Documenting Knowing-in-Action: A Mathematics Teacher's Curricular Decision-Making Images

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Abstract

Research on mathematics teacher curricular decision-making has focused more on what decisions teachers make and less on how teachers make curricular decisions. Teaching images are a well-known concept in teacher education as a form of teachers' practical knowledge (PK) and threads that connect teachers' past experiences to action in the present moment. In this study, I built on a three-year relationship with a veteran secondary mathematics teacher to construct her curricular decision-making images. I used a narrative inquiry methodology to interact and construct data alongside the teacher while she planned and taught a mathematics lesson. Data consisted of transcripts of conversations between the teacher and me, and my weekly journals. A narrative analysis revealed two teaching images: *bringing the outside inside* and *reading students and moments*. The teacher made decisions informed by past and in-the-moment teaching experiences, as well as personal commitments such as portraying students as professionals. Teacher images allow mathematics teacher educators and researchers to communicate how teachers make curricular decisions by working alongside teachers. This study contributes to curricular decision-making research by offering images as a form of PK that communicates practicing mathematics teachers' knowledge-in-action.

Keywords: mathematics teachers, curriculum decision-making, practical knowledge, teacher images, narrative inquiry

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When teaching, mathematics teachers make curricular decisions such as the selection and adaptation of tasks, as well as pedagogical approaches to teach those tasks (e.g., Heaton, 2000; Lampert, 1985; Sztajn, 2003). Mathematics teachers' curricular decisions are informed by their values and commitments (Remillard, 2009) and intertwined with teachers' histories and personal interpretations of teaching moments (Lampert, 1985; Heaton, 2000). One way to study teachers' curricular decisions is by using practical knowledge [PK], which refers to teachers' experiential, context-based knowledge guiding their actions while teaching (Elbaz, 1981; Connelly & Clandinin, 1988). PK is a type of knowledge-in-action that teachers exercise when teaching. In their daily work, teachers face various situations and "draw on a variety of sources of knowledge to help them to deal with these" (Elbaz, 1983, p. 47). I am a postsecondary mathematics teacher educator and researcher conducting research that draws on PK research. Teacher images (Clandinin, 1985; Elbaz, 1981, 1983), which in this context mean teachers' recurring mental pictures or metaphors of teaching rooted in personal and professional experience, are a form of PK and communicate threads to past experiences, informing actions in the present moment (Connelly & Clandinin, 1988). Building from a three-year relationship, I narratively inquire (Clandinin & Connelly, 2000) into a teacher's curricular decisions and sought to communicate how she made them using teaching images.

Mathematics Teachers' Curricular Decision-Making

When teaching, mathematics teachers evaluate, adapt, and adjust curriculum materials (e.g., Heaton, 2000; Lampert, 1985; Remillard, 2009; Remillard & Bryans, 2004; Roth McDuffie et al., 2017; Sztajn, 2003). I use the phrase curricular decisions to refer to teachers' task selection and pedagogical approaches to teaching. Researchers have documented how teachers create different learning opportunities for students and themselves (e.g., Remillard & Bryans, 2004; Roth McDuffie et al., 2017; Tarr et al., 2008). For instance, Tarr et al. (2008) could not infer the nature and process of teacher decisions, and Roth McDuffie et al. (2017) could not "make causal claims about how or why" (p. 567) teachers' curricular decisions were related to their orientations and noticing. These instances tend to indicate there is a need to use different lenses to study and describe teachers' curricular decision-making (Remillard, 2009).

Lampert (1985) and Heaton (2000) are two mathematics teachers who self-reported their curricular decisions. Lampert's decisions about group organization were based on what she valued (e.g., creating a comfortable space for students in her class) and on her previous experiences as a student raising her ''hand unrecognized at the back'' (Lampert, 1985, p. 183). Lampert (1985), reporting on another mathematics teacher's curricular decisions, described how a teacher positioned a student's answer as correct, even though the textbook did not. That teacher's curricular decision was informed by what she knew about the student, her view of the student's response (she saw it as valuable), and her perception of sensing "a conflict brewing and wanted to avoid it" (Lampert, 1985, p. 186). Heaton (2000) is another teacher who described her curricular decisions as aligned with her perceptions of teaching. When she did not know her students' responses in advance, she felt insecure, and she felt lifted when her students' unexpected questions were mathematically powerful and enriched the class discussions. Heaton valued and enjoyed students' discussions, which brought her to position her students as resources "for constructing curriculum" (p. 80). From an external point of view, Sztajn (2003) studied two mathematics teachers working in socioeconomically diverse schools and found that teachers emphasized different aspects of the curriculum based on what they valued and thought would benefit their students. These studies show that teachers' curricular decisions are not only cognitive, but informed by teachers' histories, knowledge of their

students and communities, and personal commitments. Thus, there is a need for mathematics education research that allows for a holistic documentation of mathematics teachers' curricular decisions.

