Evidencing Relational Trust Within Mathematics Leadership Activity

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We explore how relational trust was evidenced within the leadership activity of one mathematics leader using cultural-historical activity theory as a theoretical perspective. We use data from interview and observation sources to suggest that relational trust was a motive object of that mathematics leader's activity. Findings contribute knowledge about how relational trust dimensions, originally situated within middle leadership theory, were evidenced within that mathematics leader's activity whilst leading a professional learning experience in their school.

Recently, mathematics leadership has received attention by the mathematics education research community, however, it remains under-theorised (Sexton & Lamb, 2017). We used the cultural-historical activity theory (CHAT) concept of motive object (Kaptelinin, 2005; Leont'ev, 1978) and concepts about relational trust within middle leadership literature (e.g., Edwards-Groves et al., 206) to contribute to the theorisation of mathematics leadership. In our paper, we demonstrate the applicability of those concepts to mathematics leadership, showing how relational trust was evidenced through the activity of one primary mathematics leader. Although we only draw on one set of data from interview and observation sources, we contribute a nuanced understanding of how relational trust was evidenced as a conscious motive object of that mathematics leaders' activity.

Literature Background

With its surfacing as an educational leadership construct in recent times (De Nobile, 2018), middle leadership has been positioned as a form of practice, enacted in spaces between the executive leadership team and teaching teams in schools (De Nobile, 2018; Grootenboer, 2018; Lipscombe et al., 2021). Several definitions have provided insights into middle leadership; however, they have caused some contention (Lipscombe et al., 2021). The middle leader has been defined as a staff member who enacts a formally recognised position within the school whilst also undertaking classroom teaching responsibilities (Edwards-Groves et al., 2016; Grootenboer, 2018). Lipscombe et al. (2021) stated that a middle leader held a formally recognised school leadership position; engaged responsibilities for which the role was accountable; enacted leadership between the executive leadership and teaching teams; and that leadership actions were undertaken to influence teacher and student learning in positive ways.

De Nobile (2018), when identifying school middle leadership positions, did not state the mathematics leader as a middle leadership one. We believe, however, that the mathematics leader is indeed a middle leadership position when we consider the definition that Lipscombe et al. (2021) offered. Our reasons are that the mathematics leader is a formal position within school leadership systems (Copping, 2022; Sexton & Lamb, 2017); they undertake responsibilities, requiring active membership of executive leadership and teaching teams (Copping, 2022; Driscoll & Cheeseman, 2022); and their responsibilities include school-based professional development (PD) leadership (Bolyard & Baker, 2021; Driscoll & Cheeseman, 2022; Sexton & Lamb, 2017). Our definition of mathematics leadership also perceives it as an enactment of middle leadership activity that influences the dispositions, practices, and knowledge about and for mathematics education within schools (Sexton & Lamb, 2017).

Theorising of middle leading has highlighted the importance of PD leadership, and how relational trust mediates the establishment of relationships that are required for effective school-based PD (Edwards-Groves et al., 2016). That theorisation, drawing primarily on practice architecture theory (Edwards-Groves & Grootenboer, 2021), extended upon beliefs held about

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relational trust within school leadership generally, where it is understood as a crucial resource required for school improvement (Bryk & Schneider, 2003). Relational trust is perceived as necessary for enabling conditions that allow for enactment of developmental work through teachers' PD (Edwards-Groves et al., 2016). The reason for that is because relational trust has been perceived as collegial relationships, characterised by respect, competence, and regard, all of which are deemed necessary for meaningful PD (Bryk & Schneider, 2003).

To illustrate enactment of relational trust within middle leading practice of PD leadership, a new conceptualisation about the nature and function of relational trust has been offered by Groves et al. (2016) and Edwards-Groves and Grootenboer (2021). Those authors have positioned relational trust as a multidimensional construct, consisting of five distinct, yet interrelated dimensions. According to those authors, relational trust forms the "social resources needed for securing sustainable practice development in schools" (Edwards-Groves et al., 2016, p. 384). The relational trust dimensions are summarised in Table 1.

