Teacher Professional Learning in Tanzania: Experiences of Mathematics Teacher Leaders

By

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A thesis submitted in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

Department of Secondary Education

University of Alberta

Abstract

A multisite case study, grounded within constructivist philosophical stance, was undertaken to explore experiences of mathematics teacher leaders (MTLs) in leading the professional learning of mathematics teachers in rural and remote communities in Tanzania. Shaped by notions of symbolic interactionism, perspective consciousness, and Dewey's theory of experience, this study drew eight participants who were working as leaders of teacher professional learning in eight districts located in central and eastern regions of Tanzania mainland. The participants shared their experiences of influencing mathematics teachers to engage in promoting their professional growth for them to become successful in their mathematics classrooms. Research data were collected through open-ended questionnaire, open-ended interviews, focused interviews, metaphors, and vignettes. Thick descriptions of the MTLs' experiences were carefully generated from within- and cross-case analyses.

The study has revealed a series of activities that a mathematics teacher leader can undertake when charged with the responsibility of leading the professional learning of other teachers. Such activities include those that are assumed before, during, and after professional learning sessions. Activities that the MTLs reported undertaking before the sessions involve designing professional learning plans along with mobilizing resources and creating materials for facilitating learning during the sessions. In-session activities included greeting teachers, introducing self, others, and big ideas, distributing learning tasks and engaging teachers, motivating teachers, collecting information about teacher learning, and moderating discussions. Post-session activities that the MTLs accomplished include networking with mathematics teachers and (re)designing professional learning plans for next sessions. As such, the MTLs

engaged teachers in a series of activities that regard teacher professional learning a cyclical, long-term in nature, and an ongoing practice; not a onetime event of gathering teachers.

The study has raised a number of professional learning outcomes that include improvement of pedagogical knowledge and skills among mathematics teachers, development of teacher confidence, the establishment of teacher collaboration and networking, and development of awareness of gender-sensitive pedagogy. They attributed such success to long-term collaborative preparations, availability of resources, ongoing collaboration, and freedom of ideas and opinions. They also considered wise teacher leadership, teacher leader availability and accessibility, and use of respectful language to have contributed to the success of the professional learning of mathematics teachers in their districts.

The most significant implication of this study is that the education system of Tanzania needs to encourage and empower mathematics teachers to become teacher leaders capable of taking charge of their own professional learning. As emerged in this study, the MTLs are essential in schools as they could sustainably engage mathematics teachers in the process of promoting their professional growth, thereby, revitalizing mathematics teaching and learning in schools. Even more, situating teacher learning to the hearts, minds, hands, and bodies of mathematics teachers not just permits ongoing teacher professional learning in schools but also allows consideration of teacher's voice in a broader debate on what can be done to improve mathematics teaching and learning in primary schools in Tanzania and elsewhere.

Preface

This dissertation is an original work by Calvin Zakaria Swai. The research project, of which this dissertation is a part, received research ethics approval from the University of Alberta Research Ethics Board, under the title of: *Teacher Professional Learning in Tanzania: Experiences of Mathematics Teacher Leaders,* Pro00064108, on August 26, 2016.

Acknowledgements

I extremely thankful to Dr Florence Glanfield, my supervisor, for her continued support, encouragement, and immense guidance that made this dissertation to come to fruition. I have been truly lucky to have a supervisor who cared so deeply about my personal and professional life. I am endlessly grateful to have her as my supervisor.

I express my heartfelt gratitude to my supervisory committee members, Dr Elaine Simmt and Dr Janice Huber for their willingness to serve on my committee. I sincerely appreciate their motivation, patience, insightful comments, and immense knowledge. I am appreciative for their endless inspiration; I could not have asked for a better supervisory committee.

Now I would like to express my deepest appreciation and thanks to Dr Florence Glanfield, Dr Elaine Simmt, and Dr Joyce Mgombelo. Their dream of securing the future of Tanzanian children through a development project—*Capacity Development for Mathematics Teaching in Rural and Remote Communities in Tanzania*—enabled me to pursue my doctoral studies at the University of Alberta, Canada. I am forever grateful to them for their passion, hard work, and commitment to improving mathematics education in Tanzania and around the world. They are the ultimate role models I will always look up to. I am thankful to the Global Affairs Canada for granting me financial support throughout my doctoral program. By means of this support, I was able to concentrate on my program. I would like to thank Dr Andrew Binde, Laura Paslawski, Prudence Kaaya Ching'ole, Mohamedi Luhindi, and Jaribu Lukwele for their encouragement and continued support.

I would like to thank the eight mathematics teacher leaders who wholeheartedly agreed to share their stories of leading professional learning communities in their districts. Their stories have shaped and will continue to shape me as a teacher educator and as a human being. I appreciate the dedication they had to take on teacher leadership and their commitment to making a difference in Tanzanian schools and schooling.

I am indebted to my fellow doctoral students in Math Education Students Meetup Group for the stimulating, lengthy discussions, hard questions, and intellectual criticisms that richly enriched my research study. I am looking forward to continuing to work together in future.

I would like to acknowledge my parents—Zakaria and Evaline—for their wonderful parenting and for supporting me spiritually throughout my life. My parents had sleepless nights praying for me throughout my entire life. I am forever thankful to have them as my parents.

I must thank my wonderful family—Esther, Natalia, and Nicole—for their unconditional support, motivation, and patience. My loving wife passionately took a role of taking care of my young children and raised them in a wonderful way, and I am truly proud of who they are and who they are becoming.

Above all, I give thanks to God—for blessing my life in a special way. Without His enduring compassion, extraordinary protection, and total guidance, I could not have made it this far.

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Chapter 1

Introduction

The Position of Mathematics Teachers in Leading Teacher Learning

In a contemporary landscape of education, teachers around the world are often regarded as the key people in the quest for improving schools and schooling. Such a consideration is rooted in the conviction that teachers are well-informed of what it means and takes to promote learning of students inside and outside classrooms. With such a belief, teachers are increasingly "charged with … our children—and we count on teachers to understand them academically, socially, and emotionally; to facilitate their learning so that they can be successful" (George, 2016, p. 230). With such a consideration, it is quite apparent that teachers are facing repertoires of opportunities to work with students as school-children but also as active human beings who have different dreams, visions, purposes as well as aspirations of living in their world. "Yet when it comes to empowering teachers and including them in decision-making and trusting them to try new things, our education systems often fall short" (George, 2016, p. 230),

The same is, unfortunately, the case in the centralized education system of Tanzania when it comes to the positions teachers are oriented to assume during their professional learning. As an instance in point, Mhando (2012), in his research study, which examined whether primary school teachers in Tanzania are professionals in relation to the process of self-expanding their knowledge and expertise, concluded that:

> [I]n the case of our teachers who have subject inspectors and not mentors or subject advisors it is hard for them to be autonomous. The space of options for the teacher is very narrow… In this way teachers choose to have very little innovation in the process of developing knowledge. (p. 163)

From the issue recounted above, which speaks to the question regarding the position of teachers in teacher professional learning initiatives, one can be interested in asking, "[s]o long as teachers are increasingly required to provide their pupils with an understanding of the concepts

of responsibility and autonomy … why should they be denied the opportunity of assuming their own responsibilities" (The Organization for Economic Co-operation and Development (OECD), 1979, p. 20) of their professional growth? More than a decade after OECD asked this question, Boyler (1995) posed a similar question, wondering about the reluctance of education systems in allowing teachers spaces to take ownership of their professional learning for them to continuously engage in monitoring their own professional growth. He thoughtfully asks the following key question in connection to the natural position of teachers in improving schools and schooling:

> Who, after all, knows more about the classroom? Who is better to inspire children? … And who but teachers can create a true community for learning? Teachers are, without question, the heartbeat of a successful school. (p. 31)

These questions, which are quite relevant even today, are critical because teachers, in the current paradigm of professional learning, need to be treated as professionals who experience a sense of owning their own professional growth like their colleagues in law and health professions, to mention but a few (Dana & Yendol-Hoppey, 2016). These questions, on the other hand, are equally crucial considering George's (2016) conclusion that, "[t]eachers should have a voice in determining their own professional learning, and there needs to be buy-in from the teachers" (p. 230). At the heart of the questions is the need for schools to constantly have classroom teachers who are capable of supporting the personal and professional growth of other teachers within and outside a school (Jackson & Allender, 2016). In this manner, teachers are increasingly expected to assume responsibilities related to expanding their professional knowledge base for them to be able to ultimately help children develop a deeper understanding of what they learn in schools.

The research of Hardman and colleagues (2015) is helpful in understanding the position of primary school teachers, including mathematics teachers, in leading the professional learning of other teachers in the Tanzanian educational context. Hardman and colleagues (2015) are explicit in saying that the landscape of teacher education in Tanzania still embraces a traditional paradigm of teacher learning that encourages teachers to assume a passive role in the process of promoting their professional growth. Many teacher professional learning programs in Tanzania

still regard teachers as mere recipients of knowledge rather than active constructors of the same (Mhando, 2012). Such programs resemble what Hill (2009) calls, 'boutiques,' where "a handful of fortunate teachers" (p. 470) shop for the specified body of knowledge to be imparted to students when they return to their mathematics classrooms. With such teacher professional learning in place, one could be tempted to make a case that the Tanzanian teacher education system is unfortunately uninformed of Barth's (1981) thoughts about the implications of teacher growth:

> Teacher growth is closely related to pupil growth. Probably nothing within a school has more impact upon students in terms of skills development, self-confidence, or classroom behavior than the personal and professional growth of their teachers. When teachers examine, question, reflect on their ideas and develop new practices that lead towards their ideals, students are alive. When teachers stop growing, so do their students. (p. 145)

By being engrossed in programs, which encourage consumption of knowledge, mathematics teachers in Tanzania seem to lack opportunities to integrate their experiences, wisdom, imagination, and insights to grow as professionals. It is unfortunate that such a situation can also make teachers feel distanced and alienated from what they know and can do inside and outside their classrooms. Even more disturbing is the likelihood for them to experience troubles in applying the knowledge they received during their teacher professional learning programs (Firestone & Mangin, 2014). Mhando (2012) revealed one more situation that characterized teacher professional learning in Tanzania. He reports that in many schools "teachers do not have the … opportunity to maintain their own quality" (Mhando, 2012, p. 164), a situation that does not favor them to impact the bottom line of student mathematics learning.

The current landscape of teacher professionalization in the 21st century calls for a different approach to professional learning in which teachers are supported to become lifelong learners and educators of their teacher colleagues (Scott, Scott & Webber, 2016; Stevenson, Hedberg, O'Sullivan & Howe, 2016). As Lee and colleagues (2006) state, the intent is not to give mathematics teachers more responsibilities but, more significantly, to expand their pedagogical opportunities within their professional learning contexts. Expanding such opportunities is important in today's schools because the work of teaching is increasingly contextual and ever-

changing, and one that invariably requires teachers to be well-informed on how to facilitate effective teacher and student learning (Levin, 2012; Dana & Yendol-Hoppey, 2016). With such a call to action, more attention needs to be given to the treatment of teachers as professionals who can facilitate professional learning of other teachers inside and outside their schools (Firestone & Mangin, 2014).

As a teacher educator working at a university in Tanzania, I believe that the practice of leading teacher professional learning is a powerful experience for mathematics teachers as professionals. At the heart of this conviction is my experience of participating in professional learning initiatives designed to support our professional growth as instructors. In our group, which consisted of 17 faculty, two of my colleagues facilitated our learning that took place in our institution. In that learning space, I remember developing a profound sense of collegiality, belongingness, shared purpose, and freedom to participate in our contextualized conversations. More critical is that I developed a sense of being empowered to take ownership of my work as a teacher educator but also as an active human being. For mathematics teachers in primary schools to experience similar personal and professional growth, schools have "to be organized in ways that enable successful teaching, and a first step is overhauling teacher professional learning systems and the conditions under which this professional learning takes place" (George, 2016, p. 228). In the next section, I describe the rationale of this study, explicating the motives behind inquiring into the experiences of MTLs in leading the professional learning of mathematics teachers in remote and rural localities.

Coming to the Rationale for the Study

In the 21st century, new demands have been constantly placed on the work of teachers in schools. Pedagogically speaking, the demands have changed the social realities of the nature of the work of teaching, making teaching more challenging than before (Lieberman & Miller, 2004). One of the demands placed on teachers is for them to become "leaders, educators [of both students and teachers] who can make a difference in schools and schooling now and in the future" (Lieberman & Miller, 2004, p. 11). Similarly, Easton (2008) calls them to become educators, suggesting that they "must be knowledgeable and wise … must change in order to get different results … must become learners and they must be self-developing" (p. 756) throughout

their teaching career. Aubusson, Ewing, and Hoban (2009) sent a compelling reminder to teachers, calling them "to be in control of their own professional learning if change in schools is to be sustained beyond the length of a particular process" (p. 112).

To meet such an embedded demand, the growing research literature on education and teacher education encourages teacher professional learning to profoundly focus on supporting teachers to develop capacities and abilities they need to lead the professional learning of other teachers (Kennedy, 2014; Lieberman & Miller, 2014; Tam, 2015; Fairman & Mackenzie, 2015; Wepner and colleagues, 2016). Increasingly, the research scholarship in mathematics education has equally commended mathematics teachers to take charge of their own professional learning and work together to enrich pedagogical practices (Davis & Simmt, 2006; Neubrand et al., 2009; Davis & Renert, 2014). The intent is for teachers to orient themselves to the responsibility of leading the professional learning of other mathematics teachers, supporting them to promote their professional growth.

Equally, National Council of Teachers of Mathematics (2000) through its *Principles and Standards for School Mathematics* stresses "[t]here is an urgent and growing need for mathematics teacher-leaders … who can assist with the improvement of mathematics education" (p. 375) in schools. As prominent mathematics educators Balka, Hull, and Miles (2010) have argued, the essentiality of such leaders lies on their position of ensuring that "continuous professional [learning] is provided … sustained over time, emerge from identified teacher needs, and are directly related to the classroom" (p. x).

The idea of supporting mathematics teachers to become leaders of their professional learning calls for embracement of an expanded view of teacher learning (Louis, Hord & von Frank, 2017; Lieberman & Miller, 2014). Central to this view is to make schools places for ongoing professional learning of mathematics teachers that pays closer attention to teachers' experiences, expertise, and wisdom highly needed in promoting effective professional growth. Accordingly, such a view calls for a transformative shift—a shift from an emphasis on individual development of a teacher— to collective development of teachers by teachers themselves (Lieberman & Miller, 2004; 2014). In doing so, teacher professional learning becomes experiences for teachers to develop capacities they need to engage in sustainable and effective

learning within their working contexts (Raphael, Vasquez, Fortune, Gavelek & Au, 2015; Dana & Yendol-Hoppey, 2016). Such a view deeply resonates with Hoekstra's (2007) proposition that in the current fast-changing world, teachers need to become leaders of their learning to make schools places for relevant and ongoing professional learning.

Considering such a shift and the need to contribute in situating professional learning into the hands, hearts, minds, and bodies of teachers, I worked with mathematics teachers who pioneered the work of leading teacher professional learning in the Tanzanian educational context. An important aspect of this research project was its strength in giving the teachers a space to make sense of their work of facilitating the learning of their colleagues in rural and remote communities. Using Greene (1978) words, I was interested in understanding teachers' "evolving experiences, to be aware of the ways in which [they] encounter [their] world" (p. 2) of facilitating teacher professional learning.

As mentioned above, and with insights gained from an influential work of Lieberman and Miller (2004) on teacher leadership, such mathematics teachers are hereinafter referred to as mathematics teacher leaders (MTLs). Donaldson (2007) supports such an identification of mathematics teachers as well as the current direction of teacher professional learning, pointing out that such teachers need to be titled "leaders because their own capacity to teach and improve is infectious and helps others learn more effective ways of working with their own students" (p. 29). The idea was not to administratively isolate MTLs from their colleagues nor did I intend to make them feel superior over the other. But rather the intent is, as Lieberman and Miller (2004) have taught me, to recognize the work they have pioneered in situating the professional learning of mathematics teachers in their respective districts. For the purposes of this research and consistent with teacher professional learning scholarship, a mathematics teacher leader[1] is any mathematics teacher who "facilitates effective, professional [learning] for their teacher colleagues by leading communities … that collectively examine and improve teaching practice through ongoing inquiry" (Poekert, 2012, p. 170).

[1] Balka, Hull, and Miles (2010) provide a comprehensive view of a mathematics teacher leader. For them, "the mathematics [teacher] leader ensures that continuous professional development is provided. [He/she] guarantees that ideas about mathematical content, instruction, and assessment are relevant, sustained over time, emerge from identified teacher needs, and are directly related to classroom procedures" (p. x).

Research Question

Through reflection on the position of primary school mathematics teachers in leading teacher professional learning in Tanzanian educational contexts and the current demands placed on their work, I arrived at the research question that guided my inquiry. The question for this research study was: *What are the experiences of mathematics teacher leaders (MTLs) in leading the professional learning of primary school mathematics teachers in rural and remote communities in Tanzania?*

Unpacking the research question.

Substantial aspects of this research question are twofold. First, it has the potential of "putting teachers front and center in terms of listening to what they do [so] … to know the story in order to tell the story" (Freeman, 1994, p. 89). In so doing, it treats the mathematics teachers as active human beings who engage in professional learning not for the sake of being 'trained' but rather, and more importantly, to be empowered to own their professional learning within their working contexts. Using Murray and Zoul's (2015) words, the question shifts the thinking of professional learning as "something we do *to* teachers to something we (with their active participation) do *with* them" (p. 9) within the Tanzanian educational context. Second, the research question, methodologically speaking, was substantial in inviting the MTLs to share their experience and interpretation of the work they were doing alongside their mathematics teacher-colleagues within professional learning contexts in their districts.

More significantly for this study, the question is specific in terms of whose experiences were to be learned. It did not intend to involve any teacher; instead, the question drew mathematics teachers to the heart of the study with the goal of inquiring into their experiences of leading the professional learning of teacher colleagues. As such, it is apparent from the question that the experiences described in this study are shaped by who they were as mathematics teachers but also by what they believed and were doing as teachers teaching mathematics in their schools. With this question, therefore, I approached the study while mindful that the experience of working as mathematics teachers among the MTLs have implications to the what they shared with me as their experiences of leading teacher professional learning in their communities.

Understanding Primary Mathematics Teachers in Tanzania

The teaching force in primary schools in Tanzania is made up of teachers with grade 'A' certificates (completed ordinary secondary education (11 years) and 2-year college teacher education), diplomas (completed advanced secondary education (13 years) and 2-year college teacher education), and bachelor degrees (completed advanced secondary education and 3-year university teacher education) (see Appendix A for detailed description of the Tanzanian teaching force). While the number of grade 'A' teachers is significantly large, there are only a few teachers who hold diplomas and bachelor degrees in primary schools. According to Meena (2009), some of the primary school teachers who hold diplomas and bachelor degrees were once holders of grade 'A' certificates before upgrading their academic qualifications.

The main responsibility of primary school mathematics teachers in Tanzania, like in other countries, is to help students develop an understanding and skills related to counting, reading, and writing numbers (United Republic of Tanzania (URT), 2016). To achieve that, mathematics teachers are expected to create conditions for students, among other things, to engage in learning (e.g. geometry, algebra, etc.), depending on the standard[2] they are in. At another level, primary school mathematics teachers are responsible for helping students realize connections between school mathematics and their real-life experiences (URT, 2016). To achieve that, teachers are challenged to facilitate mathematics learning by helping students develop an understanding of school mathematics and its application to everyday life. Such responsibilities, undeniably, call Tanzanian mathematics teachers to have an in-depth understanding of the subject and the strategies upon which students can rely to develop a deeper understanding of the discipline (URT, 2016). The intent is for the teachers to be able to successfully help students to routinely use mathematics to improve life and living but also to contribute to the national development.

My experience highlights the situation that most of the primary school teachers are less interested in teaching mathematics, claiming that the subject is challenging to teach as it requires extensive preparation before teaching. In his recent study, Seka (2015) has also found that primary school teachers prefer not to teach mathematics because the subject is feared by many

[2] In the education system of Tanzania, primary education is categorized into standards unlike in other countries which use grades. In Appendix A, I offer a detailed description of education system of Tanzania, especially, its primary education.

children, a situation most of teachers find to demand a constant investment of energy in motivating students to learn the subject. As such, those teachers who agree to teach mathematics will continue to teach the subject for many years and in more than one standard. In cases where a school experiences shortage of teachers, a possibility exists for those teachers who teach mathematics to teach other subjects. A situation of primary school teachers being less interested in teaching mathematics, amongst others, prompted me to think about whether the MTLs experience the same tensions when asked to lead the professional learning of mathematics teachers. As such, I became interested in undertaking this study, to learn how the MTLs experience their leadership of the professional learning of mathematics teachers in their districts.

Tanzanian primary school teachers, including mathematics teachers, have witnessed several significant changes to the curriculum in the last two decades (Kafyulilo, Rugambuka & Moses, 2012). One of the major changes of the curriculum took place in 2005 where a competence-based curriculum replaced content-based curriculum in the name of helping students develop skills they need to succeed in the 21st Century (Kafyulilo et al., 2012). Such a change, however, negatively affected the provision of primary education in the country, leaving many teachers perplexed since they were less informed of what they were required to do to implement the competence-based curriculum (Tanzania Education Network/*Mtandao wa Elimu Tanzania*, 2012; Woods, 2007).

From my experience of observing some mathematics lessons and lesson plans of mathematics teachers as a researcher, most of them resorted to implementing the new curriculum the same way they implemented the old curriculum. What I learned from this situation is that for mathematics teachers to successfully cope with emerging demands of their work, they need to keep themselves abreast with what they are expected to do as they work to implement a new curriculum. The upshot of the situation could be a call for teachers to collaboratively engage in lifelong learning to become well-informed and, most importantly, more confident in their work of facilitating student mathematics learning in their classrooms.

Strength and Significance of the Study

If the Government of Tanzania believes that teacher professional learning is a powerful way of improving student learning in schools then it is critical that it supports teachers to take

charge of their professional growth (Wepner et al., 2016). This implies that it is necessary to build the capacity of teachers to lead their own professional learning whether inside or outside their schools. This research project informs the transition from traditional teacher professional learning to teacher-led professional learning of mathematics teachers in primary schools. The study offers needed information on how primary school mathematics teachers experience their leadership of the professional learning of their fellow mathematics teachers. Such information, undoubtedly, encourages education stakeholders, including heads of schools, ward education officers, and district education officers, to mention a few, to engage in an important work of supporting mathematics teachers to develop capacity and the understanding they need to work as both educators and leaders of their professional learning within and outside their schools.

The significance of this research study rests on its contribution to teacher professional learning, and innovation in designing and implementing effective and ongoing professional learning of mathematics teachers in Tanzania and elsewhere. The information from this study provides the Government of Tanzania with the opportunity to reconsider alternative ways in which professional learning of teachers can be organized and implemented in such a way that teachers become treated as active, thoughtful, reflective, and transformative professionals capable of expanding their professional knowledge base. This research is equally substantial as it helps primary schools to shift from being places where teachers wait for invitations to attend professional learning programs facilitated by education officers and teacher educators from teacher colleges[3] to places where teachers themselves actively engage in an ongoing work of promoting their professional growth, thereby, to ameliorate pedagogical practices (George, 2016; Wepner at al., 2016).

As a teacher educator in a university, this study provides me with a fresh understanding of how primary school mathematics teachers in Tanzania engage in leading the professional learning of other teachers. It has helped me to become increasingly aware as to how mathematics teachers make sense of the opportunity of taking charge of their own professional learning. Equally, the study has helped me understand the practices that the MTLs commonly employ in

[3] Teacher colleges are educational institutions that have the responsibility of preparing teachers to teach in Tanzania. More details about these colleges are provided in Appendix A.

their work of leading teacher professional learning to help their colleagues to expand their professional knowledge base. Even though this project involved only a few primary school mathematics teachers from rural and remote communities in Tanzania, this study has the potential to inform relevant teacher professional learning research across Tanzania, as well as related educational developments in other parts of the world. It is hoped that the study will be part of the future direction of the professional learning of mathematics teachers that is predicated on the idea of fostering teacher leadership in primary schools with the goal of inviting mathematics teachers to contribute to their professional growth as they move forward with their work of helping students learn mathematics.

For decades now, the Tanzanian mathematics education community has been experiencing lack of information on mathematics teachers' experience of leading their own professional learning. A possible reason behind such a situation is that professional learning initiatives implemented in the country were led by educational stakeholders instead of classroom teachers (Mhando, 2012). One more reason that could be attributed to the situation is the tendency of designing and implementing professional learning programs to suit teachers teaching different subjects instead of those that are meant specifically for mathematics teachers. That is, professional learning sessions become avenues that are not shaped by ideas and views about teaching mathematics, rather by those of several subjects. Given such a situation, researchers have been generating scholarship that hardly attends to what mathematics teachers experience during their professional learning as they work to broaden their knowledge and skills of teaching mathematics. As such, this study should encourage the mathematics education community of Tanzania to generate a body of literature on teacher professional learning that focuses on mathematics teachers' engagement in promoting their professional growth. That is essential as the experiences shared by the MTLs are shaped by their interactions with mathematics tasks and mathematics teachers who they worked together in their professional learning contexts.

Another significance of this research is methodological. This study employed multiple research methods in collecting data to inquire into the experiences of the MTLs in leading the professional learning of mathematics teachers. One of the methods is metaphor. Methodologically speaking, this method has helped me clearly capture and make sense of what the MTLs experienced in their work of leading the professional learning of mathematics teachers

in rural and remote communities. Metaphors have not just added figurative language in my work, which portrayed a clear picture of experiences, but have also added a novel language of describing experience that teacher leaders, as human beings, lived throughout the journey of working alongside teachers. As such, this study provides researchers with one more tool they can use to explore human experiences related to their life and work.

Outline of the dissertation

This dissertation consists of nine chapters. The current one has provided an introduction to the study. The next chapter reviews the literature related to teacher education and teacher leadership. It also offers a description of professional capital as understood within teacher's professional learning context. Chapter 3 presents the theoretical and philosophical perspectives that guide this study. Chapter 4, *Research Approach and Process*, discusses the research approach and methodological processes employed in the study. It also describes the Mathematics Education Project (MEP) that empowered participants of this study to become teacher leaders within and outside their schools. Chapter 5 offers detailed profiles of participants of the study, describing their education journeys, teaching and leadership experiences they lived since joining the teaching profession. It also illuminates leadership notions embraced in the MTLs' local communities. Chapter 6 describes individual experiences of eight mathematics teacher leaders related to their work of leading the professional learning of mathematics teachers in their districts. Chapter 7, *Teacher Leadership in (Inter)Action*, is an overview description of what it means and takes to implement teacher leadership in rural and remote communities in Tanzania. Chapter 8 describes perspectives of the MTLs on teacher-led professional learning (TLPL) as they lived and implemented it in their contexts. Finally, Chapter 9 provides concluding thoughts, including a summary of the study, implications for practice, suggestions for further research, and conclusions.

Chapter 2

Navigating Teacher Education Landscapes

Historical Perspectives on Teacher Education in Tanzania

According to Darling-Hammond (2000), there are two basic tenets which characterize teacher education, namely teacher preparation and teacher professional learning. In Tanzania, both forms of teacher education are centrally managed by the government through its Ministry of Education, Science, and Technology (MoEST). MoEST is responsible for preparing teachers who hold certificates, diplomas, bachelor, and master's degrees. This responsibility is implemented by the Tanzania Institute of Education (TIE) and the National Examination Council of Tanzania (NECTA). TIE[4] has the responsibility of determining the curriculum for teacher preparation programs hosted by teacher colleges. A full description of teacher preparation is provided in Appendix A to assist in developing an understanding of how pre-service teachers are prepared to become primary school teachers in Tanzania. NECTA[5] is charged with the responsibility of examining such a curriculum and accrediting teachers (Hardman et al., 2015). The MoEST, in collaboration with partners from around the world, is also responsible for facilitating and monitoring teacher professional learning in Tanzania, with the goal of improving pedagogical practices, thereby enriching student learning. I will now review teacher professional learning in Tanzania because this study is about the experiences of leading teacher professional learning.

The need to conceptualize teacher professional learning emerges. A few teacher professional learning theorists consider professional learning of teachers as a relatively new concept in teacher education literature. Lieberman and Miller (2014), for example, find professional learning to have replaced the so-called in-service/staff development. For them, professional learning is a growth-in-practice model which appropriates teacher learning away

[4] TIE is "a parastatal organization under the Ministry of Education, Science, and Technology charged with the responsibility of ensuring the quality of education in Tanzania at the pre-school, primary, secondary, and teacher training levels" (URT, 2017).

[5] NECTA is a government institution under the Ministry of Education, Science, and Technology that has the responsibility of examining curriculum for pre-school, primary, secondary, and teacher training levels through national examinations.

from a traditional training model. Unlike an in-service/staff development model, as Duncombe and Armour (2004) advance, a growth-in-practice mode "acknowledges teaching as an intellectual endeavor and professional [growth] as an outcome of teachers learning together" (p. 146) as they share knowledge and experience.

Quite recently, Bowles and Pearman (2017), building on the views of Mintzes (2013) and Dixon (2014) and their colleagues, have provided a concise account that fittingly describe professional learning and what it takes for a teacher to be engrossed in professional learning. For them, "[p]rofessional learning (PL) presents a unique opportunity to immerse teachers in the essential work of the teaching profession … It is an opportunity for colleagues to engage in the conversation to develop foundational understanding and instructional competences for the topic at hand … and for the social persuasion often needed to … establish or implement effective practices resulting in positive student outcomes" (Bowles & Pearman, 2017, p. 73). Building on such conceptualizations and for the purposes of this research study, teacher professional learning is a productive practice which invites teachers of varying work experiences to sustainably and collectively engage in the process of expanding and promoting pedagogical knowledge and skills.

In many schools today, teachers, including Tanzanian teachers, are continually "challenge[d] to be more responsive to the diversity of their learners and to meet the higher expectations and future-focus required by knowledge societies" (Alton-Lee, 2008, p. 254). Undoubtedly, the assertion calls for teacher professional learning programs to continually help teachers to develop a keen awareness of the changing social realities of their work of teaching. Critical to teacher professional learning programs in the current context of education is the need to provide teachers with opportunities to deepen their pedagogical practices, and in so doing to improve student learning. Murray (1996) once noted that teacher professional learning is what makes the teaching profession responsive to the growing and changing needs of its students and the society on the whole. Murray's words (1996) draw attention to the growing affirmation that teacher professional learning is a critical aspect that strengthens the teaching profession. It seems sensible to argue that for teachers to be able to address growing learning needs of their students, they ought to have access to adequate and ongoing professional learning that has the potential to enrich their pedagogical practices.

As a case in hand, the Government of Tanzania is mindful of the fact that teacher professional learning is an essential dimension that can assure provision of quality education in schools (URT, 1995). With such an awareness comes the commitment of providing teachers with opportunities to engage in professional learning as a way of improving practice. In the Education and Training Policy of 1995, and its revision of 2014, the government affirmed categorically that ongoing professional learning of teachers is a priority of the MoEST. Apparent in the policy document is the need to have ongoing professional learning of teachers that will enable schools to have qualified teachers, capable of facilitating meaningful student learning in schools.

In the early 2000s, teacher professional learning in Tanzania was mainly carried out in the form of workshops and seminars in which a few teachers attended by invitation with the most teachers being consistently overlooked (Kitta, 2004). The sessions were mainly of two arrangements: (a) teachers were invited to attend workshops or seminars in universities such as the University of Dar es Salaam, whereby the university lecturers and officials from the TIE were responsible for facilitating the sessions, and (b) university lecturers and officials from the TIE facilitated workshops and seminars in respective zones and regions (Kitta, 2004). With such arrangements, there is a temptation to argue that the professional learning of teachers was top-down considering that the TIE determined the content and modes of delivering and assessing teacher professional learning programs. In these learning contexts, there is a likelihood for teachers to find professional learning programs irrelevant and less helpful to their work of facilitating student learning.

On account of some concerns related to the provision of teacher professional learning, the Government of Tanzania launched a Teacher Development and Management Strategy (TDMS) in 2007 to, among other things, improve the quality of teachers, including primary school mathematics teachers around the country (URT, 2007; Hardman, Abd-Kadir, & Tibuhinda, 2012). Two reasons were cited in the TDMS document to have inspired the introduction of the strategy. The first reason is that many teachers had not attended any professional learning in the last ten years regardless of curricular reforms that had taken place in the education system. The situation was influenced by many teacher professional learning programs being offered in a haphazard manner, leaving many teachers unaware of when they might be invited to attend professional learning (URT, 2007).

The second reason is more disturbing—despite that teacher professional learning programs had been uneven, their duration had raised concerns among scholars and educators because the content was fragmented and condensed within a short period, leaving teachers less confident with what they learned from the seminars and workshops (URT, 2007). Such a practice ignored an observation made by Donaldson (2007) that "intellectual and instructional change requires professional learning activities to be of long duration, including both the span of time over which the activity is spread, and the number of hours spent in the activity" (p. 15). With such observations, the institution of TDMS was an effort to situate ongoing professional learning of teachers around the country (URT, 2007). As such, the strategy operationalized four aspects that were perceived important in enabling teachers to have access to efficient and contextualized professional learning (URT, 2007).

The first aspect was to establish a position of deputy director responsible for teacher professional learning around the country; the second aspect was to task TIE with the responsibility of coordinating, monitoring, and evaluating teacher professional learning programs; the third aspect that was instituted to improve teacher learning was to identify zonal in-service teacher colleges for hosting professional learning programs; and the final aspect was to establish an annual budget to facilitate the implementation of professional learning programs. On face value, the aspects were promising even though they had little connection to classroom teachers and what those teachers do alongside their students as teaching and learning are concerned.

Some researchers in education have carried out studies to understand teacher professional learning in Tanzania, following the implementation of TDMS. Komba and Nkumbi (2008), for example, explored the perceptions and practices of teacher professional learning in Tanzania. They revealed two critical practices to characterize teacher learning in Tanzania. First, they found professional learning programs to be primarily geared to help teachers become aware of new materials such as the curriculum, textbooks, and emerging policies, but also new methods and approaches to teaching. Undoubtedly, this practice was more about familiarizing teachers with what is new in their work of implementing the centralized curriculum. The second practice was the invitation of primary school teachers to use professional learning programs as avenues for upgrading "themselves from grade IIIC/B to grade IIIA, from grade IIIA to Diploma, and

from Diploma to Degree" (p. 76). With such practices, however, it is reasonable to say that the programs provided teachers with spaces to upgrade their teaching qualification instead of sharing knowledge and skills to address pedagogical challenges facing their students.

In his study of teacher professional learning in Tanzania, Hardman (2009) identified one major practice that characterized the professional learning of teachers in the early 2010s. The practice was that teachers from around the country convened in zone-specific teacher colleges for their professional learning. The sessions were facilitated by teacher educators from the respective teacher colleges. Hardman's (2009) review identified two issues that seemed to deter provision of effective professional learning among teachers. First, the facilitators of the workshops and seminars lacked a broader understanding of the realities of teaching in classrooms as some of them had little or no experience of teaching. Such a situation has the potential to make teacher professional learning less successful in supporting teachers to enrich their pedagogical practices. The second issue was that the programs lacked inputs from schools, wards, and districts, a situation which prompted Hardman (2009) to recommend inclusion of schools, ward education officers, and district education officials during the designing and planning of teacher professional learning programs. Hardman (2009) concluded his study by recommending school-based teacher professional learning that takes into consideration the needs and interests of both teachers and students in the process of designing and implementing teacher learning.

Not long ago Binde and colleagues (2013) found many mathematics teachers in Tanzanian primary schools seek help through various channels whether within or outside their schools. In their study, 78% of primary school mathematics teachers who participated in the study reported seeking help from colleagues within their schools and 16 percent of the teachers reported seeking help from colleagues outside their schools. Surprisingly, five percent of teachers reported going nowhere in case of a problem related to their work of facilitating mathematics learning among students (Binde et al., 2013). The findings revealed the readiness of teachers in working together within or outside their schools to promote their professional growth.

My personal experiences regarding teacher professional learning in Tanzania is equally illuminating. While on my summer holiday in Tanzania in 2015, I noticed large numbers of primary school teachers from across the country convene at the University of Dodoma, the

institution where I work as a teacher educator. Their mission was to attend a professional learning program on reading, writing, and arithmetic, known as 3Rs, or famously known in Swahili as KKK (*kusoma* (reading), *kuandika* (writing), and *kuhesabu* (arithmetic)). The sessions were facilitated by teacher educators from teacher colleges as well as officials from the TIE. Through conversations with some teacher attendees, I came to realize that the program aimed at introducing teachers to the new curricular materials for teaching lower standards (standards I and II) as a way of improving primary education in schools. Unfortunately, it became clear that the workshop carried a traditional notion of professional learning of teachers as it was not about utilizing teachers' experiences and prior understanding to improve practice but rather, to make them well-informed of what was new in the education landscape.

Given these observations, it is entirely fair to argue that, borrowing Miles' (1995) words, teacher professional learning in Tanzania is "everything that a learning environment shouldn't be: … radically under-resourced, brief, not sustained, designed for 'one size fits all,' … imposed rather than owned, lacking any intellectual coherence, treated as a special add-on event rather than as part of a natural process, and trapped in the constraints of the bureaucratic system" (p. vii). Within such an arrangement, it is quite difficult for professional learning to help teachers expand their professional knowledge base.

Contemporary Perspectives on Teacher Professional Learning

Teacher professional learning scholars, Lieberman and Miller (2014) are helpful in understanding the perspectives that are associated with teacher professional learning. To make sense of what professional learning means and seeks to achieve in an educational setting, the scholars have categorized their perspectives into five dimensions that distinguish professional learning of teachers from other approaches to teacher professional development. The dimensions include (a) professional learning as a steady, intellectual practice that promotes meaningful engagement with ideas, and with colleagues over time, (b) professional learning as a practice which involves teachers in knowledge construction and reconstruction through collaborative inquiry, (c) professional learning as a practice which relies largely on both inside teacher knowledge and outside expert knowledge development, (d) professional learning as a practice which focuses on specific problems of pedagogical practice and takes into account the practical experience and knowledge of teachers, and (e) professional learning as a practice which assumes

that teachers will actively engage in reflection, analysis, and critique as they make sense of what they are learning (p. 9).

The dimensions are quite helpful in developing an understanding of teacher professional learning but also of its related potentials to teachers' professional growth. They render teacher professional learning to the hands, minds, hearts, and bodies of teachers themselves, calling them to take charge of their professional learning, with the purpose of influencing them to situate the practice into their schools. With such a situation, Lieberman and Miller's (2014) dimensions agree with the current demands placed on teachers—to actively engage in the ongoing improvement of their pedagogical knowledge and skills for them to be able to facilitate meaningful student learning of mathematics in schools. In the next paragraphs, therefore, I offer expanded descriptions of each dimension as referred in the contemporary teacher professional learning scholarship. The intent is to understand what it means and takes for teachers to engage in professional learning that has the potential to help them promote their own professional growth within and outside their schools.

Lieberman and Miller's (2014) first dimension considers professional learning of teachers as a practice that should invite teachers to actively engage in the process of transforming their teaching practices in ways that could enable them to provide their students with productive learning experiences. It draws attention to the necessity of providing spaces for teachers to become active constructors of professional knowledge and not mere passive recipients of knowledge and information. As such, teachers are required to actively wrestle with ideas as well as strategies over time as they work to improve their pedagogical practice. For Hirsh (2009), like for other professional learning scholars, effective professional learning is one which offers teachers a repertoire of opportunities to "master content, hone teaching skills, evaluate their own and their students' performance, and address changes needed in teaching and learning in their schools" (p. 7). At the heart of these opportunities is the idea of inviting teachers to incorporate their wonders, prior knowledge, and experiences in what they are learning with colleagues within or outside their schools. As such, making teacher learning an ongoing practice is equally important because professional learning requires time for teachers to play with new ideas, practice new strategies, and reflect on their applicability, given the nature of the students and concepts they are learning (Guskey, 1995; Hirsh, 2009).

The second dimension of teacher professional learning draws attention to the necessity of teachers to participate in the process of creating knowledge through engaging in collaborative inquiry. From the literal sense of this dimension, it is clearer that the emphasis here is placed on creating conditions for teachers to participate in the process of constructing pedagogical knowledge and developing teaching skills by working with other teachers (Desimone & Stuckey, 2014). With such an extended view of professional learning, teachers are likely to experience opportunities that have the potential to enable them to become dedicated to their learning but also realize avenues to engage in a collegial process of deepening professional knowledge (Hord & Sommers, 2008).

On the other hand, the scholarship on teacher professional learning is wealthy with information regarding the centrality of collective inquiry among teachers. As a case in hand, DuFour and colleagues (2008) contended that collective inquiry helps teachers to "build shared knowledge, which, in turn, allows them to make more informed (and therefore better) decisions, and increases the likelihood they will arrive at consensus" (p. 16). To achieve that, teachers are required to maintain collaboration during their professional learning sessions and beyond for them to productively work together throughout the inquiry.

Lieberman and Miller's (2014) third dimension of professional learning is equally enlightening, speaking about the need to blend teacher knowledge and expert knowledge to make professional learning a rewarding experience for teachers. Unlike traditional professional learning of teachers, which rely heavily on expert knowledge at the expense of teacher knowledge, the current professional learning landscape utilizes both kinds of knowledge with the purpose of helping teachers develop pedagogical knowledge and skills they critically need to enrich student learning (Lieberman & Miller, 2014). On the one hand, as apparent in the literature of teacher professional learning, it is essential for teacher knowledge to have its defined place in the teacher learning landscape as it enables professional learning to achieve its practical meaning.

In my experiences as a teacher educator, on the other hand, expert knowledge is equally important in teacher professional learning, especially, in supporting teachers when they encounter dilemmas in their pursuit of improving professional knowledge. Experts, as Merriman (2014) explains, could share with teachers their experience on how teacher learning can become

successful in enriching practice. Given that possibility, Long (2014) cautions educators to take into account both pieces of knowledge when organizing and implementing teacher professional learning for teachers to benefit from expanding their pedagogical knowledge base to intensify classroom instructional practices.

The fourth dimension considers teacher professional learning to focus mainly on two aspects. While the first aspect is related to practical problems facing teachers, the second speaks about teachers' experiences and understanding (Lieberman & Miller (2014). As referred to in the previous sections, one of the criticisms of traditional teacher learning programs is its de-emphasis on problems facing teachers and students in classrooms, but also its inability to utilize teachers' knowledge in teacher learning (Lieberman & Miller, 2014). The dimension, on the other hand, draws attention to the need for weaving teaching and learning experiences into professional learning programs with the purpose of connecting teacher professional learning with what is happening in their classrooms.

At another level, the dimension considers professional learning to focus mostly on teachers' knowledge given that teachers, as adult learners, step into their professional learning with prior classroom experiences and knowledge of their work of teaching but also knowledge of their students' learning (Rohlwing & Spelman, 2014). In their recent works, Fisher and Frey (2014) and Tschannen-Moran and Chen (2014) observed the act of integrating teachers' experiences and knowledge into professional learning to have the potential of raising twin senses among participating teachers—sense of owning the professional learning and a sense of self-efficacy.

Lieberman and Miller's (2014) fifth dimension considers teacher professional learning to be that which engages teachers in the process of reflecting, analyzing, and critiquing what they are learning in relation to their prior experiences and pre-understandings. A few scholars have shared their thoughts regarding the need for teachers to realize opportunities to reflect, analyze, and critique the practices they employ in classrooms. Mezirow (2000), for example, considers the aspects responsible for opening conditions for teachers to engage in transformative learning, making sense of what they do and already know but also applicable to their classrooms. On the other hand, Rohlwing and Spelman (2014) found teachers required skills to reflect, analyze, and critique what they are learning in relation to what they know and do in their classrooms as

teaching and learning are concerned. The idea is for them to "make wise and principled decisions … it is about developing teachers' self-knowledge, the ability to see through teaching situations and understand the meaning of what is happening in their classroom and school" (Ghaye & Ghaye, 1998).

Some scholars and researchers in education and teacher professional learning around the world have sensed the need for teachers to take leadership of their professional learning within the context of their work. Allen (2016), for example, is confident that such a practice has the potential to provide teachers with opportunities to play an "active role in the intellectual life and decision-making of the school … crucial to instructional improvement and school change" (p. 71). With such considerations, there have been growing criticisms over teacher professional learning that does not emphasize issues of motivating and persuading teachers to become life-long educators, life-long learners, and life-long leaders of their professional learning. Central to this criticism are two substantial practical questions. One is the issue of sustainability of professional learning in schools (Wepner et al., 2016) and the second is the question of addressing the needs and gaps revealed by teachers while facilitating the learning of students in their classrooms (Lieberman & Miller, 2014).