Personal Practical Knowledge and Images

Elbaz (1981, 1983) defined PK as a type of knowledge-in-action that teachers exercise when teaching that is different from propositional knowledge. In their daily work, teachers face various situations and "draw on a variety of sources of knowledge to help them to deal with these" (Elbaz, 1983, p. 47). When teachers act, they do so by balancing their personal views and commitments with the external demands (Connelly & Clandinin, 1988; Heaton, 2000; Lampert, 1985). When teachers make curricular decisions, they express their conceptualizations and personal theories derived from their academic and non-academic interactions (e.g., Connelly & Clandinin, 1988; Fenstermacher, 1994; Ross & Chan, 2016). I build upon teacher education research to portray mathematics teachers' PK as experiential, holistic, learned in context, and expressed in teachers' words and actions (Clandinin & Connelly, 2007; Elbaz 1981; Ross & Chan, 2016).

Researchers in mathematics education (Chapman, 2011; Oonk et al., 2015) and teacher education (e.g., Craig, 2011; Ross & Chan, 2016; Schaefer & Clandinin, 2019) have identified the importance of teachers' PK in studies of teacher practice. Chapman (2011) documented a group of in-service teachers who planned their professional development by building on their PK. Oonk et al. (2015) situated teacher candidates' learning experiences as a process of enriching their PK. Craig (2011) and Ross and Chan (2016) described the potential of PK to inform teacher educators' understanding of teacher work. Schaefer and Clandinin (2019) called for teacher educators to create spaces for teachers to inquire into their PK to sustain their practices. These reports have identified PK as a fruitful area of research to inform and sustain mathematics teacher work. I position PK as one answer to Remillard's (2009) call to use different lenses to study and describe mathematics teachers' curricular decision-making processes.

Images are a form of PK (Clandinin, 1985; Elbaz, 1983) and communicate threads to past experiences, informing actions in the present moment (Connelly & Clandinin, 1988). Teacher images are teachers' perceptions of teaching connected to personal and professional narratives (Elbaz, 1983) and "designed to embody the dialectic of practice and of inquiry" (Clandinin, 1985, p. 367). Elbaz (1981) documented an English teacher's image of "a window onto the kids and what they're thinking" (p. 62) using teaching observations and informal interviews where she disclosed her research aims and goals to the teacher. Clandinin (1985) reported an elementary school teacher's image of "classroom as home" (p. 367) after working as a teacher assistant and colleague in the teacher's classroom. To create the teachers' images, the researchers reflected on what teachers shared with them, who the teachers were, and how teachers' ways of being interacted with their teaching practices. Teaching images are unique to every single teacher, embodied, and enacted.

Teaching images might be confused with research on metaphors (Lakoff & Johnson, 1980) or images as picturing (Miller, 1979). Metaphors are part of everyday life in the ways we communicate, think, and act (Lakoff & Johnson, 1980). Metaphors are usually connected to a way of describing a particular situation. While teachers might use metaphors to describe their images (Lim, 1999) as they did in Elbaz (1981) and Clandinin (1985), in this research I am considering them more broadly as teachers' self, perception, values and beliefs about their own teaching, which guide their actions and judgements in their present practice. Teaching images are threads that connect past lived experiences to present teaching moments (Connelly

& Clandinin, 1988) and orient teachers to act in ways that balance their personhood and external requirements.

I was interested in identifying a teacher's images when making curricular decisions. Given that teaching images are personal to teachers and emerge when enacting teaching, there is a need for the use of empathetic methodologies (Cox, 2019; Johnston, 1992) to study them. I followed a narrative inquiry methodology (Clandinin & Connelly, 2000), which allowed me to build from a three-year relationship to study a secondary mathematics teacher's curricular decision image. Narrative inquiry allowed me the intimate and in-depth study of the teacher's experience (Clandinin & Connelly, 2000). The question guiding the study was: What teaching images describe a veteran secondary mathematics teacher's curricular decision-making in the context of planning and teaching a mathematics task?