Table 1

Summary of Relational Trust Dimensions

Relational trust dimension	Definition of relational trust dimension
Interpersonal trust	demonstration of practice that nurtures mutual respect, trustworthiness, confidence, and relationships between staff including enactment of approachability, genuine care and empathy for, interest in, and recognition of colleagues' expertise and differences
Interactional trust	establishment and maintenance of opportunities that facilitate interactive spaces for colleagues to engage in collaborative and cooperative dialogue, characterised by integrity, equity, and independent and interdependent pedagogical reasoning
Intersubjective trust	demonstration of practice that sees the middle leader working alongside and journeying with colleagues as they develop community about the developmental work, characterised by collaborative decision-making, co-construction of shared understanding and language, and co-investment in problem-solving and sensemaking
Intellectual trust	enactment of leadership where the middle leader presents themselves as knowledgeable about the developmental work focus through demonstrations of wisdom, knowledge, and practical expertise in response to needs and requirements of that work focus
Pragmatic trust	leadership of the developmental work that presents it as having relevancy and practicality to colleagues' teaching practice, and presented in coherent and achievable ways that acknowledges the reality and complexity of teachers' work

Middle leaders are understood to enact those relational trust dimensions through their PD leadership in schools. Those dimensions are a part of practice and are not positioned as characteristics or traits of the middle leader (Edwards-Groves & Grootenboer, 2021). The relational trust dimensions are understood to be in a constant state of formation and transformation because each one influences and is influenced by the others (Edwards-Groves et al., 2016). Enactment of relational trust is perceived as dynamic, enabling conditions for middle leading that mediates professional learning (Edwards-Groves & Grootenboer, 2021).

Turning to the place of trust and mathematics leadership, we have reports of enactment of trust by mathematics leaders within some literature sources. Copping (2022) shared survey results about mathematics leaders' perceptions of their leadership, claiming that relationships were important to

mathematics leaders, forming part of a larger theme that Copping named "culture" (p. 150). Bolyard and Baker (2021) and Driscoll and Cheeseman (2022) purported that the development of constructive relationships was crucial to the work of leading primary school mathematics. Their claim confirms that of Eden (2018) who reported that trust was vital when teachers needed to discuss tensions about teaching practice with peers. According to Eden (2018), those trusting relationships mediated interactions about practice that led to practice shifts, which in turn, nurtured further trust amongst teachers.

Although we have access to knowledge about how relational trust is realised within middle leadership (e.g., Edwards-Groves et al., 2016), and recognising that trust is positioned as crucial in mathematics leadership (Copping, 2022; Driscoll & Cheeseman, 2022; Eden, 2018), we are yet to know how the relational trust dimensions are evidenced within mathematics leadership. That gave rise to the problem we explored where we sought to evidence the relational trust dimensions within the leadership activity of a mathematics leader. Drawing on an example provided by that mathematics leader, we seek to respond to the following question: *How are the relational trust dimensions evidenced within the activity enacted by a School Mathematics Leader through their professional learning leadership?*

Methodology

Recognising middle leadership as a form of practice (Grootenboer, 2018), a practice-based theory was required to perceive our problem. Practice can be understood as a form of activity (Nicolini, 2012), and with its unit of analysis on activity (Engeström, 2015), CHAT offered a way of responding to our question. With relational trust constituted as part of practice (Edwards-Groves et al., 2016), further reason for using CHAT was established.

Theoretical Perspective

As a practice-based theory (Engeström, 2015; Nicolini, 2012), CHAT offers ways to study human activity using several concepts, most of which are related to the activity system (Engeström, 2015). CHAT privileges the notion that within all activity, there is always a subject who pursues a motive object (Kaptelinin, 2005). The concept of motive object is understood to be the entity at which activity is directed, the driving force of activity (Kaptelinin, 2005). It provides the motivation for activity (Engeström, 2015; Kaptelinin, 2005; Nuttall et al., 2015).

CHAT, however, perceives motivation beyond its prevalent understanding that sees it as an individual and internal force of will. Instead, CHAT understands motivation as directing psychological and practical activity, drawn forward in simultaneous and conscious ways, as the subject seeks to realise the motive object, resulting in desired outcomes (Engeström, 2015). The motive object can also be seen as undertakings enacted by the subject as they engage in activity (Nuttall et al., 2015). Leont'ev (1978) claimed that there is a hierarchical structure of activity, meaning that as the subject pursues the motive object of activity, they enact a series of actions. Those actions are undertaken to meet the goals associated with the motive object.

It is also possible for activity to be directed at multiple motive objects, meaning that human activity can be multi-motivational (Leont'ev, 1978; Nuttall et al., 2015). Within CHAT, labour as a form of human activity, is considered to fulfill two functions: it is enacted to achieve the motive object that directs the activity, and it is intended to influence other people who are participants within that activity (Leont'ev, 1978). Therefore, the motive object acts as an essential analytical tool in understanding the what and the why of activity (Kaptelinin, 2005).