The grounds on which scholars advance their criticisms over traditional professional learning programs seem to stem from the need to shift from teacher professional learning programs that produce superficial changes to instructional practice to programs that produce and support viable changes that last over a long period. Pedagogically speaking, the intent is to have teacher professional learning that has the potential to provide teachers with opportunities to work together to "push the growth of all … and … tackle dilemmas related to their practice or wider school concerns" (Hsu & McNamara, 2016, p. 307). In that way, teacher professional learning needs to empower teachers to exert leadership given the demand placed for them to "assume more leadership roles and carry out a wider variety of instructional leadership functions than ever before" (Li, 2015, p. 435).

While engaging in a thorough review of contemporary perspectives on teacher professional learning, the term teacher leadership was quite ubiquitous throughout the scholarship. It sounded to me that in the current landscape of teacher professional learning, teacher leadership is important in helping teachers, and specifically mathematics teachers, to promote their

professional growth. It is in such a sense I find revisiting teacher professional learning without attending to the details of what teacher leadership could and should look like to offer an incomplete overview of the former. The next section reviews the concept of teacher leadership.

Exploring a Teacher Leadership Landscape

As briefly introduced in the closing comments of the previous section, I engaged in exploring the teacher leadership landscape by attending to ideas and perspectives advanced by teacher leadership scholars from around the world. To help illuminate the concept, I organized the exploration into four sub-sections. First, the conceptualization of teacher leadership as informed by the growing teacher leadership literature. Second, I describe the stages or waves of teacher leadership to help understand the origin and development of the concept and how it became featured in school reforms. Third, I offer a concise description of a teacher leader to realize what it means to be a teacher leader in the context of education today. Finally, I conclude the section by describing the key roles associated with teacher leadership in schools.

Conceptualizing teacher leadership.

Teacher leadership has gained widespread attention in the teacher professional learning literature since the education reform initiatives of the 1980s. A few educators and scholars have provided conceptualizations of teacher leadership. York-Barr and Duke (2004), for example, view teacher leadership as "the process by which teachers, individually or collectively, influence their colleagues, … and other members of school communities to improve teaching and learning practices with the aim of increased student learning and achievement" (p. 287). Similarly, Poekert (2012) views teacher leadership to be founded on "influence and interaction, rather than power and authority" (p. 171).

Building on these conceptualizations, Liljenberg (2016) describes teacher leadership as the process in which teacher leaders "influence the pedagogical development of their teacher colleagues" (p. 3). Taken all together, the descriptions, draw attention to the centrality of teachers to take charge of their professional learning by influencing other teachers to enrich their professional knowledge and skills. The conceptualizations largely focus on linking teacher learning and student learning, with both practices being at the centre of any teacher professional

learning initiative. What can be learned from these definitions is that teacher leadership is not a concept that describes one's position in the organizational structure of a school. Rather, and more importantly, teacher leadership is a process by which teachers work, among other things, together to contribute to school improvement and effectiveness (Shirley & Miller, 2016).

Orienting to developmental stages of teacher leadership.

The literature on teacher leadership suggests that the development of the concept of teacher leadership can be described in four waves or stages. According to Pounder (2006) and Hargreaves and Fullan (2012), the waves include (a) teacher leadership within the formal organizational school structure, (b) instructional teacher leadership within a formal system, (c) teacher leadership with the notions of teaching and leading, and (d) teacher leadership which facilitates development of professional capital. Equally important in the literature is a concise description of each wave that significantly characterizes the growth of teacher leadership.

The first wave "confined teacher leadership within the formal organizational hierarchy and merely placed the concept close to the teaching function" (Pounder, 2006, p. 534). In the school context, accordingly, teacher leadership meant to be the work of a head of the school and heads of a department not of the individual classroom teacher. The major responsibility of a head of the school and heads of department was, among other things, to manage teachers and monitor teacher's work with regard to decisions and instructions for improving student learning (Frymier, 1987; Pounder, 2006). In that manner, as Pounder (2006) calls them, teachers were regarded as "mere implementers of the formers' decisions" (p. 534).

The second wave of teacher leadership, according to Pounder (2006), "placed more emphasis on the instructional dimension of the teaching function but still vested teacher leadership in formally created organizational positions such as a team leader and curriculum developer" (p. 534). Teacher leadership literature is explicit that this wave accelerated management of the work of teachers (Pounder, 2006). Apparently, team leaders and curriculum developers were seen to mandate teachers on what, when, and how they should facilitate the instructional process in classrooms (Pounder, 2006). It is in that sense Pounder (2006) considers this wave as a "remote controlling of teachers" (p. 534). However, the most significant aspect of this wave was the commencement of removal of the concept of teacher leadership out of the

conventional organizational structure of schools. On such a ground, one could be tempted to say that teacher leadership started to be considered as something outside of the school's organizational structure.

Even more, Pounder (2006) believes the third wave of teacher leadership as one which incorporated the concepts of teaching and leadership. In this wave, as Pounder (2006) notes, teachers were provided with opportunities to take part in the leadership and improvement of schools and schooling. The most significant dimension about this wave was the onset of the conception of teacher leadership as a process rather than a positional concept (Pounder, 2006). Teacher leadership within such a conception required teachers to engage in supporting the professional growth of their teacher colleagues through coaching and mentoring and other professional learning modes (Pounder, 2006). In a similar vein, teachers were expected to influence their teacher colleagues to engage in professional learning activities to improve pedagogical practices (Lieberman & Miller, 2011). In that way, there is a temptation to argue that in the third wave of teacher leadership teachers were invited to participate in the process of influencing school improvement and effectiveness.

The teacher professional learning literature views teacher leadership to be in its fourth wave (Hargreaves & Shirley, 2009). In this wave, teacher leadership is conceived as a formal and informal process in which teacher leaders influence teacher colleagues to develop professional capital needed to enrich student learning (Hargreaves & Fullan, 2012). In this wave, teachers are expected to "maximize their own improvement, and be able to make effective judgments using all their capabilities and judgments" (Hargreaves & Fullan, 2012, p. 3). Accordingly, this wave, which shares many features with the third wave of teacher leadership, is grounded on the idea of ensuring that teachers participate in the process of influencing the development of professional capital among other teachers (Hargreaves & Fullan, 2012). Indeed, the wave is predicated on the need for teachers to develop the capacity they need to make a considerable difference in schools and schooling as they work as educators and leaders of both student and teacher learning.

In my opinion, teacher leadership is a relatively new concept in the teacher professional learning literature and an unfamiliar concept among teachers and scholars in many Tanzanian schools. My experiences suggest that the concept of leadership in Tanzania has been

substantially impacted by traditional notions of educational leadership which is understood to leave little room for teachers to exercise leadership of their professional learning. It is unfortunate that even today the research scholarship on education in Tanzania still treats leadership as a concept that describes one's position in the school organizational structure or in the education system of the country. I believe that teacher leadership in Tanzanian schools cannot happen by accident, rather concerted efforts from teachers themselves and scholars from within and outside are critical. One of the efforts is for this research study- to understand how mathematics teacher leaders make sense of their work of leading the professional learning of themselves and their teacher colleagues.

Who is a teacher leader?

Following the emergence of the concept of teacher leadership over three decades ago, a few teacher professional learning scholars helped the research community to understand what it means for a teacher to be a teacher leader. After years of working with teacher leaders, Drago-Severson (2009) is one of those scholars who's offered a comprehensive description of a teacher leader. Drago-Severson has advanced five criteria that characterize a teacher leader. The criteria are: a teacher leader is a teacher who has "a little seniority," [is] "respected," [has] "a little bit of experience," the capacity needed to "carry the credibility with … teachers," and [e] "a credibility in the classroom" (2009, p. 131). From the criteria, it is fair to think that a teacher leader is a classroom teacher who has demonstrated the capacity needed to lead the learning of other teachers.

Drago-Severson (2009) added further that a teacher leader is any teacher who, amongst other things, can continuously and respectfully work with his or her teacher colleagues, forge professional relationships, and help colleagues develop mutual trust and respect among each other. Drago-Severson (2009) adds that a teacher leader is one who creates conditions for prolonged collaborations and networking and is willing to provide professional support to colleagues. Such a comprehensive list of the aspects that characterize a teacher leader offers a glimpse of the roles that are associated with teacher leadership work. In the following section, therefore, I provide an evidence-based description of the roles that teacher leaders are expected to do as they work with other teachers within and outside their schools. The intent is

straightforward—to illuminate what it means and takes to work as a teacher leader amidst the current teacher professional learning landscape.

What are teacher leadership roles?

After attending to the question of who is a teacher leader, comes the roles she or he is hoped to play alongside other teachers. Some educators have outlined teacher leadership roles within an expanded view of the professional learning of teachers. According to Katzenmeyer and Moller (2009), for example, a "teacher leader role may be informal and formal and may last only a short time or be a long-term commitment" (p. 121). Moreover, in their study on spheres of teacher leadership in action, Fairman and Mackenzie (2012) found teacher leaders to play a substantial role in engaging their teacher colleagues in reflecting on a particular collective work but also, and more importantly, in solving pedagogical problems they experience while facilitating students' learning. Equally important are opportunities for teacher leaders to influence teachers to share ideas with colleagues but also to coach and mentor other teacher colleagues to improve their pedagogical practices (Lieberman & Miller, 2011; Fairman & Mackenzie, 2012). In such a context, therefore, possibilities exist for teacher leaders to design learning activities that have the power to support the learning of other teachers but also work with teachers to address dilemmas that face their students in their learning journey.

Fullan and Hargreaves (2012), North American educational change scholars, have shared their observations and thoughts regarding the roles of teacher leaders in improving schools and schooling. These scholars have revealed that teacher leadership has the potential to sponsor teachers' voices within a teacher professional learning landscape but also to open-up spaces for teachers to continually engage in developing their professional knowledge and skills they need to facilitate meaningful student learning in their classrooms. Arguably, the act of promoting teacher's voices in professional learning resonates with what the current reforms and school improvement initiatives aspire to achieve—empowering teachers to feel a sense of belonging to their profession. What seems crucial to teacher leadership, according to Fullan and Hargreaves (2012), is the realization of avenues for teacher leaders to influence teachers to monitor their professional growth but also to chart out substantial needs related to their teaching.

Lieberman and Miller (2014) are equally helpful in developing more understanding of the roles of teacher leaders in the context of teacher professional learning. They are explicit that teacher leadership is more about facilitating professional learning of teachers, which emphasizes the integration of teachers' experience, expertise, and wisdom in learning. The idea, according to Lieberman and Miller (2014), is to promote teacher learning that focuses on what teachers know and do in their classrooms but also to influence them to engage in ongoing professional learning with colleagues to address the needs of students. This aspect seems to call teacher leaders to inspire the creation of conditions for teachers to make sense of what they encounter in their classrooms but also, more significantly, find ways to address problems facing students. What is substantial regarding this aspect is the realization that teacher leaders are responsible for influencing teachers to engage in professional learning to improve schools and schooling. Lately, the research scholarship on teacher learning suggests teacher leaders influence teachers to develop professional capital for enriching student learning (Hargreaves & Fullan, 2013).

Considering the explanations of teacher leadership roles, I find Poekert's (2012) views to offer a concise synopsis of teacher leadership and its implications for teacher leaders as conductors of such a practice: He notes that:

> … the focus of a teacher leader's influence must be on improvement of instructional practice and student performance, the central matters of their concern as school leaders. In short, effective teacher leadership is effective professional development. The role of teacher leaders is to influence their colleagues to improve their teaching practice and their students' learning. (p. 172)

Professional Capital

In 2012, Hargreaves and Fullan borrowed a concept of capital from the economic sector to extend it to the concept of professional capital in the education sector. By implication, Hargreaves and Fullan (2012) state that professional capital is the "systematic development and integration of the three kinds of capitals—human, social and decisional" (p. xv). At the heart of this concept is the idea of supporting teachers to develop professional capital, a capital which "pushes the limits of what teachers will be able to achieve" (Hargreaves & Fullan, 2012, p. xvi) in schools. For Hargreaves and Fullan (2013) and me as a teacher educator, professional capital

is quite substantial in education in the contemporary world if the intent is to improve schools and schooling.

Even more, some educators, including Parsons and Stiles (2015) view professional capital to be one of the ways in which teachers can "build an efficacious profession" (p. 18) in today's fast-changing world. As such, Hargreaves and Fullan (2013) counsel that teachers need to develop professional capital and be mindful of the ways they can circulate it beyond classrooms. That is, distributing it to other teachers through teacher professional learning programs with the aim of improving student learning. In the next sections, therefore, I describe the three kinds of capitals that, when integrated, are known as professional capital as advanced by Hargreaves and Fullan (2012).

Human capital.

Human capital entails knowing the discipline and how to teach it (Hargreaves & Fullan, 2012). It literally "refers to the human resource or personnel dimension of the quality of teachers in the school—their basic teaching talents" (Fullan, 2015, p. 9). For teacher leaders to be able to develop and circulate such capital, according to Hargreaves and Fullan (2012), they need to attract their teacher colleagues to develop capacities and build on that to help them improve practice. To achieve that goal, teacher leaders need to invite teachers to draw on their diverse experiences, talents, skills, and knowledge as they work to develop capacities they need to be able to enhance meaningful student learning (Hargreaves & Fullan, 2013).

It would be fair to argue that teacher leaders are compelled to influence teachers to enrich their pedagogical practices for them to be in a position to make considerable differences in schools and schooling. In particular, one of the conditions is to "involve the deliberate use of teamwork—enabling teachers to learn from each other … and building cultures of communication, learning, trust, and collaboration" (Hargreaves & Fullan, 2012, p. 89). Such a condition points to the emergence of social capital.

Social capital.

Hargreaves and Fullan's (2012) second element of professional capital is social capital. In explaining social capital, Hargreaves and Fullan (2012) consider it as a resource which exists with others. These scholars see social capital to be about the "quantity and quality of interactions and social relationships" (p. 90) among teachers within the school and during professional learning sessions. Hargreaves and Fullan (2012) consider such capital to serve as an essential ingredient in teacher professional learning as it enables teachers to engage in collaborative work they need to improve practice. What is important, according to Parsons and Stiles (2015) about this type of capital, is for teacher leaders to influence the creation of conditions that appropriately allow teachers to collaboratively work during learning sessions to expand their professional knowledge base. Moreover, Hargreaves and Fullan (2012) suggest teacher leaders build trust, mutual respect among teachers, initiate quality collaboration and conversations among teachers and teacher leaders, and develop feelings of closeness, obligation, and expectation.

For teachers to develop social capital, as Hargreaves and Fullan (2012) maintain, they have to "appreciate the value of their peers and [even] to come together to appreciate the constructive disagreement" (p. 91). That is, to recognize the value of varying opinions and ideas from their teacher colleagues. Furthermore, these scholars recommend teacher leaders establish a critical friend network to "give teachers constructive and challenging feedback with the aid of protocols that create a safe environment in which these conversations can occur" (p. 91). According to William (1996), "Teachers do their best work when they collaborate with demanding colleagues" (p. 135).

Parsons and Stiles (2015) share their experiences on the necessity of helping teachers develop social capital. They point out that "the power of teachers acting together trumps the power of individuals acting alone" (p. 16). From such a perspective, it is convincing that teacher leaders should lead the professional learning of their teacher colleagues by influencing them to develop social capital to expand their networks for them to realize and enrich their professional growth. Such an aspect is vital in any professional learning program as social capital "affects teachers' access to knowledge and information; their senses of expectation, obligation, and trust; and their commitment to work together for a common cause" (Fullan, 2015, p. 9).

Decisional capital.

Decisional capital emerges as Hargreaves and Fullan's (2012) third element of professional capital. Indeed, decisional capital entails the "sum of practice and expertise in making decisions that may be spread across many individuals or groups in a school and its community" (Fullan, 2015, p. 9). Even more, such type of capital involves "the wisdom and expertise to make sound judgments … that are cultivated by considered experience" (Hargreaves & Fullan, 2012, p. 37). On the other hand, decisional capital plays a crucial role in ensuring that other types of capitals—human and social— work to achieve the goals of improving the school and schooling. Practically speaking, decisional capital is "required for making good decisions" (Fullan, 2015, p. 9) in the classroom as well as during professional learning sessions. Hargreaves and Fullan's (2012) main point concerning this capital is that teachers should engage in making decisions and judgments as professionals as they work to develop professional knowledge and skills individually or collectively through a collaborative learning practice. From Hargreaves and Fullan's (2012) points of view, decisional capital is enhanced when teacher leaders influence teachers to draw on their insights and experiences of their teacher colleagues in making judgments about their work of teaching students. To facilitate that, Hargreaves and Fullan further recommend teacher leaders influence their teacher colleagues to feel encouraged to share their experiences and insights without becoming hesitant in making mistakes.

Hargreaves and Fullan (2012), on the other hand, are cognizant of the need for autonomy in order for teacher leaders to make decisions and judgments as they work to facilitate teacher professional learning. In my experience, teachers in Tanzania have been experiencing little autonomy in their work of guiding student or teacher learning. Nonetheless, by having a few mathematics teachers to serve as leaders of teacher professional learning is a starting point for teachers to realize opportunities for them to make decisions and judgments in their work of facilitating teacher professional learning within and outside their schools. Further, teacher leaders are advised to influence teachers to exert "judgments and decisions with collective responsibility, openness to feedback, and willing transparency" (Hargreaves & Fullan, 2013, p. 5). From such advice, there is a temptation to argue that decisional capital is circulated when teachers work together to monitor their professional growth.

Educationally speaking, when teachers come to embody human, social, and decisional capitals and "come to exemplify the power of professional capital, they become smart and talented, committed and collegial, thoughtful and wise" (Hargreaves & Fullan, 2012, p. 5), all qualities much needed in the teaching profession in the current context of education reform. "Their moral purpose is expressed in their relentless, expert-driven pursuit of serving their students and their [professional learning], and in learning, how to do that better" (Hargreaves & Fullan, 2012, p. 5).

Summary

Since this study explores the experiences of the MTLs in leading the professional learning of primary school mathematics teachers in Tanzania, this chapter reviewed the relevant selected literature on teacher education. The overarching goal was to understand historical perspectives on teacher professional learning in Tanzania but also to understand how scholars and researchers around the world perceive professional learning of teachers in the contemporary landscape of education. With that goal, the chapter began by presenting descriptions of teacher professional learning in Tanzania and around the world. Teacher leadership, its definition, waves of development and roles related to the concept of teacher leadership were carefully explained. Then, the chapter engaged in a more elaborate discussion of the concept of professional capital, elucidating its relationship with teacher leadership. The next chapter provides a concise explanation of the theoretical and philosophical perspectives that informed the design, implementation, and analysis of the study.

Chapter 3

Theoretical and Philosophical Perspectives

Theoretical Perspectives

This study incorporated a blending of symbolic interactionism, perspective consciousness, and Dewey's theory of experience to guide the design of this study but also to inform the interpretation of research data. Central to such a combination, from a theoretical point of view, was the need to explore and then understand the experiences of the MTLs related to the work of leading the professional learning of mathematics teachers. In specific terms, symbolic interactionism and perspective consciousness guided this research study regarding how human beings, including MTLs, perceive themselves, their actions and roles, and their interactions with others within their environments. For this research study, 'others' denotes primary school mathematics teachers who attended the professional learning led by the MTLs in within their rural and remote contexts. The perspectives guided the design and implementation of the research process of this study.

Dewey's theory of experience, broadly speaking, guided the interpretation of the research data of this study. It was helpful in making sense of information shared by teacher leaders in coming to understand what it means and takes for mathematics teachers to take charge of their professional learning. In that way, symbolic interactionism, perspective consciousness, and Dewey's theory of experience, all together, were "referent for the planning, implementation, analysis, and the implementation of data" (Thomas & McRobbie, 1999, p. 670). In the subsequent sections, therefore, I describe the perspectives and the theory as informed by their founding theorists and associated scholars.

Symbolic interactionism.

Symbolic interactionism is one of the perspectives in the qualitative research landscape that seeks to understand the "complex world of lived experience from the point of view of those who live it" (Schwandt, 1994, p. 118). In other words, the goal of this perspective is to understand how people perceive themselves as human beings but also how they define the world

they live in and experience (Blumer, 1969; Charon, 1995). Key assumptions of symbolic interactionism are that "humans never see reality as it is; humans learn and remember what is useful to them; [and] humans understand and define objects in their environment according to the use they have for those objects" (Charon, 2010, p. 31).

Such assumptions have made symbolic interactionism a useful perspective for understanding how people describe life events, actions, and situations based on their perspectives that are shaped by their life realities. Equally important is that qualitative researchers employ the perspectives to make sense of "individuals' lived experience … and understanding a situation from the participant's point of view (Jeon, 2004, p. 250). In this regard, consequently, it is interesting that symbolic interactionism is consistent with the purpose of this research study—understanding the experiences of the MTLs in leading the professional learning of primary school mathematics teachers in Tanzania. In the succeeding paragraphs, therefore, I offer a historical background of symbolic interactionism.

Symbolic interactionism is often linked with the writings of a distinguished American pragmatist, George Herbert Mead (1863-1931). Mead is acknowledged as a philosopher who laid strong foundations of pragmatism and, especially, symbolic interactionism. The literature on symbolic interactionism considers Mead to be largely inspired by the influential pragmatic views of John Dewey. Working as a colleague and a collaborator of John Dewey, Mead became an influential and prolific pragmatist at the University of Chicago as well as in the United States of America (Charon, 2010). His works were shaped by his belief that people are not objects nor are they passive creatures, but rather are active organisms capable of interpreting things in their environments, based on the meanings they hold on to about those things in relation to the realities of their lives.

Herbert Blumer has been credited for advancing the work of Mead and keeping up the traditions of symbolic interactionism. Key to Blumer's (1969) work are three premises he brought forward to describe symbolic interactionism and its stance on how human beings act toward their worlds. Blumer's first premise is "that human beings act toward things on the basis of the meanings that the things have for them" (1969, p. 2). According to Blumer (1969), "[s]uch things include everything that the human being may note in his[/her] world—physical objects,

such as … human beings … activities of others, such as their commands or requests; and such situations as an individual encounters in his [or her] daily life" (p. 2). Given Blumer's first premise of symbolic interactionism, it is apparent that he views human beings as developing and attaching meanings to objects and things that are meaningful to them and are relevant to their existence in their world. At the same time, Blumer suggests that human beings are not passive individuals about their world; but rather, and more importantly, they are powerful and sensible beings aware of what is happening in the social and natural worlds where they live and that they encounter.

Blumer's second premise of symbolic interactionism rests on his understanding that "the meaning of such things is derived from, or arises out of, the social interaction that one has with one's fellows" (Blumer, 1969, p. 2). What has become apparent to me is that this premise of symbolic interactionism describes the source of meanings, which human beings develop in their daily lives. From Blumer's perspectives, people develop definitions of worldly things out of their interactions with the things; but also, interaction of one's fellows in relation to those things. In this way, "symbolic interactionism sees meanings as … creations that are formed in and through the defining activities of people as they interact" (Blumer, 1969, p. 5).

His third premise is equally illuminating—"these meanings are handled in, and modified through, an interpretative process used by the person in dealing with the things he [or she] encounters" (Blumer, 1969, p. 2). In the process of interpretation, Blumer sees an individual engage in two steps. According to Blumer (1969), while in the first step an individual interacts and communicates with himself or herself, in the second step, an individual "selects, checks, suspends, regroups, and transforms the meanings in light of the situation in which he [or she] is placed" (p. 5). Even though the abovementioned notions of symbolic interactionism as advanced by Blumer (1969) demonstrate a clear connection between symbolic interactionism and this research study, the next paragraphs explain further the agreement between the two. They pay attention to how the former shaped the latter in the pursuit of understanding the experiences of leading teacher professional learning among the MTLs.

As alluded to above, symbolic interactionism, along with other perspectives, guided this research to understand how the MTLs make sense of their work of leading teacher professional

learning in Tanzanian educational contexts. Central to the study was the need to explore the experiences of the MTLs following their interactions with mathematics teachers as their professional learning is concerned. With symbolic interactionism, as outlined by Blumer (1969), this research study views the teacher leaders as social persons who "live in worlds of objects and are guided in their orientation and action by the meaning of these objects" (p. 21). In the professional learning context, as Blumer (1969) advises, objects can include, among others, MTLs themselves, learning materials and resources, primary school mathematics teachers, personal beliefs and opinions about learning and about mathematics, mathematical ideas, feelings, and perspectives related to the learning of mathematical concepts and ideas. As such, symbolic interactionism was profoundly appropriate for this project as it sees experiences as arising in the process of interaction between MTLs and self, MTLs and mathematics teachers, and MTLs and what Blumer (1969) termed as their 'worlds.' Indeed, the term 'world' "designates the setting, the surroundings, and the texture of things that confront them" (Blumer, 1969, p. 11).

Furthermore, with symbolic interactionism, as informed by Blumer (1969), this study acknowledges an individual mathematics teacher leader as a social and an acting organism who converses with herself or himself as she or he interacts with the realities of the leadership work. At the heart of this acknowledgment is an understanding that MTLs, like other human beings, engage in the process of thinking and making deliberate actions on life situations they encounter in their daily life and work discourses (Blumer, 1969). This study drew on perspectives of symbolic interactionism to acknowledge the uniqueness of human beings in defining actions they have taken, situations they have encountered, and events they have experienced based on their interpretation of those actions, situations, and events (Blumer, 1969). Through such a perspective, this study considers individual MTLs to have their interpretations of the leadership work considering their interactions with mathematics teachers and resources and materials that characterize their professional learning contexts. Symbolic interactionism, therefore, appropriately situates this research study that sought to understand the experiences of the MTLs as they work alongside primary school mathematics teachers in professional learning.

Perspective consciousness.

Robert Hanvey (1982) advanced perspective consciousness, describing it as an awareness or "recognition of the existence, the malleability, and the diversity of perspective" (p. 162). Central to this point of view is the realization that human beings have diverse views, ideas, opinions, and experiences that reflect their personal beliefs, values, and even their contextual realities (Hanvey, 1982). This study was informed by perspective consciousness, to acknowledge the notion that human beings have "views of the world that are profoundly different from one's own" (Hanvey, 1982, p. 162). With perspective consciousness, therefore, the study acknowledges the existence of diverse perspectives among individual MTLs since there are varying influences in one's lifeworld. At another level, the perspective situates the study in the understanding that a person may have multiple viewpoints, influenced largely by, amongst others, one's culture, gender, and contexts (Hanvey, 1982).

In this study, accordingly, perspective consciousness provided the basis for considering the MTLs to possess multiple perspectives about their work of leading the professional learning of primary school mathematics teachers. This study, therefore, benefitted from perspective consciousness in developing valuable qualitative themes that emerged from the MTLs' accounts of experiences as they, occasionally, viewed their work differently (Hanvey, 1982; McRae, 2007). It has recently become apparent that "multiple perspectives are important features of good themes because they convey the complexity of the central phenomenon in qualitative research" (Clark & Creswell, 2015, p. 370). In a similar vein, this study was predicated on perspective consciousness because it facilitated the inclusion of "examples of many different perspectives held by participants, not just the most common or popular perspective" (Clark & Creswell, 2015, p. 370) but also those that uniquely speak to an individual teacher leader.

Dewey's theory of experience.

John Dewey (1859 –1952) was an American philosopher and a psychologist whose innovative ideas are still influential in today's educational discourse. His profound philosophy of education was predicated on his notion of experience that is quite imperative in understanding the world. For Dewey, as cited in Berding (1997), "[o]ur experience is simply what we do" (p. 25) in our daily life. From Dewey's interpretation of human experience, it can be argued that

experience encompasses "what happens to an individual" (Davis, 1998, p. 171) in relation to his or her lifeworlds. In his works, Dewey, recognized as a father and an influential advocate of pragmatism, considered experience educationally valuable in generating knowledge and constructions about the world. For Dewey, experience, meant wisdom and insights about life (1938). Seemingly, because he regarded experience critical to human beings in understanding the worlds they live in, Dewey made experience a central theme in his philosophy of education.

Dewey's theory of experience was employed in this study to understand the experiences of the MTLs that describe their leadership of the professional learning of primary school mathematics teachers in the Tanzanian educational context. The decision of employing this theory to inform this study stems from my understanding that it offers two principles—continuity of experience and interaction— useful for making sense of human experience (Dewey, 1938). These two principles offered tremendous opportunities for understanding the experiences of the MTLs in leading the professional learning of their teacher colleagues. As such, in the following paragraphs, I carefully describe the principles as informed by John Dewey (1938) and the role they played in interpreting research data for this study.

In his theory of experience, Dewey (1998) considers continuity of experience as a substantial principle for understanding human experience. For him, the principle "operates that we get the basis of discriminating among experiences" (p. 36). A thorough review of selected works of Dewey highlights two ideas to have prompted him to propose continuity of experience as one of the principles for understanding human experience. The first idea reflects his understanding that "there is some kind of continuity in any case since every experience affects … further experiences" (Dewey, 1938, p. 37). The second idea is equally crucial in understanding human experience, that is, "[e]very experience influences in some degree the objective conditions under which further experiences are had" (p. 37). From such ideas, it can be learned that human experiences lie on a continuum with immediate experiences existing because of some previous experiences. It is in this sense that Dewey (1938) believes past experiences guide further experiences of individual human beings. More significant about the principle of continuity is Dewey's (1938) line of reasoning that experiences are inherently elastic and stretch in different directions, enhancing an understanding of realities of the world.

Dewey's first principle of continuity of experience is substantial in this study because it offered me opportunities to make sense of the "direction in which growth takes place, [and] the end towards which it tends" (Dewey, 1938, p. 6). Further, as Dewey (1938) counsels, the principle was quite important to this study since it assisted me in developing an understanding of experiences in light of other experiences and the "grounds of what it moves towards and into" (p. 38) while interpreting the experiences of each mathematics teacher leader. At another level, with this principle of understanding human experience, I mindfully engaged in making sense of how an immediate experience offers "opportunities for continuing growth in new direction" (Dewey, 1938, p. 36) concerning the leadership of the professional learning of mathematics teachers in rural and remote localities.

Dewey's (1998) notions of experience play a crucial role in developing an understanding of human experience that has the potential to afford growth of other experiences. As he points out, such an experience is one which "generates curiosity, strengthens initiative, and sets up desires and purposes that are sufficiently intense to carry a person over dead places in the future" (Dewey, 1938, p. 38). It is in this richness that the principle of continuity of experience helped me to understand the experiences of the MTLs in leading the professional learning of mathematics teachers in the Tanzanian educational context.

Interaction, Dewey's other principle for understanding the experiences of human beings, "addresses the situated character of experience" (Jackson, 1998, p. 146). As Dewey (1938) presents, the principle attends to internal and external conditions, which sometimes are referred to worldly situations or environments commonplace in one's lifeworld. For him, situations or circumstances are "whatever conditions [that] interact with personal needs, desires, purposes, and capacities to create the experience which is had" (p. 44). Further, he views the interaction between people and between people and their environments to influence the occurrence of one's experience. Dewey (1958) puts it well that, "[t]hings interacting in certain ways are experience; they are what is experienced" (p. 4a). From that perspective, it becomes reasonable to point out that experience covers what happens to human beings in relation to their interactions with the natural and social worlds and its compounding entities. Commenting on Dewey's thoughts about this principle of experience, Greene (1998) argued that, "[f]or Dewey … experience referred to all human transactions, all encounters with the physical and human world" (p. 119). As such,

Dewey's principle of interaction of experience became increasingly substantial to this research project.

With such a principle, therefore, I engaged in developing an understanding of the experiences of the MTLs as shaped by their interactions with mathematics teachers, learning materials and resources they used to facilitate teacher professional learning but also their interactions with situations that surrounded them while leading the learning of mathematics teachers. Given the aim of this study, I interpreted the human experience as something that "does not occur in a vacuum [rather] … [t]here are sources outside which give rise to experience" (Dewey, 1938, p. 40). In such a context, therefore, such a principle of experiences, as Dewey (1938) states, significantly shaped my understanding of "an experience in its educational function" (p. 42) as the MTLs spoke of their interactions with primary school mathematics teachers, learning materials and resources, mathematical ideas and concepts, and so on.

Philosophical Perspectives

Researcher paradigm.

Paradigm, as Denzin and Lincoln (1994) argue, is a "set of beliefs that guide action" (p. 99). These beliefs, constructed by human beings, are considered to play the key role of situating the researcher in the way of seeing and perceiving the world (Denzin & Lincoln, 1994). From that perspective, it can be argued that paradigm governs how an individual views the world and interprets it based on a set of assumptions, values, and beliefs. Furthermore, paradigm entails a way a person comes to attach meanings to actions, events, and situations. In that sense, critical to paradigms in a research landscape is their influence on understanding how a researcher approaches the study and the phenomenon under investigation (Anderson, Thomas & Nashon, 2009). As such, Koro-Ljungberg and colleagues (2009) suggest researchers describe the paradigms they subscribe to for one to understand how they view reality and ways of knowing in relation to their studies. Considering this suggestion, I offer a description of the paradigm to which I subscribe as a researcher but also as a human being.

As this study sought to explore the experiences of individual MTLs in leading the professional learning of primary school mathematics teachers, the constructivist paradigm was an

appropriate paradigm for guiding this exploration. Indeed, a constructivist paradigm, as presented by Denzin and Lincoln (2011), "assumes a relativist ontology (there are multiple realities), a subjectivist epistemology (knower and respondent co-create understandings)" (p. 13). Its methodological position, accordingly, is that of exploring reconstructed understandings of a phenomenon under investigation (Denzin & Lincoln, 2011). A constructivist perspective gives importance to what individuals "know and the manner in which knowledge is constructed" (Tobin, 1990, p. 6). Constructivists acknowledge the paradigmatic process of creating meanings to vary from one individual to another but also to vary over periods of time (Paulson & Paulson, 1994). The variations are considered matters of beliefs, values, and prior experiences that are distinctive to a particular individual but also to a specific context.

The tenet of a constructivist paradigm is the assumption that the process of constructing knowledge is "not passive—a simple imprinting of sense data on the mind—but [rather] active; mind does something … with impressions, at the very least forms abstractions or concepts" (Schwandt, 1994, p. 125). Lambert (2002) and Walker (2002) share similar thoughts regarding such a paradigmatic assumption concerning knowledge construction. They argue that the process of constructing knowledge is active since it involves the formation and reformation of individual's schemata or cognitive structures that are understood to be shaped by ways in which one views the world. In that sense, therefore, for one to be a constructivist researcher one should "believe that the mind is active in the construction of knowledge … human beings do not find or discover knowledge … [but they] invent concepts, models, and schemes to make sense of experience and, further, we continually test and modify these constructions in the light of new experiences" (Schwandt, 1994, p. 125).

Constructivist perspectives resonate with my thinking of how human beings construct knowledge of and make sense of their world. Indeed, I consider people, including MTLs, to be capable of engaging in the process of constructing knowledge as they make sense of their life and work experiences. In a similar vein, I am quite confident that human beings consistently engage in the active process of constructing and reconstructing knowledge as they interact with their worlds. Further, using Goodman's (1978) terms, I believe that human beings are active in the process of making-and-remaking knowledge from what they already know, experience, and encounter. Apparently, "[t]hese 'remakings' are not simply different interpretations of the same

world, but literally different world versions … stated somewhat differently, our frames of interpretation (versions)" (Goodman, 1978, p. 126).

In this study, I treated individual MTLs as people who actively construct knowledge that is shaped by their own worldviews, perspectives, prior lived experiences, contexts and their interactions with mathematics teachers during professional learning sessions. As such, I approached this study aware that the MTLs participate in the active interpretation and re-interpretation of their prior experiences, a dimension congruent with constructivist perspectives (Lauckner, Paterson & Krupa, 2012). Also, I studied the phenomenon of this study— the experiences of leading the professional learning of mathematics teachers in Tanzania—while aware that human experience of something could correspond or vary from one mathematics teacher leader to another depending on one's background, viewpoint, and context.

Ontological deliberations.

A constructivist paradigm, according to Lincoln and colleagues (2011), adopts a relativist ontology. Critical to this ontology is an understanding that there are multiple realities—"local and specific constructed and co-constructed" (Lincoln et al., 2011, p. 98). Relativists underscore the "pluralist and plastic character of reality—pluralistic in the sense that reality is expressible in the variety of symbols and language systems; plastic in the sense that reality is stretched and shaped to fit purposeful acts of intentional human agents" (Schwandt, 1994, p. 125). With such an ontological position, accordingly, it can be argued that no single reality exists; rather, there are "multiple, apprehendable, and sometimes conflicting realities that are more products of human intellects, but that may change as their constructors become more informed and sophisticated" (Guba & Lincoln, 1994, p. 111). What can be learned from such an assertion is the impossibility of having a single absolute reality in place of varying complex human constructions (understandings) and reconstructions.

Guba and Lincoln (1994) are also helpful in making sense of the expanded assumption of a relativist ontology about research. They state that "realities are apprehended in the form of multiple, intangible mental constructions, socially and experientially based, local and specific in nature (although elements are often shared among many individuals and even across cultures) and dependent for their form and content on the individual persons or groups holding the

constructions" (p. 110). Guba and Lincoln (1994) draw attention to the idea that an individual human being engages in the process of constructing knowledge, but that process reflects social and contextual realities that surround an individual. In particular terms, such emergent knowledge, as Stake (2010) points out, is "the knowledge about one thing in its time [or moment] and in its own place and about how it works" (p. 17). Blumer has offered an influential perspective regarding the expanded assumption of a relativist ontology, noting that "the reality of the empirical world appears in the 'here and now' and is continuously recast with the achievement of new discoveries" (p. 23). It is in this sense that Blumer (1969) criticized a conception of a "reality as constituting the perpetual fixed form" (p. 23).

The relativist ontology has a particular appeal to me as it is consistent with how I think human beings live and engage in their routine life as well as work commitments. Two stances are appropriate in substantiating such an assertion. First, I believe that no single reality exists in a group of individuals; but rather, there are multiple realities that human beings attach to a particular action or situation based on their context and time. At the heart of this standpoint is the belief that people are different in how they perceive, comprehend, and see the world. As Blumer (1969) has eloquently put it, this is a case as "people may be living side by side yet be living in different worlds" (p. 11). It is in that sense I am confident that human beings hold diverging assumptions, views, beliefs, values, and prejudices that are largely shaped by their perceptions, individual cognitive processing, and social contexts; a situation that narrows chances for having one absolute reality. As such, I have become aware that reality is a matter of individual construction and reconstruction within cognitive structures of human beings (Schwandt, 1994).

The second perspective is that in "our daily living and working discourses, ideas, notions, understandings (constructions) are shared as we go about solving problems, changing plans or achieving goals" (Bayko, 2005, p. 63). I have become reasonably convinced that in particular moments individuals can come to a relative consensus about what is real according to the context they live in. However, using Denzin and Lincoln's (1994) words, realities in such a landscape "can never be established in terms of their ultimate truthfulness" (p. 99), but rather in terms of the way they are seen to be appropriate at a given time and moment those individuals live in. Since this study focused on the experiences of the MTLs in leading the professional learning of mathematics teachers, this ontological stance resonates with how I think experiences of human

beings, including those of mathematics teachers, evolve and are formed. I hold a view that experiences may vary across the MTLs according to differences in perceptions, observations, and contexts. As such, I explored the experiences shared by the MTLs and negotiated plausible connections without forgoing unique experiences lived by each teacher leader.

With such ontological perspectives, I further considered the experiences of the MTLs an outcome of their construction, backgrounds, experiences as well as preferences. Even essential is my conviction that individual teacher leaders are mindful of those constructions (understandings) in relation to their interpretations of their work of leading the professional learning of mathematics teachers. In that sense, therefore, I believe that those "constructions are alterable, as are their associated 'realities'" (Guba & Lincoln, 1994, p 111). My engagement in this inquiry was predicated on the belief that the MTLs draw the experiences of leading professional learning from multiple actions, events, and situations that characterized teacher professional learning sessions. As such, I was always mindful that no single experience from an individual teacher leader could be claimed to represent the absolute reality regarding the professional learning of mathematics teachers in the Tanzanian educational context. In that sense, therefore, my participation in this study was founded on my desire to develop an understanding of and report the experiences that reflect the MTLs' perceived realities of leading the professional learning of mathematics teachers (Lincoln et al., 2011).

Epistemological deliberations.

A constructivist paradigm, as Denzin and Lincoln (2011) argue, adopts a subjectivist and transactional epistemology. The epistemology holds the "philosophical belief that people construct their own understanding of reality; we construct meaning based on our interactions with our surroundings" (Lincoln et al., 2011, p. 103). The tenet of this epistemological stance is founded on the cognition that the researcher and participants engage in co-constructing knowledge by drawing on their personal understandings (constructions) that are predominantly influenced by how they view their worlds. In such a sense, as Guba and Lincoln (1994) point out, constructivists believe that what the researcher and participants do during and after the research process should focus on generating an understanding of the phenomenon under investigation. From that perspective, a researcher has a substantial role to play in constructing knowledge

during the research process since it is hard to separate constructivist researchers from what they know about the phenomenon under study (Lincoln et al., 2011). With such an epistemological posture comes the nature of the findings of the study. As Guba (1996) advances, the results of a study, which follows and are shaped by a subjectivist and transactional epistemology, become a product of the interaction between the researcher and participants involved in the inquiry.

As this research study sought to explore the experiences of the MTLs in leading the professional learning of primary school mathematics teachers, I find a subjectivist-transactional epistemology consistent with this exploration. Indeed, this study intended to generate subjective knowledge that was actively constructed and co-created by myself and the participants, that is, the researcher and the MTLs, respectively (Guba & Lincoln, 2005). I believe that this study generated subjective knowledge as human experiences are subjective and are shaped by individual beliefs, values, context, and prior experiences. On the other hand, the research process of this inquiry offered opportunities to work together with the MTLs to understand their experiences of leading professional learning of their teacher colleagues. In such a landscape alongside teacher leaders, I participated as a "passionate participant" and as a "facilitator of multi-voice reconstruction" of my subjective reconstruction and those of research participants (Guba & Lincoln, 1994, p. 112). As such, I engaged in the process of generating the understanding of experiences of leading teacher learning through my interactions with the MTLs but also during my active interpretation of research data gathered during the research process.

Summary

The chapter has detailed theoretical perspectives that framed this study. It described the way the perspectives (symbolic interactionism, perspective consciousness, and Dewey's theory of experience) guided the design of the study and informed the interpretation of research data. Furthermore, philosophical perspectives were presented, to illuminate the paradigm that was adopted to locate this research study. It is at this point that this chapter sets the stage for describing the research approach employed to develop an understanding of the experiences of the MTLs in leading teacher professional learning in rural and remote communities in Tanzania. The next chapter focuses on research approach and process of this study.

Chapter 4

Research Approach and Process

Choosing a Research Approach

My doctoral program exposed me to different research approaches that educational researchers employ while carrying out research projects. A thorough examination of the same deepened my understanding of what it means and takes to use each of the approaches in attempting to understand a phenomenon under investigation. Given the nature of the phenomenon explored by this study and the research question it informs, I chose a qualitative research approach because it is consistent with the characteristics of this inquiry. The theoretical and philosophical perspectives situated this study within a qualitative research landscape, a situation that influenced the employment of the approach. More critical is that this study is inherently qualitative research in nature since it "implies a direct concern with experience as it is 'lived' or 'felt' or 'undergone'" (Sherman & Webb, 1988, p. 7) by human beings.

Research approach and study connectedness.

Methodologically speaking, this research study is a qualitative study in nature since it is consistent with the characteristics of such a research tradition as informed by Merriam (2014). First, it focuses on developing an understanding of a phenomenon under exploration, which is the experiences of leading the professional learning of mathematics teachers in Tanzania. It focuses on developing a granular understanding of the experiences from mathematics teacher leaders' points of view regarding the interpretation of their work of leading the professional learning of their colleagues. Such an understanding was not intended to be generalized to a population that was not studied, rather, the study aimed to reveal what it means and takes for the MTLs to lead teacher learning and what their experiences of leadership are in that particular teacher leadership landscape (Merriam, 2014). Substantial to this study, and relevant to qualitative research, was to search for an understanding of the experiences of leading teacher professional learning from the perspectives of the MTLs, not the researcher's (Merriam, 2014).

Second, in this study, borrowing Merriam's (2014) terms, I was a "primary instrument" (p. 15) in the research process during data collection and analysis stages. I decided to choose such a role because I was mindful that "[s]ince understanding is the goal of this research, the human instrument, which is able to be immediately responsive and adaptive, would seem to be the ideal means of collecting and analyzing data" (Merriam, 2014, p. 15). The decision to assume such a role was founded on my desire to experience opportunities to "clarify and summarize material, check with respondents for … interpretation, and explore unusual or unanticipated responses" (Merriam, 2014, p. 15). With such a role, however, I was quite informed of the "sensitivity and integrity" (Merriam, 2009, p. 52) required, on my part as a researcher, in making sure that I undertake a credible research process but also in generating a trustworthy final research report.