Methodology and Methods

Narrative inquiry methodology is a way of knowing and documenting people's experiences (Connelly & Clandinin, 1988). Researchers are not removed from their narrative inquiry studies; instead, what researchers know about themselves, and their participants is a result of interaction with participants and the contexts surrounding them (Clandinin & Connelly, 2000). Narrative inquiry is a method and methodology that enables human experience to be the focus instead of predetermined theories. Narrative inquiry studies are first lived and then communicated to external audiences, honouring the uniqueness of participants' perspectives. Transferability is not a goal in narrative inquiry studies, but seeing oneself in others' experiences (Conle, 1996).

Temporality, sociality, and place (Clandinin & Connelly, 2000) are the three dimensions of inquiry space used as guidelines for narrative inquirers to move from the field texts, which constitute data, to research texts presented in final manuscripts. Narrative inquirers are attentive to the interaction of time, place, and social context contributing to the participants' experiences. Researchers "think simultaneously backward and forward, inward and outward with attentiveness to place" (Clandinin, 2013, p. 41). Temporality is linked to the backward and forward directions. The inward and outward directions are related to the social dimension. The inward direction refers to internal conditions such as feelings and hopes, and the outward direction refers to the environment. These two dimensions and directions interact with place.

Researchers in mathematics education have used narrative inquiry as a research method and methodology (e.g., Chapman, 2011, 2008, 1997; D'Ambrosio & Cox, 2015; de Freitas, 2008; Drake, 2006; Foote & Bartell, 2011; Nardi, 2016; Nicol et al., 2020; Ross, 2003; Sack, 2008). For instance, Sack (2008) described the tension she experienced in developing and sustaining mathematics teacher communities in high schools. D'Ambrosio and Cox (2015) documented their struggles as mathematics teacher educators (MTEs) facilitating a funded professional development activity for teachers. Nardi (2016) used narrative inquiry to restore a dialogue between mathematicians and mathematics educators. Nicol et al. (2020) narrated their journeys as MTEs and researchers decolonizing their teaching practices. These reports are examples of narrative inquiry studies in which researchers sought to unpack and re-tell their own or participants' experiences using narratives. Narrative inquiry reports include descriptions of participants' histories, decisions, and actions from their or agreed-upon perspectives. Below, I introduce my research participant, the teacher, Anne (pseudonym), so readers have some perspective on how I knew her.

The Mathematics Teacher and Research Participant

Anne was a secondary mathematics teacher from the U.S. who had worked in the same school for more than 30 years. Anne and I planned and taught mathematics tasks for two years before

I conducted this study (Suazo-Flores & Roetker, 2021; 2024). Anne shared enjoying working with me because she had opportunities to try new mathematics tasks. I was an immigrant in the U.S. and enjoyed being in Anne's classroom because it allowed me to learn about my PK (Chapman et al., 2020) and the teaching of mathematics in the U.S.

Anne and I worked alongside each other. When composing the research texts, I acknowledged my influence on Anne's interactions and my power in conducting and reporting the study. As a busy secondary mathematics teacher, Anne took the main role in planning and teaching lessons. The construction of field texts occurred while Anne planned, taught, and reflected on one mathematics task called the "miniature golf-course task" over three months. Yet, our previous two years working together also informed our conversations and the way we interacted with each other.

Anne grew up in an Appalachian area surrounded by a loving family, with lots of outdoor play and horseback riding. In her preteens, family circumstances caused her to move out to the city, a whole new experience for Anne. While her mother became the only economic support for her household, Anne learned to navigate the new physical, social, and emotional place in the city. Years passed, and Anne entered the field of teaching mathematics after deserting the engineering field. Anne felt uncomfortable without the social skills for success in engineering, which was male-dominated at the time. She embraced the role of an agent of change for children in a local public school. Her lived personal and teaching experiences can be described as a road with highs and lows, where her view as a lifelong learner serves as an engine that propelled her to keep teaching.

Anne enjoyed being outside of the four walls of her classroom and building on those experiences. Anne's room felt to me like being in an elementary classroom—full of boxes with posters and materials purchased or crafted by her, big tables, where students sit in pairs, and natural light coming from an interior school garden she liked to cultivate every summer. In her first 15 years of teaching, Anne taught tasks related to measuring waterfalls and setting up a school business. At the beginning of her teaching, Anne would comment on a piece of local community news and advertise potential future jobs for her students. Anne was dedicated to creating opportunities for students to obtain technical certificates when graduating from high school.