Participant and Data Generation

The data we use are from the lead author's doctoral study that explored how mathematics leaders contributed to project sustainability through leadership of school-based PD. We report on just one

event within the data generation phase of that study. Those data were generated with Cindy, a School Mathematics Leader, who participated in the Contemporary Teaching and Learning of Mathematics (CTLM) project (Clarke et al., 2013) in 2011 and 2012. Cindy had maintained the mathematics leadership position in her school at the time of data generation (November 2017). Mathematics planning meetings were used by Cindy as PD opportunities, and as a way of sustaining project-initiated reforms in her school. Cindy also fulfilled the Learning and Teaching Leader and classroom teacher roles during the data generation period.

In November 2017, Cindy was interviewed prior to and after a whole-school planning meeting she led. Prior to that meeting, Cindy was interviewed (~15 minutes) about the intentions she had set for the planning meeting. Observation was used to generate data about enactment of Cindy's leadership of that 50-minute planning meeting. The generation of data focused on the *sayings* and *doings* (Grootenboer, 2018) of Cindy's leadership, with attention paid to what she focused her activity on during that meeting. After her planning meeting took place, Cindy was interviewed again (~40 minutes) responding to questions about observation data generated by the lead author. The planning meeting and the interviews were audio recorded. The planning meeting recording was used to cross-check the accuracy of observation data, and those data were transcribed to electronic Word™ files.

Data Analysis

With its analytical potential, the CHAT concept of motive object (Kaptelinin, 2005) and the relational trust dimensions (e.g., Edwards-Groves et al., 2016) were used as sensitising concepts to analyse the dataset. A coding scheme (Saladaña, 2013) was developed that included pre-determined codes (e.g., motive object, interpersonal trust, pragmatic trust) along with definitions informed by CHAT (e.g., Kaptelinin, 2005; Nuttall et al., 2015) and relational trust literature sources (Edwards-Groves et al., 2016; Edwards-Groves & Grootenboer, 2021).

Data files were uploaded into an NVivo™ project and nodes were set up and named within that project using concepts from the coding scheme. The lead author used that scheme to deductively analyse data, looking for evidence of the motive object and relational trust dimensions within the dataset. Inductive analysis approaches were also used as a means of exemplifying how those concepts were enacted specifically by Cindy in that planning meeting. Analysis focused on Cindy's sayings and doings as evidenced in the dataset. The analysis approach was an iterative process of comparing examples with the definitions within the coding scheme, and cross-checking definitions with the examples in the dataset (Saladaña, 2013).

Findings and Discussion

We present and discuss findings simultaneously in attempts to show how the relational trust dimensions (Edwards-Groves et al., 2016) were evidenced within Cindy's leadership of that planning meeting. Our attention was first drawn to the importance of relational trust and its dimensions through insights that Cindy provided in the pre-planning meeting interview.

In response to a question about what she intended to work on in the meeting, Cindy stated:

> I've decided to share the mathematics NAPLAN results from this year. We're looking at growth analysis, and we're going to have a look at the cohort of students from when they were in Grade 3 and then to Grade 5. I want the teachers to see that we're not accommodating the needs of the top-end students. I have to be careful though. I know teachers can get upset with how NAPLAN is presented. I have to play it out carefully so that they don't feel like they're being blamed. There's a lot of emotion with NAPLAN data that I have to think about as the maths leader.

Through our CHAT perspective, Cindy revealed to us that her leadership activity for that planning meeting was directed by, what we have called, a *developmental* motive object (Kaptelinin, 2005). Cindy wanted to influence her teachers' reading of NAPLAN data and to develop a shared

interpretation of the results. She also wanted the teachers to realise that teaching practice at the school was not meeting the needs of higher-achieving students.

We were also sensitised to another motive object that extended beyond that developmental one. Cindy highlighted to us an awareness she had about her teachers' affective responses to NAPLAN data through her anticipation that the teachers may experience blame about the data results. We perceived that as evidence of a *relational* motive object within Cindy's leadership activity. Drawing on the relational trust dimensions, we further interpreted that attention to affect as Cindy's way of wanting to work on interpersonal trust (Edwards-Groves & Grootenboer, 2021). Cindy's comment led us to believe that there was a conscious intention (Engeström, 2015) to enact care and empathy in ways that drove her leadership activity (Kaptelinin, 2005) of that planning meeting with her teachers.