Thirdly, this research study is also in agreement with another qualitative research dimension that characterizes qualitative inquiry as a process that involves inductive investigation of a phenomenon (the experiences of leading the professional learning of primary school mathematics teachers). Indeed, this study was not designed with the intention of building or testing theory or a hypothesis. Rather, the study focused on eliciting information that helped to ascertain emerging themes from accounts of experiences of the MTLs about what they routinely do as teacher leaders when working with their teacher colleagues during professional learning sessions (Merriam, 2009). The information from the MTLs and the insights gained while collecting and analyzing data was profoundly helpful in determining larger themes related to the experience of leading the professional learning of mathematics teachers in each research location but also across locations (Merriam, 2009).

Fourthly, congruent with qualitative research, the research text of this study is characterized by thick and rich descriptions of the experiences of the MTLs accompanied by quotes that were selected from accounts of experiences shared by research participants. The intent of using exact words from participants' accounts of experiences as quotes is to support the findings of this exploration. Also, it is intended to allow readers of the research text the space to make sense of words and phrases used by participants in talking about their teacher leadership work (Clark & Creswell, 2015, p. 370). Following the nature of the experiences shared by the MTLs and Clark and Creswell's (2015) recommendation on ways for generating a robust qualitative research report, I decided to "select quotes that capture feelings, emotions, and ways

people talk about their experiences" (p. 370). The use of the MTLs' actual words as quotes in themes made the findings of this research study to be more informative, showing how the MTLs describe experiences leading the professional learning of mathematics teachers in their own words, phrases, and tones (Clark & Creswell, 2015).

Case Study Research

Case study research, as Yin (2014) defines, is an "empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p. 18). Methodologically, as Gerring (2007) maintains, case study researchers gain a deeper understanding of the whole by paying attention to a single situation or an event that has happened in a particular period. The underlying assumption is that individuals are keen to share their understanding of the phenomenon; the understanding of others in relation to a phenomenon; and their understanding of events that have happened over a particular time period (Woodside, 2010). As Merriam (2002b) and Flyvbjerg (2012) argue, case study researchers are interested in developing an understanding of a single phenomenon or a social unit for generating information peculiar to that setting and not for a larger population not studied.

Some educational researchers have successfully employed the methodology in exploring the experiences of teachers concerning their daily work practices (Kuntz, 2015; Farrell, 2016). Kuntz (2015), for example, adopted case study methodology to explore the experiences of instructional teacher leaders, working in some Alberta schools in Canada. Farrell (2016) also employed the same methodology to report on the experiences of three novice English-as-a-second-language-teachers in Canada about the practices they use in their work of teaching the language. In the African educational context, Samuel and Stephens (2000) used case study methodology to explore the experiences of preservice teachers in their journey of becoming teachers within the context of post-apartheid South Africa. With case study methodology, this study was successful in promoting "the exploration of complex situations, allowing for the gathering of multiple perspectives, from a range of sources, including contextual information" (Lauckner et al., 2012, p. 4).

Why case study research?

This research project employed case study research traditions in exploring the experiences of the MTLs in leading the professional learning of primary school mathematics teachers in Tanzania. The decision to approach this study using such a methodology is rooted in my belief that case study research is appropriate and powerful in helping develop an understanding of the experiences of the MTLs regarding their work of leading teacher learning. More critical is that this inquiry is in accord with the three dimensions which characterize case study research as described by Merriam (2014). The dimensions include particularistic, descriptive, and heuristic (p. 43). In agreement with the first dimension, that is, particularistic, this research study examined a phenomenon (the experiences of leading the professional learning of primary school mathematics teachers in Tanzania).

The second dimension of case study research—descriptive—is also a characteristic of this research study. That is, this study sought to generate descriptive research text that should communicate the researchers' understanding of both the phenomenon and the cases that are qualitatively studied (Merriam, 2009). Phrased differently, using Geertz's (1973) terms, this study aimed at conveying a "thick description" of the experiences of MTLs regarding their leadership of teacher professional learning. Furthermore, and consistent with the third dimension, heuristic, this research study focused on enhancing readers' understanding of the experiences of the MTLs as leaders of teacher professional learning. The aim is to offer readers of the research report of this study an opportunity to develop new meanings and insights, but also to expand their experiences and understanding of the leadership of the professional learning of mathematics teachers, by mathematics teachers.

Some case study researchers, including Merriam (2014) and Stake (2013), have outlined types of case studies within the qualitative research tradition. According to these researchers, the types of case studies include historical and observational, intrinsic and instrumental, and multisite or collective case studies. This research study is a multisite case study in nature since it collected and analyzed data from different cases (mathematics teacher leaders) that were involved in this inquiry. Indeed, the experiences of the MTLs in leading the professional learning of primary school mathematics teachers in Tanzania is the phenomenon I was interested in

understanding. In that manner, therefore, this research study employed the methodology to "promote the richness, depth, and complexity that is drawn from multiple events that help one understand the phenomenon of interest that is shared among the diverse cases" (Lauckner et al., 2012, p. 6).

Leading teacher professional learning in different locations with different mathematics teachers enables the MTLs to experience diverse work situations and varying work events. Those situations and events, as Stake (2013) emphasizes, are "expected to shape the [leadership] activity, as well as the experiencing and the interpretation of the activity" (p. 2). Such dimensions are quite imperative, as Kelchtermans (2004) explains "teachers are influenced in their professional [learning] by the peculiarities of the context, both in time and space" (p. 225). The individual MTLs (the cases), however, share common characteristics, that is, they participated in a professional learning program that supported them to be able to lead teacher professional learning but also in their respective districts. Substantial to a multisite case study, and to this research is exploring the "experiences of real cases operating in [their] real situations" (Stake, 2013, p. 3). With this type of case study, as Stake (2006) contends, I experienced opportunities to study individual cases and come up with a thick description of the experiences of the MTLs in leading teacher professional learning in Tanzania. Even more, the employment of multisite case study assisted in having a compelling interpretation and description of the experiences (Stake, 2010).

Project Profile and Participants

According to Blumer (1969), it is particularly valuable for a researcher to "sedulously seek participants … who are well informed" (p. 41) of the phenomenon under exploration. Following Blumer's (1969) recommendation, participants in this research study were primary school mathematics teachers who were involved in the project titled *Capacity Development for Mathematics Teachers in Rural and Remote Communities in Tanzania*. The project, funded by the Canadian government through Global Affairs Canada (Simmt et al., 2011), was designed to empower mathematics teachers with the skills they need to lead the professional learning of other mathematics teachers in rural and remote areas. For this research study, the project will from now on be referred to as the Mathematics Education Project (MEP). To illuminate the nature of

participants, I offer a comprehensive description of the project, to understand its objective and how it has been supporting primary school mathematics teachers to develop capacities and sensibilities to lead teacher professional learning within their rural and remote communities.

MEP was designed to respond to the feedback from primary school mathematics teachers who reported they needed more professional learning opportunities to improve their pedagogical practices (Simmt et al., 2011; Binde et al., 2013). At another level, the project was a response to the calls made by some Tanzanian scholars and researchers, including Komba and Nkumbi (2008), Binde and colleagues (2013), and Sumra and Katabaro (2014) regarding the need to transform teacher professional learning in favor of situating it in the hands, hearts, and minds of teachers, including mathematics teachers. Central to MEP was the acknowledgment that teacher-led professional learning initiatives are unlikely to occur in schools unless teachers are supported to understand what it means and takes to lead their professional learning (DuFour et al., 2008; Loucks-Horsley et al., 2010; Jackson & Allender, 2016). In my observation and participation, this project has been benefiting from considerable attention by the mainstream mathematics teachers, parents, and the public in Tanzania. Interestingly, too, is that MEP has drawn attention from the mathematics education community in Tanzania, with twofold reasons being at the heart of the situation.

First, MEP, among other things, was designed to support mathematics teachers to become leaders of the professional learning of teachers who are working in rural and remote communities in Tanzania. Undoubtedly, the idea rested on the need to help mathematics teachers make their transition from being recipients of professional learning to becoming active leaders of their professional learning (DuFour et al., 2008). In a review of the project documents, it has become explicit that MEP was not meant to introduce mathematics teachers to new strategies, but rather to encourage them to make sense of ways they have the potential to support student mathematics learning. Equally attractive is that the project was designed to "create and sustain primary teacher development in ways that honor both the community traditions, practices, and knowledge" (Glanfield et al., 2010). These aspects were substantial in providing teachers with spaces to make sense of values and beliefs honored in the places they live and work.

The second reason is equally appealing—MEP involved primary school mathematics teachers, teacher educators, school inspectors, adult educators, and district educational officials (Simmt et al., 2011). The idea was to create a platform for these educational stakeholders, who have varying responsibilities, to engage in sharing their experiences, expertise, interests, wisdom, and expectations, regarding ways in which mathematics teachers can be supported to facilitate meaningful student learning in primary schools (Glanfield et al., 2010). With the different stakeholders, each responsible for different roles, the activities were devised around the idea that adults learn well when collaboration becomes a means to learn and a way to build understanding and relationships. It would be fair to note that the learning process was organized and implemented around the principles of adult learning, that is, learning by doing, learning from experience, and learning through collaboration and teamwork (Graven, 2002). I had the opportunity to participate in some of the MEP activities and remember learning to be taken up individually and collectively through discussions, demonstrations, and onsite learning.

By bringing in mathematics teachers at the heart of the project, it is apparent that MEP was predicated on a "view of the teacher as one who is knowledgeable, thoughtful, and deeply caring about the responsibilities of … [the] vocation" (Lund et al., 2012, p. 16). This view of the teacher seems grounded on Adler's (2000) argument, stated in the African educational context, that the teacher is one of the important resources in any educational reform designed to make a difference in teaching and learning. With such a view of the teacher, it is worth mentioning that mathematics teachers in the project were considered capable of contributing to their professional growth and that of other teachers for the good of student learning. Unlike other professional learning initiatives implemented in the Tanzanian context, MEP drew teachers to the heart of their learning, empowering them to become effective in taking charge of their professional learning within and outside their schools.

Given that I have described the project and some of its rationales, I should now attend to what the MTLs underwent while participating in the program supported by the project to empower them to become teacher leaders in their respective districts. The program intended to create conditions that could allow participants spaces to build relationships with one another as they work together to improve mathematics teaching and learning in the country (Simmt, 2018). As such, it involved the MTLs who worked alongside teacher educators, school inspectors, adult

educators, and educational officials from the nine project districts. The program had these education stakeholders working in small district groups, with a mathematics teacher leader in each group. With such an arrangement, the MTLs interacted and worked with school quality assurers, adult education officers, and academic officers from their districts as well as teacher educators from teacher colleges and universities. As such, teacher leaders were expected to build professional relationships with themselves and also with the people who are their superiors given the organizational structure of Tanzanian education system.

The program engaged participants in different themes, including school mathematics, gender-sensitive pedagogy, and contemporary models of teacher professional learning, to mention a few. In relation with school mathematics, the MTLs were provided with a repertoire of opportunities to develop professional knowledge and skills for facilitating learning of mathematical concepts such as numbers, algebra, function, statistics, geometry, and so on. The learning was organized around tasks with the intention of allowing members of each group spaces to think about different strategies that can be used to teach a particular concept basing on the nature of their students and contextual realities of their schools. On the other hand, they learned about gender-sensitive pedagogy and how to situate it in a mathematics learning context. At the heart of attending to the pedagogy was the need to empower them to be able to support the learning of all while leading teacher learning sessions.

Since they were to engage in leading the professional learning of mathematics teachers, the MTLs were introduced to two models of teacher learning—lesson study and concept study. While the former was learned as developed by scholars and educators from around the world, the latter was informed by the influential writings of Davis and Simmt (2006) and Davis and Renert (2013). Consideration was given to these models because of their potential in allowing teachers avenues not just to recognize the value of teachers in owning their learning but also the importance of teacher collaboration in promoting the professional growth of mathematics teachers.

It is interesting that mathematics teachers who were part of MEP are leading the professional learning of primary school mathematics teachers in rural and remote communities in Tanzania. As such, it is reasonable to understand their experiences related to the leadership work

they have been doing alongside other mathematics teachers in their respective districts. Because I was interested in understanding the experiences of leading the professional learning of primary school mathematics teachers, mathematics teachers who have been participating in the project were undoubtedly potential participants for this exploration. On such grounds, this study recruited eight primary school mathematics teachers who were involved in the project and, during the time of this research, were leading the professional learning of their teacher colleagues in districts.

Coming to the Research Site: Exploring Rurality

Since this research study explored the experiences of the MTLs who are working with mathematics teachers in remote and rural places in Tanzania, I am mindful of the need to provide a brief overview of the contexts in which these participants live and work. That is, to describe what is meant by remote and rural places in the Tanzanian context but also what it takes to live in such a context. This endeavor is informed by Patton's (2005) suggestion that a thick and "[g]ood description takes the reader into the setting" (p. 533). For this research, therefore, the description of the place is imperative given the diversity of stances of what a remote and rural place or area is called. For this study, a place is considered "an open and yet bounded realm within which the things of the world can appear and within which events can take place" (Malpas, 1999, p. 33).

The Government of Tanzania uses two dimensions to define remote and rural places. The first dimension is the distance from the urban areas and the other dimension is related to the level of development and economic activities taking place in that particular location or geographical area. For the first dimension, Tanzania defines remote and rural places as isolated areas that are far from the district headquarters or towns (URT, 2001). In this manner, in its rural development strategy of 2001, the government considers "rural places [to] include villages and small towns" (p. 1). It is in this sense that remote and rural areas are considered as those places that are far-to-reach areas surrounded by farms and bushes.

The second dimension—the development level and economic activities— is equally fundamental in understanding the Tanzanian perception of a remote and rural place. The government defines remote and rural places as geographical areas with a "high rate of poverty"

(p. 5) attributable to low income. In these locations, for example, "food poverty is highest … at 18.4 percent compared to the national average of 16.6 percent" (URT, 2010, p. 6). The government documents are also helpful in developing an understanding of the contextual realities of those places in Tanzania. Through them, it is explicit that remote and rural areas in Tanzania are characterized by "poor infrastructure and poor social services" (URT, 2010, p. 17). Such places are also typified by small-scale agriculture, standing as the number one source of food and income (URT, 2010).

Making sense of places within which the participants live, and work is critical to this study because I honor the idea that to understand human experiences one must attend to the contextual realities of the places they live or work (Malpas, 1999). I am increasingly mindful that the places we live shape our experiences. As reverberated by Malpas (1999), the essence is that "persons [including the MTLs] and places intermingle with each other in such a way that places take on the individuality of persons, while the persons are themselves individuated and characterized by their relation to the place" (p. 5). It is in this sense that I worked with MTLs with the belief that their life and work experiences, including the experiences of leading the professional learning of mathematics teachers, are continually shaped by contextual realities of the places they live and work.

The Researcher: Telling My Story

Given that I have explored rurality as understood in the Tanzanian context, I should now describe my researcher-rurality connectedness. This description follows Patton's (2005) suggestion that "[b]ecause the researcher is the instrument in qualitative inquiry, a qualitative report must include information about the researcher" (p. 1198). One of the pieces of information that Patton suggests being included is researchers' connections to the nature of the site of the study and people residing in those places. Ely (1991) recommends reporting personal information because it helps become "increasingly more aware of our own 'eyeglasses', our own blinders so that these do not color unfairly both what we observe and detail in writing" (p. 54). To explore the connectedness, I tell a story of my experience of living in a rural village alongside my parents who both served as primary school teachers. I chose a storytelling approach because the "truth about stories is that's all we are" (King, 2003, p. 2).

I was born and raised in Kwamba, a rural village located in Tanga region, one of the coastline regions in Tanzania. My family and I lived in this small village that had about 200 people, for about seventeen years since my childhood. My family considers the village our home and a place we belong even though it is not a place neither my father nor my mother had their origins. We belong to this place as both of my parents started their lives as teachers in Kwamba primary school, the only primary school in the village. My father and my mother found themselves in Kwamba after being posted by the government to start their careers. Both of my parents taught children of this village for eighteen years before they transferred to another school in a larger village, and what some call an urban area.

I remember interacting with children belonging to three tribes as I was growing up in the village. I had some friends belonging to Nguu, Maasai, and Pare tribes. Our family belonged to the Chagga tribe that has its roots in Kilimanjaro region, a region located in the northern part of Tanzania. Each of the tribes in the village had its language unique to itself. Of the three tribes in Kwamba, the dominant and 'home-grown' tribe was the Nguu, and their language was Kinguu. All three languages have their roots from Bantu and Swahili languages. The Maasai people, on the other hand, were known for being successful pastoralists who raised cattle, sheep, and goats for consumption and for generating income. Then again, people from other tribes participated in agricultural activities and small businesses in making their living. The popular food crops that were cultivated across the farms in the village included maize, beans, millet, peas, and cowpeas. In the village, the main agricultural tool used for cultivation was a hand hoe. As people living in the village, my parents and I engaged in farming after school hours as well as during weekends.

In the village, my parents voluntarily engaged in several out-of-school events alongside parents, helping the village administration in overseeing various activities that took place in the village. Some of the activities included supervising the election of village leadership; mediating disputes and conflicts among villagers (farmers and livestock keepers); and providing education on the prevention of dangerous diseases such as malaria, cholera, and HIV/AIDS just to mention a few. As such, it seems fair to say that teaching in the village required someone who could facilitate learning inside and outside classrooms but also someone who could willingly contribute his or her expertise, talent, and time for the wellbeing of the community. Today, I am tempted to say that working beyond school buildings seemed what it takes to be a teacher in Kwamba village but also what it means to live well with people in the community.

From my parents' experience, it is possible to assume that my father and my mother had the same influence on what was happening in their school as working with their fellow teachers is concerned. Unfortunately, during my recent conversations with them that focused on understanding their experiences of working in the village to understand what the nature of their work was like, I came to realize that my parents had little autonomy over their work

within the school. They claim that they did not have the opportunity to contribute to the development of their professional growth as teachers but also to the development of their fellow teachers. That was the case as most of their stories contained verses of being conceived incompetent and unaware of what they needed to be able to improve the learning of their students. My parents' experience brings to light what constituted the nature of the work of teaching of that time but also what was taken for granted by the education system.

From these experiences, I realized the resonance for understanding the experiences of those teachers who work in rural and remote communities. When I point to understand the experiences of those teachers, I refer especially to the belief that if we understand those experiences—for example, the experience of leading teacher professional learning, whatever that might look like—we could be able to motivate teachers to keep working to enrich students' learning experiences but also to understand the complexity of their work.

The Research Process

The research process of this study involved: recruiting participants, sharing research information, negotiating the path forward, and gathering the research data. Other activities that constituted the research process were communicating with the MTLs, member checking, and data analysis. To illuminate what was endeavored during the research process, I describe each activity pursued.

Recruiting participants.

To recruit potential participants for this research study, I mailed sealed invitation letters to each mathematics teacher leader. The letter detailed, among other things, the purpose of the research study, the stages of the research process, contact information for both the researcher and the academic supervisor in case of questions or concerns, and the responsibilities and obligations of participants while engaging in the study, if they chose to participate in the study. The letter also detailed the way confidentiality was to be maintained, and the risks and potential benefits of participating in the study. With such a letter, the participants became aware of this study, it's research question, and its research process. The letter is attached as Appendix B.

I invited all eleven MTLs, who were involved in the project and who pioneered the work of leading the professional learning of mathematics teachers in Tanzania through MEP, to participate in this research project. The idea of inviting all the MTLs in the study was predicated

on the need to open doors for the interested MTLs to realize opportunities for sharing their stories of leading teacher professional learning in their districts. Therefore, in appreciating and honoring the unique work the MTLs have been doing alongside mathematics teachers, I keenly decided to request the participation of each teacher leader in all stages of the research process of this study (Kuntz, 2015). Of the invitations mailed, eight teacher leaders responded, agreeing to voluntarily participate in the research process. Such a response revealed the MTLs' enthusiasm to share their stories of leading teacher professional learning and allowed for the collection of rich information related to the leadership of the professional learning of mathematics teachers. Table 1 is a summary of participants.

Table 1.

A Matrix of Individual Cases

Name	Educ.	Years of experience		Standard level taught	Current leadership role	Other previous roles	# of teachers in the sessions	
		Urban	Rural				Fema-les	Males
Gabby	Grade A	-	20	IV	School Treasurer, Class Teacher & MTL	Class Teacher	32	34
Anne	B. Ed.	-	9	V-VII & Form I	Ward Education Officer & MTL	Academic Mistress & Head teacher	31	33
Senzini	Grade A	19	12	VI-VII	Head Teacher & MTL	Ward Education Officer & Academic Master	20	18
Pili	Grade A	-	28	VII	Academic Mistress & MTL	Class Teacher	25	24
Thea	Grade A	-	6	I-II	Class Teacher & MTL	Academic Mistress & Supplies teacher	22	20
Isile	Grade A	-	8	VII	Deputy Head Teacher & MTL	Class Teacher & Academic Master	19	19
Mazengo	Grade A	6	30	VII	MTL	Academic Master, Deputy/Head Teacher & Secretary	31	27
Kenny	Grade A	7	13	I-II	School Treasurer & MTL	Teacher's Union, Academic Master & Deputy Head Teacher	19	19

Sharing study information.

With the 8 participants, I planned an in-person meeting with each one. I met MTLs in their villages, away from district headquarters, a situation that allowed me to re-experience being and living in a rural landscape. In these meetings, I presented and then discussed the research information about the study. In order for them to make sense of each detail of the research process, we talked about the purpose of the study, the stages of the research process that were to be pursued, and their responsibilities and obligations if they chose to participate further. I also familiarized them with the level of confidentiality offered, and the risks and potential benefits associated with their participation in the study.

In the same way, I informed each participant about their rights to withdraw from the study and also their rights to access research information they shared with me during the research process. For them to understand the study, I even invited them to ask questions or raise any concerns about the study before embarking on the research process. What became apparent to me in these first meetings was the enthusiasm of the MTLs to share what they experienced during their professional learning sessions as mathematics teachers, as teacher leaders and as human beings. On the other hand, the first meeting with each participant was necessary for this study given the difference in research ethics protocols in Tanzania and Canada. In my experience as an educational researcher in the former country, there is no emphasis for researchers to make sure that participants are well-informed of the study and its research process that are expected to navigate in a particular timeframe. Following my consciousness of the natural rights of participants and how to maintain them as a researcher, I conducted these meetings with each participant before the commencement of data collection, so to become aware of the research process and its associated ethical protocols.

Negotiating a path forward.

In the wake of sharing the research information, and after the MTLs' confirmation that they understood the study and what was expected of them, we engaged in negotiating a path forward. That was an important endeavor since it helped both the participants and myself to make sense of activities to be conducted; tentative dates, time, and duration of our meetings; ways in which information was to be gathered and shared, and venues that we were to meet.

Such planning enabled us to come to a comprehensive understanding of the research process, becoming aware of the entire research journey for this study. Negotiating a path forward also created a professional working relationship between the participants and myself, enabling us to have ongoing communications throughout the research process.

Following Miles and Huberman's (1994) recommendations for qualitative researchers to "reach some explicit agreements about shared expectations" (p. 47), participants and I engaged in a conversation to agree on some matters at the outset. One of the agreements we reached was about active involvement in the research process of the study. Participants agreed to actively engage in sharing their experiences by responding to the sources of information that were provided to them within a given timeline. We also agreed to communicate regularly in case either side needed clarifications or more information about the sources of information (for participants) or the experiences shared by participants (for me as a researcher). On the other hand, I informed each participant about the right to withdraw from the study. I made clear to them that in case they wish to withdraw from the study they should contact me or my supervisor through the contact information provided in the invitation letter. Such agreements and information, amongst other things, permitted an efficient research process that allowed the gathering of rich information from MTLs. The information assisted me in generating thick descriptions of experiences of leading professional learning of mathematics teachers.

Gathering research data: Describing methods.

This research study, like other qualitative research studies, pursued "data that represents personal experience in particular situations" (Stake, 2010, p. 88). It gathered information that assisted in developing an understanding of the experiences of the MTLs in leading the professional learning of mathematics teachers in Tanzania. The qualitative research scholarship is rife with research methods appropriate for this kind of exploration. This study, accordingly, utilized a combination of research methods that have been used in previous qualitative case study research and found success in gathering rich and relevant information about participants' experiences of their world realities (Flick, 2007a). Rich and pertinent information, as Stake (2010) describes, is information that enables qualitative researchers to develop an understanding of human experience related to actions, events, and situations commonplace in one's world.

Three motives lead to employing a combination of research methods. First, I was interested in using ethically appropriate methods that have the potential to offer opportunities for getting "a clearer picture" (Blumer, 1969, p. 41) of the experiences of the MTLs in leading the professional learning of primary school mathematics teachers in Tanzania. Second, since "many qualitative data are personal happenings in time in a place" (Stake, 2010, p. 88) it was critical for this study to use several research methods that could appropriately and comprehensively capture those happenings in time. That was possible because each method used a different protocol to gather information from participants at different times. The decision to use multiple research methods also stemmed from my desire to benefit from the strengths of each method in exploring the experiences of leading teacher professional learning. With the methods, therefore, I was successful in gleaning information relevant to developing an understanding of the experiences of working as a mathematics teacher leader in the Tanzanian educational context.

The third motive rested on the need to contribute to the expansion of qualitative research literature by demonstrating how multiple research methods (Flick, 2007b; 2009) can be useful in studying experience related to the leadership of teacher professional learning. Because of that, accordingly, since this study is a qualitative study and multimethod in nature (Flick, 2007b), an open-ended questionnaire, open-ended interviews, focused interviews, vignettes, and metaphors were used as sources of research data for this study. In a nutshell, I used an open-ended questionnaire to largely explore notions of the leadership within their local communities. In the same way, I conducted both open-ended and focused interviews to elicit feelings, thoughts, opinions, perspectives, and views (Yin, 2014) among the MTLs concerning their work of leading the professional learning of mathematics teachers. Further, this study provided the MTLs with spaces to write vignettes to capture their views on what happened during their learning sessions (Lieberman, 1987a). Finally, metaphor research method, as a substantial approach of generating in-depth insights, was employed to gather ideas (Midgley & Trimmer, 2013) from the MTLs about the work of leading the professional learning of mathematics teachers.

The methods were appropriate because they captured views, opinions, perspectives, and beliefs of the MTLs as I worked with them to understand their experiences of leading teacher learning (Woodside, 2010). To collect rich information for this study, the interviews, vignettes, and metaphors were written in Swahili and then translated into English. The decision of using

Swahili was grounded on my understanding that the MTLs are using the language in their work of leading the professional learning of mathematics teachers but also in facilitating student learning in their classrooms. Because of that, I was increasingly cognizant of sensitivity required while engaging in translating both the research instruments and the data collected through those instruments. As such, I carefully translated the transcripts and double-checked the translations with the MTLs to ensure that what they shared during the research process was fully captured as intended. In the subsequent sections, I offer a detailed description of each method, to explicate meanings and the nature of data I collected through each source during the inquiry.

Open-ended questionnaire. Mills, Durepos, and Wiebe (2010) consider questionnaires appropriate for gathering qualitative research data related to participants' opinions and beliefs about a phenomenon under exploration. As Patton (2005) describes, qualitative researchers use the instrument to generate credible and useful research data for their studies that focus on studying human views and experiences. Unlike closed-ended questionnaires, this type of questionnaire allows for the generation of useful data as it enables participants to freely share their opinions and understanding of the phenomenon under question (Patton, 2005).

To initiate the data collection process, I mailed the open-ended questionnaire (see Appendix C) to all participants who agreed to participate in the study. The decision to mail the questionnaire to participants was founded on the need to provide them with the flexibility they needed to freely answer the questions at their own pace (Mills et al., 2010). Furthermore, the idea was to provide participants with opportunities to reflect on leadership practices of, and in, their local communities but also on teacher leadership practices commonplace in their professional learning contexts. To help participants understand the questionnaire and offer more information about leadership practices they had experienced and pursued, I set the items using simple, clear, and respective language (Chadwick et al., 1984). The idea was to make items readily understood to the MTLs, and not laboring them to spend more time only to work to understand what is entailed in the items.

I included only three items in the questionnaire for participants to offer detailed information on each item. I believed that minimizing the number of items in the questionnaire could motivate participants to say more about their work but also to complete

and return the questionnaire for translation, preliminary analysis, and member checking. More importantly, because I made it clear from the beginning of the research process that participation in this research study was confidential, the MTLs freely completed the questionnaire "without embarrassment or fear of reprisal" (Chadwick et al., 1984, p. 137). To ensure participants returned the questionnaire, I attached a request that they return the completed questionnaires to me by mail. It is fortunate that all participants returned the filled questionnaires. The questionnaires, therefore, provided information related to notions of the leadership of, and in, their local communities. The responses to the open-ended questionnaire were also useful in capturing the MTLs' feelings of being invited to attend the program in the Project to help them become teacher leaders in their districts.

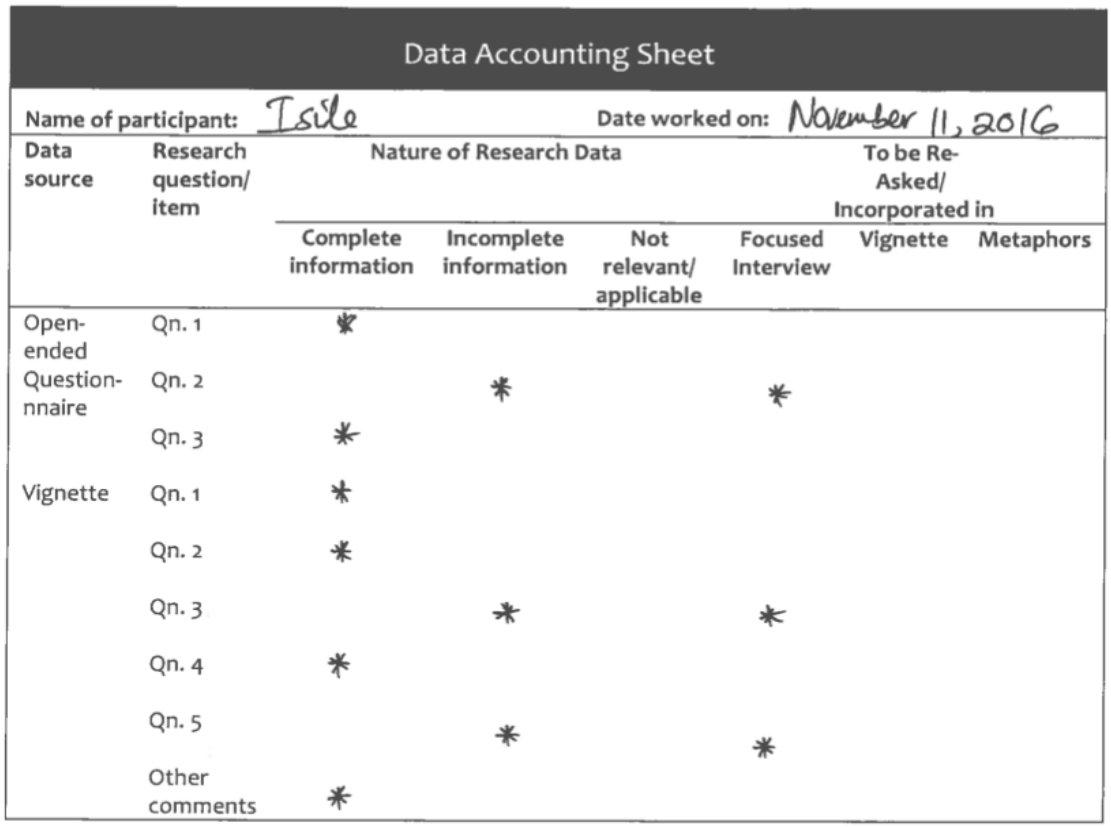
Interviews. As introduced earlier, this study used interviews to collect data for understanding the experiences of the MTLs in leading teacher professional learning. The decision of using interviews was grounded in my awareness that the method is appropriate in gathering information useful for understanding human experience (Stake, 2005; Yin, 2014). Patton (2002) encourages qualitative researchers to use interviews as a source of research data since "we interview people to find out from them those things we cannot directly observe" (p. 340). Indeed, human experience is one of the phenomena that is impossible to observe. As well, qualitative researchers are interested in studying events and situations that have already lapsed and were likely not observed (Silverman, 1993). At the core of this interest is the belief that interviews help qualitative researchers to "probe an interviewee's thoughts, values, prejudices, perceptions, views, feelings, and perspectives … elicit their version or their account of situations which they may have lived or taught through: his or her story" (Wellington, 2015, p. 137).

The qualitative research literature is explicit that there are three types of interviews: open-ended/unstructured, focused/semi-structured, and structured (Yin, 2014; Merriam, 2014). This study employed open-ended and focused interviews in collecting accounts from participants regarding their experiences of working as MTLs. While the former was used in the first interview session, the latter shaped the second interview session with each participant. The MTLs voluntarily participated in both open-ended and focused interviews. In the next sections, I offer a brief description of both sessions.

The first interview: Open-ended interview. The first interview followed an open-ended interview protocol. This type of interview is characteristically fluid in nature (Yin, 2014) given its "greater flexibility and freedom" (Nixon, 1992, p. 88). With such a character, it provides spaces for a respondent to use his or her own words; but it also offers "better access to interviewee's views, interpretation of events, understanding experiences and opinions" (Byrne, 2004, p. 209). From that perspective, the open-ended interview is particularly attractive to qualitative researchers because it provides interviewees with avenues to express their perspectives, views, and stances related to their everyday life events, actions, and situations. Some qualitative researchers, including Merriam (2014) consider open-ended interviews appropriate for gleaning information to answer questions related to human experience as well as their opinions about what they experience in their worlds.

The decision of utilizing open-ended interviews was predicated on the understanding that this type of interview was the appropriate "way to learn in depth about the experiences of single individuals" (Clark & Creswell, 2015, p. 340). In that manner, an open-ended interview was consistent with the ontological commitments which guided this particular research project. Indeed, this study embraced an "ontological position which respects people's knowledge, values, and experiences as meaningful and worthy of exploration" (Byrne, 2004, p. 209). Increasingly, the open-ended interview opened-up spaces for the MTLs to express their experiences, based on their perceptions and sensibilities of their work of leading teacher learning. Further, through such interviews, I developed in-depth insights about the experiences of the MTLs on the work they have been doing alongside mathematics teachers within their particular contexts.

In this one hour-long first interview session, my conversations with the MTLs occurred as I asked them unstructured questions (see Appendix D) that allowed them the freedom to say more about their work with mathematics teachers (Merriam, 2014). The questions offered opportunities to capture the MTLs' accounts regarding their experiences of their leadership work. I created a data accounting sheet (see Figure 4.1) to enable me to make thorough follow up with the participants about some of the items where I needed clarification or more information. As such, the first conversation informed the subsequent conversation that was conducted through a focused interview protocol.



Data Accounting Sheet

Name of participant: Isile Date worked on: November 11, 2016

Data source	Research question/ item	Nature of Research Data				To be Re-Asked/ Incorporated in	
		Complete information	Incomplete information	Not relevant/ applicable	Focused Interview	Vignette	Metaphors
Open-ended Question-nnaire	Qn. 1	*					
	Qn. 2		*		*		
	Qn. 3	*					
Vignette	Qn. 1	*					
	Qn. 2	*					
	Qn. 3		*		*		
	Qn. 4	*					
	Qn. 5		*		*		
	Other comments	*					

Figure 4.1. Data accounting sheet

The second interview: Focused interview. The second interview session followed a focused interview protocol. Yin (2014) views the focused interview as one of the types of interviews in which the researcher uses questions, prepared in advance, to interview participants for a particular period of time. Such questions are deliberately used to initiate and stimulate active interaction between the respondent and the researcher of the study. The potential of a focused interview rests on its power to "maximize the scope of the topics and to give interviewees an opportunity to invoke points of view that had not been anticipated" (Hopf, 2004, p. 205) by the researcher. This type of interview, which "assumes a conversational manner" (Yin, 1989, p. 89), is methodologically substantial when the researcher seeks particular information as well as other information from a respondent that relates to the phenomenon under inquiry (Stake, 2010).

In this research project, a focused interview protocol was used because it has been found to provide "accurate pictures of respondents' selves and lives" (Fontana & Frey, 2003, p. 63). What this method can facilitate, as reflected in the assertion, is consistent with what this research study

sought to achieve—to obtain a fuller picture of the MTLs' experiences of their work of leading the professional learning of their teacher colleagues. Indeed, the intent was to use the focused interview to gather the MTLs' views or accounts of their teacher leadership work. With a set of well-phrased items (see Appendix E), the MTLs were encouraged to recollect events, actions, roles, and situations that symbolize their work of leading teacher professional learning (Fontana & Frey, 1998; Hopf, 2004). From my observation, the items encouraged participants to provide more information that described their leadership experiences. The purpose was to create an environment that invited teacher leaders to "provide a fresh commentary" (Yin, 1989, p. 89) about their leadership work.

Accordingly, this one hour-long interview session focused on eliciting more and accurate information related to the work of the MTLs, corroborating what they shared in the first interview (the open-ended interview). To achieve that, as recommended by Clark and Creswell (2015), I used probing questions to invite the MTLs to make clarifications of what they shared in the first interview and also encouraged them to elaborate on their ideas so that I had a better understanding. That was possible because a focused interview "gives the researcher and respondent much more flexibility … [as] the researcher is able to follow up particularly interesting avenues that emerge[d] in the interview and the respondent is able to give a fuller picture … [depicting] the richness of the themes emerging from respondent's talk" (Smith, 1995, p. 9) related to their experiences.

Between the open-ended and focused interviews was an interval of two months. A two-month time was intended to give me as well as the MTLs an appropriate time to engage in reflecting on what happened in the first interview but also in thinking about what was to occur in the second interview. During this time, I expected the MTLs to engage in re-thinking and recollecting events, actions, and situations regarding their work in light of our first interview. The interval of two months enabled the MTLs to say more about their work of leading the learning of other mathematics teachers. This two-month interval was also appropriate for me to engage in generating transcripts and in making initial sense of what the MTLs shared in the first interview. Indeed, in the same period, I started and continued to analyze information collected from the MTLs, a situation that enabled me to improve the questions or add more questions for the focused interview as well as to begin to prepare for the outline of the vignette. The data

accounting sheet helped me to keep track of data I was collecting and the questions I was improving in a period of time.

Both interviews were audio-recorded. The audiotapes provided "a more accurate rendition of interview[s]" (Yin, 2014, p. 110). The audiotaping of the interviews, however, did not substitute my active listening of the MTLs words nor did I record the interviews if I became aware that a participant was feeling uncomfortable with the recording. Indeed, the audio recording was meant to reinforce what I was listening for from each mathematics teacher leader during both interviews. Equally, I engaged in what Davis and Renert (2014) call, hermeneutic listening, with the intent of "seeking difference of opinions and encourage a variety of thought" (p. 85). I paid close attention to two dimensions during the interviews. First, I worked with MTLs with the intent of satisfying this research inquiry—exploring the experiences of the MTLs in leading teacher professional learning. The second dimension was "putting forth 'friendly' and 'non-threating' questions" (Yin, 2014, p. 110) while interviewing the MTLs to obtain accounts of their experiences of leading teacher professional learning.

Vignettes. Since this research study explored the experiences of the MTLs in leading the professional learning of mathematics teachers, a review of previous research studies suggested vignettes as an appropriate research method for such exploration. A vignette, as defined by Miles and Huberman (1994), is a "description of a series of events taken to be representative, typical, or emblematic in the case" (p. 81). With such a nature, vignettes have long been used in social science research to gather information from individual human beings. Within education, the same has been used to elicit views from teachers about professional practice (Lieberman, 1987a), their understanding of instructional strategies (Jeffries & Maeder, 2005), judgment and decision-making processes (Elhoweris, 2008), and how they experience becoming teacher leaders (Lieberman & Friendrich, 2010). In her study, for example, Lieberman (1987a) concluded that vignettes "hold real promise as a tool for collecting data" (p. 12) for qualitative research studies. Its potential lies in its ability to allow participants to define situations using their terms (Barter & Renold, 1999), show "the variety of activities, strategies, and tactics … they use over time" (Lieberman & Friendrich, 2010, p. 1), and describe what they do in a particular moment (Wepner et al., 2016).

Other qualitative researchers have drawn attention to the potentials of vignettes as a method for collecting information from participants. Erickson (1986), for example, considers a vignette as a "vivid portrayal of a conduct of an event of everyday life, in which the sights and sounds of what was being said and done are described in the natural sequence of their occurrence in real time" (p. 149). From Erickson's argument, it can be learned that the method is powerful in providing participants with opportunities to describe what happened with their everyday life and work realities. Moreover, Gould (1996) and Evans and colleagues (2015) are also mindful that vignettes are appropriate in developing an understanding of one's experience, knowledge, and opinions of an event, action, or situation. From such observations, a vignette becomes one appropriate instrument for eliciting people's views and beliefs on what they have been experiencing in their work and life commitments.

This study used vignettes to understand how the MTLs experience their work of leading teacher learning. The key to using this method was the need to capture individual mathematics teacher leader's views on what happened while leading the professional learning of their teacher colleagues. In other words, the method was used for the MTLs to compose vignettes that revealed their leadership practices and actions, and, in turn, derive an understanding of their leadership experiences (Hughes & Huby, 2002; Wilks, 2004; Lieberman & Friendrich, 2010). By reading and rereading vignettes composed by each participant, I made sense of the work of leading teacher professional learning as such instrument can provide what Lieberman (1987a) calls, "a fuller picture" (p. 5) of one's lived experiences.

The vignettes consisted of a series of prompts meant to explore the experiences of the MTLs. Through the vignettes, therefore, the MTLs were asked to respond to the prompts by writing what they think represents their leadership of teacher professional learning in their particular contexts. To achieve the goal, this study adopted Lieberman's (1987a) outlines of the vignette, to capture the experiences of the MTLs in leading the professional learning of mathematics teachers. The decision to adopt the outline was based on Miles and Huberman's (1949) observation that the same allowed Lieberman (1987a) to successfully "examine a situation that turned out well" (p. 81). I also decided to adopt the outline because it clearly indicated to me that it is powerful in capturing the nuances of what an individual was doing.

In the outline, therefore, I added two prompts for the vignettes to capture relevant information that reflected what the participants experienced while serving as leaders of teacher professional learning. Such prompts, however, were prepared not to make the vignettes too rigid for teacher leaders to find it hard to express their leadership experiences (Lieberman, 1987b). The outline of the vignette used in this study is attached as Appendix F. The activity of writing vignettes, which happened between open-ended and focused interviews, lasted for six weeks with the MTLs encouraged to read and reread their responses and make possible changes if necessary. After that, I collected and carefully read each vignette and contacted the MTLs when I needed more information during translation and preliminary interpretation.

Metaphors. The other way to understand the experience that individual MTLs may hold about their work of leading the professional learning of mathematics teachers is through metaphors (Tobin, 1990; Lorsbach, 1995; Lee et al., 2014). Metaphor, according to Lakoff and Johnson (1980), Lakoff (1994), and Cochran-Smith (2002), is a conceptual system that governs human perceptions of the world and which define everyday life and work realities of an individual human being. Even more, metaphors have been linked to belief sets and the way people think about the world as well as circumstances apparent in their everyday life (Tobin, 1990; Midgley & Trimmer, 2013). From that perspective, there is a temptation to argue that metaphors are central to making sense of the meanings that human beings attach to events, actions, and situations in their natural and social worlds.

Some qualitative researchers have detected the importance of using metaphors in collecting research data for understanding human experience. Black (2013), for example, observed that metaphor is a "viable and important resource for making educational worlds visible and for supporting understanding of, and connection with, experiences and knowledge" (p. 26). From that assertion, it is reasonable to believe that metaphors are useful in exploring human experiences about beliefs and values held by an individual. Black (2013) is also helpful in understanding the reason for a growing interest in using metaphor as a research method in qualitative research studies. He writes that the "attraction of metaphor as a methodological resource is its capacity to render and connect knowledge and life experiences in relevant and meaningful ways" (p. 26). What makes metaphor an appropriate research method in qualitative

research is its power in facilitating an understanding of the lived experience of human beings in relation to their surrounding environments of their social and natural worlds.