Description of the Mathematics Task

I provide information about the task to help readers understand the excerpts of conversations presented in the analysis (more details about the implementation days are in Table 1). In the miniature golf-course task, students had to redesign the layout of a miniature golf course to be in each rectangular space using 18 shapes that represented golf holes. Students needed to provide a measure of the 'green space,' defined as the space left after placing the golf holes (i.e., the 18 shapes). The measurement would then be provided to golf-course builders to purchase sod to cover the requisite green space.

Students worked in groups, drawing sketches of the golf course and computing areas of the given shapes. Most of the students struggled to compute the area of the given irregular shape (see Fig. 1) and asked for more guidelines; others were satisfied with having the area of the irregular shape approximated using the area of known shapes.

Figure 1

The Irregular Shape Given in the Task.

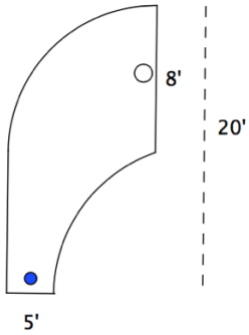

Table 1

Description of Students' Main Activities.

Day	Students' Main Activities Over the Five Days Working on the Task
1	Read the newspaper article and learned about the project. Anne launched the task using the engineering design cycle and talked about group-work strategies
2 & 3	Worked on the project in groups, drawing sketches of the layout of the golf course and computing areas of the given shapes
4 & 5	Expressed concerns related to computing the area of the irregular shape (Fig. 1); teachers provided individual guidelines to those who requested help
6	Discussed strategies to measure the area of the given irregular shape

Data or Field Texts

Field texts were constructed out of transcripts of conversations between Anne and me about our mathematics teacher stories, and during planning and teaching the miniature golf-course task. The conversations mostly transpired in Anne's classroom, except for one instance when we met in a café outside the school. Conversations are "a flow of co-ordinations of actions and emotions" (Maturana, 1988, p. 23) that refuse how people are positioned by societal norms and allow space to weave together knowledge through language (Dávila & Maturana, 2021). Our conversations occurred over three months, and each lasted between 20 and 127 minutes; the transcripts of all our conversations comprise a 362-page file.

During the planning and teaching of the task, I was Anne's colleague, sharing insights about my views of the task and its teaching. After every day of teaching, I revisited the moments we lived in the classroom by writing notes in a personal journal and making copies of students' written work to keep evidence of how they were understanding the task.

Analysis

Narrative analysis is the procedure used by researchers to organize the field texts into a coherent story that represents participants' lived experiences from their point of view. "The outcome of narrative analysis is a story" (Polkinghorne, 1995, p. 15). I read the transcripts of our conversations multiple times to identify the meaning life events had for Anne (Polkinghorne, 2007) in the context of planning and teaching the task. Polkinghorne (1995) stated, "not all data elements will be needed for the telling of the story" (p. 16). Life events in

this study were Anne's academic and everyday lived experiences. Some of those lived experiences were co-constructed during our time working together.

Trustworthiness in narrative analysis is achieved by reflecting intentionally on the participants' actions and relationships, situating the story socially and contextually, and accounting for participants' identities and viewpoints (Grant & Lincoln, 2021; Lyons & LaBoskey, 2002). I shared the results of the analysis and a print draft of the narrative with Anne, so she could read the draft by herself and later provide me with her insights. Anne recognized seeing herself as a person and a mathematics teacher in a new way. In the next paragraphs, I share details of the two phases of my narrative analysis process and examples of pieces of field texts.

Phase 1

I focused on identifying evidence of Anne's PK. For instance, Anne joined a committee that planned the creation of a career centre for students to get technical job certificates. I highlighted the conversations about this topic in the transcripts, as evidence of Anne's commitment to her school and community, which I understood as part of Anne's PK (Elbaz, 1981, 1983). I then looked for more evidence in the field texts of Anne's view of her role in the school and community.