Our interpretation of that conscious relational motive object of Cindy's leadership activity was further supported by the following comment:

> I need to take my time today and go slowly. I know there will be a lot of emotions in there. I have to make sure that I focus on what we need to do with the NAPLAN data, but also make sure that the staff are okay. We have to talk about what we are going to do about the data, but I don't want staff feeling blamed or upset. There will be a lot going on for me in there today.

Cindy revealed that for her and the teachers at her school, NAPLAN results were highly imbued with affect. We have interpreted that NAPLAN data use in that PD setting was emotionally freighted for the teachers and for Cindy herself, surfacing that relational motive object of her activity. Our interpretation confirms findings by Thompson and Mockler (2016) who found that teachers can experience anxious responses to NAPLAN data. We have extended that knowledge to include how mathematics leaders may also be affected as they pay attention to teacher anxieties and their professional vulnerabilities in ways that Cindy shared. We have presented evidence to suggest that mathematics leaders may be consciously motivated to nurture interpersonal trust when working with NAPLAN results in PD settings because of their awareness of teachers' potential responses to NAPLAN data.

Recognising that within CHAT, actions are undertaken as a means of achieving motive objects (Leont'ev, 1978), we now turn to Cindy's leadership actions during that planning meeting. Due to constraints, we do not include all observation data. We use examples and include interpretation of Cindy's leadership actions to further show how relational trust was worked on by her through the developmental and relational motive objects of activity. We present that in Table 2, with the observation data presented in a way that acknowledges the temporality of Cindy's leadership actions during that mathematics planning meeting.

Data in Table 2 confirm that Cindy worked on the developmental motive object of activity. We interpreted that the developmental motive object was pursued by Cindy as she encouraged teachers to identify and discuss teaching practice that would meet the needs of higher-achieving students in the school. Cindy' leadership actions that sought to influence her teachers' knowledge and use of open-ended tasks and extending prompts (Sullivan et al., 2015) are further evidence of that developmental motive object. Her work on that developmental motive object also included how she engaged the teachers in a goalsetting about those open-ended tasks.

Table 2

Observation Data Examples, Interpretation, and Relational Trust Dimension

Observation data example	Interpretation of leadership action(s)	Relational trust dimension(s)
Cindy mentions that it is alarming that high-achieving students made "low progress" from Year 3 in 2015 to Year 5 in 2017. She quickly highlights that several students who did make "high progress". Cindy reminds the teachers in the meeting that "it's only NAPLAN data."	Managing teachers' affect and emotional responses to NAPLAN data; preserving teacher self-esteem	Interpersonal trust
Cindy says to the teachers about "being in this together" and that the NAPLAN data are "everyone's responsibility." Cindy adds that it is important that the teachers decide as a team about "ways forward with using the data."	Reminding teachers of team approach; reiterating a sense of collaboration and the importance of shared responsibility for data results	Intersubjective trust
Cindy asks teachers to offer questions that clarify her interpretation of the NAPLAN data. She invites teachers to talk about ways of addressing the needs of high-achieving students, "What can we do in our maths teaching to make sure we are meeting the needs of the top kids?"	Opening spaces for dialogue by inviting clarifying questions about NAPLAN data; creating opportunities for shared decision-making about ways of using data to inform practice	Interactional trust Intersubjective trust
Cindy references CTLM ideas, specifically open-ended tasks and differentiation prompts. She says the NAPLAN data as reason to continue with the practices learned in CTLM. Cindy invites input from teachers for agreement with her interpretation of NAPLAN data and the need to continue with CTLM practices that she said she knows "works".	Demonstrating knowledge of mathematical tasks (task selection and implementation); using data as influencing tool to create shared understanding and purpose for collective work about mathematics teaching practice	Intellectual trust Interactional trust Intersubjective trust
Cindy sits with a group of teachers and gives advice on how to choose an open-ended task and how changing the number range can extend its demands. Cindy shares a story of her use of open-ended tasks, giving an example from her own teaching and how she changed the task demand using extending prompts that increased the number range.	Demonstrating knowledge of mathematical tasks, including selection and implementation through differentiation prompts; using own stories of practice to highlight practicality and relevancy of teaching strategies	Intellectual trust Pragmatic trust
Cindy asks teachers to plan the use of one open-ended task to be used in the following week. Cindy prompts teachers to identify a goal about using open-ended tasks with extending prompts. She asks teachers to email their goal so that she is aware: "I want to know what you want to get better at with extending the top kids with the open tasks. I can help you more then."	Building in goal setting and making the work of extending students' learning practical, relevant, and achievable; demonstrating interest in teachers' professional learning goals	Pragmatic trust Interpersonal trust