Midgley and Trimmer (2013) are other qualitative researchers who have shared their experiences of using metaphor as a research method for collecting data from participants. They consider metaphors as "mechanisms for exploring abstract, novel and speculative ideas … that can lead to new forms of conceptual insights" (p. 2). From that perspective, it can be learned that metaphor is a research method that can allow a researcher to generate understandings and insights of the real-life experiences of participants involved in a study. Even more, Midgley and Trimmer (2013) found metaphors useful in exploring social phenomena that cannot be explored using other methods of soliciting research data. One aspect that can be learned from the above observation is that metaphors are useful in providing participants with opportunities to explicate a particular experience of their world.

As highlighted in the previous section, this study used metaphor as one of the research methods following an understanding that the method is appropriate for exploring human lived experience (Lakoff & Johnson, 1980). Indeed, the method is consistent with the belief behind this study, that is, "[t]he way we think, what we experience, and what we do every day is very much a matter of metaphor" (Lakoff & Johnson, 1980, p. 3). Accordingly, the method was suitable for this project because it was a way to capture meanings, beliefs, and conceptions of individual MTLs regarding their work of leading the professional learning of mathematics teachers. The intent of using metaphors as one of the sources of research data for this study was highly triggered by the need to make tacit referents of teacher leadership explicit (Thomas & McRobbie, 1999). As such, methodologically speaking, metaphors were used "as lexical gap fillers for [understanding teacher leadership] events that are personal and difficult to describe" (Thomas & McRobbie, 1999, p. 669).

In the first half of an hour-long activity, each mathematics teacher leader was asked to write metaphors that they believed described their work of leading the learning of mathematics teachers. The activity was conducted in a relational and "relaxed, friendly manner" (Anderson & Thomas, 2014, p. 7) for the MTLs to feel free and encouraged to write metaphors that appropriately described their leadership experiences. The idea was to allow the MTLs the space

to reflect on actions, events, and situations that substantiated their work of facilitating teacher learning. Before writing the metaphors, teacher leaders were informed that the activity was not meant to gather one correct metaphor; rather, and more importantly, it intended to invite them to make sense of their work of leading the learning of their teacher colleagues. A guide that was used by participants to generate metaphors is attached as Appendix G.

In the second half of an hour-long activity, I asked each teacher leader to talk about the thinking around the metaphors they generated and the implications of those metaphors in relation to the leadership of teacher professional learning. Some teachers altered their initial metaphors when they realized that the initial metaphor did not appropriately describe their roles and actions as well as situations that were commonplace in their professional learning contexts. At another level, I identified metaphors that emerged while analyzing interview transcripts and the written vignettes. As such, metaphor work assisted in developing an understanding of leadership experiences of the MTLs as they work alongside primary school mathematics teachers.

Member checking.

Curtin and Fossey (2007) view member checking as a "way of finding out whether the data analysis is congruent with the participants' experiences" (p. 92). Merriam (2014) considers this practice of "[t]aking data and tentative interpretations back to the people from whom they were derived and asking if they are plausible" (p. 229) as member checking. Along these lines and the need to ensure the credibility of this study, I engaged in the process of providing participants with opportunities to review the collected research data and the preliminary translations and interpretations that were already made at that time of the research process (Merriam, 2014). As expected, such opportunities enabled participants to ascertain whether the research data translated and interpreted correctly and accurately carried the stories of experiences of leading teacher professional learning they shared during the research process. In the same way, I ethically encouraged the MTLs to feel free to criticize interpretations or ask for clarifications when they realized any contradictions, concerns or inconsistencies when the accounts did not fully portray the experiences they lived as leaders of teacher professional learning. Such situations gave participants opportunities to provide additional information related to their experiences of leading teacher professional learning.

Like other qualitative researchers, it was critical for me to conduct member checking because of my desire to ensure openness and transparency to the participants (Rasmussen, Ostergaard & Beckmann, 2006). I, therefore, conducted member checking as a measure of respecting MTLs as people with unique experiences that must be treated with honor. On another level, I performed member checking with each participant to increase rigor, soundness, and trustworthiness of the results of this research study (Machimana, 2017) and also to look for new information that enriched the interpretation of the results (Stake 2010). Member checking, nevertheless, helped me to rule out my misinterpretations of the experiences of MTLs related to their work of leading the professional learning of mathematics teachers (Merriam, 2014).

I paid attention to two aspects to ensure a productive member checking experience among participants. Regarding the first aspect, I carefully conducted member checking by not instilling MTLs "with feelings of disappointment, uncertainty, or embarrassment, or squelch the willingness … to continue [participate] in the study" (Carlson, 2010, p. 1103). During member checking, I did not give a participant a transcript nor did I share a story of experiences of another participant (Stake, 2010). The second dimension was equally helpful, I provided the MTLs with their research data immediately after transcription and my preliminary analysis. I was mindful that waiting until participants had any information from other data sources might not allow them to respond effectively to the research data and initial analysis (Stake, 2010). This strategy allowed participants to respond to the research data while some of them added new information to the transcripts.

Data analysis.

This research study explored the experiences of the MTLs in leading the professional learning of primary school mathematics teachers in rural and remote communities in Tanzania. To achieve the aim, this study wove data analysis with data collection. Such a practice, accordingly, made data analysis an ongoing process during and after data collection exercise. The idea of interweaving data collection with data analysis activities rested on the need to engage in tentative interpretations of the collected data as a way of "collecting new, often better, data" (Miles & Huberman, 1994, p. 50). I confidently consider the practice paramount for this

research study as I am mindful that, "[d]ata that has been analyzed while being collected are both parsimonious and illuminating" (Merriam, 2014, p. 170).

During the data collection process, I simultaneously engaged in transcribing the conversations into transcriptions verbatim to capture the "complete record of the collected data (Clark & Creswell, 2015, p. 357). The intent was to generate clearer insights and understanding from the data collected. At another level, in analyzing data for this research study, I used what Miles and Huberman (1994) called, "concurrent flows of activity: data reduction [and] data display" (p. 10). In the subsequent sections, I offer descriptions of these activities that fall within the umbrella of data analysis.

Data reduction. Miles and Huberman (1994) have defined data reduction as a "process of selecting, focusing, simplifying, abstracting, and transforming the data that appear in … transcriptions" (p. 10). They considered the activity to help a researcher in sorting, organizing, discarding, and sharpening collected information. In starting to analyze data inductively for this study, I carefully engaged in reading the transcripts to get a holistic sense with respect to the research question. Such an understanding and with the assistance of the data accounting sheet, I was successful in sorting out research data. On the transcripts, I wrote notes in the margins and memos to myself as reflective remarks, tentative emerging themes, and aspects that I needed to pursue further to fully capture the experiences of the MTLs about their work. Indeed, such aspects entailed my initial interpretation of the research data (Yin, 2014).

Data coding is one of the data analysis activities employed to "reduce and channel data into a smaller number of concepts that can be mentally encoded, stored, and readily retrieved" (Miles & Huberman, 1994, p. 69). As I employed a manual coding protocol, I generated a list of tentative themes with their corresponding color codes as informed by the research question, related literature, and from theoretical perspectives that guided this research project. Throughout the research process, I carefully kept the themes in a running list with different colors using Microsoft™ platform, changing them over time as new insights and ideas emerged from new information shared by the MTLs. For consistency and integrity purposes, I developed an operational description of each theme with color code "closest to the concept it is describing" (Miles & Huberman, 1994, p. 64) as some of them made explicit in Figure 4.2.

Theme	Theme description	Color Code
Collaboration	Working with mathematics teachers before, during, and after professional learning sessions with the goal of improving professional knowledge to improve practice.	Blue
Commitment	Efforts to engage in promoting professional growth during and after professional learning sessions.	Orange
Respective environment	A space where mathematics teachers are treated around ethical and moral principles as human beings, not objects of manipulation or any form of control.	Gray
Feelings	Emotional state or reactions of MTLs to a situation related to their engagement in facilitating the professional learning of their teacher-colleagues.	Green
Hopes/ Expectations	What MTLs expected would happen during their professional learning alongside mathematics teachers (e.g. increased teacher confidence, increased teacher knowledge, etc.).	Pink
Roles	What MTLs did before, during, and after professional learning sessions in their learning communities.	Purple
Outcomes	What MTLs consider having changed on themselves but also on mathematics teachers following their participation in the professional learning in the learning community.	Dark blue
Traditional professional learning	Teacher professional learning in which mathematics teachers are oriented to assume a passive role in the entire process of their learning.	Red
Challenges	Issues that MTLs and mathematics teachers encountered during their engagement in professional learning.	Yellow

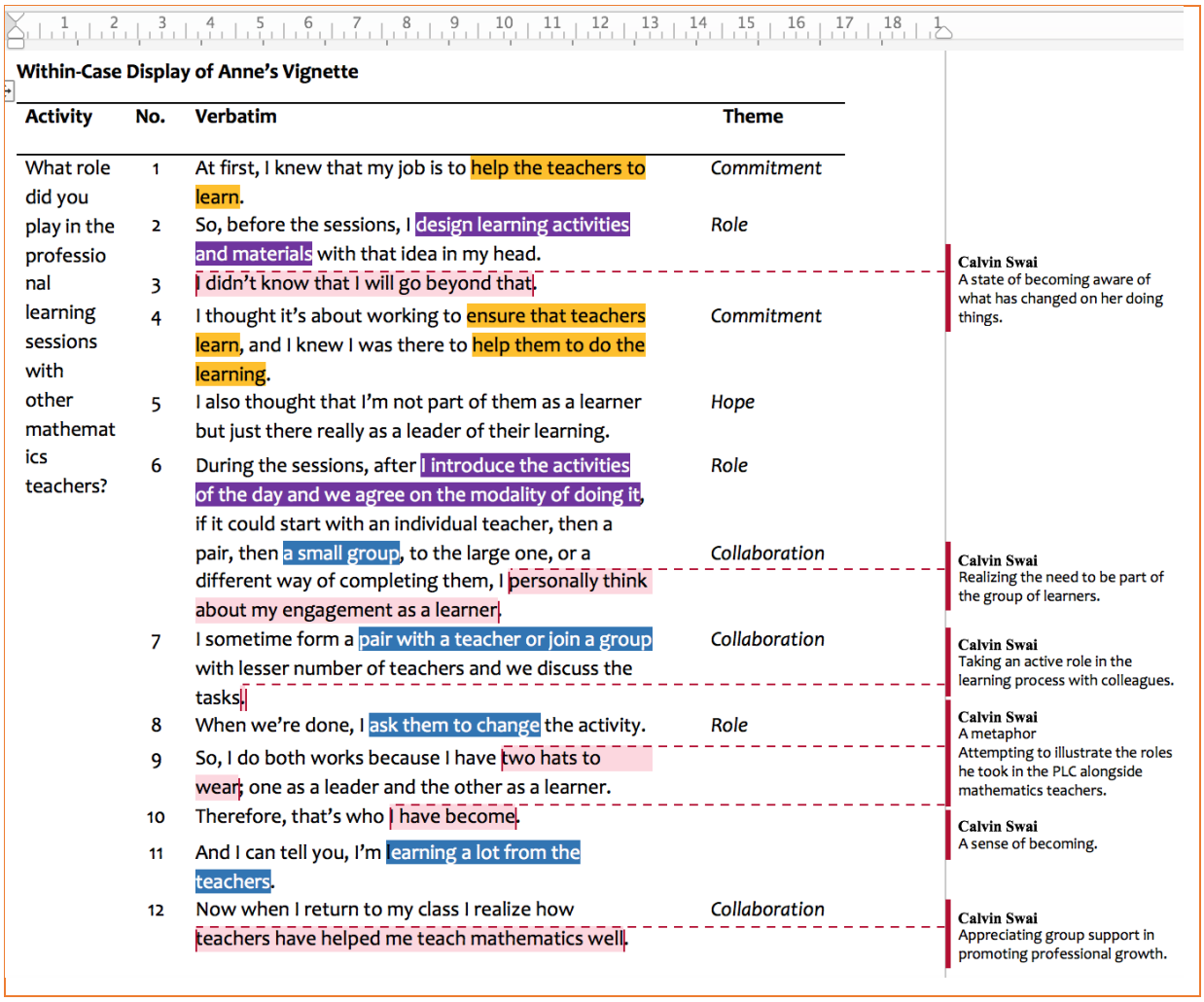
Figure 4.2. Abridged list of codes and themes

To identify themes that emerged in each case, I engaged in rereading transcripts of each case to identify themes connected to the research question of this study. Then, I colored chunks of phrases, sentences, and paragraphs of interview transcripts, vignettes and metaphors. Such an endeavor enabled me to classify and categorize data into groups, facilitating understanding of the collected data. The color codes, moreover, facilitated sorting research data into preliminary themes and categories that shared similar meanings with the descriptive information collected from each mathematics teacher leader. To complement the coding process and the need to have an in-depth analytic process, I made marginal remarks in interview transcripts and vignettes (see

Figure 4.3). Miles and Huberman (1994) have recommended such a pursuit, claiming that it helps "retaining mindfulness in coding" (p. 67).

Data display. Data display, as Miles and Huberman (1994) argue, is "an organized, compressed assembly of information that permits conclusion drawing and action" (p. 11). At the heart of this activity was arranging research data in a way that provoked further understanding of the data with respect to the research question of this study—What are the experiences of the MTLs in leading the professional learning of primary school mathematics teachers in Tanzania? Miles and Huberman (1994) suggest researchers display data in formats like text, matrix, chart, or diagram, depending on a researchers' choice and the nature of information. According to the National Science Foundation (2016), "[a]t the display stage, [important are] additional, higher order categories or themes that … emerge from the research data that go beyond those first discovered during the initial process of data reduction" (para. 16). As such, such a data analysis stage was substantial as it provided opportunities to enrich the categories and themes that I developed from the transcripts and the written vignettes. For validity purposes, this research study adopted within-case display and cross-case display (Miles & Huberman, 1994). In such an analytic process, as Patton (2005) advises, analysis started with each individual case, after that, I engaged in cross-case analysis with the goal of determining emerging themes across the cases studied.

Within-case data display. To carry out within-case analysis of the research data, I displayed the processed data of each case (mathematics teacher leader). To do that, I used a matrix to "know clearly what is going on and how things are proceeding … to explain coherently why things occur as they do" (Miles & Huberman, 1994, p. 90). Such a display helped me organize the research data into themes that emerged from research data collected from each mathematics teacher leader. The display helped me to make data more accessible, enabling me to make sense of what is happening in relation to the research question of the study (Miles & Huberman, 1994). In addition to illustrating the way I made notes in the margin, Figure 4.3 also represents a within-case display of Anne's vignette.



Within-Case Display of Anne's Vignette

Activity	No.	Verbatim	Theme
What role did you play in the professional learning sessions with other mathematics teachers?	1	At first, I knew that my job is to help the teachers to learn.	*Commitment*
	2	So, before the sessions, I design learning activities and materials with that idea in my head.	*Role*
	3	I didn't know that I will go beyond that.	
	4	I thought it's about working to ensure that teachers learn, and I knew I was there to help them to do the learning.	*Commitment*
	5	I also thought that I'm not part of them as a learner but just there really as a leader of their learning.	*Hope*
	6	During the sessions, after I introduce the activities of the day and we agree on the modality of doing it, if it could start with an individual teacher, then a pair, then a small group, to the large one, or a different way of completing them, I personally think about my engagement as a learner.	*Role* / *Collaboration*
	7	I sometime form a pair with a teacher or join a group with lesser number of teachers and we discuss the tasks.	*Collaboration*
	8	When we're done, I ask them to change the activity.	*Role*
	9	So, I do both works because I have two hats to wear; one as a leader and the other as a learner.	
	10	Therefore, that's who I have become.	
	11	And I can tell you, I'm learning a lot from the teachers.	
	12	Now when I return to my class I realize how teachers have helped me teach mathematics well.	*Collaboration*

Calvin Swai
A state of becoming aware of what has changed on her doing things.

Calvin Swai
Realizing the need to be part of the group of learners.

Calvin Swai
Taking an active role in the learning process with colleagues.

Calvin Swai
A metaphor
Attempting to illustrate the roles he took in the PLC alongside mathematics teachers.

Calvin Swai
A sense of becoming.

Calvin Swai
Appreciating group support in promoting professional growth.

Figure 4.3. Within-case display

Cross-case data display. In making sense of research data across the cases (mathematics teacher leaders), I displayed data using Miles and Huberman's (1994) "case-level display" (p. 179). The intent behind organizing research data in such a display was to sort and display data across the cases for me to see "what data looks like" (Miles & Huberman, 1994, p. 178) and what is happening around them. More importantly, the case-level display helped me to recognize the "themes that cut across cases" (Miles & Huberman, 1994, p. 175). With such a method of displaying research data, nonetheless, I paid closer attention to unique experiences characteristic to individual cases. The idea was to make sure that experiences that speak to a personal mathematics teacher leader are carefully attended to in informing how each of them experienced and perceived their teacher leadership work. A visual representation of case-level display of some of the research data shared by the MTLs' through vignettes is attached as Appendix H.

Conclusion drawing. The other activity that I carried out in relation to data analysis is conclusion drawing. This activity entails, as Miles and Huberman (1994) state, "a fleeting second thought crossing the analyst's mind … with a short excursion back to … [transcripts], or it may be thorough and elaborate, with length argumentation and review" (p. 11). In this study, I drew conclusions based on the meanings that emerged from the displayed research data. I also attended to those emerging meanings with respect to their implications to the question of this study—What are the experiences of the MTLs in leading the professional learning of primary school mathematics teachers in rural and remote communities in Tanzania? Considering that, I stepped back and reflected on what the analyzed data was informing in relation to the experiences of the MTLs in their work of leading the professional learning of their teacher colleagues.

Ethical Commitments

Research ethics have been variously defined by researchers within a qualitative research tradition. This research study regards research ethics as a "set of ethical principles that guide and govern the design and implementation of research … [and] distinguish between what is morally sound and what is unacceptable" (Wong & Nather, 2015, p. 149). The definition seems to draw attention to the centrality of having a research process that satisfies the line of inquiry, the researcher, and more importantly, the participants. With such a definition of research ethics, therefore, my primary concern was to attend to ethical principles in relation to the implementation of this research study. Such a stance is predicated on my understanding that "a 'good' qualitative study is one that is conducted in an ethical manner" (Merriam, 2002b). Equally, it merits noting that at the heart of this inquiry is my desire to conduct research with participants, not on participants (Clegg & Slife, 2009).

In carrying out this research study, I was mindful of a strong commitment required in maintaining principles and norms of conduct in working with research participants (Kitchener & Kitchener, 2009; Wellington, 2015). From the outset, I was conscious that "ethical decisions do not belong to a separate stage [such as recruiting participants and collecting, processing, analyzing and reporting research data] … but arise throughout the entire research process" (Kvale, 1996, p. 110). Consistent with Kvale's affirmation is the need to engage in making

ethical decisions before, during, and after entering the research locations to collect data. Essential to this commitment is to attend to the multiple layers of ethics that govern qualitative research and research as a whole. The layers include issues of informed consent, anonymity, participants' access to research information, respect for participants as human beings, freedom of participants, storage of information, and research relations (Burgess, 2005; Mertens & Ginsberg, 2009).

In advance of the commencement of research, I completed a *University of Alberta Research Ethics Board Graduate Student Application for Ethics Review*. In that application, I concisely described the study, the research locations, study objectives and design, research methods and procedures, but also offered an analysis of the benefits of this research study to the participants. Further, I explained the participants' recruitment process and commitments related to informed consent, data storage, retention, and disposal. Before entering research locations for data collection, on the other hand, I sought a research clearance (see Appendix I) from the Ministry of Education, Science, and Technology of Tanzania.

In the research locations, I paid close attention to ethical dimensions as a way of protecting research participants but also as a way of assuring a meaningful research process. Fidelity, one of the ethical dimensions, is crucial for this study because it is an aspect that determined my working relationship with participants (Kitchener & Kitchener, 2009). To maintain such a dimension, I was honest with participants throughout the research process but, also, I kept my promises in relation to what we collaboratively agreed to do during and after the research process. I endeavored to maintain this aspect, as Burnard (1991) has it, "attempts must be made to represent the thoughts and feelings of others in a systematics but honest way" (p. 465).

The second dimension is respect for persons who I call research participants (Kitchener & Kitchener, 2009). Indeed, I worked with participants while treating them with respect as autonomous human beings who have freedom of choice, judgments, and decisions (Brown, 2016). More importantly, I ensured that my interpretations of research data do not harm participants' personality nor undermine their views, opinions, perspectives, and their ways of being in their world. Now comes issues of confidentiality. I maintained confidentiality during and after the inquiry by omitting personal identifiers of the participants such as their names and the schools they were working at during the time of this inquiry. The purpose was to circumvent

a possibility for a reader of the research report of this study to identify participants and the information they shared during the research process. To achieve that, I used pseudonyms to identify the research participants, with the belief that they will not allow one to identify the participants.

The other dimension is related to issues of informed consent. Before seeking participants' consent, I ensured that the MTLs are "fully aware of all the important information about the [research study], including the risks, benefits, and procedure" (Wong & Nather, 2015, p. 156). For enabling the MTLs to understand the research study, as introduced in section 4.6.4, I used the Swahili language, the first language in Tanzania, to convey information about the study and what it specifically seeks to explore. The idea was to minimize ambiguity among participants regarding the purpose of the research study. Indeed, I asked the consent of the MTLs by requesting them to fill in the consent form to confirm their readiness to participate in the study. Transparently, I informed participants that their participation in the study is purely optional that they should not feel obliged to take part in the study. I also informed them that they have the freedom to withdraw from the study at any time up to one month after the data is collected (Lincoln, 2009).

During data collection and analysis stages, I ensured that the MTLs have access to research information already processed or yet to be processed. At another level, I shared research information with participants when needs for further clarification became pertinent while analyzing research data. On the other hand, with having research data from the participants comes the issue of storing them safely and privately. I ensured that the research data is secured in a protected cabinet in my residence, with electronic research data protected with a password and secured on the hard drives of my computer.

Limitations of the Study

In this section, I present the limitations of this study that relate to the number of participants and generalization of the findings. The number of MTLs engaged in the research process of this multisite case study was limited to those who voluntarily agreed to participate. I invited all eleven MTLs who were involved in MEP project to participate in this study but only eight agreed. I did not or would not influence or coerce teacher leaders to take part in this

research study. The intention was explicit—not to have participants who are "unfairly included [in] the research" (Yin, 2011, p. 46). With this quest, it was MTL's decision to whether or not participate in this study. As it turned out, the MTLs who agreed to take part in the study were entirely committed throughout the research process and beyond.

One more limitation is that the findings of this study may not be generalized to a population that was not studied. Even though I am aware that "each situation is unique, [and] not generalizable" (Given, 2008, p. 77), the findings may be generalized to other settings within and beyond Tanzania. That is the case as "each situation … is connected to and interacts with other situations" (Given, 2008, p. 77). Given that this study has provided rich and thick descriptions of the experiences of MTLs in leading the professional learning of mathematics teachers, other researchers can transfer the findings in different settings (Machimana, 2017).

Summary

The chapter focused on presenting the research approach and process that were pursued with the goal of understanding the experiences of the MTLs in leading the professional learning of primary school mathematics teachers in rural and remote communities in Tanzania. The methodological deliberations were carefully explained, to frame the research study. Then, the chapter described the participants of the study and the project in which the participants were recruited from. This was followed by a description of the nature of research site, attending to what it means to call a place rural and remote. In a detailed manner, the chapter also described the research process with the intent of elucidating what was done before, during, and after entering study locations. In offering a comprehensive explanation of the process I journeyed, the intent is to illuminate procedures endeavored, and events lived while working with the MTLs to listen to their stories of situating ongoing teacher professional learning in their districts. At the end of the chapter was a description of ethical issues that were justly maintained in protecting participants from any harm associated with their participation. The next introduces the eight MTLs who shared their experiences of leading the professional learning of mathematics teachers in rural and remote communities in Tanzania. It also describes local leadership notions that inform leadership practices within the MTLs' local communities.

Chapter 5

Introducing the Cases

Why Introductions?

Before introducing the cases, I would like to articulate the logic behind introductions and, more critically, their appeal to this study. For this research and consistent with the traditions of case study research, the cases are the eight MTLs who led the professional learning of primary school mathematics teachers working in rural and remote communities in Tanzania. The MTLs' introductions emerged from within-case analysis of open-ended questionnaires and interview transcripts and are presented to assist in making sense of the MTLs' experiences in engaging mathematics teachers in the process of deepening their professional growth (Miles and Huberman, 1994). Even though all the teacher leaders went through the same education system, which is centralized in nature, understanding individual teacher leaders and who they are is key given that no two of them are alike as to their desires, expectations, and impulses they felt on their journeys (Dewey, 1934).

In describing teaching and formal leadership experiences of each case (a mathematics teacher leader), the intent is to help develop insights about what the MTLs did and endured as mathematics teachers but also as formal leaders in their schools. The insights, in turn, are helpful in coming to understand how such experiences inform the experiences of leading the professional learning of mathematics teachers. This engagement is shaped by the awareness that "[f]ailure to take … an experience into account so as to judge and direct it on the ground of what it is moving into means disloyalty to the principle of experience itself" (Dewey, 1934, p. 38). It is equally evoked by the understanding that "no experience lives and dies to itself" … [but] every experience lives on" (p. 27). As such, there can be no greater oversight for this study than not to engage in understanding such experiences, which, undoubtedly, play a reinforcing role on both the emergence and nature of MTLs' experiences of leading teacher professional learning in their contexts.

Again, the motivation behind offering contextual scans of professional learning sessions reflects Knox's (2016) substantiation that learning contexts shape the experiences of those who

lead teacher professional learning as it does to those who engage in learning. As it turns out, the scans assist in developing a fuller understanding of the experiences of MTLs in leading the professional learning of their colleagues

Coming to the cases and their profiles.

As advised by Patton (2005), this section introduces Anne, Gabby, Pili, Kenny, Thea, Mazengo, Senzini, and Isile. The introductions focus on their educational backgrounds and teaching and leadership experiences. The contexts of the professional learning are presented, to illuminate the sizes of their learning sessions and gender composition. No specific criterion was used to order the cases.

Case Anne. Born and raised in an agrarian community in northern Tanzania, Anne completed both primary and secondary education in rural public schools. In advanced secondary school, she pursued the physics, geography, and mathematics subject combination. She recalled being discouraged by most of the community members not to pursue mathematics because the subject was considered difficult and fit for boys. Anne, nonetheless, was not dismayed with the sentiments, remembering to continue to learn the subject because of her passion of becoming a mathematician. She, afterward, joined a public teacher college in a nearby region for her diploma in education. On graduation, she was posted to a newly established primary school to work as a mathematics teacher. After teaching for a year, Anne left the school to pursue a Bachelor degree in Education in a privately-owned university in eastern Tanzania.

Anne had taught primary mathematics for nine years during the time of this study. Of the years, she spent one year in the southern part of Tanzania and the rest of the years in central Tanzania, where she worked as a mathematics teacher in both small and large public schools. After teaching primary school mathematics for two years, Anne was asked by the Ministry of Education, Science, and Technology (MoEST) to teach mathematics in a nearby ward secondary school because of the acute shortage of mathematics teachers in the school. One year later, MoEST asked her to return to her primary school. Given such experiences, Anne reported being grateful for the opportunity to teach in both kinds of schools, appreciating her interactions with the students, teachers, and parents in becoming confident teaching mathematics.

Besides teaching, Anne had worked as an academic mistress[6] for about two academic years. She remembered helping the school administration with issues related to planning, coordinating, and monitoring teaching and student learning in all standards. After six years of teaching and two years of overseeing academic matters in the school, Anne was promoted to a head teacher position. At the end of her second year as a head teacher, she was promoted to a ward education officer (WEO) position, a position she had during the time of this research. With such a formal leadership position, Anne reported interacting with head teachers and teachers from all the schools located in the ward.

Again, during this study, Anne was serving as a teacher leader with the role of leading the professional learning of mathematics teachers in her district. She reported working with 64 teachers (31 males; 33 females) to advance their professional knowledge and skills. For Anne, the participation of female teachers was encouraging given their low attendance in other professional learning initiatives implemented in the district. She recounted feeling pleased, saying that she feels empowered to see that her female colleagues are participating in the process of making one another successful in their mathematics classrooms.

Case Gabby. Gabby completed his primary education in the late 1970s in a government-owned rural school. He recalled being accelerated once to the next standard because of his performance in several subjects, including mathematics. Following his Primary School Leaving Examination (PSLE) results, Gabby was selected to join a public boarding secondary school in another region, leaving his home village for four years of his ordinary secondary education. On graduation, he was enrolled in a two-year grade A teaching program to become a primary school teacher. At the time of this study, he was in his 20th year of his teaching career. Of the years, Gabby taught in three primary schools located in one district in the eastern Tanzania.

Gabby reported enjoying teaching primary school mathematics despite claims, from his colleagues that teaching the subject is a demanding endeavor. He started his teaching career not as a mathematics teacher, instead, as a science and *siasa* (politics) teacher. That happened as his first school had many mathematics teachers to teach the subject in all standards. Gabby

[6] In the Tanzanian education context, an academic mistress is a female teacher who is responsible for overseeing academic matters in a school. One of her responsibilities is to work alongside teachers to prepare an academic calendar for a school.

remembered being pleased when asked by the school administration to teach mathematics in standard IV after the mathematics teacher who was teaching the class left the school. It is at that moment, he started teaching mathematics full time, and at the time of this study, he was in his 15th year of teaching mathematics.

Other than teaching, Gabby reported using his out-of-school time, mostly during weekends, to engage in farming activities in his small farm. He typically grows rice because of the watery nature of the land of his village. He considered farming to have connected him to most of the parents of his students who he teaches in the school. He believes the experiences of teaching and living in a rural village and his connection to parents to continue to shape his love of working in rural and remote communities. During this study, Gabby was working as a school treasurer, responsible for overseeing school income and expenditures. He was also leading a group of 66 mathematics teachers (32 males; 34 females), working to influence them to improve their professional knowledge, so to foster student mathematics learning. Gabby considered such a gender representation remarkable given gender imbalance in many aspects in the country. He felt content with the attendance of female teachers, believing that it could help motivate other female teachers to develop an interest in teaching the subject.

Case Pili. After completing primary education in the late 1960s, Pili joined a public secondary school for her ordinary secondary education as she had already made up her mind to become a primary school teacher. As such, she joined a teacher college to pursue a grade C teaching program. On her graduation, Pili was awarded a grade C teaching certificate, marking her entry into the teaching profession. After teaching for many years, she returned to a teacher college to pursue a grade A teaching program as an attempt to upgrade her teaching qualifications after her grade C teaching certificate was no longer a minimum teaching qualification for a primary school teacher in the country. Pili appreciated the opportunity to improve her teaching qualification, considering it to have helped her retain her work.

Pili had been a primary school teacher for almost 28 years at the time of this study. In such a teaching journey, she had the opportunity to work with children in many primary schools located in both urban and rural communities in several districts in central Tanzania. Since joining the teaching profession, she had mostly taught mathematics with the experience of teaching other

subjects when the need arose. Pili, who was residing in one of the teacher houses during the time of this research, relished the opportunity to teach mathematics to what she called, "an exam standard"—standard VII, which required her to use the maximum of her class time and after school time to work with the children to help them develop a deeper understanding of mathematics.

During the time of this study, Pili was also working as an academic mistress in what she called, "a large school," (about 800 students from pre-primary through standard VII). With such a formal leadership position, she reported working with other teachers in finding ways for supporting meaningful student learning in the school. Pili claimed to have not accepted any leadership positions such as deputy head teacher and head teacher other than academic mistress because she wanted to optimize her time to entirely work to help children learn mathematics. Such a commitment, on the other hand, had motivated her to accept the invitation to become a teacher leader, leading the professional learning of 54 mathematics teachers (25 males; 29 females). She was delighted that most of the teachers were females because they have been denied opportunities to foster their professional growth for quite a long time.

Case Kenny. Kenny completed both primary and secondary education in public schools in northern Tanzania. He recalled doing well in chemistry, physics, and mathematics subjects in his ordinary secondary education. As such, he reported receiving several prizes after registering excellent performances in school wide and national examinations. On completion of ordinary secondary school, Kenny joined a teacher college to pursue a two-year grade A teaching program, paving the way for him to become a primary school teacher. He remembered his two years in the college as inspiring his love for working with young children of all backgrounds, tribes and walks of life. On attainment of his grade A teaching certificate, Kenny was posted by the government to an urban primary school to start his teaching career.

Kenny had worked as a primary school teacher for 20 years at the time of this study. He has taught in two primary schools in a district in eastern Tanzania. He taught in the first school, near the district headquarters, for 13 years. Kenny was then transferred to a rural school, located in a remote hilly part of the district, where he had been teaching for seven years. In the early years of his teaching career, he taught standards IV and VII mathematics. He remembered being

asked by the school administration to teach the standards as an attempt to address the issue of the poor performance of students in the PSLE in the past decade. After teaching those standards for many years, he requested permission from the school administration to teach mathematics in standards I and II classes. His request was motivated by his desire to help young students in those lower standards to effectively learn mathematics.

Kenny had served in several formal leadership positions since joining the teaching profession. In the early years of his teaching journey, he worked as an academic master responsible for overseeing undertakings related to teaching and learning in the school. Upon arrival at his second school, Kenny was appointed as a deputy head teacher, with the responsibility of assisting the head teacher in managing the school to achieve its mission and vision. After teaching mathematics for many years, Kenny was invited to attend a professional program designed to support mathematics teachers to become leaders of the professional learning of the other teachers. After becoming a mathematics teacher leader, he reported working with 40 mathematics teachers (17 males; 23 females) from around the district.

Case Thea. Thea attended a public primary school located in her home village during the early 1990s. Because of her excellent performance in the PSLE, she was selected to join a day-secondary school for her ordinary secondary education. She recalled performing well in science and mathematics, a situation that motivated her to invest more efforts in learning the subjects. Following convocation, Thea joined a teacher college for her grade A teacher education program. The decision to become a teacher was highly inspired by her desire to contribute towards addressing the problem of a shortage of teachers, especially science and mathematics teachers, in rural and remote areas.

At the time of this study, Thea had six years in the teaching profession. She had spent half of the years working in an urban school and half in a rural school close to her home village. The second school, where she was working at the time of this research, had about 900 students with only seven classroom teachers, teaching standards I through VII. With such a low number of teachers, however, Thea reported not feeling discouraged with the heavy workload, but rather, motivated to help students find mathematics learning meaningful to their lives in the rural area.

As a mathematics teacher, Thea reported spending her first four years teaching standards IV and VII classes. Then, she was asked by the school administration to teach mathematics in standards I and II classes, a situation that made her work with more than 120 children in each class. At the heart of the decision was the school administration's effort to fulfill its commitment to helping children in lower standards to build strong mathematics foundations for their effective future learning of the subject. Thea, however, remembered receiving invitations from other mathematics teachers of her school to co-teach a few mathematical concepts in standard VII, to prepare and help children succeed in their PSLE.

Since joining the teaching profession, Thea had served two formal leadership positions in her two primary schools. In the first school, she served as an academic mistress for almost two years and a half, working with teachers on matters related to improving student learning. She treasured the position as it allowed her to work as a bridge between teachers and school quality assurers in their pursuit of providing students with meaningful learning experiences. In the second school, the one where she was working at the time of this study, Thea reported working as a supplies teacher. She was also working as a mathematics teacher leader, leading the professional learning of 42 mathematics teachers (22 females; 20 males). Thea, however, did not work with any teacher from her school.

Case Mazengo. Mazengo, with 36 years of teaching, was the most experienced mathematics teacher who took part in this study. He recalled his love of mathematics as starting while he was in standard IV after doing well in school wide mathematics examinations to qualify for admission into standard V. Following his performance in the PSLE, he joined a teacher college to pursue a two-year grade C teaching program. By pursuing such a teacher education route, he did not attend secondary school for his ordinary secondary education, rather, he was enrolled in a program to automatically become a primary school teacher with a grade C teaching qualification. On graduation, Mazengo was posted to a primary school to start his teaching career. However, following the Government of Tanzania's announcement that it was phasing out grade C teaching qualification in the country, he was compelled to join a teacher college to upgrade his teaching qualifications to grade A teaching qualification.

Of his years in the teaching profession, Mazengo taught in 16 primary schools in four districts in two regions. Of the schools, many were in rural and remote communities in central and southern Tanzania. He appreciated the opportunity to work in many schools with different contextual realities, describing becoming more aware of mathematics teaching and learning environments in various localities in the region. Throughout his teaching career, he was interested in teaching mathematics in higher standards, a passion that lead him to teach standard VII mathematics for the last 12 years of his career.

Besides teaching, Mazengo assumed several formal leadership positions in the schools where he worked. The positions included academic master, deputy head teacher for 3 years, and head teacher in 5 different primary schools over 20 years. Mazengo was also selected a secretary of *Chama Cha Walimu* (Teachers' Trade Union) at a district level for many years with the role of safeguarding the teaching profession and the welfare of teachers in the district chapter. During the research process of this study, Mazengo was working as a leader of the professional learning of mathematics teachers in the district. He attributed his invitation to become a teacher leader to his experience of working with many teachers and in many primary schools where he had been privileged to work. Mazengo's learning sessions had 58 teachers (31 males; 27 females). He appreciated the commitment of mathematics teachers in his district, recalling no incidence or situation in which they became uninterested in engaging in their professional learning.

Case Senzini. Senzini recalled doing well in many subjects during his primary education in a school located in his rural village. On completion, he joined a teacher college for his grade C teaching qualification to qualify for a primary school teaching position. Senzini was compelled to return to a teacher college to upgrade his teaching credentials. After spending a year in a college, he was awarded a grade A teaching certificate to continue to work as a primary school teacher. Senzini had been in the teaching profession for approximately 31 years at the time of this research. He had spent all the years of his career in one district in central Tanzania, working in two primary schools. Senzini spent 19 years teaching in the first school; 7 years working as a ward education officer; and has been in his second school for approximately 5 years. While the first school was relatively small with around 400 children with standards I through VII, the second school, the one he was working in during the time of this research, had about 1100 children from Kindergarten through standard VII.

For almost 20 years, Senzini has taught standard VI and VII primary mathematics. However, he was confident about the possibility of teaching lower classes (standard I to III) before his retirement. Senzini believed that teaching a lower standard could be an opportunity for him to engage students in effective mathematics learning experiences since he knows what it means and takes to learn higher standard mathematics. As a teacher for both standards VI and VII classes, Senzini recalled his joy of seeing many of his students perform well in their PSLE and join secondary school inside and outside the district. Along these lines, he articulated his school ranked high in the district because of the outstanding performance of students in national examinations.

Alongside teaching, Senzini had served formal leadership positions in the two schools he taught. He once worked as an academic master and head teacher in his first school before being appointed to act as a ward education officer (WEO) for seven years. As a WEO, Senzini interacted with many teachers from schools located in his ward, working together to put in place strategies for enhancing effective student learning across subjects and schools. At the end of his seventh year as a WEO, he decided to return to his previous school to continue to teach standards VI and VII mathematics. Senzini said that the decision to return to teaching was motivated by his commitment to helping students become successful in learning mathematics.

Beyond teaching students and serving different formal leadership positions in schools and at the ward, Senzini was leading a professional community of 38 mathematics teachers (20 females; 18 males). Most of them were working with children whose parents and guardians were livestock and beekeepers. Senzini considered the size of his sessions to allow interactions and collaborations among mathematics teachers while engaging in discussing ideas and sharing thoughts about how they could successfully teach the subject.

Case Isile. Isile attended his primary education in his home village in one of the coastal regions of Tanzania. On completion, he was selected to join a secondary school for his ordinary secondary education. It is during this time when he realized his passion for poetry, becoming highly motivated to write poetry and performing arts inside and outside classrooms. On graduation, he decided to follow the footsteps of his father by joining a teacher college to pursue

a grade A teaching program. Isile completed his studies and was awarded a grade A teaching qualification, a license for him to teach primary school children.

Isile had taught primary school children for almost eight years at the time of this study. He had spent all the years working in one school located in an isolated area about six kilometers from his local community. As such, Isile decided to buy a motorcycle (commonly known in Tanzania as *bodaboda*) to facilitate his movements to and from the school. In the school, he was teaching standard VII mathematics, helping children learn mathematics and become efficacious about their learning. To actualize such a desire, he reported integrating poems into his teaching for students to develop interests in learning mathematics but also to make sense of the school mathematics they were learning. As such, he reported providing his students with opportunities to write poems that communicated mathematical ideas they were learning. He pondered poetry to have helped his students develop a passion for learning the subject.

Apart from teaching, Isile has served in various formal leadership positions in his school. He started his leadership working as an academic master for about three years. One of his achievements in serving the position was the establishment of a school library that featured different teaching and learning resources and materials locally made by teachers alongside their students. During the time of this research, Isile was in his fourth year working as a deputy head-teacher. He was also working as a mathematics teacher leader, leading the professional learning of 38 mathematics teachers (19 females; 19 males). He recalled enjoying having equal numbers of female and male teachers, saying that such a situation allowed teachers the space to learn from the experiences of one another. He recounted a moment in which one female teacher fell down when the learning sessions were in-progress. As he reported, such an incidence led them to suspend the sessions in order for them to attend to their colleague with first aid before taking her to a nearby public health center for further medication. He considered the incidence to have helped the MTLs to develop a sense of care for oneself and others but also to be informed of the power of teamwork while working for a shared goal of developing capacities for teaching the subject.

Sense-making.

From the profiles, it is apparent that this study gathered the experiences of the MTLs whose educational journeys all started in primary schools located in rural and remote communities. Within such contexts, most of them reported enjoying learning mathematics in their primary and secondary education but also in doing well in their national examinations, including the PSLE. One common characteristic to nearly all the MTLs is that they worked in rural and remote schools, with a few of them having the opportunity to work in schools located in both rural and urban areas. Such observations highlight the possibilities for the experiences of the MTLs in leading teacher professional learning being highly shaped by their experiences of growing up, living, and working in rural and remote areas.

The MTLs reported holding grade A teaching qualifications they earned through two different routes. On the first route, most of them (Anne, Gabby, Kenny, Thea, and Isile) completed ordinary secondary education and joined a teacher college for their grade A teaching qualification. On the second route, Pili, Mazengo, and Senzini obtained their grade A qualifications after joining teacher college to upgrade their teaching qualifications from grade C qualification. The MTLs who journeyed the second route had not attended secondary school for their ordinary secondary education. The second path, as described in Appendix J, was in place at the time when schools needed many teachers to cope with the increased enrollment of students in primary schools. Such a situation had compelled teacher colleges to enroll primary school leavers to become teachers with grade C teaching qualifications. Despite the nature of the routes they navigated, all the MTLs registered their love of becoming teachers and their passion for teaching mathematics in primary schools.

One more observation evident in the introductions is the involvement of most of the MTLs who had spent many years working as primary school mathematics teachers, a situation which, practically speaking, qualifies them to be considered experienced teachers. Perhaps the most striking observations come from Mazengo who reported working as a primary school teacher for about 36 years in 16 different schools and four districts. It is interesting that all the MTLs assumed formal leadership positions in and beyond their schools since joining the teaching profession. As such, they had experiences, which fall into the first wave of teacher leadership

since the positions are entirely bureaucratic in nature and far from what is happening in the classroom as teaching and learning mathematics is concerned (Pounder, 2006).

The MTLs, however, leapt to the fourth wave of teacher leadership (Hargreaves and Shirley, 2009) as they reported engaging in leading professional learning of varying numbers of mathematics teachers with the intent of promoting their professional growth, thereby to improve practice in classrooms. While Pili, Mazengo, Anne, and Gabby led sessions with large numbers of teachers, others (Kenny and Thea) led mid-sized, at the same time as Isile and Senzini led smaller-sized groups. Not so long ago, consistently, Stoll and Louis' (2007) study has found those teacher leaders who lead small and mid-sized sessions to experience conditions that have the potential to influence mathematics teachers to interact with each other and remain interacting throughout their learning, unlike what could happen in large-sized sessions.

Attending to Local Leadership Landscapes

Even though this study focuses on the experiences of leading the professional learning of mathematics teachers, I find the need to describe what the MTLs understand as notions of leadership of their local communities. The notions are not necessarily those of formal leadership as instituted and maintained by political and administrative systems of the country, but those of an informal nature that determine the leadership of a local community. For this study, a local community refers to a small or large social unit of people who are closely related, sharing the same traditions, values, and beliefs with a "hierarchy of duties, responsibilities, and loyalties" (Silk, 1999, p. 6).