When reading the highlighted pieces in the transcripts, I also paid attention to my interactions with Anne concerning place and time (Clandinin & Connelly, 2000). I made notes of what I remembered was happening during the moment highlighted in the transcripts (my journaling supplemented the highlighted transcripts) or what common experience Anne was referring to in the transcripts. I asked myself questions such as *What was that day's lesson about? What was happening in the school at that time? What did we discuss the day before? What were important events (e.g., birthday, taxes, maternity responsibilities) for us at the moment? Who was around us?* One example of my journal entry is below, and it exemplifies a connection to the career-centre conversation mentioned before:

Anne is doing too many things at the same time. She has a meeting tomorrow for the career centre, and that is why she will not be in school at the beginning of the day. I'm hoping we will have some time to talk before the fourth period starts. (Journal entry, April 8, 2017)

I then used a qualitative software program to organize the highlighted pieces of transcripts into sets of conversations. The sets contained similar conversation topics, and I named them accordingly. Below, I provide some examples.

I named one set of conversations *Changing Places*. It contained discussions about Anne's participation in the career centre and other conversations about her experiences outside of the school. Two excerpts from transcripts illustrate the set of conversations named *Changing Places*.

Anne: This is what I did when I was little, clearly not girl things. I would ride horses wild, there is not even a saddle there.

Elizabeth: Did you use the hair of horse to hold you?

Anne: He does have a ring on, but not a saddle, and you know we will shoot guns.

Elizabeth: How old were you?

Anne: Probably around 10. There will be nothing to come home and see rabbits hanging from the porch because that will be food, and so it was a different way of growing up compared to living in the city. So, I lived there until I was about that age, 10, and then moved to the city, and that was very different, honestly, almost I didn't know how to behave or act.

The following excerpt comes from the same conversation as above, but now Anne is referring to her academic experiences in the city:

Anne: I really focused on my schoolwork, and that was how I became, I've been a good student, but that was where I really excel. And then, I decided to go into engineering, and there were not many women in engineering in the early 80s. So, because socially, I think I was mmmm, I didn't have the social skills probably that I needed at that time to be assertive as a female in that world. I decided to leave engineering and move into mathematics, and I pursued a teaching degree because I was really, you know, still good at it, and I felt more confident. I wanted to help kids; I enjoyed children; I enjoyed kids.

I called another set of conversations *Anne's Learning* and contained excerpts of conversations relating to how Anne viewed learning in her mathematics classroom. Below, I share one piece of the transcripts that were part of this set of conversations.

Anne: Right, that's really important because they [students] are in a way different place than I am, and to take them further on their path requires me to put myself on their path, which is sometimes hard because I don't think about it like that. You know, that's not the way that I learned it, and it's not the way I understand it, and it's not necessarily the way I think about it, but I have to be willing to change the way or think about it differently. It's not that it's wrong. I just need to think about it differently, and that is hard.

I revised the sets of conversations with Anne, which allowed me to validate the selected pieces based on Anne's personal meanings (Polkinghorne, 2007). The analysis process created 18 sets of conversations that contained 894 overlapping pieces of conversation. I considered these sets of conversations a baseline to construct Anne's teaching images.

Phase 2

I constructed teaching images that described how Anne made curricular decisions by looking across the sets of conversations and reflecting on them, considering what I knew about Anne as a person and her teaching practices over our years of collaboration. Two teaching images were evident from the analysis: *bringing the outside inside* and *reading students and moments.* These images are the findings of this study, and I narrate them next. In naming the images, I followed Clandinin (1985) and Elbaz (1983) in writing brief and descriptive phrases that represented to an external audience how Anne made curricular decisions.

Over the years, Anne enjoyed being outside and connecting her mathematics activities to life outside the school. This is why I use the phrase *bringing the outside inside.* The phrase *reading students and moments* came from the evidence of how she listened to her students' ideas and ways of thinking, and how she made the happenings surrounding her classroom relevant to her teaching of mathematics.

Findings

Anne's Image: Bringing the Outside Inside

When selecting a task to teach for this study, Anne returned to her memories of teaching. She had a bank of tasks printed in different physical and digital folders. Based on our previous teaching experiences, we agreed on having a task related to the concept of area. I offered some ideas for tasks, but she did not take any of them. The task Anne selected, the miniature golf course task, portrayed students as professionals, involved a real-world context, and her former students enjoyed working on it.

