to resist neoliberalist practices and engage in ways of being which foster democratic practices and relationships with others (Lenz Taguchi, 2010; Rinaldi, 2012). This study draws on literature that considers pedagogical documentation as integral to a specific approach to learning (Dahlberg, 2012; Rinaldi, 2012; Wien et al., 2011). Pedagogical documentation includes collecting materials like photos, videos, written transcriptions, and children’s work to be revisited and considered by students and educators together, as a way to make thinking visible and move thinking forward. In this way, those who use pedagogical documentation use it to reveal children’s varied ideas and theories without the urge to categorize those ideas and by resisting the temptation to use documentation to observe and track normative outcomes of the child (Lenz Taguchi, 2010). In this approach to learning, a “pedagogy of listening” helps educators engage with a deep awareness, suspending their judgements and prejudices (Dahlberg & Moss, 2005). The pedagogy of listening embraces “the importance of being in a community for creating and re-creating theories [including many diverse and provisional] as part of a continuous process of learning that involves theorizing, dialogue, reflection and negotiation” (Dahlberg & Moss, 2005, p. 101) and in doing so, employ democratic processes.

The Ministry of Education of Ontario’s kindergarten program document discussed the way in which educators must engage with pedagogical documentation. The description of pedagogical documentation in this document reveals neoliberal undertones in the choice of words used like: “eliciting and interpreting evidence”, “rigorous evidence of student learning”, and “educators are becoming ‘knowledge leaders’” (Ministry of Education of Ontario, 2016, p. 36). However, the document refers to the “pedagogy of listening” and acknowledges that pedagogical documentation is not summative assessment. It seems that the kindergarten program document attempts to reconcile the use of pedagogical documentation in a system that is heavily influenced by neoliberalist practices, which in turn creates a tension for it to be used as a conduit for democratic practices in education.

It is also critical to consider what research says about mathematics teaching and learning. Many scholars believe that learners in the 21st century need to be able to think critically, communicate effectively, innovate, and solve problems (Scott, 2015). However, Scott (2015) stated that lecturing students without student participation, often called the “transmission” model, reigns as the dominant model of instruction in education and will not advance learners’ critical thinking abilities. Additionally, much research promotes problem solving as a vehicle for understanding mathematics (Hiebert et al., 1996; Melville et al., 2013, National Council of Teachers of Mathematics, 2014). The National Council of Teachers of Mathematics (2014), as the world’s largest mathematics education organization, advised that the learning of mathematics must include opportunities to make connections and use representations, pose intentional

questions, build understanding conceptually, encourage productive struggle, and use student thinking to promote mathematical conversations.

Davis and Renert (2013) positioned “mathematics knowledge for teaching in terms of a learnable participatory disposition within an evolving knowledge domain” (p. 247). This notion is gleaned from the authors’ extensive research which suggested that when teachers participate in shared mathematical activities, these activities have an immediate and substantial influence on their knowledge of mathematics and in turn, their teaching practice. Mason and Davis (2013) suggested that teachers “seemed to lack the vital connective tissue between mathematical awareness and in-the-moment pedagogy” (p. 183). In other words, the authors noted that it is one thing for a teacher to notice something that a student lacks or is missing, but it is altogether a different thing to be able to think of an appropriate pedagogical action in the immediate moment when a student requires teacher input. It is thinking about the appropriate pedagogical action that Mason and Davis (2013) referred to as the connective tissue. Mason and Davis (2013) suggested that what teachers do in teaching must be based on intentional and deliberate choices in-the-moment as they attend to both the choice itself and the conditions around the choice, as well as develop this kind of knowing by way of “being mathematical with and in front of their students” (p. 188). Mason and Davis (2013) suggested that what is important in teaching is “noticing more” and understanding the range of possible actions which come to mind when they are needed and teach by responding to students through awareness, noticing, and sensitivity, rather than depending on their habitual actions.

Therefore, this study investigates the views of teachers in Ontario about pedagogical documentation in the early learning math classroom, by exploring the research question as follows: “How do teachers conceptualize pedagogical documentation?”.

Conceptual Framework

Clark and Peterson (1984) played a major role in establishing how important it is to listen to teachers talk about teaching. Their work provided a framework to understand how teacher knowledge and beliefs influence teacher actions. This study uses Clark and Peterson’s (1984) framework to examine what kind of thinking must be researched. Additionally, it has been extensively used in mathematics education (e.g., Russo et al., 2020; Sullivan, 2018), as it offers a way to conceptualize how teachers talk about their thoughts and beliefs and what thoughts they think about, as well as how their actions are informed by their thinking. Clark and Peterson (1984) suggested that there are three interrelated thought processes that influence teachers’ intentions in the classroom. The three thought processes are: a) teacher’s planning which includes the thinking prior to instruction; b) teachers’ interactive thoughts and decisions; and c) teachers’ theories and beliefs, which encompasses the knowledge and beliefs of objects, events, people, and their intertwining relationships (Clark & Peterson, 1984). Clark & Peterson (1984) stated that teachers often have to make quick decisions in their work, and that their beliefs influence what they say and do. This study uses Clark and Peterson’s (1984) work to lay significance to how important it is to listen to teachers.