The commitment to attending to local leadership landscapes is reinforced by the need to pay close attention to "what is already experienced into a fuller and richer and more organized form" (Dewey, 1938, p. 74). On one sense, the decision is provoked by Dewey's (1938) advice to take into consideration the totality of human experience. The input is grounded on the understanding that experience tends to rise to what Dewey (1938) called, habit—defining it as a "more or less fixed way of doing things" (p. 35). As such, the MTLs might have developed habits of leadership out of experiencing leadership of their local communities. Consistent with this study, in the other sense, is the understanding that human beings cannot be easily separated from their practices, traditions, values, customs, and beliefs that they embrace in their local

communities nor do they quickly forget what is traditionally honored in their places. Attending to the local leadership landscapes, therefore, is a deliberate endeavor for not treating the MTLs as mere physical objects which can be separated from what has made them who they are and what they have lived in their lifetime.

Such awareness resonates with Lieberman and Friedrich's (2010) assertion that "widely held societal and cultural definitions shape how we see ourselves and our place in the world" (p. 8). Connected to that and to the question of studying local leadership notions is their conclusion that "how individuals see themselves shapes their ability to participate in social activities including work [and] community commitments" (p. 8). It is, therefore, critical for this research study to describe the local leadership landscape to make sense of what Lieberman and Friedrich (2010) regarded as notions that are understood to shape the process of putting in place and practicing leadership in local communities. The embedded understanding of the notions will eventually assist in developing a fuller sense of their connections to the MTLs' leadership of the professional learning of mathematics teachers in their respective districts. It is in that sense I am convinced that the more we understand the leadership notions eminent in each local community of the MTLs, the more we come to make sense of their experiences of leading the professional learning of their fellow mathematics teachers. As such, the succeeding section highlights the notions that shaped and still shape the local leadership in each community of the teacher leaders.

Local leadership notions.

The referential notions, which are unique to eight MTLs' local communities, include leadership by inheritance (Anne), leadership by fame (Gabby), leadership by shrewdness (Pili), leadership by uniting (Kenny), leadership by heroism (Thea), leadership by age (Mazengo), leadership by wealth (Senzini), and leadership by prudency (Isile). Methodologically speaking, the notions emerged from within-case analysis of open-ended questionnaires and interview transcripts as each mathematics teacher leader were asked to respond to a question that asked them to elucidate notions that are embodied in their local communities while engaging in the process of obtaining leaders to lead their communities. In the next sections, I describe each notion with a keen focus on their influence on the MTLs' leadership of the professional learning of mathematics teachers in their respective districts.

Leadership by inheritance. Anne pondered awhile over the process her local community pursues to obtain a community member to become a local leader. She pointed out that one becomes a leader of their local community by inheriting leadership responsibilities from the outgoing leader. As she recounted, such a tradition materializes in the advent of incidences such as the death of a leader, resignation or removal from the position when concerns over issues related to inefficiency and misconducts arise from among community members.

In such a community, however, to be a community member is one thing and to inherit community leadership is quite another. As she described, for a community member to inherit leadership responsibilities, she or he must belong to the clan that has been traditionally identified and honored to provide people to assume the responsibility of leading the community. Anne alluded to her ancestors for choosing the clan for executing such a traditional obligation. With such a local, celebrated arrangement, practically speaking, leadership, as an aspect of the local community, is confined to a group of people who belong to what Anne branded, as a "chosen clan." To belong to the clan, however, is not enough for a person to automatically inherit the leadership in Anne's local community. As she expanded:

> The members are really aware of the types of people who can succeed in that position. Those first-born men are the one to become leaders. That's how we do things here. All our leaders are men; no woman had a chance to become a leader in our community. I can say that we've been doing this for so many years now. We found our parents doing the way we do, and we hope that our kids will do the same.

Anne's description offers illuminative evidence that gender is one more criterion for excluding some members of the clan from being leaders of their local community. From her realistic sense, the experience is profoundly negative as it plainly distances her and other women from possibilities of assuming leadership roles in the community to contribute towards its existence and development. Perhaps a revealing issue is not only about Anne's distressing feelings regarding the practice but more about how such feelings shaped and continues to shape her leadership of the professional learning of mathematics teachers.

> When I joined teaching, and was chosen to become an academic mistress, as my first leadership appointment in the school, I was a bit nervous. I considered myself not a leader

> because I'm a woman. But, after that, I perceived myself a leader. And I think even my community members considered me not a leader. But I worked hard to show that I can lead. So, as a teacher leader, I work to lead to show them that women can do the job. I interact well with both female and male teachers. I think they all like my job. That gives me more energy to continue to do the job. I always encourage women to show that we can lead as well.

The statement reveals a situation in which some MTLs find themselves in as they try to cross over the historical boundaries that define leadership in their local communities. As a case in hand, such a dominant leadership notion forced Anne to perceive herself not a leader as she stepped into formal leadership in her first school even becoming compelled to negotiate her position during her early days of teacher leadership. Even more, the experiences of her community leadership made her experience a challenging start of her role of leading teacher professional learning. As such, she decided to facilitate teacher learning by showcasing her abilities and qualities of working as a mathematics teacher leader.

Not so long ago, Lieberman and Friedrich (2010) highlighted the tension that faces teacher leaders who have recently stepped into teacher leadership. They assert that teachers encounter a challenge of understanding their new identity as leaders of teacher learning. Furthermore, these teacher leadership scholars consider such a situation to happen since teacher leaders have been immersed in community notions that influence their sense of working as leaders of teacher learning. They further made it clear that "individuals' identities and sense of ability to act do not come from within but are shaped by their use of and response to cultural norms" (p. 9).

Leadership by fame. Unique to Gabby's local community is a custom of orienting leadership around the notion of fame or popularity of a community member. The community engages elders through what he described as *baraza* (council) to choose one popular community member to assume leadership responsibilities of the local community. As he elucidated:

> In my community, the members take the issue very seriously. Basically, the process of choosing a leader is initiated by elders who appoint one person for the job. They develop, of course, something like a list of famous people in our community. They then narrow the

list and get one person for it. As members of the community, our work is to agree to the decision as approved by our elders.

It is apparent that not all members are involved in the initial process of identifying candidates who are deemed potential for such a leadership position. Instead, at the core of the preliminary process are elders who determine the means and ends of the journey of situating local leadership. Apparently, community members trust elders and believe that they are the people capable of making important decisions during the process of sorting out potential members to serve the community. He applauded the elders for what they have done for the community, pointing out that they deserve such a role because they have demonstrated the ability to identify suitable community members for the position.

The more striking observation is not just who participates in the process of choosing a community leader but more about who can be elected to become a leader in that process. Gabby described that the process is grounded on the need to have a leader who is famous among community members. For this community, as Gabby expanded, members who can be considered popular include well-known traditional healers and retired officers such as teachers, clinicians, nurses, and police officers. The essence of choosing a famous community member, as he added, rests on community members' desire of having local leadership, which is consistently celebrated by all in the community.

Being immersed in such leadership practices, Gabby reported leading the professional learning of mathematics teachers in ways that marginally mirrored what is embraced in his local community. He recalled engaging in leadership work while paying attention to his desire of becoming famous among mathematics teachers who attended his learning sessions during his early days as a teacher leader. For Gabby, the work of leading the learning of mathematics teachers is more about being recognized to have significant differences from those whom they worked alongside during the sessions.

Leadership by shrewdness (hekima). Leadership by shrewdness is a notion unique to Pili's local community. She affirmed that her community, which is dominated by many livestock keepers, is led by a group of leaders who are locally elected to serve their community. As she explained:

> Like other members of our community, I have been involved in the process of electing people to the positions. That's the common thing for everyone here. We elect men and women to become leaders. So, there is no gender discrimination when it comes to issues of leadership. The important thing, though, is to elect someone who could be able to lead. Not just because he or she is of a particular gender, she or he should be elected!

Two aspects are quite characteristic of this community regarding who chooses a leader but also who can become a community leader. On the first issue, community members engage in the entire process of electing a group of leaders, unlike other communities in which the process is reserved for a particular group of community people. As such, the collective determines the leadership of the community and not otherwise. The second aspect speaks to the issue of inclusion of all genders in the process of assuming the leadership of the local community. As she said, this is the case as the elections are meant to have leaders of both genders since any community member, whether a male or female, has the potential to assume local leadership.

In this community, however, not every member can be elected a local leader. The community, as Pili pointed out, demands aspirants to demonstrate the capacity to make sound judgments and shrewdly enact the same with the focus of animating the lives of all members of the community. With an emphasis on practical judgment as a nuance of shrewdness, as she said, the essence is to have community leadership, which respect community members by treating them with senses of humanity and diligence regardless of their age, gender, and background.

With such a leadership notion comes its influence on Pili's leadership of the professional learning of mathematics teachers in the district. She reported leading teacher learning while paying attention to making sound judgements that are meant to help teachers to effectively foster their professional growth. As a mathematics teacher leader immersed in a leadership landscape that emphasizes shrewdness, Pili recalled engaging in carefully thinking before making any judgment. She intended to value what mathematics teachers know, can do, and want to be able to do in their mathematics classrooms as a result of their professional learning sessions.

Leadership by uniting. Leadership by uniting emerged as a notion that determines leadership in Kenny's local community. This is the community of his first school, where he

started his teaching career and to which he declared to belong. As he described, the community provides equal opportunities for all community members to assume leadership responsibilities.

> In that community, which I think I know best, there is a local leadership, which is different from the government one. One member is chosen to lead others. But there is one thing he or she should be able to do for her or him to become a leader. And that is to unite us, make us one, make us come together in good and bad times. As you know unity is a strength, disunity is a weakness. So, for the community members, it's all about building a united community. The members do not want some to make our community weak, rather, be able to make it strong because of the unity of its members.

The narrative shows the most critical leadership attribute a community member should possess for him/her to become a leader in Kenny's local community. For this community, a leader should be able to demonstrate the capacity to unite the community members, embracing and implementing the idea of togetherness within the community. As he said, to identify such a leadership attribute, community members are continuously urged to be mindful of the experiences of all those seeking the leadership of the community. As a mathematics teacher leader, Kenny reported embracing such a leadership notion in his leadership work to unite mathematics teachers but also to make them feel connected to each other during and after their learning sessions. He expanded further that:

> I think, my primary role as a leader of teachers is to unite them to become colleagues who collegially work to support the development of each other. This is crucial for teacher learning. I always ask them to be connected and work as friends, not strangers.

Kenny's act of embracing his leadership notion in his work of leading teacher professional learning had the potential to create an environment in which mathematics teachers realized the opportunity to learn from the experiences of each other. Such a situation reflects Hargreaves and Fullan's (2012) social capital and what it is expected to bring in a professional learning context. The capital which speaks about "how the quantity and quality of interactions and social relationships among people [including mathematics teachers] affects their access to knowledge and information" (p. 90). It is evident that Kenny's leadership encouraged collective learning among mathematics teachers, bringing them together to share experiences as they work to

enhance their professional growth. By promoting such a learning practice, Robinson (2017) would say that Kenny knew beforehand that the "synergy of efforts [would], unequivocally and decisively, outlast, overcome, and transform the greatest challenges into the greatest opportunities" (p. 27).

Leadership by heroism. Leadership by heroism is a notion that characterizes leadership in Thea's local community. During an interview, she was informative that her community obtains its leaders through elections whereby members choose one person to assume responsibilities of leading the community.

> The thing is not all members engage in local elections in our small community. The elders are the ones taking care of the elections. We don't really do it in a specific time interval but only when the leader dies, or we remove him or her from the leadership. So, any member can be elected to be a leader as we found that the incumbent is not delivering to our expectation.

What became an interesting thread in Thea's description is the involvement of both male and female community members in assuming the leadership of the local community. As she described, women in her local community are considered potential leaders of their local community as they can lead like their counterpart. They are also considered capable of leading their community because they know the community and its members considering that they spend much of their time within the community, taking care of their families when men go around, even far away to look for areas where they can feed their livestock.

As Thea said, the number one leadership attribute that community members identify from those aspiring to become local leaders is heroism. In one way, as she recounted, the attribute speaks to the need for having a community leader who is capable of protecting the welfare of each member of the community. In another way, the community members demand a leader capable of situating leadership that can safeguard the community and what belongs to it but also that which can take care of the traditions and customs of the community. As Thea expanded further:

> A leader must be courageous, brave, and strong enough to protect people and what is there, including land and livestock that community members possess. He or she must be an individual who has demonstrated nuances of heroism and other communities around must know that. I know other communities do consider wealth as an advantage, but that's not the issue there. Members want someone who is a hero who is concerned with the need to protect members and what they possess.

The storyline is quite illuminating, speaking to what Thea's community prioritizes as important to members while choosing a person to become a local leader. With such a leadership practice comes its influence on the leadership of the professional learning of mathematics teachers in the district. As she explained:

> I've always been working to serve my fellow math teachers. I have the feeling that this job is about making sure that the teachers learn what they need to learn for students to enjoy their math lessons. I think my feeling is in harmony with what our work is all about. I always want them to be in a good position to help our kids in schools. My big role was just to help them do what could help them to teach mathematics effectively.

From the description, it is more evident that Thea appropriated local leadership notions to her professional learning sessions she was leading. She creatively customized the leadership notion with the idea that leading teacher professional learning is about making sure that mathematics teachers benefit from the collective. Thea's sense of teacher leadership reflects Hargreaves and Fullan's (2012) call for teacher leaders to possess decisional capital for them to effectively lead a professional learning session. Such a capital, which Thea possessed, is crucial as it enables MTLs to make and enact decisions that could empower and motivate mathematics teachers to continue to deliberately engage in the process of promoting their professional growth.

Leadership by age. Age became an attribute that characterizes leadership in Mazengo's local community. As he advanced:

> In our community, the elders are the ones who can become our leader. Of course, not any elder can become a leader. The rule is that the oldest of all becomes the leader. And that person should be a man, not otherwise. So, our current leader is the most elderly man in

our community. That man is the leader and the spokesperson of our community.

What became clearer from the account is the existence of a unique relationship between community leadership and being elderly. In the community, elderly, an aspect of human life, has its serious place in influencing the choice of a community member to serve as a local leader. The community members, as Mazengo pronounced, have a feeling that elders are strategically positioned to become leaders when compared to other members of the community. With such a declaration, perhaps more illuminating is not only the consideration of elders in the leadership of local community but more about the reasons behind considering them suitable for the position.

> The eldest persons really know what it means to live here. They are aware of many things related to this place than anybody else because they've been here for so many years now. So, they know all of us. They are respected by many members of the community. They know where our community is coming from and where it should go. I think that's the reason why they deserve such a role in our community.

The elders are potential leaders in Mazengo's community because, unlike other community members, they had encountered different life realities and experiences, a situation which makes them appropriate individuals to lead the local community. As he described, one more added advantage that elders have over other community members is wisdom needed to lead a local community. As he described, such an elderly-wisdom nexus is predicated on the understanding that the more one grows older, the wiser she or he becomes. That is, elders are more informed about the challenges of the world and how to go about addressing them through wise actions. But also, they regard them capable of making and enacting sensible decisions and judgments over various situations and circumstances.

Mazengo, on the other hand, reported not considering age to hold any substantial influence in his work of leading teacher professional learning in the district. He, rather, recalled leading teacher learning by treating teachers equally regardless of their age differences or any other discriminative aspect related to that. Mazengo, as he said, "ask[s] teachers to form groups not by their age," but on the "basis of their genders" as a way of making sure that teams consist of both genders. He intended to benefit from experiences and professional knowledge of all genders represented in the teacher learning sessions.

Leadership by wealth. Senzini belongs to a local community that associates leadership with wealth. It is noteworthy that he considered his community to engage in what he called, "an uncomplicated process" of obtaining its local leader as he narrated:

> Our community has an uncomplicated process of getting a person to be a leader. It is uncomplicated because we get a leader by just looking at all members and take one who has the largest piece of land, many cattle, and goats, and many assets like houses, things like cars or other possessions that are legal. Having a lot of money is another factor of course. The good thing is that people who possess such things are known by many members, so it's easy to know them because they are few.

The description speaks to what the community members consider as an important leadership attribute for one to become a local leader. It has become clearer that the community members favor leadership, which is founded largely on wealth of a single community member. With such an attribute of community leadership comes the question as to why wealthy persons are considered potential leaders of the local community. The community members, as Senzini recounted, choose a member with such an attribute because they do not want to be led by someone who could be engaging in begging community members for his or her survival during his or her leadership of their community. As such, one could say that a local leader should be one who could be able to self-support his or her living while leading the community.

Senzini reported not embracing such a notion of leadership when working with teachers during learning sessions. He considers himself a mathematics teacher leader based not on his wealth, but instead, on his experience of participating in the professional learning program that empowered him to become a leader of teacher professional learning. Senzini elaborated further that he did not engage in choosing mathematics teachers to chair their small groups or to take any leadership role based on their affluence or something related to that. Instead, his decision depended upon their commitments to engage in their professional learning to promote their professional growth.

Leadership by prudency (busara). Isile spoke about his experience of participating in the process of choosing a member of the community to lead their local community. From his experiences, local leadership is predicated on the motive of having a leader who can demonstrate

nuances of prudency throughout his or her leadership. Something unique to this community is the involvement of spiritual leaders in the course of choosing and handling leadership responsibilities to one community member. As such, the process does not involve all community members but, a few, depending on their spirituality.

Quite striking here is the rationale behind involving spiritual leaders in such a process. Community members, as Isile recollected, applauded such people on the ground that they possess sensibilities and feelings needed to help identify a community member who has the potential to lead the community. Spiritual leaders, who enjoy the trust of the community members for years, are compelled to choose a community leader who can embody and uphold traditions, customs, values, and beliefs honored and lived by ancestors for years in their community.

Isile went on to advance the number one leadership attribute that spiritual leaders pay attention to while searching for a person to become a local leader:

> Spiritual leaders are involved in choosing a community leader who is careful in making decisions for the community. In fact, … what I know is that the community should be led by someone who can take things with caution and engage in thinking first, not someone who jumps into things without careful thoughts. The community hates a leader who could be rushing into things, actions, and decisions without understanding the negatives and positives or their impact to the community.

The most appealing leadership aspect spiritual leaders are expected to identify in among community members is a sense of prudence needed to lead the local community. Directly associated is the ability to make and enact decisions that cannot subject the community to complexities and dangers nor could harm any community member and properties they own. By harm, as he expanded, the members want to have local leadership that could not risk the community to lose, for example, a piece of land that helps them to sustain their living but also to generate income.

Isile, on the other hand, reported weaving such a notion of the leadership of his local community into his leadership of the professional learning of mathematics teachers. He believes

that as a teacher leader he should be prudent throughout the learning sessions for him to make the learning of his colleagues, not just efficient but one that attends to their needs and interests as facilitators of student mathematics learning. By integrating this leadership notion into teacher learning landscape, Isile reported making decisions that were in line with the need to foster teacher professional growth. Using his words, decisions that do "not discourage mathematics teachers to learn," but rather, to "help them become adept at helping students learn mathematics for their future benefits." As such, Isile made decisions that encouraged the teachers to promote their professional growth to be able to improve pedagogical practices in their classrooms.

Reflection.

Quite revealing from MTLs' accounts is their mindfulness of the notions that shape the processes of situating leadership in their local communities. From their experiencing of local leadership, it is evident that notions that are embraced by their communities did not emerge from a vacuum, but rather, from the customs and traditions honored by community members as it was the case to their descendants many years ago. Phrased differently but related, what communities do today when situating their leadership leaderships reflects the notions that their ancestors cheerfully embraced over years when it comes to local leadership.

The MTLs tailored the notions of leadership to their learning sessions with the intent of furthering teacher professional growth. It was quite difficult for them not to weave such leadership notions into teacher learning when twofold aspects are taken into consideration. One is when they found their ancestors honoring such notions in their local communities, and so they lived by them since their childhood. Another aspect is that they carried such leadership notions to their learning sessions because the same might have been serving their local communities so well, becoming difficult to overlook them while working with their colleagues. Dewey (1938) would agree with such views as he asserts that "[e]xperience does not go on simply inside a person. It does go on there, for it influences the formation of [the] attitude of desire and purpose" (p. 39). Practically speaking, the leadership notions are critical in making sense of their connections to the leadership of teacher professional learning. Directly related is the idea that understanding the MTLs' local leadership experiences is essential in coming to understand their

experiences of leading the professional learning of mathematics teachers who work in rural and remote communities in Tanzania.

Summary

The chapter introduced the MTLs who took part in this research study to understand their educational backgrounds, teaching and formal leadership experiences, and the contexts of their professional learning sessions. In reading the introductions, it is possible to learn about each teacher leader and the journeys they navigated since joining the teaching profession. As such, the profiles help to make sense of their experiences of leading the professional learning of mathematics teachers in rural and remote communities in Tanzania. Moreover, the chapter described leadership notions that are customarily embraced in each of the MTLs' local communities and ones that shape the process of situating community leadership. The notions intended to develop an awareness of the practices that community members pursue when locating leadership in their local communities and how they shaped and continue to shape the leadership of the professional learning of mathematics teachers.

The next chapter describes unique experiences of the MTLs in leading the professional learning of mathematics teachers in their respective districts.

Chapter 6

Uncovering Unique Leadership Experiences

Why Unique Experiences?

Before starting into the MTLs' unique experiences of leading teacher learning, I would like to substantiate the position of individual experiences in understanding what it means and takes for mathematics teachers to take charge of their professional learning. The decision to describe the experiences of each teacher leader is triggered by the awareness that human beings, including the MTLs, are unique when it comes to interpreting worldly actions and situations but also in perceiving their interactions with others and objects. Related to that is Lieberman and Miller's (2008) scholarly reminder that professional learning sessions are profoundly idiosyncratic in that what a teacher leader experiences in one may be entirely different for another even though they lived a similar experience. As such, I attended to these experiences because I am aware that when they are intentionally or unintentionally overlooked "experience [becomes] treated as if it were something which goes on exclusively inside an individuals' body and mind" (Dewey, 1938, p. 39).

With such experiences, which emerged out of the within-case analysis, I intend to provide each mathematics teacher leader with a space to voice their feelings, actions, and reactions related to her or his work of leading the professional learning of their colleagues. Phrased differently, but related, the goal is to understand how each of the MTLs experienced working with mathematics teachers in facilitating their professional learning in the district.

In hearing the teacher leader voices, which speak to their leadership of teacher professional learning, it is possible to make sense of how each of the MTLs navigated his or her role in influencing mathematics teachers to engage in upholding their professional growth. For me, failure to take the experiences of each of the teacher leaders into account to understand what was going on among the MTLs means developing an incomplete understanding of the experiences of leading teacher professional learning in rural and remote communities. In the following sections, therefore, I describe individual experiences of the MTLs to develop a fuller understanding of what it means and takes for an individual mathematics teacher to lead the professional learning

of their colleagues in their districts. As such, from each case (mathematics teacher leader), two experiences were selected and are described. The selection of these experiences followed Dewey's (1938) suggestion that one should "select the kind of present experiences that live fruitfully and creatively in subsequent experiences" (p. 28).

Case Anne.

Feeling recognized, trusted. Two of the threads that dominated my conversations with Anne was "I feel recognized," and "I feel trusted." On the one side, her tone and voice while describing her feelings of being "recognized" revealed to me her appreciation of the opportunity to become a leader of the professional learning of her fellow mathematics teachers in the district:

> I've spent many years in helping improve math education in different schools I taught. I've worked with other teachers in days and nights together to make things happen in our math classes. That's because I love math. I'm humbled that I was recognized and given a chance to continue to work with my colleagues. I become pleased when I see teachers attend professional learning, and I'm the one to facilitate it, I feel very well. I'm happy for this opportunity.

In her account, Anne returns to her past experiences of working in primary and secondary schools to register her commitment to supporting both teachers and students for them to become successful in their teaching and learning of mathematics respectively. She attributed her long-standing commitment to improving mathematics education to her invitation to work alongside teachers with a goal of making a difference in teaching and learning of mathematics in the district. Her account shows how she started to see herself as a mathematics teacher leader amidst other teachers in the district. It equally shows a sense of the work she did as a mathematics teacher gradually unfolded, becoming more confident that she deserved an opportunity to work as a mathematics teacher leader.

Anne, on the other hand, went on to voice her feelings of being "trusted" to have the capacity to lead the professional learning of mathematics teachers:

> I just wanted to thank my leaders [education officers] in the district for trusting me and my capacity to push mathematics education forward. When I look back … this was the work of officials and even tutors only, but today it's my responsibility. Actually, this situation makes me feel trusted. I'm grateful for being given such a role out of many teachers. I know I can do, and I've been doing a good job up to this point in our district.

Anne's comment about feeling "trusted" is quite illuminating. It speaks to three issues. First is an issue of gender. Her sense of feeling trusted seems highly shaped by her previous experience of being discouraged by community members of her local community not to learn mathematics because of her gender. As Dewey would have it, that is the case because "every experience influences … further experiences" (1938, p. 37). The invitation to lead teacher learning took Anne back to her early years of schooling, re-experiencing being seen as not capable of learning the subject because mathematics was considered a male subject within the community. It is the experience of living the discouragements in her community but also of realizing being invited to lead mathematics teachers' professional learning, that seem to have shaped Anne's feeling of being trusted to become a mathematics teacher leader in the district. She was pleased that after all the discouragements she was the one entrusted with the responsibility of leading the professional learning of mathematics teachers in the district.

Second is her conviction that the invitation to lead teacher learning was based on trust that district education officers bestowed on her that she has what it takes to facilitate the learning of other mathematics teachers. With such a conviction, she developed nuances that teacher leadership is a role that is connected to one's capacity of accomplishing the desired responsibilities of improving practice in a mathematics classroom. Her experience is consistent with Katzenmeyer and Moller's (2009) contention that "although we encourage teachers to contribute as leaders, we are aware that their level of involvement is not for every teacher" (p. 126). That is, not all mathematics teachers have what it takes to become teacher leaders given varying levels of commitment and capacity to teach the subject.

Another issue speaks to the question of the position of mathematics teachers in leading the professional learning of other mathematics teachers in Anne's district like in other districts in Tanzania. The account is informative about a situation that mathematics teachers are no longer

mere attendees of learning initiatives, but rather, leaders of their own professional learning. Such a situation is explicit as Anne, as a mathematics teacher leader, did a piece of work, which, for quite a long time, was reserved for teacher educators from teacher colleges and officials from the district and the ministry of education. As such, she felt trusted to have an opportunity to lead the professional learning of her colleagues.

Practically speaking, the issue of recognizing and trusting teachers to take ownership of their professional learning has long-standing consequences within the teaching profession. Drawing on Lieberman and Friedrich's (2010) work, teachers have found a lack of recognition and trust to monitor their professional growth not only alienating but also repressive and difficult to apprehend as professionals charged with the responsibility of helping children achieve their dreams. As Angelle and colleagues (2011) assert, teachers' sense of being trusted is central in improving schooling and schools because it "increases teacher willingness to step up to school-wide leadership roles [as] teachers … feel empowered" (p. 4). For all that, Crowther, Ferguson, and Hann (2009) would agree with the opinion about the importance of centering trust at the heart of the teaching profession. They contend that "trust [is] required if teacher leadership is to flourish … also essential … if the complex processes that enable school capacity to transpire namely, holistic professional learning … and school-wide pedagogical development are to achieve practical meaning" (p. 57). Building on such observations, George (2016) recently concluded that "[f]or teachers to be successful … they must be trusted" (p. 230) that they can take charge of their professional growth.

Perhaps the most illuminating observation is related to Anne's experience of participating in the program while having a toddler.

> In our early days when we were prepared to become teacher leaders, I got a young baby. And I was to go for five days to attend the program. I told my husband that I've to go and attend the sessions. I said to him that because people have trusted me, I should not let them down. So, I participated in the course together with my baby and a babysitter. I decided to go because I wanted to make sure that I become a teacher leader in our district to help other teachers.

What is apparent in Anne's description is her desire to become a mathematics teacher leader regardless of a situation that could have discouraged her not to navigate her transition to teacher leadership. As she described, she needed to be fully involved in the program to become more aware of what it means and takes to be a mathematics teacher leader who could ultimately engage teachers in promoting their professional growth. Anne was motivated to repay the trust she had received as the only mathematics teacher in the district identified to have the capacity to lead the learning of other teachers. Her experience speaks to Hord and Sommers' (2008) view that teachers' sense of being trusted has the potential to "exhibit higher morale … and [make them] feel renewed and inspired professionally" (p. 19). On the other hand, Anne's experience of attending the program with a baby reveals what it is like to work as a female mathematics teacher in rural and remote communities in the Tanzanian education system. Even though she was attending the program, she was also needed to take care of the baby throughout the sessions because the latter is a role reserved for women in her local community. As she described, being a female mathematics teacher, therefore, is not just about teaching mathematics in a school but also about accomplishing home-related roles that the community has identified to be suited for women.

Anne's take on teacher leadership attends to the mounting demand for MTLs to become leaders who can make a difference in mathematics education (Wepner et al., 2016; Lieberman & Miller, 2004). Lieberman and Friedrich (2010) are vocal about this issue, calling teachers, including mathematics teachers, to "accept both formal and informal opportunities to lead" (p. 31). With this, however, mathematics teachers are challenged on two fronts. On the first, in connection to what happened to Anne, they must be ready to face challenges and obstacles when negotiating their entry into teacher leadership to contribute to improving schooling (Lieberman & Friedrich, 2010). On the other front, however, as Katzenmeyer and Moller (2009) counsel, even though "to take leadership is enticing, possibly ego satisfying," it is important for the teachers to be "wise to move in and out of leadership roles based on the concept of the work and level of outside commitments and obligations in one's personal life" (p. 126).

Leading learning for all. Anne was informative about what she was doing during professional learning sessions to ensure that mathematics teachers engage in upholding their professional growth. Her leadership work, as she described, was motivated by her previous

experiences of learning mathematics in a boys-dominated context during the time of her primary and secondary education. Of course, it was a difficult task for Anne, as a mathematics teacher leader, to isolate herself from what she went through in her educational journey in the village.

> My past experiences as a girl in math class are still with me. I always remember to have struggled to learn math. Because of that, I now pay attention to girls' math learning. But also, to supporting my fellow female teachers in our group for them to effectively learn how to teach math in their classrooms without any challenge. I work hard to help them. So, due to that, I collaborate closely with them to address challenges that they face during sessions. I do the same to make all teachers to learn to be able to meet the expectations of their students.

Anne's experience enlightens two issues. While the first issue sounds philosophical in its literal sense, the second is entirely personal, speaking to the individuality of the MTLs and how that shapes their leadership work. Specifically, the first issue is related to Dewey's (1934) notion of continuity of experience, which deliberates that past experiences reinforce future human experiences. Plainly speaking, it is this notion of experience that I suppose that the MTLs' engagement in leading teacher professional learning is largely shaped by their previous experiences as students, as mathematics teachers but also as human beings who are free to attach meanings to things, events, and situations that speak to their lives and their purposes of living. Concisely, Dewey (1934) frames the process of such a situation, asserting that:

> … every experience enacted and undergone modifies the one who acts and undergoes, while this modification affects, whether we wish it or not, the … subsequent experiences … from this point of view, [it] means that every experience both takes up something from those which have gone before and modifies in some way the quality of those which come after. (p. 35)

Anne's plot reveals a moment that she engaged in making backward and forward connections (Dewey, 1938) between what she experienced and what she wanted the mathematics teachers, especially female teachers, to experience. Quite edifying is a situation where her experience positively shaped her leadership of teacher learning, becoming motivated to create conditions that allowed both female and male mathematics teachers spaces to enhance their

professional growth. It is clear that Anne was not in favor of leaving female teachers in a space where they could have experienced what she had experienced in her mathematics learning journey. Along with this experience of 'going back and forth' to make sense of the present, she had the opportunity to reflect on her past experiences to make sense of her present experiences as the line that separates the two is virtually nonexistent as experience exists in a continuum.

The second issue and this is equally revealing, speaks to personal desires of some MTLs, deciding to engage in influencing changes on how things are conventionally understood or implemented in educational settings. Anne is one of the teacher leaders who had such desires, and her engagement in leading teacher professional learning is a case in point. She reported being determined to make sure that female teachers, like other teachers, find themselves continually supported to promote their professional growth. To actualize her determination, as explicit in the account, Anne had to confront historical narratives that, for quite a long time, favored the development of male mathematics teachers at the expense of the professional growth of their colleagues. Such an engagement highlights her courage to overturn practices that were considered a way of implementing teacher learning in her district. Fullan and Quinn (2016) would commend Anne for her audacity, contending that it enunciates a dedication to "deep learning for all … regardless of background or circumstance [and] commitment to the moral imperative of education for all" (p. 17). Without a hesitation, one could say that Anne attended to the recent call by Gustafson (2017) for the MTLs to demonstrate readiness to become a "powerful force for leading change" (p. 6) within educational contexts.

With a focus on ensuring learning for all in her district, Anne went on to describe how she invited female teachers to engage in their professional learning alongside male mathematics teachers. She expanded:

> Well! I frequently ask teachers to sit in small groups with a mixture of male and female teachers. I also make sure that they participate in discussions and small and large group presentations. I sometimes ask female teachers who have any concerns or questions to see me during breaks or at the end of the sessions to talk about what they are learning and experiencing. I also welcome male teachers to come and talk to me about what is going on. I want to see female teachers learn as much as they want like male teachers.

The experience of working to ensure a balanced participation of both female and male mathematics teachers in professional learning is quite insightful. The description articulates the importance of having MTLs who are committed to devising strategies that have the potential to safeguard the needs and interests of teachers during learning sessions and beyond regardless of their gender, background, age, teaching experience, and locality. Such MTLs, Anne as a case in point, are quite effective as they are even willing to "try new things and take risks" (George, 2016, p. 230) in making sure that the professional learning of mathematics teachers achieve its conceptual and practical meaning. On the other hand, her experience of engaging all mathematics teachers highlights the need for MTLs not to embrace conventional learning practices that discourage and disown some of the teachers because of who they are regarding their background, age, and gender. Instead, they are expected to creatively use teacher learning pedagogies that provide room for all mathematics teachers to uphold their professional growth. Moreover, Anne's engagement reflected what she experienced in her early years of schooling in the village, being discouraged not to learn mathematics because of her gender. As she noted, she decided to create conditions to encourage female teachers to learn because she had experienced what it is like to learn mathematics within rural and remote communities.

Katzenmeyer and Moller (2009) are quite helpful in making sense of such a situation, writing that:

> Teacher leaders who understand the challenge of learning … know that they must take personal responsibility for not only their own development but also the extent to which others … have opportunities to develop. It is a collective endeavor … These teacher leaders recognize the power of effectively modelling for other teachers and exhibit skillfulness … so that colleagues can grow and develop. (p. 48)

Case Gabby.

Leading learning in a safe space. Gabby embarked on the work of leading the professional learning of mathematics teachers with a strategy in mind. The strategy, as he articulated, was to play a role in making learning sessions safe places for teachers as they work to advance their professional knowledge. His subsequent passage shows a strategic landscape that he navigated to create such a place for teachers:

> I knew beforehand that teachers are from different schools and contexts with varying experience on how things can be done in a mathematics classroom. So, before the sessions, I said to myself that I need to have a strategy that could make every teacher enjoy his or her time in the sessions. Therefore, on the first day, I told teachers that we need a motto to guide us. I told them that our motto is to learn by respecting everyone's idea during discussions.

From the quotation, it is ostensible that Gabby was informed about potential differences that mathematics teachers might possess as human beings even though they all lived and worked in remote and rural localities. Accordingly, he was strong-minded to take advantage of those differences to make teacher professional learning a worthwhile experience for every teacher. Not so long ago, Katzenmeyer and Moller (2009) recommended a similar undertaking to teacher leaders, calling them to spend the time to thoroughly think about potential personal differences among them and to chart out ways to leverage the differences to enhance the learning of all. The idea, as Hord and Sommers (2008) have emphasized, is not to iron out those differences, but rather to build on them to "honor and encourage diversity … invite differences of opinions and learn from the hard work of the individual in schools" (p. 36). In so doing, a professional learning context becomes a safe place where differences are appreciated and crucial for enriching learning practice.

One more observation gleaned from the quotation speaks to the process in which Gabby involved mathematics teachers in the decision-making process. He did not move on with the motto until he informed and received inputs from mathematics teachers. Katzenmeyer and Moller (2009) would agree with Gabby's take on introducing the motto to the mathematics teachers before its implementation. The scholars write, "in our work with teacher leaders … we encourage them to introduce their issue briefly and then to listen to the other person's perspective on the same issue" (p. 112). With such an engagement, as he described, the intent was for teachers to become informed about the essentiality of their opinions in the entire process of their professional learning. He wanted mathematics teachers to become clear about what is expected of them, especially, how they are supposed to participate in their professional learning.

The motto, "to learn by respecting everyone's idea" resonates with two outstanding questions. The first is Cajete's (2009) question, asked almost eight years ago and relevant even today: How are we going to live with each other? The second and related is quite recent, asked by Tanaka (2016): How did the learning community … influence our ability to get along with people who are different from us? The motto and the questions reflect a process of shifting a focus from having professional learning that perpetuates selfness and individuality for its own right to one which favors selflessness and collectivity, attending to the shared goal of promoting professional growth. With the motto, on one side, both Gabby and the teachers were careful in making learning sessions a conducive space for every teacher, reducing chances for one to feel alienated from fully engaging in the process of learning.

From its literal logic, further, the motto was intended to create an environment, which is situated around themes of respect and care among mathematics teachers. The same, equally, articulates a sense of having a group in which its members respect the other, care for ideas, but also care for the professional growth of oneself and others. On the other side, in a collective sense, the motto attended to the need of encouraging mathematics teachers to demonstrate tolerance over ones' idea, worldview, criticism, or opinion. That lies on the understanding that those aspects vary from one person to another as they are mostly shaped by ones' background, context, prejudices, and beliefs about the world; and, especially, about how mathematics can be taught and learned in a learning context. My conversation with Gabby elucidates an incidence on which the motto became helpful in creating a safe space for teacher learning.

Calvin: Can you tell me about the incidence that you said the motto became helpful?

Gabby: Yes, so, I remember at the beginning of our sessions we had a teacher who was used to discourage the contribution of others during our discussions. He used to show that he is the only person who offers valuable ideas than others. I remember he used words like "you are completely wrong," "that's not a point," "a wrong idea," "you don't know math," and others. I remember seeing other teachers feeling uncomfortable with that, and because we had our motto, I decided to tell him to respect other people and their contribution to our discussions. After that, that teacher started to make respectful contributions unlike what he did in the beginning.

The conversation highlights a situation in which some of the teachers can create a condition that can jeopardize the direction and success of the group of teachers. Gabby's take on the incidence in front of the eyes of teachers speaks to his engagement in the process of ensuring safety. From the storyline, it is apparent that he desired teacher professional learning to rediscover its original intention of safeguarding ideas that teachers bring in discussions. Such an aspect reflects Hadar and Brody's (2016) view that leaders of teacher professional learning should create enabling conditions that encourage teachers to actively and safely engage in the process of deepening their professional knowledge. As they asserted, "a key requirement for effective adult learning is the creation of a non-threatening learning environment in which participants feel psychologically safe to express themselves openly" (p. 66). They added further that a "safe professional learning … environment enables teachers not only to explore new ideas but also to challenge their own assumptions" (p. 66). Recently, Louis (2017) has echoed such sentiments, claiming that "[w]hat teachers need most is a feeling of safety in professional learning" (p. 26).

Navigating dual identities. At the beginning of his work of leading the professional learning of mathematics teachers, Gabby knew that his work was to facilitate the learning of his colleagues with the focus on improving their mathematics pedagogy. He described the situation as follows:

> In day one, I knew that my job is to help the teachers to learn. So, before the sessions, I designed learning activities and materials with that idea in my head. I didn't know that I will go beyond that. I thought it's about working to ensure that teachers learn, and I knew I was there to help them to do the learning. I also thought that I'm not part of them as a learner but just there really as a leader of their learning.

The description articulates the process in which Gabby engaged in making sense of his new identity—a teacher leader. It is explicit that in the beginning, Gabby had a narrow view of his teacher leadership work. The conception of his role reflected that of formal leadership known for perpetuating the existence of two different groups-the leader and the followers (Pounder, 2006). As such, he considered himself not a learner after stepping into leading the professional learning of other teachers with nuances of the formal school leadership notions in mind, being

unaware that teacher leadership is a collective project in which mathematics teachers work together for a shared goal of improving practice. Gabby struggled to make sense of the subtle differences that exist between formal leadership (which sees leadership as a position) and teacher leadership (which sees leadership as a process).

Such an observation got me thinking about the leadership notion that Gabby's local community embraces when it comes to how one is expected to lead others. As described in Chapter 5, he grew up in a community that defined leadership around the notion of fame. One thing about this notion of leadership, which he naturally stepped into teacher leadership with, is its influence in creating a boundary between teacher leaders from mathematics teachers. Such a borderline entices the former to perceive themselves being different from the latter even though they work together in their learning sessions. As such, Gabby was caught in the middle of the different kinds of leadership—leadership of the local community and teacher leadership, experiencing a challenge on how he could attend to his dual roles of leading and learning at the same time.

For beginning MTLs, like Gabby, who pioneered teacher leadership in the district, the experience of seeing themselves teacher leaders and not learners is natural yet undesired if it surfaces. It is understandable for them to consider themselves leaders and not both teacher leaders and learners at the beginning of their leadership journeys. Katzenmeyer and Moller (2009) found such a situation to be highly influenced by what they called "the complexity of the context factors" (p. 134) of the places these teacher leaders live and work. They believe that what happened in the context with the name of leadership has the potential to largely shape how one sees herself/himself a teacher leader.

Along with becoming innately in tune with his dual identities (a teacher leader and a learner), Gabby realized "a great deal of learning from [mathematics] teachers." He narrated how he engaged in learning together with his colleagues:

> During the sessions, after I introduce the activities of the day, and we agree on the modality of doing it, if it could start with an individual teacher, then a pair, then a small group, to the large one, or a different way of completing them, I think about how I should engage in learning. I sometimes form a pair with a teacher or join a group with a lesser

number of teachers for discussion. When we're done, I ask them to change the activity. So, I do both works because I have two hats to wear; one as a leader and the other as a learner. Therefore, that's the person I have become these days. And I can tell you, and I'm learning a lot from the teachers. Now, when I return to my class I realize how teachers have helped me teach mathematics well.

The comment reflects the natural evolving process of becoming aware of possibilities abounding teacher leadership. It is explicit that Gabby was pushed to engage in wearing "two hats" each at a time, interchanging the roles depending on what is happening at a particular moment. In such movements, he reported becoming more aware of what it means and takes to simultaneously work as a leader of teacher learning but also as a learner who yearns for professional knowledge. As such, in one sense, Gabby was apparently able to see his own professional growth as a teacher, appreciating the experience of benefiting from his interactions with mathematics teachers during the sessions. On the other sense, he was in a good position to influence his teachers to engage in professional learning, to further their growth.

Gabby, as he said, ultimately saw a learning session not an avenue for executing power and authority, but for mutual knowledge and skill growth to all its members. This proclamation resonates with Katzenmeyer and Moller's (2009) affirmation that "teacher leaders are part of a community of leaders and learners [and] to influence teaching and learning in a school, teacher leaders [should] join with other teachers to continuously learn" (p. 135). The intention is for them, as Donaldson (2007) emphasizes, to "bring their own persisting classroom challenges to their colleagues, seeking assistance and support from colleagues in the same way that they make themselves available to help their colleagues" (p. 136). That was important because, as Barth (2007) notes, he had so much to offer to mathematics teachers and so much to learn from his colleagues.

Case Pili.

Talking less and listening more. From the onset of her teacher leadership work, Pili led the professional learning of mathematics teachers through what I am tempted to call, a strategy. As she expanded:

> In my work, I organized myself in such a way that I engage in listening to what teachers are saying to themselves and me during discussions and even during their presentations. I decided to be a person who talks less and listen more … to hear what teachers do but also to motivate them. I didn't want to do like what I was doing in my own classroom with my students, where I used to talk more and a bit of listening to them.

The description shows the process in which Pili engaged in negotiating roles for herself but also for the teachers. It showcases her determination in rendering the control of the professional learning to the hands and hearts of who deserves it (the mathematics teachers), drawing them to the core of their learning to uphold their professional growth. By talking less, as she said, the intent was to encourage them to own their learning but also, and, essentially, to become active players of their professional learning throughout the sessions. With such type of leadership, she expected the teachers to realize nuances of being valued but also needed to honor such an opportunity, becoming motivated to unreservedly engage in talking about what they know, do, and experience in their classrooms for the benefit of others during the sessions.

With such a way of engaging teachers in learning comes the rationale for coming up with such a novel method of treating mathematics teachers, who were conventionally used to being listeners. Pili elaborated:

> Honestly, I did what I did because I knew those teachers have so much to say about the work they do in their classes. And I knew they have been working so hard in their classrooms with so many students, in many math concepts. So, I wanted them to talk more than me and really to bring the answers to questions they raised along the way. I didn't want to overlook that. And as a leader with a role of influencing them towards different directions, so by listening to them, I got a good sense of where we could go with our learning. Through this, I got a big picture of what they know, what they wanted to know and what they didn't know and how we can go about filling that gap.