Drawing on their definitions (e.g., Edwards-Groves et al., 2016), we applied the relational trust dimensions as we interpreted Cindy's leadership actions. We interpreted that as Cindy sought to influence teachers' practice and knowledge (Sexton & Lamb, 2017), she worked simultaneously on relational trust and its dimensions. Cindy's leadership actions, as evidence of her work on that relational motive object, suggest to us that she directed her activity at development of the relational trust dimensions, as reported within literature about middle leading (Edwards-Groves & Grootenboer, 2021). Our interpretation of Cindy's leadership activity, however, shows that those

relational trust dimensions hold nuance when observed through the perspective of mathematics leadership activity.

Taking just a few examples from Table 2, we can see that intersubjective trust was developed by Cindy through her attempts to nurture shared understanding and collective responsibility for the NAPLAN results. She also worked on creating space for teachers to contribute to collective responses concerning the use of those data to improve mathematics teaching practice. A different example of relational trust development was evidenced in how Cindy enacted intellectual trust when she, as School Mathematics Leader, shared her knowledge of task selection and implementation when she interacted with her teachers about the use of open-ended tasks and enabling prompts. Cindy's leadership activity highlighted how the relational trust dimensions surfaced in multi-dimensional ways through her leadership activity, confirming that the enactment of relational trust as dynamic (Edwards-Groves & Grootenboer, 2021).

During the post-meeting interview, Cindy explained her attention to relationship, noted by the first author during observation of that planning meeting. Cindy revealed the vitality of relationships within her leadership activity, evidencing further that relational motive object:

> Relationship plays a big part in mathematics leadership, even more so with maths. There's something about mathematics, trust, and relationships that allows me to know how my teachers really feel about maths and their teaching, especially the teachers with maths anxiety. I always make sure that people are okay, and we have trust before I push. I have to make sure we are confident in our relationships.

As the School Mathematics Leader and Learning and Teaching Leader, Cindy was afforded opportunities to compare leadership roles. We have interpreted that for Cindy relational trust held a unique space within her mathematics leadership activity when compared to her other roles. By investing in secure relationships (e.g., Driscoll & Cheeseman, 2022), Cindy created conditions for her to generate knowledge about teachers' dispositions (i.e., teacher anxieties) as well as insights into their mathematics teaching practice. We also interpreted Cindy's comment to mean that as the middle leader of mathematics, she understood how relational trust formed conditions for the teachers to engage in the professional learning agenda that she sets within her school site (Edwards-Groves & Grootenboer, 2021).

For Cindy, the work on nurturing relational trust as a motive object enabled conditions for teachers to engage in PD in her school, providing further evidence of its importance in enabling middle leadership that mediates teachers' professional learning (Edwards-Groves et al., 2016). We have interpreted that for Cindy, developing relational trust as a motive object of activity (Kaptelinin, 2005) played a crucial role in mediating her leadership of mathematics, confirming previous research (e.g., Bolyard & Baker, 2021; Driscoll & Cheeseman, 2022; Eden, 2018).

Drawing those interpretations together, we have reason to believe that Cindy's leadership activity was multi-motivational (Leont'ev, 1978), in the way that there existed developmental and relational motive objects that she worked on during that planning meeting. By this we mean that for Cindy, along with the intention of influencing teachers' understanding of NAPLAN results and the implications of that for teaching practice, fostering relational trust was also a driving force of activity (Kaptelinin, 2005), realised through her mathematics leadership.

Conclusion

We asked how relational trust, as offered in middle leadership literature, was evidenced within Cindy's mathematics leadership activity. We shared our interpretation of her leadership of one planning meeting. For that reason, we are cognisant of limitations and mindful of not making grand claims. Through our CHAT perspective, however, we evidenced relational trust as a motive object of activity pursued by Cindy. We provided examples of our application of the relational trust dimensions to Cindy's leadership actions in that mathematics planning meeting to support our

interpretation of her activity. CHAT allowed us to perceive relational trust as a conscious motive object of activity. This is a nuanced contribution to knowledge about mathematics leadership not yet considered, and is therefore, worthy of further study as a means of extending the theorisation of mathematics leadership in school settings.

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