To launch the task, Anne wanted to get students' attention by asking them to read a news article about a mini-golf course she found in an online newspaper. The article reported

on two entrepreneurs who wanted to revive an existing miniature golf course. By using the newspaper article, Anne brought the outside world into her classroom. Anne invited students to think about the task using an Engineering Design Cycle (EDC) and work in groups by using a group-work strategy called Scrum. Anne had learned about EDC in previous professional development activities and about the scrumming group-work technique from one of her engineering sons. By using these engineering practices, Anne positioned students as professionals, which created an environment like being outside of the school in her classroom. The idea of bringing the outside world into her classroom was not new to Anne.

During her first 15 years of teaching mathematics, Anne and her students visited local rivers to take water-flow measurements. Students calculated how fast the water flowed by using timers, dropping things in the water, and watching them flow. Anne joined teachers from science, social science, and language arts to plan and teach such activities. Anne also taught economic tasks, in which students completed all the paperwork to ask for loans from a local bank that supported her teaching. Once students obtained the loan, they invested in making and selling books and used the profits to take field trips.

Circumstances beyond Anne's four classroom walls encouraged her to supplement her passion for teaching tasks involving field trips with teaching real-world contexts tasks. While I was working with her, Science, Technology, Engineering, and Mathematics (STEM) tasks were encouraged in schools. Anne was teaching tasks where students could see themselves as professionals, particularly engineers. Anne's connection with the engineering field was not new, as before becoming a mathematics teacher, she wanted to be an engineer.

The *bringing the outside inside* image narrates how Anne made decisions regarding the context of the task and how to teach it. Her life experiences, teaching tasks connected to outside-of-school experiences, were brought to bear in thinking of a task to teach for this study. The outside context of the task was not only used in the launching of the task, but also to position students as professionals and to teach them engineering practices for group work.

Anne's Image: Reading Students and Moments

While students were working in groups, I observed that Anne paid attention to their conversations and the language they used to express their ideas. For instance, Anne shared with me students' use of words. Anne noted how a student said, "I need to know the area to design" after Anne asked them why they needed to know the area of each piece (or golf hole). Another student realized that she could not compute the area of the irregular shape (Fig. 1) and said to Anne, "I do not remember." Anne interpreted that student's comment as a request for a formula to compute the area of the irregular shape. Anne pointed out to me these students' expressions in the middle of teaching, and she shared how those expressions were information to her about how her students were thinking about the task.

Anne reflected on how students approached problems. In Anne's words, students' thinking processes took different paths. She envisioned the known paths as the ones that take less time to walk. Therefore, for Anne, students were learning something new when they walked slowly as they entered new landscapes. When students expressed confusion or annoyance because they did not know the answer right away, Anne understood her students were learning. Anne read those situations as students needing space to wrestle with their thoughts, and she did not provide hints or a guide to them. She gave them a day off to refresh their minds and return with new energy to keep thinking about the problem.

Anne turned their attention to planning an extra teaching day after perceiving how her students were curious about approximating the area of the irregular shape (Fig. 1). In the middle of teaching the task and while students worked in groups, a student approached Anne to ask

about how to calculate the area of the irregular shape. As Anne worked with the student, she started thinking differently about how to teach someone to compute the area of an irregular shape. Lived and in-the-moment experiences came together to illuminate a new way of thinking for her. The class ended, and Anne did not have enough time to finish working with that student. Anne's *reading of that student and moment* was critical in encouraging her to plan for an extra day so that students would have the opportunity to talk about strategies to compute the area of the irregular shape.

Discussion

I narrated two teaching images that represent to an external audience ***how*** Anne made curricular decisions. Anne's curricular decisions could be described with the images of *bringing the outside in* and *reading students and moments*. Anne enjoyed implementing tasks that would take students on field trips, and when they were not possible, she used tasks embedded in real-world contexts or that allowed students to act as professionals. The *bringing the outside inside* image also communicates the sources of examples and analogies Anne used when teaching mathematics. In the second image, called *reading students and moments*, the use of the word reading describes and highlights Anne's personal interpretations of the happenings in the classroom. When teaching tasks, Anne paid attention to what students were doing and saying. Her interpretation of the students' conversations and actions guided her next curricular decision. Anne listened to small group conversations to understand how students were experiencing the task, which also helped her to learn new ways of thinking about the task. She built on her memories of the time when she taught a similar task to decide whether to implement it again. Anne decided to plan an extra teaching day based on her reading of what would benefit her students in future mathematics classes. The *reading students and moments* image represents the interaction of time, place, and social dimensions (Clandinin & Connelly, 2000) in Anne's curricular decisions. Anne made curricular decisions referring to her memories, personal commitments, and in-the-moment experiences, with a look into her students' past and future.