One obvious observation apparent in the account is Pili's sense of the need to predicate professional learning on experiences of teachers who are more informed of what they need to know to improve practice in their classrooms. With such a sense, she reaffirmed the place of mathematics teachers in their professional learning, affording them a borderless space to

communicate what they know and need to know to be able to untangle pedagogical challenges they encounter in their mathematics classrooms. Pili realized a need for them to do the talking to help them to openly disclose what they experience in their classrooms for them to think about what can be done to improve practice. McCormack, Gore, and Thomas (2006) would support Pili's take on inviting teachers to talk more than her even though she was a leader of the learning sessions. Consistently, the scholars suggest teacher leaders create spaces for teachers to "voice their most pressing issues and concerns, examine prior knowledge in the light of new understanding and construct new knowledge through the processes of reflection [and] dialogue" (p. 99).

On the other hand, it is one thing to foreground teacher learning in talk-less-and-listen-more approach, and quite another for mathematics teachers to be in unison with the strategy.

> In the beginning, teachers weren't talking, so I had to ask and encourage them to speak by giving them works to do in groups and present to others. After some time, they started to talk, and they talked a lot. I saw them engaging in lengthy discussions. So, my work was making sure of that happening in our sessions.

By employing such an approach, therefore, Pili wanted to experience an alternative way of working together as adults. One could say that she worked to achieve what Vangrieken, Meredith, and Packer (2017) recently called, a "power balance characterized by equality" (p. 99). This balance is "essential in rendering successful learning communities and realizing a sense of agency and responsibility for the teachers" (p. 57). At one time, equally, Frost and Durant (2003) recommended the approach because it helps MTLs to situate teacher professional learning on the "principles that underpin a democratic way of life to develop … communities in which all members have a voice and are allowed the space to fulfill their human potential" (p. 176).

Leading thirsty teachers. Pili spoke about what mathematics teachers demonstrated while engaging in professional learning sessions in her district. She explained:

> I think the group was quite impressive to work with. It was good for me to work with the teachers who really wanted to learn. Their participation indicated to me that they were thirsty. I noticed such a situation from the beginning of our sessions to the last meeting that

> we had a month ago. So, I just like the group because it made our sessions very engaging as many had a desire to learn, of course, to quench their thirst.

The quote highlights Pili's impression of the group of mathematics teachers she had an opportunity to work with since becoming a mathematics teacher leader. She regarded teachers being thirsty, metaphorically alluding to their commitment to engage in collaborative learning to promote their professional growth. Pili described her feelings of working alongside thirsty teachers from the beginning of their professional learning journey:

> As a leader, it feels so good to see people are serious about what you do together. So, I felt happy because I said to myself, my work now is not complicated as the teachers are really in need of learning, wanting to learn. So, I was not a leader who was there to push them to learn, no! My responsibility was to make sure that we meet our primary goal.

In this quotation, Pili registers her exhilaration after noticing mathematics teachers wanting to "quench their thirst" to advance their professional knowledge alongside her leadership. Leading a group of teachers is one thing and leading the same but with teachers who innately yearn for knowledge is quite another. While it is necessary for the leader of the former to create conditions for inviting mathematics teachers to engage in learning, it is optional for one leading the latter as the teachers are already motivated to participate in the process. Having such teachers, Pili, however, still needed to capitalize on teachers' "thirst" by creating conditions to make them feel more "thirst" to expand their professional knowledge base.

In the following story, Pili describes what she considered to be at the heart of mathematics teachers' thirst of craving to engage in their professional learning:

> The issue here is that in the places we work, many teachers do not have access to the opportunities for in-service learning. There were teachers in our sessions who never attended any professional learning initiative since joining teaching. For such teachers, this was a golden opportunity as they were really in need of getting a feeling of it. And they were like, say; this is the chance we have waited for a long time we should use it. I saw many of them anxious to learn. And I think they valued the work we're doing together that's why they continued to learn.

Twofold aspects emerge out of Pili's description of what she thought to have made mathematics teachers "thirst" to learn. First, it is quite clear that the teachers were thirsty because they had never or hardly attended professional learning initiatives for them to promote their professional growth. As such, after grabbing, using her words, the "golden opportunity" teachers felt the need to keenly engage in professional learning. The second aspect is equally enlightening, speaking about the expectation of mathematics teachers about their engagement in professional learning while working with Pili. From the description, it is apparent that the teachers were thirsty to learn because they were mindful that their active participation could help them improve teaching and learning of mathematics in their classrooms (Lieberman & Friedrich, 2010). As she said, they had hoped for better, perceiving their engagement to bear fruits in improving mathematics teaching and learning in schools.

Case Kenny.

Embracing the familiar. The acts of using local learning materials during attending the program that was designed to empower mathematics teachers to become teacher leaders challenged Kenny's notion regarding the incorporation of such materials in teaching. Before the program, he was not well-informed about how local materials could be used to help mathematics teachers navigate their transition to teacher leadership. To the contrary, program facilitators exposed him to ways in which the learning materials can be used to enhance the understanding of mathematical concepts. As he described:

> In my initial sessions of the program, I was shocked to see materials like tree leaves [see Figure 6.1], stones, seeds and other real objects distributed to our groups. Then, we were told to think about how we can use them to do a math activity but also teach math in our classes. That situation shocked me as those materials are common to me, but I never used them in my class. I used to wait for a school to buy materials from shops in town. Maybe I was ignorant about how to use them that's why I never used them before.

What is apparent in the excerpt is the presence of two groups of mathematics teachers when it comes to using local materials in classrooms. The first group involves those who consciously do not use such materials in their pedagogy. The other group consists of those teachers who do not incorporate the materials into their teaching because of twofold reasons.

While the first is unawareness of how to go about using the materials in facilitating student learning, the second is related to teachers' little understanding of the potentials of the same in helping students engage in effective mathematics learning. As such, Kenny's sense of the place of those materials in mathematics learning serves as an example of teachers who formed the second group. It is because of being in that group he was surprised to see such materials becoming important ingredients of their learning.

In the next excerpt, Kenny describes how he exposed mathematics teachers to local learning materials and what emerged out of it:

> So, I prepared some of them before the start of the learning sessions together with teachers. When we gathered to start the sessions for the first time, I encouraged them to use the materials I prepared. After that, I remember asking them to think about materials that are found in their places. Then, I asked them … how they can be used to teach math to students. I remember seeing some of them shocked as they didn't think materials in their places can be resources for learning. After we worked with grains, stones, leaves, and other materials, they started to see the connections and the importance of those things. So, I had to keep emphasizing them to think about what is available in their places they were coming from and relevant to math.

The description highlights the tension that existed among mathematics teachers when Kenny incorporated local learning materials in their learning. Figure 6.1 shows one of the materials he used during the sessions. Like what happened to Kenny during his participation in the program before being a leader, the teachers engaged in the process of becoming abreast of the use of such materials for facilitating the development of mathematical understanding. It is equally clear that the teachers were uninformed of the importance of using local materials in a classroom but also of the strategies they can use them to facilitate practical mathematics learning among students. Returning to Kenny's case, incorporating local materials in teacher learning, was an essential first step in making such materials commonplace not just in his teacher learning sessions but also in mathematics classrooms. On the other hand, making teachers understand how to use the materials with their students was a completing step in making local materials an integral part of mathematics pedagogy in schools.

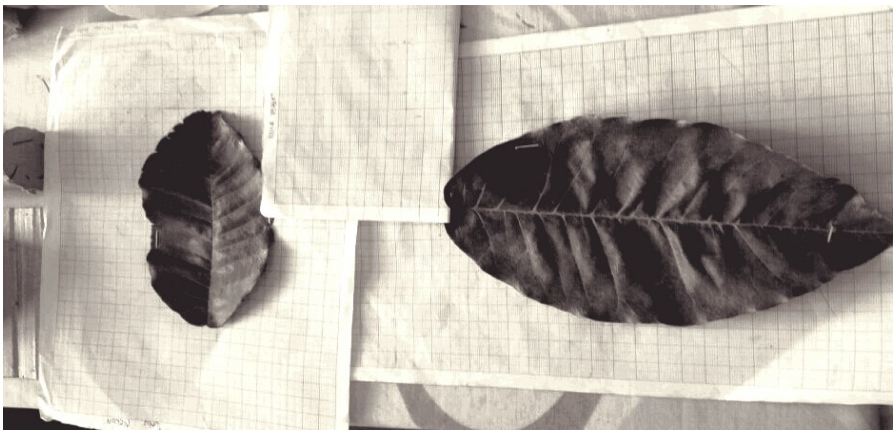


Figure 6.1. Leaves used by Kenny

Kenny, moreover, went on to describe the reaction of teachers regarding the incorporation of local materials into their mathematics learning:

> I saw many teachers being comfortable with the materials. They liked it. You know, they are always asked by their school inspectors to use materials in their classes, so they were happy because they had the opportunity to create them and realized ways of using them. They kept telling me that they liked the practice because it will help them to start to teach with using materials.

It is apparent from the storyline that Kenny's use of the materials helped mathematics teachers to develop an awareness of the application and power of local materials in enriching the professional learning of mathematics teachers. With such a new consciousness, as he shared, teachers started to think about local materials available in their localities and how they can use them to support student mathematics learning. As Kenny reported, the teachers promised to use learning materials in their teaching as a way of situating useful mathematics learning in classrooms.

Coming to terms with leading adults. Before stepping into leading teacher professional learning, Kenny reported thinking about his transition from working with students to working with mathematics teachers in a learning context. For him, paying attention to the transition was an important endeavor because of the existing differences between working with children (students) and working with adults (mathematics teachers). Such a transition got Kenny thinking,

as he acknowledged he had only taught students since joining the teaching profession and never worked with teachers.

> One big thing for me was how I would work with teachers as I was used to working with students for many years. Remember students were like my children and teachers are colleagues, … not like students. So, I became concerned about how I will work with adults for the first time. I didn't want to make them to feel embarrassed with my leadership. In my initial sessions, I started to slowly learn how I should engage them, different to how I used to do things in my classes.

In this excerpt, Kenny was reporting on the ways that he facilitated the learning of students in his mathematics classrooms. He was aware of the need to think about how he will productively work with mathematics teachers after spending about 20 years working with children. At the heart of such thinking is a sense of leading teachers as professionals, allowing them spaces to freely interact and share ideas related to mathematics teaching. It is evident from the description that Kenny wished to treat teachers as people who possess practical experience of their work of teaching.

Along with gaining knowledge of how adults learn, Kenny went on to describe his experience of creating a climate to encourage teachers to effectively engage in learning:

> I think one important thing for teacher leaders like me is to know that these people have lots of experience. So, it is important to give space for them to talk about their experiences. But also, as adults, I thought there is a need to treat them with a sense of valuing what they already know about how they teach mathematics in their classrooms. I treated them in a way they could feel appreciated throughout the process.

Kenny's comment shows conditions that MTLs could create to keep professional learning productive and motivating to mathematics teachers. It speaks to the need for establishing a stimulating learning environment that treats teachers as human beings and not physical objects that can be controlled, manipulated, and even ignored for ones' sake. The comment, on the other hand, resonates with how Louis and Murphy (2017) think adults should be treated while engaging in their professional learning. Their current study revealed the need for MTLs to

organize teacher learning around values of respect because the aspect shapes how teachers interact with the teacher leader, with their colleagues, but also with their learning materials.

Furthermore, along with such an awareness, I asked Kenny about what he did as a way of making mathematics teachers comfortable during the sessions. He replied:

> Even before the sessions, I knew that teachers had lots of issues to do. For example, they were to take care of their families even though they were attending their PD [professional development]. Others were leaders in their schools as I had head teachers, deputy head teachers and so on. I knew beforehand that they would need some time to attend to matters related to their schools. So, you may find movements of teachers, going outside of the sessions, making calls to their families and their schools. Others were bending down, sending text messages. Even though these were like detractors, well, I wanted teachers not to be far from their families and schools.

The plot offers a glimpse of what Kenny did in working with mathematics teachers (adults) of his district. It is explicit that he afforded them spaces to concurrently engage in professional learning but also to attend to family and work matters that needed their immediate attention. For him, unless teachers realized opportunities to attend to those matters, they could feel controlled but also could perceive being treated as mere students. Reflecting Kenny's treatment of teachers, Knowles, Holton, and Swanson (1998) would advise MTLs to be cautious not to deny adults with the freedom they need to learn as adults and not treating them otherwise. They added that:

> When an adult finds himself/[herself] in a situation in which he/[she] is not allowed to be self-directing, he/[she] experiences a tension between that situation and his [or her] self-concept. His/[her] reaction is bound to be taunted with resentment and resistance. (p. 56)

Foord and Haar (2008) echo the sentiment, admitting that "adults resist being treated as objects to be used by someone and strive as much as possible to control what occurs in their learning environment" (p. 26). That is, unless they see their professional learning as crucial for their success and unless they become committed and respectful to the freedom their teacher leaders give them, their learning could not achieve its conceptual and practical meaning.

Case Thea.

Leading amidst experienced colleagues. Before the beginning of the learning sessions, Thea was quite mindful of the fact that her learning sessions could comprise mathematics teachers of varying teaching experiences. However, she had no idea about the possibility of having some of them who were more experienced than her in terms of the number of years since joining the teaching profession. In the first session, Thea realized that in attendance were experienced colleagues who had taught the subject for a long time. She spoke of her feelings after noticing such mathematics teachers after stepping into leading in her district:

> In the beginning, I was really shocked with that situation as I did not expect to lead teachers of such experience. I was worried about how am I going to lead people who are more experienced than me. I doubted whether they could listen to me and cooperate with me and find my work helping them to become effective teachers. What I can tell you, is, well, my confidence went down in the first place as I was thinking about what teachers could be thinking of me as I was not as experienced as them.

From the description, it is apparent that Thea was concerned with how she could exert her influence on mathematics teachers who were more experienced than her. While thinking of those teachers, she recounted questioning her experience of teaching mathematics, believing that it could be difficult for those teachers to find her work to make sense with them given the number of years they have taught the subject. It is also evident from the account that Thea wondered about how such a situation could shape her leadership of teacher learning and her relationships with the mathematics teachers who she works with to deepen their professional knowledge and skills. Such situations made her lose the confidence she needed, at first, to lead the sessions, becoming moved with the presence of such teachers but also her thinking about what might happen while leading experienced colleagues.

What helped Thea to regain confidence is the cooperation she received from the experienced mathematics teachers during the sessions. As she said, the interactions she had with the teachers helped her notice nuances of being appreciated for her ability to empower her teacher-colleagues. As she expanded:

> After the sessions unfolded, I saw teachers collaborating with me in all activities that I provided for them to work together. I actually saw them paying attention to what I was saying to them about the activities. They were serious, the thing that I didn't expect. So, I gained confidence and was not worried anymore about anything. I started to interact with them in good ways. We engaged in various activities together without any problem. I was happy to hear them saying … they are learning important things, and they look forward to using some of the ideas in their classrooms. That gave me the energy to do more.

Thea's experiences explicate what beginning MTLs might be feeling when they navigate their journey of leading the learning of mathematics teachers who are more experienced than them. A short while ago, Katzenmeyer and Moller (2009) considered such a situation to happen to many teacher leaders as they step into facilitating teacher professional learning. They write:

> Teacher [leaders] continue to struggle with concerns about the reactions of peers to their leadership activities. Fears of opposition to their ideas and of being criticized are real to teachers who want to maintain positive relations with their colleagues. (p. 130)

Wepner and colleagues (2016), correspondingly, advise MTLs who find themselves in that situation to develop the courage to continue to engage in leading teacher professional learning regardless of any circumstance that unexpectedly emerges during professional learning sessions. The suggestion is motivated by their understanding that "[w]hen you can maintain your own level of professionalism and stand up for what you know is right, you can transcend the most frustrating and hurtful moments" (p. 26). What the scholars suggest echoes what Thea reported doing after finding herself required to work with experienced teacher colleagues in the district. Thea developed self-confidence, believing that she had the capacity needed to accomplish her responsibilities as a leader of teacher professional learning. Thea also considered herself to possess what it takes to facilitate the learning of teachers of all experiences. Using Wepner and colleagues' (2016) words, Thea would be considered to have sensed the need and developed a prowess to "press on" (p. 28) to keep the learning of mathematics teachers going as desired.

Leading a split group. To have a single label that describes the mathematics teachers of her district was a challenging endeavor for Thea during our interviews. Instead, she haphazardly reported having two labels for the teachers, each carrying a meaning that contrasted the other.

Literally speaking, the labels dichotomized Thea's group into two differing sub-groups of teachers. On the first, which had more teachers, Thea detailed that:

> I had really good teachers there. They were dedicated to learning to improve what they do in their classrooms. Demonstrated readiness to practice new strategies and methods. Interacted well with others. Not interested in anything but their learning, and that of their kids.

For Thea, the group comprised of mathematics teachers who demonstrated enthusiasm to engage in their professional learning alongside other teachers, working to enhance their professional growth. This is apparently the case as her description is demonstrative of teachers' commitment to using their professional learning time to effectively engage in learning to address pedagogical complexities that faced their students. Nichols (2011) considers such teachers as dedicated, who care for oneself and others, willing to constantly learn with others, and willing to help their colleagues to grow as professionals but also as human beings.

The other group was quite the opposite of the first, as Thea narrated:

> In my sessions, not all teachers were good teachers. I've had a few teachers who, I'm sorry to call them, bad teachers because of the way they engaged in what we were doing during the sessions. It's was a challenge to work with them because they didn't want us to keep going in the desired direction.

The account highlights Thea's negative feeling of working with some of the mathematics teachers. The feeling prompted her to label such teachers as "bad teachers," attributing them to hamper effective professional learning in the district. Her account shows how a mathematics teacher leader can become stressed with attitudes, behaviors, and engagement of some teachers, reaching a point where she or he might consider them an obstacle towards achieving the goal of engaging in collegial inquiry. With such a shocking observation comes the need to understand what the teachers did for them to be labeled as being "bad."

> In fact, … these teachers were not committed to their learning. Instead, they were just there thinking about different things. And to be honest with you they were there for the sake of

> getting allowances. Before I persuaded them, they were busy going outside talking with phones while others are learning. Just that. As I have said, they were there for the sake of waiting for *bahasha ya kaki* [a khaki envelope].

To help understand who they were in relation to their professional learning experience, Thea used a metaphor of *bahasha ya kaki* (a khaki envelope) to describe the behavior of "bad teachers." *Bahasha ya kaki* is a common metaphor among professionals in Tanzania, including primary school teachers. Its popularity rests on how such colored envelopes are used during the implementation of a learning program in the country across professions. Customarily yet formal, the envelopes have been used as packages of financial allowances that are provided to the attendees of the professional learning program to cover expenses related to their participation in the same. From a metaphorical sense, it is apparent that Thea initially had teachers who participated in the professional learning for the sake of getting allowances. As such, these teachers considered the professional learning opportunity as a source of income and not an occasion meant to enhance their professional growth. The teachers had a primitive impression that teacher professional learning has little to do with enriching pedagogical practice but more about assuring them financial gains at the end of the sessions.

With such a divided group, understanding how Thea engaged the "bad teachers" in their professional learning becomes a worthwhile endeavor to pursue. In an interview, she was explicit that she paid close attention to those teachers to help them to complete learning activities that were provided as a way of expanding their knowledge. What she passionately did was to "convince and encourage the teachers to understand that they need to use the rare opportunity they had to further their knowledge together with other teachers." The idea, as she described, was to persuade the teachers to become knowledge seekers and not income-seekers, encouraging them to realize the need to effectively learn to be able to address complexities facing their mathematics classrooms. To achieve that, Thea engaged in influencing them to enthusiastically value the professional learning opportunity and their time and what they were experiencing during their interactions with their colleagues. In such a perplexing situation, however, she was cautious not to publicly "label the teachers as bad teachers in front of other teachers because [she] didn't want to embarrass any teacher." Thea, rather, reported focusing on leading the entire

group of mathematics teachers in such a way that they came to realize the value of participating in a collegial professional learning.

Further, in ensuring "bad teachers" become practically engaged in professional learning, Thea recounted using small group approaches that allowed mathematics teachers to work together on various learning tasks related to concepts they were studying. With such a strategy, as she described, the teachers worked with others on the tasks, with the latter shaping the engagement, commitment, and expectations of the former with regards to their professional learning. The strategy is consistent with what Hargreaves and Fullan (2013) have clearly emphasized in making a learning context a place where all members become engaged in the process of enhancing professional growth. The scholars encourage teacher learning to be organized around social groups to permit collaborative learning, encouraging teachers to work as friends with the shared goal of deepening professional knowledge. According to Hargreaves and Fullan (2013), such a strategy has the potential to "promote deeper discussion; or to change the structures by positioning a struggling new teacher alongside an experienced pro, rather than placing him or her out in a portable [isolated] hut" (Hargreaves & Fullan, 2013, p. 39). Such an approach is powerful, for as Mraz and Kissel (2014) note "knowledge must be collectively shared through ongoing interactions among all members of the community" (p. 174).

Thea's treatment of "bad teachers" showcases how a teacher leader and a group can change teachers' notions of what professional learning is meant to achieve and the role a teacher must strive to accomplish when attending learning sessions. By having mathematics teachers who are less interested in learning to improve practice, teacher leaders are "require[d] to perhaps work outside [their] comfort zones for a while, or for as long as it takes to make a difference in the lives of others" (Nichols, 2011, p. 96). It is in such a moment where some teacher professional learning scholars, including Robinson (2017), consider the leadership of teacher learning a challenging venture, contending that:

> Leadership matters in resolving adaptive challenges and changing people's values, beliefs, habits, ways of working, or ways of life. It is about mobilizing … communities to deal with difficulties. It is … often personally difficult and professionally dangerous. It is about saying what needs to be heard rather than what is preferred. In the end, leadership is more

> … about problem resolution and addressing adaptive challenges through the synergistic efforts [and] a commitment by all at work in concert and not in contradiction. Leadership involves challenging people to resolve the contradiction of espoused values and actual behaviors, facing up to frustrating realities. (p. 32)

Case Mazengo.

The power of acquaintanceship. Mazengo considered his leadership of the professional learning of mathematics teachers and their engagement to be shaped by the acquaintanceship that emerged even before they gathered together for their learning. As he described, the aspect existed in two faces. Regarding the first face, Mazengo pointed out that:

> I'm fortunate that most of the teachers in our sessions know me well even before coming to the sessions. I met them during various events like the invigilation of national Standard VII exams as we used to move from one school to another. The fact is I've taught in many schools around that's why they knew me, and I know some of them. My time at *Chama cha Walimu Tanzania* (Teachers' Trade Union) helped to interact with many teachers. They know me, and I know most of them well. This helped us to learn well as we were not strangers to each other.

Mazengo's experience reveals the existence of acquaintanceship between him and the teachers because of working for quite a long time in many different schools. Such a situation, as he described, made his leadership of teacher learning smooth and efficient as he found teachers being friends and not strangers since the beginning of their learning sessions. For him, it also allowed him to nurture a favorable professional learning climate for teachers to learn to enhance their professional growth. As recent research (Charner-Laird, Ippolito & Dobbs, 2016) suggests, acquaintanceship has the potential to shape teacher leadership that promotes effective interactions and communications among teachers, allowing them to unreservedly share all kinds of experiences of their work. As such, mathematics teachers feel free to "expose their own insecurities about their teaching practice … be honest with their struggles in teaching" (Katzenmeyer & Moller, 2009, p. 69).

Mazengo, on the other hand, described another face of acquaintanceship that equally

shaped the professional learning of his mathematics teachers:

> The teachers in our group don't just know me, they know each other, too. You know teachers are often transferred from one school to another. They visit schools to invigilate exams. That helped them become aware of each other. So, in our sessions, they freely talk to each other as they were not new to many. They looked confident to speak. I'm sure that these connections are the one that made our sessions so productive in terms of learning from each as we interacted well. We worked as one family, and I liked that.

Mazengo acknowledged acquaintanceship among mathematics teachers themselves to help them develop the confidence to work with others. Metaphorically, he equated his group with a family to show how teachers were deeply connected to each other because of their prior connections that emerged out of their interactions before convening for the professional learning program. From his observation, the aspect is powerful in two senses—theoretical and practical. In a theoretical sense, such an aspect was key in building a foundation for their future interactions beyond their learning sessions. In a practical sense, their acquaintanceship facilitated the establishment of professional interactions among teachers during their learning, encouraging them to collegially share ideas and thoughts on how to improve practice.

Katzenmeyer and Moller (2009), however, would not agree with the use of a metaphor of a family in describing the nature of the professional learning of mathematics teachers. They categorically discourage the use of the metaphor because "it preserves the hierarchical structure in which the [MTLs] are the parents and the [mathematics teachers] are dependent children" (p. 27). I understand this discouragement to rest on the idea of organizing and implementing teacher professional learning under the umbrella of equality and equity for all teachers by giving each of them a voice over what to learn, how to learn, and when to learn. As such, one could say that Katzenmeyer and Moller's (2009) opposition to the use of the metaphor is intended to remind teacher leaders not to make learning sessions be comprised of teachers who feel inferior to others during discussions and conversations about how to improve practice.

Mazengo's experience resonates with Choo and Darling-Hammond's (2015) views that that acquaintanceship is practically beneficial in any learning session. This agreement rests on the understanding that the aspect has the potential to encourage mathematics teachers to learn

without hesitating to make mistakes or errors in front of their peers during their learning sessions. When acquaintanceship informs interactions during learning sessions, as Choo and Darling-Hammond (2015) note, teachers ultimately "act as co-learners and critical friends so they feel safe to take the risks of sharing their assumptions and personal theories, experimenting with new ideas and practices, and sharing their successes and problems" (p. 69).

Leading beyond employment. At the time of this research Mazengo was in his first year after retiring from teaching in a primary school. As he shared, even though he knew he would shortly retire, he decided to accept the invitation to become a leader of the professional learning of mathematics teachers in his district. Two reasons motivated his decision to accept the invitation. As he said in an interview:

> I knew very well that I would soon retire, but I decided to accept a call because I knew that math teachers like me are few in our district. So, staying away from such a work was like making the initiative to lack experienced people. I wanted to contribute to improving math education in the district. I love teaching math, and that's what forced me to accept the invitation. So, it was easy for me to say yes that I can be part of it.

Drawing from Mazengo's experience, it is evident that the decision to join teacher leadership reflects grounds that speak to mathematics teachers as human beings but also as members of their local communities. The contexts of the work of teaching are also at play when a teacher thinks about stepping into teacher leadership. Learning from Mazengo's case, both intrinsic and extrinsic motivations were at play in shaping his decision to step into leading an initiative aimed at promoting mathematics teachers' professional growth. While the first kind of motivation is highly influenced by ones' beliefs and interests, the latter is more about what he was experiencing in a school, local community, or district.

For Mazengo, his love of teaching mathematics framed his intrinsic motivation, deciding to accept the invitation to become a teacher leader in his district. On the other way, the shortage of experienced mathematics teachers like him in his district, especially in his community's primary school, aroused his extrinsic motivation, becoming intrigued to accept teacher leadership roles even though he was on the verge of retiring from teaching. As such, his decision to become a teacher leader did not come from a vacuum, but rather, and from his passion for mathematics but

also his practical knowledge of what is happening in mathematics classrooms as teaching and learning are concerned.

In one moment, Mazengo made it clear that he accepted the invitation to respond to the call made by his teacher colleagues of his last school not to completely leave the teaching profession. Instead, this was a way to continue to be connected to the school and to the teaching of mathematics within the district. Teacher leadership scholars, including Katzenmeyer and Moller (2009), could support Mazengo's decision to step into leading the professional learning of mathematics teachers while he was not teaching in a primary school. Unequivocally, they "acknowledge that teacher leaders may leave the classroom and remain quite effective in working with other teachers [as] their work is still focused on the improvement of teaching and learning" (p. 7).

To remain connected to mathematics classroom experience, Mazengo decided to establish an evening mathematics class in his residence a few months after his retirement. As he described, the children that attended his class were those residing in his small local community. To lead the learning of mathematics in his class, Mazengo used his evening times, twice a week, engaging the children in mathematical concepts that they were learning their schools. The idea of opening such a class was motivated by his desire to continue to teach mathematics in order not to lose touch with the subject but also, and to help children to develop an understanding of mathematical concepts. Mazengo, on the other hand, regarded his class to be a place for him to work on ideas he was learning from mathematics teachers. Such a class turned out to be an avenue for supporting children's mathematics learning on the one hand, and a place for implementing new strategies, on the other hand.

There is one more undertaking that Mazengo reported pursuing in his desire to extend his purview regardless of being on his retirement. He recalled meeting with a group of mathematics teachers who were teaching in a school, which was his last school before his retirement and one close to his residence. To be exact, it takes about three minutes to walk from Mazengo's home to the school. He reported meeting with the teachers once per month to discuss issues related to mathematics teaching and learning, ranging from creating pedagogical materials to working on mathematical ideas related to concepts that teachers found worth considering. As he articulated,

none of these teachers, who teach mathematics in standards I through VII, attended his professional learning sessions. In such a formal (to the school) and informal (to the district education office) initiative, Mazengo and the teachers spent not more than two hours, sharing experiences of teaching mathematics as they worked to untangle challenges that were commonplace in their classrooms.

With such endeavors on his shoulders, Mazengo demonstrated his commitment to supporting children who needed assistance in learning mathematics. Proponents of teacher leadership like Lieberman and Miller (2004) could suggest the MTLs who are in their retirement, like Mazengo, to continue to support teachers as they work to advance their professional knowledge and skills. In so doing, undoubtedly, MTLs could become active "leaders of change … by accepting more responsibility for helping colleagues to advance success for all the students" (Katzenmeyer & Moller, 2009, p. 6).

Case Senzini.

Experiencing room for creativity. From the outset, Senzini was quite unsure about what it takes to lead the professional learning of mathematics teachers. Through his engagement in his teacher leadership work, he became aware that teacher leadership is inherently a creative project, requiring senses of imagination. As he expanded:

> I now see this work to be about being creative in teaching and learning mathematics. It truly requires having that imagination and a sense of a big picture of things related to how you can make teachers realize opportunities to learn, and, in fact, engage in active learning. You can't succeed in this work if you can't think about what might work and what not in a moment of time. Creativity has its place in this process.

The account articulates a process in which Senzini became more informed about what it takes to work as a leader of the professional learning of mathematics teachers. He registers his feelings about his teacher leadership work, viewing it to require an investment of creativity to enable teachers to find their professional learning a pleasing experience. It is delightful to see how engagement in teacher leadership plays a changing role—helping a teacher leader realize a terrain of possibilities associated with their work of leading the learning of their colleagues. Two

aspects are at play here with such an observation. One is that being a leader of teacher professional learning is one thing and becoming aware of opportunities around such work is quite another. The second speaks to the conviction that realizing room for integrating creativity in teacher learning is a first important step in making it routine in their sessions.

Senzini explained his association of teacher leadership with creativity:

> I think this work requires creativity before, during, and after the sessions. Here, I reflect on the activities and materials that are needed in the process. The work required me to be inventive on the things I was doing as a leader to foster teacher learning. This is because it's more than just preparing materials and activities. It's about making materials and activities that could make teachers at the end of the day to say they have learned something. When I think about the nature of feedback I give teachers, the conclusion I make, all that call for creative thinking before you operationalize them.

The quotation is explicit about some of the engagements that demanded employment of creativity to make teacher professional learning even more useful to teachers in Senzini's sessions. For a mathematics teacher leader, understanding the need to be creative in what is done before, during, and after learning sessions becomes a promising starting point for meaningful interactions and engagements of teachers during the sessions. Senzini's experience, as a case in hand, reflects a deeper sense of the work of leading mathematics teachers' professional learning through exploring and navigating avenues for incorporating creativity with the goal of enriching the learning experience. Such a sense is exemplified by his awareness of attending to the details responsible for making teacher learning meaningful but also one which encourages teachers to continue to engage in their learning.

Senzini, moreover, reported realizing avenues for integrating creativity because he had the freedom to decide about what mathematics teachers can learn, how they can learn, and what materials and resources can be used to facilitate the learning process. That is to say that, he found himself navigating a boundless space to engage in imagining teachers' learning journey, feeling encouraged to think about what can be done to improve the experience. It's such a space where Senzini reported realizing a pathway for accommodating innovative ideas to make the professional learning an insightful experience for mathematics teachers.

Consistent with Senzini's experience, Astuto and colleagues (1994) underscored what it is like to work in a non-bureaucratic landscape:

> The hope of authentic reform rests in empowerment that generates action at the site of responsibility by encouraging people to assume responsibility for themselves. When self-control replaces bureaucratic control, people are free to work at the edge of their competence and, consequently, to develop in ways that expand the limits of their expertise (p. 89).

The assertion reflects a landscape that has the potential to make MTLs feel encouraged to freely engage in optimizing their capacities and talents in making professional learning a worthwhile experience for mathematics teachers. Senzini realized a place for creativity, imagination, and innovation because there was no bureaucratic control over what was to be learned and how teachers should learn. With such a power, on the other hand, Senzini could not have realized opportunities for incorporating what he believed to have the potential to improve the learning of mathematics teachers.

Cascading teacher leadership. Senzini acknowledged his teacher leadership work as being something that should not be confined in professional learning sessions. Rather, he considered it needed to be extended to the school premises to feature into school improvement initiatives. For him, teacher leadership is a fluid practice that needs to be embraced by mathematics teachers even those not attending the learning sessions. Through such an up-surging understanding, Senzini became motivated to make teacher leadership an integral part of his school improvement agenda as learning of mathematics is concerned. As he expanded:

> Since the day I became aware that this work is for all teachers, I have been working to spread it to my fellow teachers in my school. I have already introduced it to teachers, and I'm working with a number of them, as their mentor, to help them realize what and how they can contribute towards rotating the wheel of improvement of our school. For me, this work is important for every teacher. We need to have teacher leaders who can bring changes in our school.

The comment indicates Senzini's readiness to influence mathematics teachers in his school to become teacher leaders for them to contribute to making a difference in schools. Here, the outstanding issue is his desire to situate teacher leadership to the hands, hearts, and minds of mathematics teachers in his school, becoming increasingly aware that teacher leadership is for all teachers and not for selected few. As he articulated, the decision to introduce teacher leadership to his school was driven by his desire to ensure that his colleagues take part in improving mathematics learning in a school by working as teacher leaders. Senzini used a metaphor of rotating the wheel to allude to the need of bringing many teachers into the work of teacher leadership to push mathematics education to the desired direction and pace.

Senzini articulated what was behind his decision to attempt to expand the horizon of teacher leadership beyond learning sessions:

> I realized a tendency for teachers, especially math teachers, to feel so isolated and alienated from the work of improving their schools. So, after working with math teachers in our sessions and … [seeing] how teacher leadership works, I realized that this thing could make teachers in my school come together to support the school. I wanted to convince them first so that teachers learn from them.

Senzini went on to describe how he engaged in influencing mathematics teachers to become teacher leaders in his school:

> We normally meet for our math-subject meetings once a month. So, in one meeting I asked the head of our math department to give me some minutes to talk about something. So, as I was allowed to talk, I asked the teachers to think about how they can take chances to improve math teaching and learning in our school, in order for our students to do well in math exams. I asked them to think about what they can do to achieve the goal, whether to volunteer to prepare materials for other classes or to engage in team teaching in the school or at a nearby school. After some time now, I have recently seen some of the teachers starting to initiate things. For example, there is this one teacher who is volunteering to teach math during nights from 8 p. m to 9 p. m, Monday to Friday for Standard VII as a way of preparing them for final national exams. So, students go home and can come back to school to learn math. There is another teacher who was running a math club, but

unfortunately, he was transferred to another school to become a head teacher. But I'm happy to have it started here.

On one sense, the account shows the process in which Senzini engaged in persuading his colleagues to think about how they can tap opportunities associated with teacher leadership with the goal of improving students' mathematics learning. With such a pioneering spirit, he was successful in influencing some of the teachers to try to see themselves as teacher leaders, establishing small projects to initiate changes in how things were conventionally handled in the teaching of the subject. On the other sense, equally, the account demonstrates a situation in which Senzini was responsible for invigorating teacher leadership spirit among teacher colleagues in the school. For him, "math-subject meetings" were a place to start to spread the teacher leadership message, trying to advocate the idea that every mathematics teacher could and should play a substantial role in improving mathematics pedagogy in the school.

This strategy of using what might work in relation to the nature of the context is consistent with DuFour and colleagues' (2010) suggestion that MTLs should customize strategies they learn from other contexts to fit their specific contexts of their work. With the desire to expand the horizon of his work, on the other hand, one could be tempted to say that Senzini was informed of Hanuscin, Rebello, and Sinha's (2012) assertion that "there are many informal ways in which teachers [can] exert influence and make a positive difference in their schools" (p. 17).

The most concerning issue Senzini reported was the lack of commitment among some of the teachers of his school to become MTLs. He remembered a few teachers to give excuses not to join teacher leadership, saying that such work is not linked to promotion or remuneration. With such an experience, DuFour and colleagues (2010) would encourage Senzini to continue to persuade more teachers to become teacher leaders in his school and those nearby. They made it clear that even though teacher leadership is neither easy nor intended to be perceived ingenious, in its practical sense, it is a work worth pursuing if the goal of the school is to revitalize student learning. As such, they went on, advising MTLs "who care upon others to engage in a new work, achieve new standards and accomplish new goals [assume the] responsibility to develop the capacity of those they lead to be successful" (p. 1). Similarly, Donaldson (2007) notes, a teacher

leader who "draw[s] teachers to her or him for professional assistance and support has achieved an enviable and very influential role in shaping the success of the school" (p. 136).

Case Isile.

Leading within and beyond the district. As the only teacher leader in the district, one could expect Isile to focus only on leading the professional learning of the teachers. It is interesting that that was not a case for him as he reported being involved in other undertakings that had district and even national establishments. Isile's involvement in various educational activities shows his readiness to connect with a wider mathematics education community. He made it clear that:

> In our district, head teachers and WEOs are often held accountable when students fail in national standard VII exams. In case it happens that most of the students fail in this exam it is a big problem for them. Therefore, they don't want their students to fail exams in order not to be in troubles. So, some of these officers asked me to come to their schools and talk with teachers about how we can improve the learning of some of the difficult math topics. Because I've my motorcycle, it is easy for me to visit schools and work on those issues from time to time.

The storyline uncovers Isile's readiness to work with mathematics teachers who were not part of the learning sessions. Equally revealing is his embedded commitment to support effective mathematics education beyond his school by working with teachers to help them with improving pedagogical practices in their classrooms. Even more, such a determination is exemplified by his decision to use his personal possession—a motorcycle—to be able to visit different schools to meet teachers, head teachers, WEOs and other education stakeholders to think about what can be done to improve student learning of mathematics. Such a situation highlights the MTLs' enthusiasm in contributing towards tackling various complexities that hamper the provision of quality mathematics education in schools (Horton, 2017).

At a national stage, Isile, on the other hand, reported participating actively in several events held outside the district. Of the events is the Congress of Mathematicians and Mathematics Teachers of Tanzania that was organized by the Mathematics Association of Tanzania alongside

district education officers. One of the things he was asked to do during the congress was to talk with teachers about his experience of leading teacher learning. During the congress, he recalled spending a whole day working with mathematics teachers from around the country, demonstrating different pedagogical strategies that can help them to situate effective instructional practices in their classrooms. As a follow-up to what he shared, as he described, they, then, engaged in a discussion about how they can teach mathematics in ways that could help students learn the subject given conditions of their classrooms and schools. As it turned out, on the one hand, such conversations motivated him to continue to reach out to many teachers through the networks he established during the Congress. The conversations, on the other hand, reinvigorated his desire to prepare a workbook, containing exemplary lessons for facilitating the teaching of primary school mathematics. The idea behind such a pursuit is, as he described, to "help teachers to see how other teachers prepare and teach math lessons in their classrooms."

In her influential work *The Many Faces of Leadership*, Danielson (2007) uncovered the presence of teacher leaders who voluntarily yet determinedly exercise their leadership in different avenues with different classroom teachers. She writes:

> There are teachers whose vision extends beyond their own classrooms—even beyond their own teams or departments. Such teachers recognize that students' school experiences depend not only on interaction with individual teachers, but also on the complex systems in place throughout the school and district. This awareness prompts these teachers to want to influence change. They experience professional restlessness—what some have called the "leadership itch." Sometimes on their own initiative and sometimes within a more formal structure, these professionals find a variety of ways to exercise teacher leadership. (p. 14)

Weaving poetry into leadership and learning. Isile described himself as a poet, reporting to write and present his artistic work to different occasions within and outside his school. In our interview, he talked about his initial impression about his desire to incorporate poetry into the professional learning of mathematics teachers. Unfortunately, he had no idea about how such an integration could become a reality during their professional learning sessions. As he shared:

> I like poetry since my childhood. I do compose poems for many events to sensitize people on different issues, diseases, and to educate the community about environmental issues and

much more. So, I wanted to make poetry part of what we do with teachers in our sessions. But the issue was quite complex in the first place. I remember saying that this could be something difficult to do. You know that math is about numbers and poetry is something different. So, when I started this work I was perplexed with this issue, and I … wondered … how teachers will think of it. I didn't want to leave poetry out of our learning at all. I had to think about what I can do to make it part of teacher learning.

The account brings to light twofold aspects. The first aspect is quite personal, speaking to Isile as an artistic mathematics teacher leader. In a broader view, it shows a situation in which some of the MTLs possess skills that uniquely shape teacher leadership and teacher professional learning. That is apparently the case as, out of all teacher leaders involved in this research study, only Isile reported writing poetry, an art that significantly shaped his leadership of teacher learning. From the account, it is explicit that he was passionately determined to make his poetry visible to mathematics teachers, engaging in thinking about how it could support teacher learning during the sessions. The same shows a desire of some teacher leaders in blending unique skills and talents they possess to enrich the professional learning of their colleagues.

The second aspect apparent in Isile's experience of weaving poetry into teacher learning is related to existing possibilities that can be explored to make teacher learning useful during learning sessions. In practice, such opportunities are manifest as MTLs have room to ponder different ways they can encourage mathematics teachers to professionally grow to improve practice. Consistent with pioneers of teacher leadership, including Little (1988), what happened to Isile is not something strange nor did it occur by chance. Rather, it is what is expected to happen in any professional learning session, which is led by a teacher leader. When advocating teacher leadership, Little (1988), nearly three decades ago, made it clear that teacher leadership offers what she called, "a plausible inventory of possibilities" (p. 84) that teacher leaders can utilize to support teachers' professional growth.

Perhaps the illuminating observation is how Isile wove poetry into his leadership but also into the professional learning of mathematics teachers in his district:

After I figured out how I could use poems in teachers' learning, I started to use it in our sessions. So, I had two ways. One, I prepared poems based on what we were learning in

> each session, and then at the end of each day, I read the poems to teachers on what we just covered in that day. Sometimes, I asked one teacher to read for others. I used poems to clarify an issue, summarize what we learned, or make a conclusion. The other way was to ask teachers, who were interested in poetry, to write poems and read them before others. We worked together to develop those poems because it was a strange idea to many. Sometimes we talked about how we can use them in our classes to motivate our students to learn.

After spending the time in thinking about and working to integrate poetry in his work, Isile became informed of how poems could contribute to teacher professional learning. From the description, such ways show his commitment not to leave behind what he reported loving and was capable of doing as a mathematics teacher leader but also as a human being. This commitment demonstrates his passion for poetry but also for using it to ultimately support the professional learning of his colleagues. The same is also relevant with his desire to persuade teachers to be able to write poetry but also to make poetry commonplace in their mathematics classrooms. It is quite clear that Isile's intent was to use poetry in ways that motivate students to learn the subject but also to enhance their learning.

Summary

At the heart of the chapter was to describe individual experiences of the MTLs in leading teacher professional learning. It showcased how the MTLs differently experienced their work of leading teacher learning given the nature of their professional learning contexts. Even more, each teacher leader shared unique experiences as they reflected who they are as mathematics teachers and people with varying worldviews, experiences, and beliefs about social and natural worlds. Through the experiences, therefore, it is possible to make sense of how each mathematics teacher leader sees him/herself responsible to influence teachers to engage in the process of promoting their professional growth. The next chapter attends to teacher leadership and what it means and takes to situate it in a professional learning context within remote and rural primary schools.