Methods

Eleven kindergarten teachers participated as a focus group, who met for 10 weeks over the summer, meeting once a week through online Zoom meetings for one hour and a half. The participants, who either were full time kindergarten teachers, teachers who had kindergarten as a

part of their teaching assignment, or pre-service teachers who had placements in kindergarten, joined the study voluntarily. Every session was video and audio recorded.

The data were analyzed using phenomenography, examining the data from weeks six and nine. The researcher examined the data for the variety of ways participants thought about pedagogical documentation in the context of two specific pieces of documentation: “The Price of Apples” and “The Columns of the Municipal Theatre”. These two examples of documentation came from a book offering examples of pedagogical documentation from a school in Reggio Emilia, Italy (Rinaldi et al., 2016).

Descriptions of the participants’ perceptions that result from a phenomenographic analysis are “descriptive, experiential, content-oriented, and qualitative” (Marton, 1986). The process of phenomenography expresses variations of an experience in hierarchical statements. The lowest level presents the most simplistic way of experiencing or thinking about the phenomenon, whereas the highest level presents the “most sophisticated and developed way of experiencing the phenomenon” (Han & Ellis, 2019, p. 6). The data are recorded as isolated statements that address the research question. These statements are sorted and re-sorted to determine distinctive characteristics in the “pool of meaning”, as described by Marton (1986).

Two conversations about two different pieces of documentation were analyzed. Each conversation was analyzed separately. For each conversation, the data were sorted categorically. Statements were transcribed onto cards and cards were continually sorted to determine their distinctive characteristics.

Findings

The findings for the purpose of this paper come from one conversation about the pedagogical documentation entitled “The Columns of the Municipal Theatre” (Rinaldi et al., 2016, p. 16). The participants experienced the mathematics of this example of documentation as specific topics, such as number sense, spatial sense, and measurement in relation to the curriculum. Participants gave examples of how they identified the mathematics. One participant offered examples of the way students would count the number of columns or steps taken between the columns. Another participant suggested that fractions could be introduced when students wrapped their arms around the columns. Another participant wondered if the child understood equality because they were chanting rhythmically as they ran between the columns touching the columns at equal intervals. One participant noticed that the children were able to talk about spatial sense through perspective and size. A participant thought children would certainly notice the symmetry in the windows. Participants stated that their students would probably also notice patterns in the rhythm of their chanting as they ran between the columns. Participants observed that students in the documentation ran chanting “inside, outside”, and wondered if they noticed that pattern.

Discussion

Much of the conversation of the study group focused on identifying mathematics in general or identifying mathematics that appears in the curriculum document. It is imperative to assert that the discourse seldom framed mathematics as an opportunity to develop student ideas. Additionally, the analysis highlights a crucial gap in the participants understanding of “in-the-moment” action, as discussed by Mason and Davis (2013).

When analyzing the data around the conversations about mathematics, it is important to note that most often the comments consisted of stating what mathematics was present and how it connected to or appeared in the Ontario kindergarten curriculum document. Two teachers related to the curriculum when they discussed the students counting in groups of 2, 5 and 10, as is mentioned in the curriculum. The significance here surfaces when the participants, despite their profound curriculum knowledge, fall short in discussing examples in relation to actively being with students or advancing student ideas. The participants did not talk about mathematical ideas as participatory, nor did they suggest how they interacted with students to engage in mathematical experiences.

When discussing pedagogical documentation, some participants acknowledged that pedagogical documentation was about building relationships, but most teachers did not talk about it as a “way of being” or as a way to challenge the status quo. Participants did not see pedagogical documentation as part of a process that could challenge pedagogies that promote standardization and competition. For the most part, participants referenced pedagogical documentation as a great way to record student thinking.

Implications

This study has implications for pre-service and in-service teacher professional development and further research. It seems that the testimony of the participants would suggest that teachers could benefit from experiences with mathematics where various realizations of concepts and processes can be investigated through a “learnable participatory discourse” (Davis & Renert, 2013, p. 247). I would also suggest that further research into what teachers specifically need in terms of “in-the-moment” actions, to be able to help students build on their own ideas. In turn, professional development to help teachers learn how to build on student thinking and use pedagogical documentation in that process, would also be beneficial.

The testament of the participants of the study is important as it reveals that teachers in Ontario may not be aware of the possibilities of pedagogical documentation, in a way that is in line with the literature and ethos of its original intention. Pre-service and in-service teachers need a better theoretical understanding of pedagogical documentation in a way that is in line with its intended approach. Teachers would need to examine pedagogical documentation as an opportunity to disrupt neoliberal discourses of competition and standardization, while fostering and celebrating ideas that emerge from the process. In turn, using their understanding of “in-the-moment” pedagogies, teachers could benefit greatly from using pedagogical documentation as a living record of students’ mathematical thinking. Teachers may require more concrete examples of the process of pedagogical documentation and examples of how the process involves children. This type of pedagogical documentation in math education is in stark contrast to an educator taking notes to ensure accountability that the child has achieved standardized outcomes.

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