Theoretical Implications: Mathematics Teacher Curricular Decision Research and Teachers' Images

Teacher image is a concept well known in teacher education (e.g., Clandinin, 1985; Elbaz, 1981) and less in mathematics education. This study brings the concept to mathematics education research in the context of curricular decision-making, and with that, it answers Remillard's (2009) call to use different lenses to study and describe mathematics teachers' curricular decision-making. Some existing studies (e.g., Remillard & Bryans, 2004; Roth McDuffie et al., 2017; Tarr et al., 2008) have been unable to report why or how teachers make certain curricular decisions. Using the framework of PK and the concept of teacher image (Clandinin, 1985; Elbaz, 1981), I documented how a veteran mathematics teacher made curricular decisions in her classroom, and in doing so, I unearthed this mathematics teacher's knowledge-in-action.

Methodological Implications: Narrative Inquiry as a Tool to Study Teachers' PK

Teachers hold and use PK when teaching (Elbaz, 1981), and narrative inquiry is a methodological tool that mathematics education researchers can use to build from teachers' PK, be alongside teachers in the schools, and document mathematics teacher work. What is communicated in narrative inquiry studies is not an external objective truth, but lived, unique teaching experiences narrated from what researchers learn from teachers' perspectives, and that have the potential for the audience to see themselves in teachers' experiences (Conle, 1996).

Narrative inquiry methodology (Clandinin & Connelly, 2000) allows for in-depth collaborative fieldwork where researchers take the role of assistants and teacher colleagues. In this methodology, extended field work and conversations (Maturana, 1988; Maturana & Dávila, 2021) are tools researchers can use to learn about mathematics teachers' perspectives and create spaces for teachers to revisit lived experiences and imagine new futures for their teaching practice. This study is an example of how this could be done and contributes to expanding the use of narrative inquiry in working with mathematics teachers.

Pedagogical Implications for MTEs: Embracing Teachers' Images

Teachers continually evaluate their experiences, repeating certain ones and avoiding others. Those behaviours and patterns in communication are data MTEs could use to construct teacher images. MTEs can use teacher images as a compass in their interactions with mathematics teachers. To support mathematics teachers and their work, I join researchers in teacher education (e.g., Craig, 2011; Ross & Chan, 2016; Schaefer & Clandinin, 2019) and mathematics education (Chapman, 2008, 2011) in calling for the creation of spaces where prospective and in-service teachers can inquire into their PK. Learning about and reflecting on their PK can allow teachers to become aware (Connelly & Clandinin, 1995) of what drives their practice, providing teachers with opportunities to revisit decisions made and possibly change unwanted practices. MTEs and teachers' interactions would then be spaces for collaboratively authoring their learning (Craig, 2011).

Limitations and Future Studies

Narratively inquiring (Clandinin & Connelly, 2000) into Anne's PK involved spending regular and extensive time in her classroom. The time invested was worthwhile, as we felt energized and sustained in our respective practices. I wrote about my learning in Chapman et al. (2020). I call for funding agencies and institutions to allow researchers and teachers to plan for generous field time and have the freedom to decide their measures of growth (D'Ambrosio & Cox, 2015).

I already had a relationship with Anne before this study began, and this relationship turned out to be a prominent factor in the construction of her teaching images. Having an existing relationship was why I followed a narrative inquiry methodology (Clandinin & Connelly, 2000), which allowed us to be ourselves, contributing to authentic conversations that constituted data. Thus, future studies may investigate how relationships develop.

Anne recognized that she had not been aware of the two teaching images I reported, yet I did not explore further the influence of this awareness on her practice. Future studies might explore ways teachers expand or transform their teaching images. Anecdotally, after this research study, Anne became the school's mathematics coach and applied what she learned from our interactions to work alongside other mathematics teachers.

This narrative inquiry study communicated how a secondary mathematics teacher made curricular decisions by describing two of her teaching images: *bringing the outside inside* and *reading students and moments.* These two images are the ones I identified based on my analysis and relationship with Anne. Teaching images evidence that mathematics teachers' curricular decisions are informed by who they are and their interpretations of teaching moments, and are available to researchers in collegial relationships where teachers can be themselves. This study contributes to curricular decision-making research by offering images as a form of PK that communicates mathematics teachers' knowledge-in-action.

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