Chapter 7

Teacher Leadership in (Inter)Action

Expectations

Before presenting the MTLs' expectations of their work, I would like to articulate, in brief, the grounds behind exploring such an aspect. Of course, expectations are substantially relevant for this study because they help us understand what the MTLs were imagining of their work considering that they were new to the role. Equally, such understanding is substantial as mathematics teachers who were to work with the MTLs were used to a different teacher professional learning model facilitated by people who were not classroom teachers. As such, it is reasonably important to make sense of what teacher leaders were expecting to experience while working with such teachers in a learning context. My engagement, on the other hand, is shaped by the understanding that the act of expecting something to happen is "an integral part of what it is to be human" (Webb, 2007, p. 67). But also, expectation entails "a condition for the possibility of leading a human life" (McGreer, 2004, p. 102). Recently, Robinson (2017) explained how an act of expecting something shapes a person in ways she or he might become fully engaged in pursuing. As such, expectation plays a substantial role in shaping MTLs' perceptions of and their engagement in their work of leading teacher professional learning.

Four sub-themes emerged out of the cross-case analysis of the MTLs' interview transcripts and vignettes. They include expecting deepened teacher understanding, expecting cold and warm receptions, expecting a slow take-off, and expecting increased teacher confidence. The expectations, accordingly, do not just add an important dimension to the description of the teacher leadership work, they give one more source of information regarding the experiences of teacher leaders in leading teacher professional learning. In subsequent sections, I offer thick description of each expectation.

Expecting warm and cold receptions.

While one group of the MTLs anticipated a cold reception from mathematics teachers, the other expected warm reception as they stepped into leading teacher learning for the first time. Kenny, Gabby Isile, Anne, and Thea, in particular, were worried that teachers would coldly

welcome them when noticing that they are the one leading their professional learning. In the following excerpt, Anne is even explicit about the reason behind such an expectation:

> I had a feeling that teachers will not receive me well because for many years the programs like this were led by people who were not teachers but bosses from outside the school. So, I was wondering how they will think of me because we are in the same level of education as teachers, and, in fact, teaching in the same kind of locality.

Some of the MTLs expected the teachers to raise questions as to what happened for them to lead the teacher professional learning program while they are still classroom teachers. As Thea shared:

> … in fact, I expected contempt. I expected to see them unhappy to be led by someone like me because I'm just like them, we are all teachers, not from big offices. So, I expected to see them becoming uncomfortable with my position.

The MTLs' sensibilities are enlightening when thinking about the expectations that mathematics teachers had when imagining their work of leading the professional learning of their colleagues. They illuminate an important issue about teachers' feelings when it comes to their position in implementing teacher professional learning. The expectations shaped by their understanding that their colleagues were used to traditional teacher professional learning programs facilitated by officers and experts, expecting them to still think that the responsibility of leading teacher professional learning is not for classroom teachers. On face value, they expected their colleagues to view them as not suited to support their professional growth as they have similar teaching qualifications but also, they work in similar teaching and learning contexts.

As advanced above, not all the MTLs awaited a cold reception from their colleagues. Mazengo, Pili, and Senzini expected a warm welcome from mathematics teachers. Mazengo, as a case in hand, had such an expectation as he believed the interactions that he had with teachers before coming to the learning sessions could make their first encounter become a positive experience to both. In his words, he "expected teachers to be excited seeing me there because these are people who we have worked together for so many years." As such, Mazengo was confident that mathematics teachers would be pleased to see him leading their professional

learning. Unlike Mazengo, who centered his expectation around his experience of working in many schools, Pili predicated her expectation on the notion that teachers prefer to collaborate with their colleagues, and through their leadership, they would realize opportunities to freely share what they know and do throughout their professional learning. She made it clear that:

> In fact, I expected them [mathematics teachers] to be happy seeing me working as their leader. I had that feeling because I thought they want to have the freedom to do what they think is necessary for their classes.

The accounts demonstrate varying expectations when it comes to how the MTLs see themselves as teacher leaders alongside their colleagues in the early days of their work. It has become visible that the expectations that the MTLs had about their receptions are subject to longstanding sensibilities about the position of mathematics teachers in promoting their professional growth within the education system. The experiences, moreover, showcase how expectations drew teacher leaders to think about how their colleagues will perceive them in the first place. Also, they reveal the situation in which the MTLs prioritized thinking about the nature of relationships they were going to experience alongside the mathematics teachers. The observation is insightful considering that many teacher professional learning scholars and researchers, including DuFour et al., (2010) and Katzenmeyer & Miller (2009) have advised teacher leaders to constantly think about their relationships with mathematics teachers during their learning sessions.

Expecting a complicated take-off.

Some of the MTLs foresaw many of their mathematics teachers to find the process of their professional learning unfamiliar, wondering about how they should adjust themselves to engage in the learning process. At the heart of such an expectation is their understanding that their colleagues were used to experience a model of teacher professional learning, which discouraged them to become active throughout the sessions. The MTLs, consequently, expected their colleagues to encounter a challenging beginning, warranting a slow take-off of teacher learning. Senzini, for example, sensed such a situation at the time when he was planning the learning sessions, predicting witnessing mathematics teachers to struggle to engage in such a novel learning space. As he expanded:

> Teachers who had a chance to attend PD [professional development] before were used to playing a very minimal role in their learning. So, I said to myself that this program is going to be something new to many if not all teachers as they are not used to it. I expected them to take a long time to think about what to do.

Consistently, Gabby expected tensions among the teachers when they realized that they were required to shift from being passive participants to becoming active professional learners, needed to foster their own professional growth. As he expanded:

> I was imagining them being demanded to do more than their expectations. The thing is they were required to understand that they are no longer there to be taught some concepts, rather, to work so that to become skilled for them to be able to help their students learn mathematics. For me, such a turnaround is not easy as it is something complicated, thus why I expected them to become stressed in some ways.

Other MTLs were explicit about anticipating a dawdling process of learning among mathematics teachers. They made it clear that they were prepared to spend more time, in the beginning, to help their colleagues to become more aware of what is expected of them as they engage in advancing their professional knowledge and skills. As such, the MTLs chose to help the teachers, so they would not become discouraged and opt out of the learning process. As Kenny expanded:

> Because this program requires teachers to actively participate in their learning, and not listening to me as their leader, I knew that I need to work with them to understand their position. You know I experienced the same when I was introduced to this kind of teacher learning. So, I wanted to give them a hand on that. I was confident it would take time until they become comfortable with it.

The issue of expecting a complicated process of learning at the start of the professional learning sessions is quite illuminating. It speaks to the perceived impact of the tendency of treating mathematics teachers as passive recipients of knowledge and people who have no or limited say in the process of monitoring their professional growth. The more striking observation is the concern that Gabby raises about his expectations of seeing the teachers waiting to be taught

mathematical concepts as it was a routine practice in traditional professional learning programs. From his account, he was informed about how such programs treated mathematics teachers as objects that attend a professional learning for them to receive knowledge they were expected to apply in their mathematics classrooms. Collectively, the experience of expecting complicated beginnings agrees with the views of Mhando (2012) that teacher learning in Tanzania is dominated by notions and practices that alienate mathematics teachers from owning their professional learning.

Expecting increased teacher self-confidence.

The MTLs expected their work of leading teacher professional learning to increase mathematics teachers' confidence in teaching mathematics. They held that the program could allow teachers spaces to become bold in using diverse pedagogical practices to situate meaningful mathematics learning in their classrooms. As Isile expressed:

> You know we have been prepared to do this work for many years now, so I prepared the sessions well to help teachers become confident teachers to teach this subject which is feared by many teachers and students as well. That's why I expected them to develop such an important piece of confidence.

The MTLs had a belief that the engagement of mathematics teachers in their professional learning could enable them to ultimately gain the confidence they need to facilitate effective mathematics learning among students. It is noticeable that these teacher leaders expected the program to help teachers become poised to successfully teach the subject for the sake of enhancing student learning of mathematics.

Other MTLs foresaw the professional learning to play an instrumental role in revitalizing female teachers to see themselves suited to teach the subject in their schools. They, therefore, expected mathematics teachers to become interested in teaching mathematics over other subjects of primary education. As a case in hand, Anne wanted teachers to develop the confidence to overcome all sorts of deterrents and provocations associated with teaching the subject. Such expectation seems highly shaped by her previous experience of receiving discouraging comments from community members that she should not learn mathematics because she was a

girl. The experience evoked her memories of her early years of schooling, thrusting her to create conditions for her fellow female teachers to experience a supportive learning environment. As she expanded:

> By having someone like me leading their learning, I expected that the female teachers would gain a lot of confidence out of that. I was ready to see them developing confidence in teaching mathematics through their interactions with other female teachers as well as male teachers. In fact, I wanted them to realize that teaching mathematics is not a work for male teachers but rather for all teachers regardless of genders.

Pili, likewise, anticipated female mathematics teachers to realize opportunities to continue to engage in teaching the subject in their schools after participating in their professional learning. For her, "[w]hat female teachers need to be able to teach the subject is confidence as most of them lack that." With such a view of teachers, Pili "was expecting they (female teachers] could be inspired to continue to teach mathematics in their schools after participating in the program." She associated such an expectation with the way in which the program was organized. That is, according to Pili, to help mathematics teachers to gain confidence in teaching the subject. With these experiences, having female MTLs (Anne and Pili) who expected the female mathematics teachers to gain confidence in teaching mathematics out of the participation in the professional learning program is a critical observation. They desired to see their colleagues becoming confident and successful teachers of mathematics in their schools. Also, the MTLs needed to see their fellow female teachers poised not just to teach mathematics but also teach any mathematical concept in any standard that they are asked to teach in their schools.

Expecting deepened teacher understanding.

The MTLs believed that the professional learning experience would ultimately benefit mathematics teachers by becoming more informed about diverse pedagogical strategies that could be suited to facilitate teaching and learning of various mathematical concepts in a classroom setting. Most MTLs expected conversations and discussions they were going to have to provide avenues for teachers to expand their understanding of pedagogical strategies that they narrowly understood or were novel to them. The excerpt by Gabby highlights what the MTLs expected of the teachers:

> My expectations were related to the changes that teachers can bring to their classrooms after the sessions. I had this hope that they will be in a good position to develop bunches of strategies or approaches to improve their teaching and learning of their students.

Some of the MTLs were expecting that collaborations and interactions that were to happen among members of the group could become gateways for mathematics teachers to develop insights of different pedagogical strategies appropriate for their classrooms. Thea, as a case in hand, "anticipated a change of understanding in teachers after their professional learning." She was "quite sure that by working together they could learn from the experiences of one another [which is] … a powerful way of learning several tactics of teaching the subject." Because of their perception of the preparation they made, other MTLs hoped mathematics teachers would develop a deeper understanding of a variety of teaching strategies that they can choose from when it comes to teaching their students. Isile, for example, expected "mathematics teachers would learn something new and something concrete from one another… that could help them make a difference on how they teach their students."

It is visible that the MTLs expected to see mathematics teachers become aware of different learning strategies that have the potential to improve mathematics pedagogy. With such an expectation, the MTLs were encouraged to led teacher professional learning in ways that could enable their colleagues to become who they expected they could become following their engagement in the professional learning journey. That is plausible as they had a sense of direction as to where the professional learning would take mathematics teachers out of their participation in different learning experiences. That is even more possible because expectation has "a profound transformative force" (Webb, 2007, p. 66) influential in shaping teacher leadership.

Teacher Leadership Roles

The cross-case analysis generated three categories of roles—pre-session, in-session, and post-session teacher leadership roles. To illuminate the roles, I offer a comprehensive description of the functions that fall under each category, highlighting what the MTLs did before, during, and after learning sessions alongside mathematics teachers.

Pre-session leadership roles.

The MTLs described shouldering two leadership roles before the commencement of the learning sessions. While the first activity is related to the process of designing professional learning plans, the second involves mobilizing resources and creating materials to enhance teacher learning. In the succeeding sections, accordingly, I offer an in-depth description of each activity as implicated within MTLs' experiences of leading the professional learning of their teacher-colleagues.

Designing a learning plan. The MTLs, altogether, recounted engaging in designing professional learning plans that suit the needs of mathematics teachers. For them, the designing process involved developing learning modules and daily tasks. As they pointed out, the latter was used to invite teachers to engage in deepening their professional knowledge and skills, thereby to enrich practice. As Isile composed in the vignette.

> As a poet and a leader, I'm responsible for designing modules, but also, I am needed to create a few poems for the teachers. For the modules, the idea is to get a sense of what we need to focus on during the sessions. That is an important document because through it teachers make sense of what they are going to learn.

Other MTLs shared comparable experiences regarding what they did before the beginning of the professional learning sessions in their districts. They recounted the process of designing learning plans to have come with some tensions along the way in their early days after stepping into leading teacher professional learning because it was a new experience for them. As Anne explained in a focused interview:

> I remember, in the beginning, it was tough for me to prepare a module. But I took my time to work on it with the help of my colleagues to make sure that I prepare them. Yes, it was hard for me during that time. I'm happy that after taking my time to do and redo for different sessions, I became convinced that I can prepare them in a good way.

Anne is illuminating how she navigated the process of designing learning plans in the first place. She is categorical about experiencing a challenging start while engaging in preparing

learning plans for her sessions. This was the case even though Anne and other MTLs were familiarized to the processes of developing plans during the program they attended before becoming teacher leaders. Mazengo, who had comparatively many years of designing learning plans for his primary school students, experienced a similar situation like that of Anne. He talked at length about being deeply stressed when he started engaging in such a work. One thing that made him become stressed is the duration of the time he needed to initiate the process of designing the documents as well as completing the designing of the same, to be used in his first session. As he said:

> You know the beginning is always hard. I remember I struggled to get the designing to move forward with the work. I had to spend more time to get things done in the first place. I can't imagine that nowadays it's something very possible for me to do as I can do it without spending too much time thinking about where to start and how I can do it.

In their vignettes, the MTLs considered the preparation of modules and learning tasks to require an investment of thinking to develop a professional learning plan that has the potential to enable mathematics teachers to expand their professional knowledge and skills. For Gabby, such a work, using his words, "cannot be completed just for the sake of doing it, to get things done." Rather, as he said, it compels a teacher leader to develop a sense of a big picture of what to include in the plan to meet the needs of mathematics teachers, to become adept at locating effective mathematics learning in their classrooms.

Being novice to teacher leadership work, the activity of preparing modules and learning tasks was undeniably challenging to most MTLs. The plans, as they mentioned, were helpful in making sense of the direction of their learning, guiding them to remain focused on the journey of expanding professional knowledge. In the absence of such tools, as Dana and Yendol-Hoppey (2016) caution, teachers "risk making little or no progress in their learning, getting lost, and even returning to the comfort of the ways their teaching has always been done without the benefits and insights that [professional learning] work can bring" (p. 43).

It is quite noteworthy that nearly all the MTLs reported being more comfortable in preparing such tools after becoming engaged in designing professional learning plans for different learning sessions. Dana and Yendol-Hoppey (2016) concur with the experience of the

MTLs that the process of developing learning plans is time-consuming but "it is important to devote some … time to constructing a road map and charting a course for the learning you wish to accomplish together over time rather than progressing somewhat aimlessly from one [professional learning] meeting to the next" (p. 44). The importance of such a work lies in the understanding that "[i]n the history of education, no improvement effort has ever succeeded in the absence of thoughtfully-planned and well-implemented professional [learning]" (Guskey & Yoon, 2009, p. 497).

Mobilizing resources and creating materials. The MTLs recounted mobilizing resources and creating materials they needed to facilitate the professional learning of mathematics teachers. As they explained, while most of the resources were brought to the sessions through the support of MEP, some of the learning materials they needed were created by the MTLs themselves. As Thea pointed out in her vignettes:

> In fact, I created some of the materials that we used in our sessions. I had to go to carpentry units to ask them to prepare for me some wooden shapes, like shapes of triangles, rectangles, squares, etc. When I get them, I have to make sure that I store them well as I was waiting to bring them in our sessions.

Mazengo shared a similar experience, saying that he regularly "prepared materials in advance so that to get everything done and in place before teachers convene for their professional learning." He talked at length about his initial experience of struggling to prepare learning materials for the sessions, experiencing the work to be demanding as it called for the employment of imaginative and artistic skills to accomplish it. However, after being immersed in such a creative work, as he explained, he eventually became more contented and skilled in creating different learning materials within a short period. Other MTLs (Isile and Senzini), who both reported possessing skills needed for a teacher leader to develop learning materials of different shapes and sizes, talked about their experience of using resources that were available in their homes to create learning materials for their sessions.

Senzini, in particular, showed me a box which was full of different learning materials for the professional learning of his mathematics teachers. The materials included figures of several geometrical shapes such as cubes and cylinders that were made of papers and wood materials.

His intent in showing me the materials, was to demonstrate not just what he has been able to create since joining the teacher leadership work but also what his teachers have been using to expand their professional knowledge base. As he explained:

> The thing is, I like to do this work, so I always create materials for my class but also these days I have to prepare for the teachers that we work together. And because we are well supported with the resources from the project, I have created so many materials within a short time since I became a leader. I do this because I frequently want the teachers to use materials to learn as well as encouraging them to teach using materials.

During our separate interviews, the MTLs recalled inviting mathematics teachers of their primary schools to share their opinions about the suitability of the learning materials they created before bringing them to learning sessions ready for teacher use. The intent, as they explained, was to make sure that the materials attend to the goal of helping mathematics teachers to enrich their professional knowledge and skills of the concepts they were to engage during the process. Kenny is a case in hand:

> … when I finish creating learning materials, I normally take them to teachers who teach mathematics in our school. I urge them to say about what the materials are trying to communicate and what needs to be improved for them to be useful for teachers. I have done this since the beginning of this work because I don't want to bring something that could make teachers uninterested in learning.

Nearly all the MTLs affirmed engaging in the process of assembling resources and developing learning materials before the beginning of the sessions. From their descriptions, it is visible that most of them found the work to be challenging in the first place since it was the first time for them to engage in preparing materials for teacher learning. However, they reported being comfortable with the undertaking, alluding it to be a rewarding process as it provided them with opportunities to learn different aspects of connecting materials to a mathematics concept that the teachers were to learn. One striking observation from the MTLs' experiences is related to the way in which they made the process of developing learning materials to become a collaborative practice. That was a case as they reported inviting their teacher-colleagues to share views about the potentiality of the learning materials in teacher professional learning. Borko

(2004) supports such an engagement of the MTLs, saying that it is a powerful way of achieving twofold aspects in any professional learning session. First, it helps to develop learning materials which are capable of communicating the intended mathematical concept. The second is equally consistent with the views of nearly all MTLs—creating materials which not just meet the needs of teachers but also attend to the conditions and requirements of their mathematics classrooms.

In-session leadership roles.

The MTLs talked about assuming several leadership activities when the professional learning sessions were underway within their districts. The six main activities emerged out of cross-case analysis of their vignettes that included greeting teachers; introducing self, others, and big ideas; distributing learning tasks and engaging teachers; motivating teachers; and collecting information about teacher learning. Other activities are moderating discussions and facilitating consensus. In the succeeding sub-sections, I describe the activities as shared by the teacher leaders. To facilitate the understanding of what MTLs did during the sessions, I explain the roles in chronological order, starting with those they assume at the beginning of the session to the end.

Greeting teachers. In all the vignettes I collected, the MTLs indicated engaging in greeting mathematics teachers who were part of the group after stepping into the venues where the professional learning sessions were taking place. For them, as they briefly indicated, the greetings were the first thing they should do before initiating the learning process. A line of experience by Senzini demonstrates the MTLs' engagement in such an undertaking:

> The first thing I always do is to salute the members of our group by asking them what is going on their side. After that, we start our session

With such a description of his experience, it is interesting to understand what comprised the greetings during the sessions. Nearly all of them reported using the MEP's saying, *Hisabati ni Maisha* (Mathematics is Life; Mathematics is Living) in greeting the teachers. Isile became increasingly helpful in making sense of what they usually do when greeting mathematics teachers as he demonstrated to me during our interview:

Calvin: Can you tell me more about how you greet the teachers in your group?

Isile: Yes, so, we normally use the *Hisabati ni Maisha* saying to greet the teachers. And it has been a greeting that I have decided to adopt in my mathematics classes in my school. Okay, so when I just step in, I just say *hisabatiiiii!* (mathematics) and the teachers will respond … *ni maishaaaaaa!* (is life) I can even repeat it twice as much as I think I need to do so. But … it's not like our schools where students must stand up to reply to the greeting, and teachers normally remain seated.

The MTLs' declaration that they engaged in greeting their teacher-colleagues reflects an informal yet common practice of primary school teachers in Tanzania to greet their students as they step into their classrooms. As such, the teacher leaders were equally compelled to greet teachers before they embark on their learning as a way of showing respect and attachment to one another. From their perspectives, by greeting teachers, the MTLs made their colleagues feel respected, and that a sense of belonging to the group developed.

A more enlightening issue from the descriptions is that of adopting *Hisabati ni Maisha* (Mathematics is Life; Mathematics is Living) saying as their message of their greeting. As they elucidated, the decision of using the saying was inspired by their intention of making their learning sessions to sound mathematical from the onset of the learning session, considering the message it conveys to both mathematics teachers and teacher leaders. From their experiences, the MTLs observed the saying to take mathematics teachers back to what they are expected to do as they work to enrich their professional knowledge and skills. A greeting, as a cultural dimension, has been well attended by Hord and Sommers (2008) in their discussion about things that have the potential to make teacher leaders can do in order to remain connected with mathematics teachers beyond learning sessions. Because of such a role, the scholars suggest MTLs pay close attention to cultural dimensions by making them "part of the context and the setting in which ... [teacher professional learning] operates" (p. 49).

Introducing self, others, and big ideas. The participating MTLs reported introducing their teacher colleagues. For them, the introductions are meant to enable members of the groups to become aware of each other before engaging in a collaborative learning practice. The intent, as they elucidated, was to ensure that every member embarks on their professional learning while aware of not just the people who they will regularly interact with along their learning journey but

also what they were going to learn in the sessions. Anne, as a case in hand, reported spending a considerable amount of time in accomplishing such an activity given the size of her session—more than 60 teachers. As she described:

> As a leader, you can't just take teachers to activities without letting them know those who surround them. In our group, we normally spare some minutes to have the introductions, and through that, we come to know everybody there. I also introduce the ideas that we are going to learn on that particular day.

Mazengo, consistently, considered introductions to be a norm in the group since he became a teacher leader. That was the situation because, using his words, the introduction was "something that we must do when teachers convene for their [professional] learning." He added further that introductions of teachers are indispensable because of experiencing attendance of new teachers who join the sessions for the first time. Given such a situation, using his words, "teachers needed to understand their colleagues for them to feel comfortable in their new environment." Mazengo, also, reiterated the undertaking to play a substantial role in helping mathematics teachers to become well-informed of the leader of their professional learning.

Kenny, like colleagues, considered his work of introducing himself and mathematics teachers essential in initiating the formation of professional relationships. He explained in an interview that:

> I think you need to make teachers feel connected to each other from the very beginning. That's only possible when you have them talk about themselves and what they do in their classrooms and schools at large. I think, in that way, they become connected to one another in some ways. And that marks the beginning of their relationships and friendships as mathematics teachers.

In conclusion, most MTLs made it visible that they engaged in making introductions to help the teachers to become more aware of their colleagues but also to become mindful of what they were expected to focus on during their professional learning. The MTLs realized the need to start their work by introducing teachers considering that not the same of them attended the sessions all the time. Drawing on their experiences, on one side, the MTLs considered

introductions as necessary in helping new mathematics teachers new to the group develop a sense of belonging to the team. On the other hand, they reported finding such an undertaking deeply helpful and contextually relevant in making teachers aware of their colleagues, whether they are new or already familiar to one another.

Distributing learning tasks and provoking teachers. My observation about this role is MTLs' habit of using learning tasks, activities, and questions interchangeably when describing learning tasks that they provide to mathematics teachers to deepen their professional knowledge base. In particular, to initiate the process of teacher professional learning, the teacher leaders reported embarking on distributing learning tasks they prepared before the commencement of the sessions. Anne, who led large-sized sessions, documented in her vignettes that she "provided the tasks to teachers for them [teachers] to start doing in pairs first, then in small groups, thereafter to be discussed in the large group." Her intent with such a style of distributing tasks was to ensure that every mathematics teacher work on the tasks, so become actively engaged in their learning from the beginning of the session.

Other MTLs shared similar sentiments, recounting to distribute tasks as a way of initiating the learning process. Kenny, a case in hand, reported that he "always start the learning session with learning activities." He further added that "it's my work to provide teachers with the activities in their tables, and I ask them to respond to them." Thea, who was leading a mid-sized group of more than 40 mathematics teachers, recounted providing teachers with learning activities to communicate big ideas for them to recollect their experiences of teaching mathematics in their classrooms. Like her colleagues, she recalled having activities for introducing the concept but also others for engaging teachers in a collaborative work of deepening their understanding of the concept they were learning. As she added, such activities shaped what teachers learned in the sessions, and, as it turned out, helped them to ultimately expand their professional knowledge and skills.

Since all the MTLs indicated engaging in distributing tasks to their mathematics teachers, I became interested in probing more about the rationale behind such an endeavor during our focused interviews. Nearly all of them made it clear that they provided teachers with tasks as a way of inviting them to share their views, experiences, and understanding of the learning tasks

and to move forward with that to learn the concepts. For them, the tasks were instrumental in taking teachers back to their mathematics classrooms, rethinking the strategies they used to help students to learn similar tasks. The MTLs were also interested in provoking teachers to share their understanding of the concepts they were learning in their sessions. Pili's quote reveals the MTLs' intention behind provoking the teachers during their sessions:

> With the questions, I wanted to achieve some things. The issue was to provoke teachers to bring ideas to the tables for everyone to make sense of them concerning the nature of their classes they teach in their schools. Most of the concepts that we work on in our sessions are familiar to teachers, nothing new, but some strategies were. So, my idea was to give them opportunities to share their experience of teaching those concepts.

On the other hand, Isile, who was leading medium-sized sessions, provided tasks to teachers with the intention of laying a foundation for further understanding of the concepts. He intended to understand "what teachers are aware of in relation to the concept that [they] were learning each day." Like other MTLs, he reported basing on "such awareness to introduce teachers to new or challenging things that [he] thought they needed to be more aware of for them to be able to help the learning of their students."

From the experiences, it is ostensible that the MTLs distributed learning tasks not just to initiate the learning of mathematics teachers but also to provoke them to communicate their thoughts related to the concepts. It is also evident that they used the same to invite teachers to take an active role in promoting their professional growth. For them, the tasks drew teachers to the front and center of their learning, becoming more encouraged to share what they know about the tasks. The MTLs' engagements resonate with Murray and Zoul's (2015) views that teacher leaders should use learning tasks to find "where each of our teachers is in their own learning journey and where they think they need to go next in order to grow and improve" (p. 11). From the MTLs' accounts, it is clear that learning tasks play a substantial role in helping to provide spaces for mathematics teachers to take control of professional learning throughout the sessions.

Moving around to experience learning. In their vignettes, the MTLs recorded walking around their learning venues to meet and talk with mathematics teachers about what they are experiencing in their learning. They decided to pursue such an undertaking with the goal of

making sense of what mathematics teachers were doing in relation to the learning tasks provided to them. On the other hand, the decision, as most of them said, was motivated by the need to realize opportunities for helping teachers to focus on improving their professional knowledge. Kenny, for example, reported engaging in gathering information about the learning of the teachers during the sessions by comparing "what is happening" in every group. He was categorical that he decided to pursue such a direction in the interest of identifying groups that were well-positioned to support learning in other groups, which were experiencing some difficulty. As he described, the intent was to provide teachers with opportunities to work together in furtherance of supporting one another during and even beyond the learning sessions.

Even though she was not interested in comparing the groups, Pili, like Kenny, decided to visit the groups to witness what mathematics teachers were experiencing while engaging in furthering their growth as professionals. That was apparent as she stated that she "moved from one group to another to see what teachers were doing during their small group discussions but also during paired conversations." For her, such a commitment ameliorated her to notice enabling or disabling conditions that the teachers were experiencing while navigating their learning journey. In a case of witnessing disabling conditions, Pili reported engaging in rectifying the situation for the teachers to become successful in upholding their professional growth.

Other MTLs recounted engaging in walking around simply because it is an inherent role to be accomplished by any leader of teacher professional learning. For Thea, as a case in hand, a mathematics teacher leader is not expected to remain locked in one group or at the table in front of the venue where professional learning is taking place. Instead, as she expanded, a leader is expected to naturally visit every group, one after the other, anytime "ask[ing] what the teachers are discussing or doing in a particular moment." When I enquired with her to know more about the reason for them to move around the venue to meet teachers, Thea made it clear that the idea was to make sense of not just where mathematics teachers are in their learning but also what they were experiencing in their learning journey. Using her words, she considered the activity to assist a teacher leader to "listen to the teachers in relation to the challenges that they face" as learners.

The MTLs were even explicit about engaging in meeting with mathematics teachers with the goal of witnessing the learning. Through such an endeavor, as they said, they were able to say more about what teachers were expected to do as it was their first time to participate in such a form of teacher professional learning. Drago-Severson and colleagues (2013) are in support of this engagement, suggesting teacher leaders create supportive structures for enabling mathematics teachers to realize opportunities for growth.

The commitment shown by the MTLs reflects the suggestion made by Hord and Sommers (2008) about what a teacher leader can do to continuously monitor the professional learning of teachers. The teacher learning scholars note that "there will be bumps, dips, and detours on the road … [so] someone must monitor the pulse of individuals … to help ease them over the rough spots" (p. 114). As such, by talking with the teachers about their learning, the MTLs were in an appropriate position to offer needed support and assistance helpful in situating meaningful professional learning. In that way, the MTLs were even "accountable for the quality and results of professional learning" (Louis, Hord & von Frank, 2017, p. xiv).

Motivating teachers. Following distributing the learning tasks, the MTLs recounted engaging in motivating mathematics teachers at the time when the learning sessions were in-progress. While most of them used verbal motivation and body language to encourage their colleagues to engage in learning. As Mazengo indicated in his vignette:

> One of my tasks in my sessions, as a leader, is to encourage teachers to keep learning regardless of what could be like hampering them to learn.

The MTLs demonstrated becoming mindful of the need to encourage their colleagues to navigate their professional learning journey. Since nearly all of them reported engaging in motivating teachers, the question as to why they decided to assume such a role became imminent. For example, Thea, who claimed to have led a divided group of mathematics teachers at the beginning of her work, needed to motivate her teachers to determinedly use the professional learning opportunity to become aware of pedagogical strategies they can use to improve practice. As she expanded in a focused interview:

> I have learned that not all teachers like to be active in their professional learning at the beginning. Others need to be encouraged or pushed a little bit. So, I think it is important to motivate them all to seriously learn as it is what has brought them there and not something else.

Senzini found motivating mathematics teachers a vital role following his understanding that his colleagues were experiencing a new professional learning experience. He reported being mindful of the need to encourage teachers to actively engage in their learning. With such a consciousness, he comfortably pursued the role of heartening his colleagues to keep working on advancing their professional knowledge and skills. As he described, his commitment was shaped by his desire of not seeing mathematics teachers lose their industriousness during their learning nor did he intend to leave them exhausted to learn. He considered himself responsible for making sure that "the teachers are motivated to learn [amidst] tensions and challenges that might discourage them to learn."

Other MTLs declared pursuing similar undertakings to enable teachers not to find professional learning something unanimated and strenuous. As Gabby expressed, the decision to attend to such a direction was relevant following the realization that teachers were used to traditional learning that oriented them to feel required to undertake a minimal role during their learning. As such, he sensed that teachers needed constant encouragement and motivation for them to navigate their transition to a kind of teacher professional learning which calls for active participation and engagement throughout the sessions.

The MTLs reveal what triggered them to motivate teachers during their leadership of the professional learning sessions. For them, they believed the presence of a teacher leader not enough until mathematics teachers are motivated to deeply engage in the process of promoting their professional growth. The intent, as they described, was to ensure that teachers honor the opportunity of being involved in a teacher professional learning program led by teachers themselves. Even though the MTLs led sessions of varying sizes of teachers who had diverse experiences, they all reported encouraging their colleagues to actively monitor their professional growth.

Facilitating teacher discussions. One more undertaking that nearly all the MTLs reported pursuing is facilitating discussions during their learning sessions. As leaders of teacher learning, they pondered being responsible for creating conditions for productive discussions among mathematics teachers during sessions. From the MTLs' sense, they deemed such a commitment to suit their capacities of leading teacher professional learning, viewing themselves well-informed about ways of facilitating meaningful discussions within a group. With such a sense, Kenny, like colleagues, shared the following in his vignette regarding the undertaking:

> I engaged in leading discussions then I offered concluding thoughts during one larger group discussion that occurred immediately after small group discussions

During focused interviews, I probed more about the intention of endeavoring to facilitate mathematics teachers' discussions during sessions. It became clear to me that the MTLs decided to assume such a role because they wanted to make sure that every mathematics teacher becomes engaged in the professional learning by sharing ideas, and experiences regarding the concept under discussion. Through the same, they reported being interested in creating an enabling context that could help the voice of every teacher be heard not just during the discussions but also during the process of negotiating a way forward of their learning. As Isile explained in an interview:

> Yes! What I learned during our preparatory program is to make sure that every teacher is engaged in the learning process. So, it was important for me to make sure that everyone realizes a chance to participate in learning. The idea was to make sure that everyone there is having an opportunity to be heard if she or he wants to do so.

In the same manner, Gabby undertook the role with the goal of guaranteeing that ideas shared by every mathematics teacher are respected but also well-taken care of by members of the group. For him, by not having someone taking care of discussions, chances exist for some ideas, thoughts, and views of some members to be intentionally or unintentionally overlooked. Kenny, on the other hand, defended his pursuit of facilitating discussions, saying that it was crucial that teachers realize key takeaways of discussions as they move forward with their professional learning and with implementing ideas in their classrooms. That was an important endeavor to

pursue, from his perspective, because one discussion usually informs subsequent discussions and ultimately impacts how to engage in improving practice.

Taken together, the descriptions showcase the way the MTLs saw themselves being responsible for taking care of discussions as a way of attending to their embedded desire of assuring that every teacher realizes spaces to contribute to the development of the collective. With such a passion, on the other level, it means that they were concerned with the need to ensure that conceptions and misconceptions of every teacher are taken aboard, informing future teacher learning. For them, such a commitment was crucial as it allowed teachers to develop a sense of belonging to the group but also gave the MTLs an understanding of where teachers are in their learning with respect to where they are expected to be and go.

What the MTLs did regarding their decision to facilitate discussions agrees with Louis' (2017) observation that teacher leaders are expected to take a leading role in creating supportive systems and conditions that encourage teachers to actively further their professional knowledge. As Louis (2017) has it, the idea is for professional learning contexts to become places where mathematics teachers feel invited to successfully monitor their professional growth.

Post-session leadership roles.

After leading teacher professional learning, nearly all the MTLs reported exercising their leadership role in twofold ways. While the first is about networking with mathematics teachers, the second involved (re)designing professional learning plans for next sessions. They reported undertaking these activities while they were in their workplaces. In the next sub-section, I describe each activity as enshrined in experiential accounts shared by the teacher leaders.

Networking with teachers. As alluded to above, the MTLs communicated with mathematics teachers after adjourning their learning sessions. Such communications, as they said, did not happen on a regular basis but rather only when teachers realized the need to do so. In other words, communication between teachers and the MTLs occurred when the former needed assistance from the latter to address pedagogical challenges of impacting the bottom line of student mathematics learning. They also communicated when they needed more information about the learning activities they provided them with to implement.

Anne, for example, wrote the following in her vignette, demonstrating a situation in which the MTLs communicated with mathematics teachers in their districts:

> I see this work being ongoing because when we depart, I still communicate with teachers in case they want some help or anything. I have experienced this situation since the time I started this work, and now I'm used to it.

Here, Anne attributes her engagement with communicating with teachers to the nature of teacher leadership work. She is categorical that their work of leading teacher professional learning is inherently ongoing. Such a conception of their work reveals a situation in which the MTLs became more comfortable to engage in the ongoing process of supporting their colleagues when the need awakes. Such an observation provoked me to probe more about the feelings of the MTLs concerning a situation of being engaged by teachers in constant communication even after learning sessions. Most of them described feeling pleased with such a situation, relishing the opportunity to continue to help their teacher-colleagues when they encountered challenges in their work. For them, the situation of being approached by their colleagues for assistance motivated them to keep doing the work at any time.

Mazengo admitted being relaxed to engage in ongoing communications that sustained the work they initiated during their sessions. He attributed such an engagement to what it means and takes to work as a mathematics teacher leader in a district. Like his fellow MTLs, he recounted feeling delighted to work with other mathematics teachers from different schools, seeing himself as a resource in the district when it comes to supporting teachers in furthering their professional knowledge and skills.

Thea, equally, stated feeling indulged and appreciated when mathematics teachers contacted her for assistance. She relished the opportunity to communicate with teachers, describing learning a great deal from the teachers during their conversations. As she pointed out in an interview:

> I like it because, when we communicate we share many ideas on how we can address issues that are in our classrooms. So, at the end of the day, I learned a lot of things from them. That's why I said I feel well with this work.

It is considerably manifest in the sentiments that the MTLs were steadily involved in leading the professional learning of their colleagues beyond learning sessions. The most revealing observation is related to teacher leaders' comfort in engaging in such a work, associating it with a learning process as it provided them and teachers spaces to continuously intensify their professional knowledge base. The teacher leaders saw their work not bound to a particular context and time. Rather, and more critical, they see their work as an ongoing commitment to empowering others, to successfully untangle pedagogical challenges the teachers face in their work. This means that the MTLs worked to ensure that teacher professional learning becomes a collaborative, productive, and ongoing practice in their districts.

(Re)designing forthcoming professional learning. The MTLs were informative that they engaged in designing and redesigning professional learning plans for the next learning session of mathematics teachers. For them, as they said, the end of one session marked the beginning of the preparation of the coming session, engaging in imagining what the session could look like in relation to what teachers have learned in previous sessions. As such, they recounted communicating with fellow teacher leaders to start designing learning plans they would need to facilitate the learning of teachers in a few days to come. Quotes by Thea and Isile showcase how the MTLs navigated one learning session to another:

> After we finish the session, my attention turns to the next session because this work is continuous and, so we should start to do design things (Thea).

> The other roles that I play after our session are to try to think about what is needed in our coming sessions. So, I have to create materials and gather some resources for that (Isile).

What became clearer from the vignettes is the readiness of the MTLs in re-engaging in the process of designing professional learning plans for the next session. As such they experienced a continuity of their leadership work, becoming more comfortable to meet the demands of their work with the aim of making sure that they work alongside their mathematics teachers' colleagues to support them in promoting their professional growth. One more issue learned from the MTLs is their sense of cooperation that endured among them as leaders when it comes to the time they are needed to develop learning plans for teacher learning. That was the case as most of

them narrated corresponding with their colleagues to plan how they organize themselves to start accomplishing the undertaking.

Roadblocks

The cross-case analysis revealed two roadblocks that the MTLs encountered in their work of leading the professional learning of their teacher colleagues. The first is a traditional conception of teacher professional learning among mathematics teachers. The second is a situation whereby teachers used more than one language while communicating ideas and views during learning sessions. In the succeeding sections, I offer a description of each roadblock as experienced by the MTLs while leading the professional learning of mathematics teachers in rural and remote communities in their districts.

Traditional conceptions of teacher professional learning. Teacher leaders reported becoming uncomfortable at the beginning of their leadership work after they experienced a few mathematics teachers struggling to engage themselves in the novel way of promoting their professional growth. Through their initial interactions, the MTLs became mindful of the fact that teachers held a traditional view of teacher professional learning that made them prepared to passively engage in learning during the sessions. With such a conception of learning, as they said, many teachers found professional learning something strange, struggling to organically engage in learning. As Anne and Gabby, respectively, shared:

> In the beginning, most of the teachers seemed uncomfortable with how I engaged them in learning. I saw them like … bored as I asked them to take active roles instead of staying quiet from morning to evening.

> … teachers in our district were used to learning by listening and doing nothing throughout the session. So, when I involved them in tasks and discussions and presentations some of them seemed tired and puzzled a little bit.

From the accounts, it is apparent that the mathematics teachers, using Dana and Yendol-Hoppey's (2008) words, expected to assume a "sit and get" (p. 4) role during their professional learning because of the view they held about teacher learning. To address such a situation, the

MTLs endeavored to encourage their colleagues to accommodate the new role in their learning for them to become more involved in the process of promoting their professional growth. To an extreme, as evident in the storylines, many teacher leaders reported adopting a "slowing down" strategy with the goal of allowing their colleagues to negotiate their transition from passive to active professional learning experiences as a way of ensuring that none is left behind.

Isile, as a case in hand, decided to "spend some time to orient teachers to a new way of professional learning in order to become aware of what [he] expected them to do." The strategy, as Hargreaves (2000) notes, was appropriate considering the observation that the "benefits of increased teacher time for working together [in learning activities] seems almost incontestable" (Hargreaves, 2000, p. 171). Hargreaves (2000), furthermore, agrees with the practice of spending more time at the beginning of a teacher professional learning process to allow teachers to make sense of the learning journey they are expected to pursue. Hargreaves (2000), like Hord and Sommers (2008), recommends the strategy based on its potential of making teachers feel comfortable to engage in advancing their professional growth.

The MTLs demonstrate a "sense of realistic honesty to acknowledge when things did or didn't go well" (Horton, 2017, p. 67). Such a sense calls for teacher leaders' abilities to understand the conditions and situations that transpire during learning sessions by monitoring what is happening or not happening as learning as teachers engage in various learning activities. Hargreaves and Fullan (2013) consider such ability as professional capital, which allows MTLs to make important decisions during the professional learning of teachers. With such decisions, the idea is to allow teacher leaders "not being pejorative about where people [teachers] are at the beginning, combined with moving them forward" (Hargreaves & Fullan, 2013, p. 39) to where they are expected to be in connection with the demands of their students.

Mixing languages. The MTLs talked about how a few mathematics teachers mixed languages during their discussions and conversations, which became a challenge in professional learning contexts. In particular, they revealed how the teachers used mother tongue languages, such as Swahili and English, in their phrases when they were expressing their views and ideas related to mathematics teaching and learning in their classrooms. For them, such a situation diverted teacher learning because the mother tongue languages and English are not spoken by

many teachers who attended the sessions. While the former is tribal specific, the latter is not used in public primary schools where teachers were working. The following accounts explicate the situation:

> Most of the teachers in my group belonged to one tribe, so often they used their tribal language when they were working on tasks in pairs and groups. So, it was disturbing for those few teachers who were unfamiliar with the language that their colleagues preferred (Mazengo).

> I think language was an issue in our sessions. We had these teachers who liked to use their vernacular languages during the process. It was disturbing because it was something strange to others and I felt some were not comfortable with that (Senzini).

What is apparent in above accounts is the MTLs' discontentment with teachers' conduct of mixing languages while communicating their ideas, views, and opinions on what they were learning in their sessions. To ensure that teachers use a language common to many, teacher leaders reported urging teachers to solely use the national language for everyone to understand what was communicated.

On another level, surprisingly, other MTLs (Kenny and Gabby being two of them), admitted using English words when communicating with teachers in their sessions. While this happened unintentionally, as they said, these MTLs reported noticing some of the teachers struggling to understand what they were saying. As they made sense of a situation, teacher leaders decided to translate the words and made clarifications, so teachers could understand what they were communicating. Such a situation dictated wastage of professional learning time as the MTLs spent time for translations and clarifications as a way of bringing their colleagues on the same page. Perhaps what is more illuminating is Kenny's declaration that he equally mixed languages when talking with mathematics teachers during their learning sessions. The use of many languages in learning sessions, as he recalled, left other teachers experiencing a difficulty in making sense of what was communicated during the sessions.

Most of the MTLs, however, pondered the situation commonplace in their early professional learning sessions, noticing decreasing of the same as the sessions unfolded. From

the MTLs' sentiments, it is ostensible that mathematics teachers they worked with mixed words from different languages in their phrases when communicating with others during their learning sessions. It is interesting that the teacher leaders worked to ensure that mathematics teachers and themselves use the national language since it is spoken by many, but also it is the official language that primary school teachers must use when working with students and other teachers.

Summary

This chapter elucidated what it means and takes to implement teacher leadership in rural and remote communities in Tanzania. It began with a description of expectations lived by the MTLs to illuminate what they imagined would happen before stepping into leading teacher professional learning in their districts. In making sense of what it takes to lead teacher learning, the chapter presented the accounts of leadership roles endeavored by the MTLs before, during, and after professional learning sessions. Finally, the chapter concluded with a description of roadblocks that teacher leaders experienced while working alongside mathematics teachers to promote their professional growth.

The next chapter presents the perspectives of the MTLs on teacher-led professional learning following their work of facilitating the professional learning of mathematics teachers in their respective districts.

Chapter 8

Perspectives on Teacher-led Professional Learning

Dimensions of the Perspectives

The work of leading the professional learning of mathematics teachers in rural and remote communities in Tanzania was an opportunity for the MTLs to experience teacher learning from another perspective in practical and felt ways. With the intention of gaining valuable insights into the perspectives of the MTLs on teacher-led professional learning (TLPL), five dimensions are detailed to portray the stances, beliefs, and even feelings they developed out of their participation and facilitation of such a teacher learning practice. The dimensions, which emerged out of cross-case analysis, include participative and engaging; reflective and experiential; collaborative; practical and contextual; and ongoing and sustainable.

In describing the perspectives, the intention is to gain a deeper understanding of how the MTLs, who were used to a traditional mode of teacher learning, ultimately experienced TLPL. My hope is that, with the multiple perspectives gleaned from participants who were working in different contexts, it is possible to develop a more granular understanding of the MTLs experiencing and interpretation of TLPL. In the following sections, therefore, I fully describe each dimension as they speak to mathematics teacher leaders' experience of the practice as they sensed, felt, and lived it.

TLPL as a participative and engaging practice.

Most MTLs overwhelmingly conceived TLPL as a practice that empowers mathematics teachers to become active learners, deeply engaged in the process of their professional learning to improve practice. They developed such a conception following their cognition that the presence of teacher leaders motivated the engagement and participation of mathematics teachers in their professional learning. On such a ground, nearly all the MTLs pondered the practice to allow mathematics teachers spaces to wonder and freely express their thoughts, becoming encouraged to participate in learning alongside their colleagues. Senzini, for example, explained:

> The feeling that teachers get when they attend a professional learning [session] which is led by a teacher is that of … our learning is under our colleague, our friend who is … part of us. So, I think that this feeling makes them not to feel shy to speak their minds. They can talk all what they want as they … aren't afraid [of] the leader because he or she is their fellow teacher. I think that this type of professional learning is powerful as it removes the curtain that has separated them from leading teacher professional learning for a long time.

The metaphor of a curtain as used by Senzini above to describe what mathematics teachers feel when they find their professional learning is led by their teacher-colleague is substantially revealing. *Oxford Advanced Learner's Dictionary* is quite helpful here in making sense of the use of the metaphor. It defines a curtain as "a very thin piece of cloth that you hang at a window, which allows light to enter but stops people outside from being able to see inside," and vice versa equally fits quite well. From its etymological sense, therefore, the metaphor speaks to the boundaries that teachers experience when participating in a professional learning program which is led by an education officer from the district or the ministry. Returning to the context in which the metaphor was used, as Senzini explained, TLPL is non-alienating as it allows mathematics teachers to experience conditions to liberally and enthusiastically engage in expanding their professional knowledge to help students effectively learn mathematics. It has become clearer that the absence of the curtain in a learning session makes mathematics teachers feel more invited to talk to their teacher leader as well as their colleagues without worrying about the implication of their statements.

The sentiment is echoed by Mazengo, who points out that the "one thing special about this practice [TLPL] is the fact that teachers cannot stay quiet, sitting down waiting … [rather], they will do what they think is important and say what they want to say as no one is there to make them accountable for what they say or do during and after the sessions." Even though his thoughts, for the greater length, reverberate with that of Senzini, Mazengo's description is more enlightening. It highlights a situation in which mathematics teachers are likely to find themselves in when their fellow teacher leads their professional learning. For him, the situation would likely be different if an education officer, who is considered to make decisions about teacher's lives, was the leader. As Mazengo described, in a TLPL arrangement, teachers do not feel required to necessarily make some choices about what to say, what to do, how to do what they are required

to do, and at what time they should say and do. From his observations, such aspects are not favored in such a practice as a teacher leader is not entitled to hold mathematics teachers responsible for the kind of participation they demonstrate during their professional learning.

In exemplifying what is likely to happen in traditional teacher learning practice, Mazengo is equally informative that a mathematics teacher can even be asked by his or her leader a question like, "why you have asked this simple question while you were trained to teach this, and you have been a teacher for many years? You are not an effective teacher at all!" As he further explained, based on his experience of the practice, these are the questions that are usually asked by education officers while leading teacher professional learning, ultimately hindering effective participation among mathematics teachers. With TLPL practice in place, Mazengo felt that mathematics teachers realized a friendly environment for them to genuinely engage in learning because the practice is not led by a formal, authoritative leader, but by a teacher colleagues.

Other MTLs expressed similar sentiments, claiming the practice to be influential in allowing mathematics teachers to actively engage in their professional learning unlike other kinds of teacher learning. They are categorical that teachers feel comfortable to engage in professional learning when their fellow teacher leads such learning. The MTLs, still, considered the practice not intended to make teachers feel controlled or disempowered by those who lead their professional learning. Anne is a case in hand:

> Think about having more than 60 free souls completely unworried to do what they think could help their students to learn mathematics. Well, my teachers were very happy to have me there as they know that I'm a teacher like them, nothing to worry about. So, they engaged very well, others stepping into discussions, others engaging in lengthy conversations about what they were learning. I find this practice to give teachers what they want as professionals.

The more illuminating issue is how the presence of a teacher leader shapes the participation of mathematics teachers in their professional learning. The common thread that overwhelms the MTLs' experiences is related to the development of a sense of confidence among mathematics teachers when professional learning is led by a teacher colleague. It is visible from the descriptions that they considered the practice to make teachers actively engaged

in their learning, becoming more comfortable to be led by their fellow mathematics teacher; unlike when their learning is facilitated by an education officer.

As learned from the MTLs, mathematics teachers considered their teacher leaders as people who were far from affecting their employment. The perspectives of many teacher leaders resonate with Murray's (2014) views that teachers become deeply dedicated and more engaged in their professional learning when they realize that they are learning in an environment where they are emotionally, physically, and professionally safe. As Senzini's metaphor of a curtain suggests, TLPL is free from making teachers feel restricted to keenly participate in their professional learning. Instead, it invites them to take a livelier role in promoting their professional growth. That is, the practice allows mathematics teachers the freedom to wonder, notice, and freely express what they know, believe, and do while engaging in their learning. Such a situation reflects Drago-Severson, Blum-DeStefano and Asghar's (2013) influential assertion that "[c]reating supportive, relational contexts in which adults can talk regularly about their practice—as well as their values, beliefs, challenges, and guiding philosophies—facilitates self-analysis and can enhance the individuals' and the school's practice" (p. 39).

TLPL as a reflective and experiential practice.

The MTLs perceived TLPL to allow mathematics teachers spaces to engage in the process of reflection on their practice and, in turn, incorporate their classroom experiences into their professional learning. By having a leader of teacher learning who is more aware of what teachers and students do in practice, as they shared, the learning ultimately dwells, at length, upon careful consideration of what teachers and students experience in mathematics classrooms. Kenny, for example, explained further about how the practice is useful in encouraging teachers to reflect and integrate classroom experiences into their learning.

> Having a teacher leading the learning of other teachers makes a big difference. The first thing with that is about what he/she will want teachers to focus on. I think, the focus will be on what we do in classes, which is all about teaching and facilitating student learning. So, that's the essential part of this type of learning of teachers. For us, I remember, we were concentrating on what we have been doing in our classrooms. It's entirely about our experiences of our classrooms and how we can improve that.

Kenny's comment reflects the idea that TLPL enables mathematics teachers to revisit pedagogical practices they employ in their classrooms to help students learn mathematics. It also reveals his confidence that the practice can help mathematics teachers to deeply pay attention to their classroom experiences, realizing ways to improve what they do together with the students. For him, the focus of teacher learning is on the learning of students and not on other aspects that have little or no connection to what is happening in mathematics classrooms.

As well, there was confidence that by participating in TLPL, mathematics teachers realize opportunities to share their experiences of teaching mathematics, as Gabby explained:

> The one thing I like about this [TLPL] is how it makes teachers feel during their learning. There is always flexibility that they cannot find in other initiatives. In our sessions, I do remember them going back to our classrooms … thinking and rethinking about what worked and didn't work in those places. That was important because they needed to think about what they can change … for the benefit of their students.

Here, drawing from his experience of working with mathematics teachers, Gabby reports engaging in back and forth movements alongside his colleagues in trying to make sense of what they can do to make a difference in their classrooms. For him, by having a teacher-colleague as a leader, teachers develop the confidence to engage in extended discussions meant to find ways for improving practice. Such an observation is echoed by Anne, who pointed out that "teachers need … opportunities to reflect on their experiences of teaching." She is confident that by having a teacher "leading the professional learning, that's very possible … the experiences become the focus for teachers to move forward [a]nd … the core of teacher professional learning."

Other MTLs drew on their experiences to demonstrate how the integration of classroom experiences shaped the nature of discussions during their learning sessions. They made it clear that teacher leadership evokes other teachers to candidly share thoughts, opinions, and experiences of teaching the subject in their classrooms. Senzini's comment about how incorporation of pedagogical experience into teacher learning is a natural tenet of TLPL:

> Our sessions were experience-based as most of the teachers talked about the things they do in their classrooms as they were working on tasks that we gave them to complete. So,

because of that we tended to have very long discussions that even shortened our time for health breaks.

The MTLs acknowledged the practice to open spaces for colleagues to engage in reflecting on and integrating their teaching experiences into their professional learning. Such a perspective speaks to the notion that teacher leadership creates spaces for mathematics teachers to build on what is happening in their classrooms as they work to promote their professional growth. The MTLs are explicit that the practice is powerful in providing mathematics teachers with opportunities to revisit practices they employ in their classrooms but also to make sense of those experiences in moving forward with deepening their pedagogical knowledge.

Perhaps a more revealing issue comes from Kenny's comment of "teacher leaders make a big difference" when it comes to inviting teachers to engage in reflective learning. For nearly all the MTLs, reflection on, and integration of the experience is possible in TLPL as mathematics teachers are naturally attracted to talk about their classrooms because that is what they have the passion for but also it is the reason why they invest time and energy. Hadar and Brody (2016) support this view, maintaining that teachers "[a]s professionals who deal with the domain of pedagogy" (p. 76), it is natural for them to think and talk about their students as well as how they experience their learning.

From MTLs' perspectives, it is reasonably clear that the prominence of TLPL lies in its power of allowing mathematics teachers to develop reflective thoughts that can help them enrich their professional learning, thereby deepening student learning. Dewey (1938) is in support of this notion of the process of reflection. He influentially stresses that "[t]he function of reflective thought is, therefore, to transform a situation in which there is experienced obscurity, doubt, conflict, disturbance of some sort, into a situation that is clear, coherent, settled, harmonious" (p. 100). Hadar and Brody (2016) have also richly reported the importance of allowing teachers to engage in the process of reflecting on their classroom practices. They assert that "[r]eflection in the community invites feedback and helps others explore new ideas about teaching and moves thinking forward" (p. 68). The assertion, undeniably, reflects the perspective of the MTLs—TLPL as a reflective practice—but also it illustrates the position of TLPL in opening-up venues for teachers to reflect on practices they employ in helping students learn mathematics.

TLPL as a collaborative practice.

The MTLs expressed their confidence that TLPL is suited to provide mathematics teachers with opportunities to engage in collaborative learning. This conviction is predicated on their conception that when a mathematics teacher leads the learning of her or his colleagues, other teachers are likely to feel welcomed to collaborate and freely interact with their leader as well as with themselves beyond their learning sessions. For them, such an experience is not likely to happen in traditional teacher professional learning because of the bureaucratic nature of relations between education officers and teachers. Pili showed what her experience of facilitating the practice looked like as she narrated:

> It's really a different thing to be led by someone whom you share many aspects of the work you all do. When teachers gather for their learning and meet a teacher leading the sessions, I think, they simply become comfortable with each other and quickly become friends. So, such friendship enabled them to work together during the sessions. I think that's the aspect of this process, which I think is good for teachers in our places.

Pili's description is quite illuminating when thinking about what mathematics teachers could feel and how they could engage in their professional learning when they find a teacher colleague leading their learning. It shows a process upon which friendship developed among the teachers and their teacher leader, enabling them to engross themselves in collegial learning. Pili reported such a social aspect to emerge because mathematics teachers and teacher leaders share many attributes and experiences related to their work of facilitating student learning of the subject. Pili's observation resonated with those of other MTLs, describing mathematics teachers' collaboration to develop as they see themselves as colleagues belonging to the same profession and work in comparable geographical contexts.

Mazengo drew from his own experience of living the practice to demonstrate how he became exposed to mathematics teachers and how that situation shaped his leadership of teacher professional learning.

> I have been in this career for many years now, as I told you before, this year is my 36th year since joining this profession. Because of that, I happened to meet many teachers in

> this district, as in other districts before coming here some years ago. For me being a leader is good news for teachers because they know me in some ways as teachers often meet. So, I think these teachers there were not worried to work with a person like me. I think from there it was easy for us to work together up to this very point.

From the comment, it is apparent that the notion that TLPL encourages collaboration during the professional learning sessions is knotted to a belief that the mathematics teachers, as colleagues are connected in some ways. Mazengo pondered the presence of a teacher leader to enable teachers to feel safe to collaborate with a teacher leader and mathematics teachers in deepening their professional knowledge. As he pointed out, mathematics teachers become even more open to their teacher leader, a situation that promotes teamwork during learning sessions. This sentiment is equally echoed by other MTLs, who consider the situation to sustain beyond learning sessions. Gabby, as a case in point, described, "well, I think … because the teachers and their leaders [are] from [the] same localities and do similar things, … the cooperation that they develop in their learning sessions may continue for many years to come." Such embedded perspective acknowledges the common aspects of the work that teachers and teacher leaders share, to link them up, remaining tied together as they attend to matters related to their classrooms.

For the MTLs, TLPL do not just bring mathematics teachers and teacher leaders together, but it also enables them to be and remain in long-lasting networks. For them, these networks are quite advantageous since they allow teachers to keep on working together, and to realize room to support each other in many ways. In the following quote, Anne showcases how she continually interacts with mathematics teachers. As she recounted:

> I remember one day, which was a market day in our village, and I was just preparing myself to get there to do shopping, I received a phone call from one of my teachers who lives like seven kilometers from here, it's not like a village really, rather, you can call it a suburb. So, he was very low in his tone. He asked me if I can help with getting a car to pick up his pregnant wife to bring to our dispensary here. So, instead of going to the market, I decided to go to ask someone who owns a car in this village to go to pick up my fellow teacher's wife. After that then I informed other teachers of our sessions, about what

is going on with our fellow. I remember seeing a few of them going to visit her. This is just one of the ways we help and support each other these days.

From my conversation with Anne, it is evident that collaboration went beyond learning sessions, to include non-educational collaborations and interactions. For her, the aspects have the potential to reinforce the educational connections that the teachers have already established and maintain. Nussbaum-Beach and Hall (2012) supported both kinds of collaborations and interactions, maintaining that they make mathematics teachers become connected, finding "themselves not just learning how to be better educators but more tuned-in and effective people" (p. 39) within their schools and local communities.

Based on the MTLs' experiences, it is remarkable that TLPL is believed to produce a friendly and collegial learning environment, which in turn encourages long-term collaboration among mathematics teachers and teacher leaders. Such an environment is conceived to emerge as teachers became leaders of teacher professional learning initiatives. The collegial environment is said to encourage teachers to feel more welcomed to actively work together with others during and beyond learning sessions. In such a space, as learned from the MTLs' accounts, teachers become significantly encouraged to promote their professional growth. It is even more clear that the same environment stimulates the resurgence of what Guskey (1995) termed, "the naturally occurring relationships among professionals" (p. 121).

One of the noteworthy observations comes from Anne's experience of observing collaborations and interactions to persist even beyond learning sessions. Her experience demonstrates how collaboration included non-educational collaborations and interactions. From such observations, it is quite clear that the practice has the potential to motivate the teachers to establish enduring relations geared into addressing problems they face in their mathematics classrooms. That is the case as the MTLs considered TLPL to bring and glue mathematics teachers together, working to improve mathematics teaching. The teacher leaders' views resonate with those Murray (2014) that:

> First, teachers who work together are more likely to discuss concepts, skills, and problems that arise during their professional learning experiences … Second, teachers … share curricular materials, course offerings, and assessments. Through engaging in collaborative

> learning, they will be better prepared to integrate what they learn with other aspects of their instructional environment. Third, teachers … discuss students' needs across classes and grade levels. Finally, [it] may help create shared professional culture, in which teachers in a school or district develop common understanding of instructional goals, methods, problems, and solutions. (p. 17)

TLPL as a contextual and relevant practice.

The MTLs conceived TLPL as a practice which is relevant to the need of improving student mathematics learning. Behind such a conception is their observation that the practice provides mathematics teachers with the freedom to contextualize their professional learning. In other words, the MTLs considered what teachers learn in TLPL to largely reflect the contextual realities of their pedagogical practices. As Kenny discussed:

> For me, by having a teacher there, I think the discussions will focus on teaching and learning. I don't expect something else to capture the interest of classroom teachers. It could be different to those PDs [professional developments] where teachers are told things that do not have any connection to the contexts of their work of teaching. And that's because the leaders of those PDs … have not taught the subject for many years. So, that's why I think this other way [TLPL] is the important thing.

In this quote, Kenny is trying to compare TLPL with other kinds of teacher learning, to better describe the relevancy of the former to teacher professional learning. From his viewpoint, the practice is germane to student mathematics learning, considering that the interest of many teachers is largely about their students and how the students could become successful in learning mathematics. Gabby perceives teacher leaders to naturally create an environment upon which teachers realize avenues to structure their learning around what they can do to improve student learning as he elucidated:

> Having a teacher there, I think teachers will have the freedom to talk different things, including what they are needed to do to make a difference in student learning. I'm not convinced that teachers will not use the freedom brought by their fellow teacher not to talk about what is going wrong in their classrooms. For someone else, yes, but for their teacher

> colleague, I think no. Because of that freedom, I know some will be there to praise themselves, but there could be those who would want to use the freedom to become more informed about what they can do for them to change things for the betterment of their students.

Pili is confident that contextualization of professional learning becomes what she called, a "norm" when a mathematics teacher takes the leadership role in teacher learning. For her, "this type of learning is the only way for teachers to solve problems of their classes." She added that "teachers may decide to throw a math problem there for teachers … to work on it that she or he struggled to make sense of." Isile used a metaphor of a healing place to describe how he views TLPL. With such a metaphor, Isile was considering the practice to make a learning context become a place where mathematics teachers bring classroom 'diseases' they have suffered for them to get healed out of their interactions with themselves and with their teacher leaders. With such a situation, from his perspective, the practice stands out as not just relevant to the work of teachers but also context-specific, enabling teachers to attend to what is going on in actual mathematics classrooms.

Mazengo, similarly, expressed his feelings about the position of TLPL in allowing mathematics teachers to attend to pedagogical realities they experience in their classrooms. He shared that the "practice is in the safe hands as teachers are the one who knows what teachers and students need in their classrooms [therefore] teachers are likely to link professional learning with their classrooms to find out ways to help improve the learning of students." This conception is predicated on his belief that mathematics teachers have the potential to make teacher professional learning relevant to classroom practice considering their awareness of what is needed in classrooms to improve learning, unlike other educational stakeholders.

It is apparent that the MTLs view TLPL to provide mathematics teachers with opportunities to contextualize their learning to what is commonplace in their classrooms as a way of improving what they do. With such opportunities, these teacher leaders considered the practice appropriate in attending to the needs of students. The views are in line with Keay and Lloyd's (2011) observation that teachers "want to focus closely on the specific needs of their

pupils" (p. 52). With such a focus, teacher learning becomes not just embedded in everyday pedagogical classroom practice but also responsive to students' substantial needs and interests.

From MTLs' descriptions, it is visible that the presence of a mathematics teacher as a leader of teacher learning strongly influences the drive for prioritizing students' needs over other educational needs that have little connection to what is happening in classrooms. Such perspectives resonate with what teacher professional learning scholars have been emphasizing in making teacher learning relevant to student learning. As Murray (2014) observed, the practice is pertinent in improving schooling as it can "connect what teachers learn … with the daily challenges they face in the classroom" (p. 16).

On what he branded as "protecting the learning mission" (p. 135), Donaldson (2007) considers TLPL to be well positioned to attract teachers to contextualize their professional learning because of the presence of the teacher leaders overseeing the teacher learning process. As he described, consistently, "teacher leaders have unique opportunities to keep the focus of their collective work on kids, on learning and on the effectiveness of that work" (p. 135). Such opportunities, from his perspectives, enable them to encourage teachers to capitalize on what overwhelms their classrooms to improve student mathematics learning. In times when discussions are taking a different direction other than student learning, as Donaldson (2007) emphasizes, "teacher leaders speak up to return to kids, and learning [and] insist that time together be devoted to working on ways to make all teachers more successful with children" (p. 135).

TLPL as a sustainable and ongoing practice.

For many MTLs, TLPL is a sustainable practice that keeps mathematics teachers engaged in the process of expanding their professional knowledge base. They see the practice to emerge as a viable resource for teachers who aspire to be abreast of the ways in which they can effectively facilitate student mathematics learning. The MTLs underscored the prominence of the practice in keeping the professional learning alive through ongoing discussions and conversations among mathematics teachers. As Mazengo explained:

> This system of learning … involves leaders and teachers who live in the same areas. For that reason, then, there is a possibility for them to meet in formal or informal situations. So, teachers continue to talk about what they do in classes, what is not going well, and what is going wrong in their classrooms [and] they support one another.

Mazengo is assured that TLPL is powerful in offering avenues for mathematics teachers and teacher leaders to remain in touch when they return to their classrooms, continuing to engage in collegial dialogues and conversations meant to promote professional growth. Some of the MTLs, on the other hand, pondered the practice to attend to what was lacking in traditional teacher learning. As Senzini explained:

> The issue that we had in those days is that we didn't have people to help us when the workshops and seminars were over, and we are back in our schools. I think that was the challenge that faced many of us. You find you need some support on how to apply something you learned, but oh … you don't get that support because people who taught us are nowhere to be found. With this new approach to learning, … it's very easy to get help from teacher leaders as they are just in schools, if not in this school, you may find one in the next school.

Drawing from his experience of taking part in different kinds of teacher professional learning, Senzini became poised that TLPL is a practice that enables mathematics teachers to continue to receive support and assistance even when the learning sessions are concluded. Relatedly, Gabby reported seeing the practice to "fill the gap that has stressed teachers for quite a long time." As he expounded, this practice becomes important as "teachers find resource persons [teacher leaders] close to their places and [they] can call them anytime without a formal letter or appointment." He emphasized further that the practice is well-suited in helping mathematics teachers and their teacher leaders to continually engage in supporting and assisting each other as they work to address pedagogical challenges they face in their classrooms. With such a practice in place, as Gabby described, mathematics teachers can easily communicate what they are experiencing in their classes while facilitating student learning of mathematics.

Moreover, Anne observed TLPL create a friendly, collegial learning environment that invites mathematics teachers to sustainably participate in learning. She believes that "the

situation in which teachers work with people they know and who are at the same level and close to them influences how they see each other." For her, "teachers can comfortably work together for a long time when led by people they know as their colleagues." Anne's comments highlight what could bind mathematics teachers and teacher leaders together during and beyond their learning sessions. With this practice, as she emphasized, mathematics teachers and their leaders become colleagues because of the nature of the treatment of each other during learning sessions. For Anne, it's such a sense of collegiality that makes members remain connected even after departing to their schools.

To exemplify what was shared by his colleagues, Isile described how TLPL is inherently a sustainable project:

> Since the day teachers in our schools became aware that I'm also facilitating the learning of math teachers in the district, they have been in demand of me for their help. They have been calling me to go to their classes to help them with teaching, and others call me at our staff room to discuss some issues related to mathematics teaching. I have these teachers who call me to co-create teaching aids for their lessons. So, even though our sessions are off, I'm still working with teachers.

Isile is quite confident that TLPL is crucial in encouraging mathematics teachers to continue to engage in learning throughout their teaching career. From his perspective, by having teachers taking charge of their learning, the professional learning becomes a common practice in schools, contributing into improving schooling. That is possible considering that teacher professional learning becomes situated on the hands, hearts, and minds of mathematics teachers themselves.

Many MTLs attributed TLPL to be a practice that shifts teacher learning from being a one-time, sporadic event to a process that allows mathematics teachers to promote their professional growth while at school. For them, the practice emerges as an endeavor for sustaining teacher professional learning activities much needed to continuously empower mathematics teachers. One illuminating piece of information from the MTLs' accounts is related to their observation that through the practice, mathematics teachers and their leaders become friends out of their interactions during learning sessions. It is ostensible that a sense of collegiality is responsible for

keeping teacher professional learning ongoing, encouraging them to communicate on matters related to enriching mathematics pedagogy. Consistent with the perspectives of the MTLs, Donaldson (2007) believes teacher leaders to promote continuous teacher professional learning "because the relationships they have with fellow teachers keep them connected" (p. 135) beyond their sessions.

Revisiting the Perspectives: A Reflection

As introduced in Chapter 5, one common characteristic to all the MTLs who shared their perspectives on TLPL is that they worked in rural and remote schools. Such an observation highlights the possibility for their perspectives of the practice to be shaped by their experiences of working in the countryside where opportunities for attending professional learning programs are relatively scarce (Hardman et al., 2015). Such an experience is likely to have triggered the MTLs to view TLPL as powerful alongside traditional teacher learning approaches as the former is facilitated by teacher leaders who are also rural teachers. The situation is different in the latter as it was used to take place far from schools and under the control of education officers who had minimal interactions with teachers after professional learning sessions. As such, the MTLs were confident that the practice is effective in helping mathematics teachers to engage in a powerful, ongoing process of promoting their professional growth.

For education systems like that of Tanzania, where teacher professional learning programs are sporadic (Komba & Nkumbi, 2008), TLPL becomes a promising practice for mathematics teachers, especially those working in rural areas, promote their professional growth. Its potentiality lies in its strength of involving teachers actively in the process of expanding their knowledge base for them to be able to meet the needs of students. Even more, TLPL is appropriate as it has the potential to invite teachers to situate ongoing professional learning within their schools. That would be possible as mathematics teachers, who can lead teacher learning—MTLs— are accessible by other teachers in case they need support in untangling particular pedagogical complexities facing their classrooms.

Professional Learning Outcomes

The MTLs revealed experiencing professional growth among mathematics teachers following their engagement in their professional learning. Such growth, which entails professional learning outcomes, became evident to them through their interactions with the teachers but also through making sense of the feedback they received at the end of learning sessions. The cross-case analysis of interviews and vignettes revealed four dimensions that the MTLs considered as outcomes of the professional learning of mathematics teachers. They include: improved teacher knowledge; increased collaboration and networking; increased confidence among mathematics teachers; and greater awareness of gender-sensitive pedagogy. In the succeeding sections, thereupon, is the description of each outcome.

Improved teacher knowledge.

The teacher leaders revealed the professional learning to have improved the professional knowledge among mathematics teachers. They were contented realizing that their colleagues have become adept at using various pedagogical strategies to teach mathematical concepts they collaboratively learned in the sessions. For the MTLs, the practice helped mathematics teachers feel comfortable in working on different mathematical concepts they might teach in their classrooms. Kenny, for example, observed a difference regarding the way teachers started to approach mathematical concepts as professional learning sessions unfolded. As he indicated in his vignette:

> I have witnessed changes in the way the teachers were doing things. I experienced a big difference among teachers when they were implementing lessons but also during the presentations of their ideas. The teachers demonstrated awareness of different teaching and learning strategies and ways they can use them in their classrooms. I was so happy to see them becoming comfortable in using new approaches they learned.

Kenny is satisfied with the impact of the practice towards mathematics teachers' professional growth. He associates the improved professional knowledge with teachers' demonstration of the ability to use various teaching strategies for facilitating the learning of mathematics. For him, the professional learning played a principal role in helping teachers to

become more informed about how and when to implement a particular pedagogical strategy but also about its consonance with a concept. Thea, likewise, "think[s] … the understanding of math concepts among math teachers who have been attending the sessions has changed." Behind such a conviction, is her realization of teachers' development of professional knowledge through their engagement in discussions and presentations. She regarded mathematics teachers becoming aware of "appropriate teaching and learning strategies that can be used to teach math regardless of the topic or concept." Thea was certain that teachers developed capacities to implement teaching which stresses doing rather than listening on the part of students."

Correspondingly, Mazengo detailed being convinced that mathematics teachers learned "new methods and strategies for teaching and learning [that could] bring good results in classrooms." He attributed the engagement of teachers and their interactions during and after the learning sessions to have contributed to the development of professional knowledge among them, claiming that they became more informed in using effective methods and strategies for teaching mathematics. As Mazengo further expressed, the knowledge teachers developed is instrumental in helping students become successful in learning mathematics. He recounted seeing teachers being elated because of the occasion to learn different things from their colleagues.

Some MTLs reported that teachers not only learned new pedagogical strategies but those that have the potential to engage students in the mathematics pedagogy. As a case in hand, Pili shared:

> Teachers have been relishing the opportunity because they get to learn new, very engaging teaching and learning strategies and methods that are highly emphasized in our education system

The comments by the MTLs regarding the development of professional knowledge among teachers after engaging in their professional learning in their districts are quite noteworthy. From teacher leaders, it is apparent that when teachers participate actively in the professional learning chances exist for them to realize spaces to improve their professional knowledge. The MTLs' resonate with the recent sentiments by Louis (2017) that professional learning should help teachers realize opportunities to create and recreate new ideas for advancing practice. That is the

case, from his perspectives, as teachers assume "the role of knowledge creation and build this into their job-embedded professional [learning] plans" (p. 17).

Increased collaboration and networking.

The MTLs reported noticing increased collaboration and networking among mathematics teachers following their participation in the professional learning. As teacher leaders said, such social dimensions, which germinated in early days of their learning, continued beyond their learning sessions, becoming a way of learning among mathematics teachers. They attributed the rise and existence of the dimensions to teacher learning experience, saying that it oriented their colleagues around the theme of working and learning together with the interest of supporting the professional growth of each other. As such, they revealed noticing synergistic relationships among mathematics teachers as they were engaging in completing learning tasks. In his vignette, Isile shared:

> One of the important things that this program emphasized is working together in learning. This program has helped teachers to develop the readiness to work together because many of the activities were provided in groups or pairs. Because of that, teachers now work together in discussing and sharing ideas on what can be done to help students learn math.

Other MTLs shared a similar observation, stating that the professional learning has made, using his words, "a big difference" in bringing mathematics teachers together and making them connected beyond learning sessions. As MTLs described, teachers, demonstrated preferring to learn independently during their initial learning sessions, but they were steadily challenged to work in pairs and small groups as the sessions unfolded. As such, they recounted being pleased seeing mathematics teachers becoming cooperative while working in making sense of various pedagogical strategies they can use to teach mathematics. As Anne expressed:

> I'm happy because that is a chance for them to exchange experience related to the teaching of different complicated concepts or topics through discussions, a situation which helps them to come up with joint solutions for many problems they are facing (Anne).

Senzini described witnessing mathematics teachers becoming comfortable to work together during their professional learning sessions. That was the case, as he said, teachers reported becoming accustomed to the way in which they can learn in a collective learning environment, unlike what was the matter before attending the program. Senzini observed mathematics teachers starting to work together after they realized benefitting from their collaborations and interactions while working to promote their professional growth.

From the experiences accorded by the MTLs, it is manifest that the TLPL contributed to encouraging mathematics teachers to work together beyond learning sessions. They are informative about teachers being new to a collaborative learning practice. Not so long ago, Komba and Nkumbi (2008) found teachers being used to a professional learning practice which emphasizes independent learning over collaborative learning practice. The most salient observation comes from Isile who recalled what was emphasized in the program they attended to become teacher leaders. Isile is categorical that the program urged them to encourage collaboration among mathematics teachers during and beyond their learning sessions for them to support each other in promoting professional growth.

Increased teacher confidence.

The MTLs were informative about observing increased confidence among mathematics teachers following their participation in the professional learning. The teacher leaders, who reported experiencing a lack of confidence among teachers in the beginning of the sessions saw their colleagues becoming fearless teachers of mathematics as the sessions unfolded. They attributed such a change to the professional learning, saying that it allowed teachers spaces to grow and develop the confidence they need to teach mathematics in their schools.

In her vignette, Anne, as a case in hand, described the journey in which teachers navigated to develop the confidence. As Anne indicated:

> I think the sessions have strengthened teachers in so many ways so far. One has to do with helping them develop the confidence to teach mathematics because they were used to see mathematics as a difficult subject compared to other subjects. I am happy for this because, in the beginning, I remember most of them were not confident teachers, but after some

time they even said that they are confident because they learn many things out of their professional learning.

Kenny echoed Anne's sentiment, announcing that he observed increased confidence among teachers of his group. He witnessed "teachers becom[ing] confident as [their] sessions went on and that was evident as they changed the way they participated in activities unlike what they did in the beginning." Kenny's line of experience is quite informative when thinking about ways in which a leader of teacher professional learning can notice a change of levels of confidence among teachers of their districts. Here, he spotted mathematics teachers' increase of confidence by comparing their current and previous engagements in the professional learning.

Other MTLs shared about what teachers have become after developing confidence out of their engagement in the professional learning. They reported feeling happy seeing teachers making a difference in their interactions during their learning. Gabby, for example, shared:

> Teachers have become different persons these days. Now, they are really talkative as they have the confidence to share their thoughts with one another. That's a good indication of their development.

Such MTLs' experiential descriptions concur with the views of Nolan and Molla (2017) that teacher confidence is expected to be one of the outcomes of any professional learning program designed to empower teachers to improve practice. The scholars observe a professional learning opportunity to play an instrumental role in building teacher confidence much needed to help students become successful in what they are learning. Confidence is substantial, as Hicks (2001) notes "if teachers lack confidence in their ability to strive for their intentions, they are also limited in reaching beyond the boundaries set in place for them" (p. 137).

Increased awareness of gender-sensitive pedagogy.

The MTLs went further to point out that mathematics teachers developed awareness of gender-sensitive pedagogy (GSP) through their engagement in the professional learning. They reported teachers to have discerned the need for situating such a pedagogy in their classrooms, to motivate girls and boys to learn and continue learning primary school mathematics and moving

forward. In the beginning, the MTLs reported realizing lack of awareness among the teachers on how they can implement the pedagogy in their classrooms but also about potentials that come with the pedagogy when adequately implemented.

Anne, who experienced being discouraged to learn mathematics because of her gender in her early years of schooling, described how the professional learning became an eye opener to mathematics teachers of her district about the pedagogy. While she expressed noticing teachers becoming cognizant of the prominence of the pedagogy, and its potential in helping children, regardless of their genders, learn the subject. During our interviews, Anne was explicit that the pedagogy helped even herself in fulfilling her dream of ensuring that girls' find teaching and learning of mathematics non-threatening. As she explained:

> Of course, this program has enabled the teachers to become aware of the details of gender-sensitive pedagogy. They have been reporting to me that they are now trying to teach mathematics while paying attention not to favor a particular gender during their teaching but to make sure that all students learn the subject.

Other MTLs, likewise, talked about the role that the professional learning played in empowering mathematics teachers to make sense of what was missing in their classrooms concerning the participation of girls and boys in learning mathematics. As Mazengo shared:

> In fact, it was perfect to see teachers appreciating that they have learned good things that they think could help them improve their teaching. One of the things is how to motivate students, especially girls who have been pedagogically segregated in primary schools

Isile, who led learning sessions that had an equal number of male and female teachers, regarded the development of teachers' "awareness of the need to change [their] practices to facilitate the learning of all" as one of the outcomes of teacher learning. He recounted learning many mathematics teachers saying that they used to overlook such an aspect when implementing their instructional practices. One reason they advanced, as he said, is that they were ill-informed of the strategies they can use to ensure that mathematics classrooms become places where every student comfortably learns mathematics. Even female teachers, Isile added, reported to have not

engaged their students in ways that could have ensured all of them eventually feel welcomed to fulfill their learning potential but also un-threatened to learn.

What is communicated in the MTLs' storylines is a deeper sense of ways the practice altered mathematics teachers' thinking about the value of locating GSP in their classrooms. The comments bring to light an interesting issue when thinking about ways in which teachers used to facilitate mathematics learning in their classrooms before attending professional learning. It is quite clear that they used to pay little attention to creating conditions relevant in ensuring that boys and girls students feel encouraged to learn mathematics. That is apparently the case as the MTLs reported hearing many teachers claiming the program to have equipped them with the knowledge they needed to make their classrooms conducive places for every student.

For the MTLs, mathematics teachers developed the consciousness of the GSP following their participation in the professional learning that was founded on the pedagogy throughout their learning. As they described, through noticing how their teacher leaders treated them, the teachers became mindful of the aspects of the pedagogy but also of the possibilities associated with student mathematics learning. In that way, the MTLs were confident that teachers had an opportunity to develop an understanding of the pedagogy and how they could situate the same in their classrooms to help their students become motivated to learn mathematics. Because of the awareness, the MTLs were proud of their work because it improved teachers' understanding of the pedagogy that was something new to them in the beginning of their professional learning.

The experiences of observing teachers becoming mindful of GSP are quite illuminating. They articulate how the professional learning experience helped teachers gain awareness of the need to ensure that all children learn mathematics regardless of their genders. The experience also highlights the situation in which the MTLs considered the practice to influence the bottom line of student mathematics learning. These experiences, moreover, reveal the situation in which the teacher leaders organized and implemented professional learning around the pedagogy. This is the pedagogy they learned while participating in the program to become a teacher leader. The act of drawing the pedagogy to the heart of teacher learning speaks to one of the Dewey's (1938) principles of experience—continuity of experiences. That is, the MTLs' prior experiences of participating in the program shaped their experiences of leading teacher learning in their districts.

As such, it is apparent that the program helped the teacher leaders not just to influence the learning of all mathematics teachers but also see themselves needed to create conditions for their colleagues to realize the prominence of situating GSP in their mathematics classrooms.

Factors Contributing to Success

The cross-case analysis of the MTLs' interviews, metaphors, and vignettes revealed factors that have the potential to contribute to the success of teacher professional learning. They include long-term collaborative preparations, availability of resources, respectful and ongoing collaboration, freedom of ideas and opinions, and wise teacher leadership. Other factors are teacher leader accessibility and use of respectful language. In the subsequent sections, I describe each factor as shared by the MTLs out of their experiences of leading teacher professional learning.

Long-term collaborative preparations.

Nearly all the MTLs considered long-term collaborative preparations key in having a successful teacher professional learning. For them, preparations play a significant role in putting together a professional learning program that allow teachers spaces to engage in deepening their professional knowledge within and beyond learning sessions. Without such preparations in place, as they said, the practice is likely not to achieve its practical meaning—promoting professional growth among mathematics teachers. For them, long-term collaborative preparations take many months to complete and also involves different people to execute it. The following quote by Pili showcases the thoughts of the MTLs regarding the contribution of preparations in making professional learning ultimately a success:

> For me, I think preparation [is] something meaningful for teachers and their growth as professionals. I am confident that the preparations are highly needed if you want to have meaningful professional learning among teachers.

What is apparent in the quote is a deeper appreciation of the role the preparations can play in enabling mathematics teachers to intensely engage in expanding their professional knowledge and skills. Pili is confident that the preparations help to design a learning plan, which allows

teachers to experience the professional learning as attentive to the needs of their mathematics classrooms. It is because of such a realization she was not hesitant to recommend the practice to colleagues in the spirit of providing mathematics teachers with rich professional learning experiences they professionally deserve. Gabby shared similar sentiments, saying that "preparations [are] effective in helping teachers learn and improve their knowledge and skills." Thea was not far from her colleagues as she claimed that such a "groundwork …, even though it's something that consumes much of [the] time of leaders of the professional learning of teachers, [is] extremely helpful."

These stories articulate a sense that the MTLs developed regarding the consequence of long-term preparations in situating effective teacher professional learning in their districts. For them, such an engagement is helpful in developing an awareness of what they are required to do as teacher leaders but also of how teachers could expand their knowledge base. It is this sense that they linked the success of teacher learning to the preparations that a teacher leader undertakes before the commencement of learning sessions. Teacher professional learning researchers, including Hord and Sommers (2008), have also found preparations to contribute to the success of the professional learning of mathematics teachers. They revealed the preparations to play a vital role in enabling leaders of teacher learning to become efficient and comfortable in engaging teachers in the process of promoting their professional growth.

Availability of learning resources.

The MTLs considered the availability of learning resources in professional learning sessions to provide mathematics teachers with a rewarding professional learning experience. For them, learning resources help teacher leaders to create learning materials needed to facilitate the learning of particular mathematical concepts among teachers. Pili, for example, expressed that the availability of the same simplifies and improves the leadership of teacher learning as teacher leaders experience no concern to worry about learning resources. Rather, they focus on using those provided to create conditions for effective teacher professional learning. Pili, on the other hand, acknowledged the availability of resources provided by MEP to have motivated them to actively engage in ensuring that teachers find their participation meaningful. As she described:

> Another aspect that I believe has made the learning of teachers become something delightful and efficient is the resources. We're provided with all the resources we wanted for different concepts that we learned. In fact, our work was then to use them in such a way that the participation of teachers becomes something productive.

Other MTLs experienced similar situations, applauding the contribution of learning materials in supporting the professional growth among mathematics teachers. Isile, for example, indicated that:

> The learning resources … help … to achieve our goal of ensuring that every teacher expands his professional knowledge and skills. I think that [teachers] benefit much by having these resources.

What is apparent in the comments is an admission of the position of learning resources in providing teachers with a substantial professional learning experience. The MTLs are clear that the availability of resources motivates teacher leaders to engage teachers in learning for them to uphold their professional growth. In a sense that the teacher leaders are making, it is evident that the MTLs have realized the position of learning resources in enriching professional learning experiences among mathematics teachers. Their views resonate with those of Hord and Sommers (2008) that learning resources are influential in improving the process of deepening professional knowledge and skills among teachers.

Ongoing teacher collaborations.

The teacher leaders pondered ongoing collaborations among mathematics teachers as essential in promoting teacher professional growth. In particular, nearly all the MTLs viewed the dimension instrumental in bringing teachers together and also in facilitating the work of expanding their professional knowledge and skills among teachers. Gabby is a case in hand:

> Collaborations [are] very useful as teachers [get] the opportunity to learn from each other. I also think that they enabled [teachers] to be in a good position to improve their [professional] knowledge.

Recalling to what happened to his group, Senzini relished what he termed the "spirit of togetherness" that mathematics teachers demonstrated during their professional learning. For him, the spirit spiced the interactions during the sessions, creating an environment that encouraged teachers to collaboratively work to attend to issues that thwarted their teaching practices. As he described:

> I was fortunate to work with teachers who had a spirit of togetherness. Their sense was important in their professional learning because it allowed them to work well when we asked them to work in pairs and groups. Through that, they learned so many important things about the concepts that we studied.

Like Thea, Kenny, who grew up in a local community which embraces leadership which emphasizes uniting people, voiced seeing mathematics teachers collaborate well during their learning sessions, claiming that they were "motivated … to work together" throughout their sessions. For him, ongoing collaborations allow teachers to realize avenues to share their experiences of teaching various mathematical concepts. As such, he was confident that collaborations contribute to the achievement of the professional learning of mathematics teachers in his district.

From the descriptions above, it is manifest that the MTLs predicated teacher learning around a theme of collaboration to encourage mathematics teachers to work to achieve a shared goal of improving teaching and learning of mathematics in rural and remote communities. As such, they reported recognizing collaborations to have a bearing on situating effective professional learning in their districts. They believe the dimension to have positively impacted teacher learning as it provided teachers with spaces to learn from their ongoing interactions with one another. From the comments, it is also clear that the MTLs observed collaborations of members of their groups to last after the completion of the learning session persisting beyond the sessions, opening more possibilities for them to continue to interact as a way of monitoring their professional growth.

Freedom of ideas and opinions.

The MTLs considered freedom of ideas and opinions to influence the success of the professional learning of mathematics teachers. For them, such a social dimension stimulated teachers to enthusiastically engage in promoting their professional growth and in realizing their natural position in the professional learning journey. They made it clear that when mathematics teachers find themselves with the freedom to share opinions and ideas, they candidly participate in their professional learning, becoming more comfortable to communicate their experiences, success, and weaknesses as teachers of mathematics. Senzini, as a case in hand, returned to his experience of leading teacher learning sessions to illuminate the position of providing teachers with the freedom of ideas and opinions:

> … I asked teachers to feel free to share what they know and do in their classrooms, I saw great sharing throughout our sessions. That decision paid off very well as they shared so many things which were very helpful for us to know and then move forward with how we can help our students to learn this subject without problems.

It is unequivocal in the storyline that Senzini created conditions that enabled mathematics teachers to feel invigorated to engage in their learning with the goal of bolstering their professional growth. During an interview, he expanded further that teachers relished such an opportunity, saying that it allowed them avenues to connect their professional learning with what characterized their mathematics classrooms. From this experience, Senzini noted that freedom of ideas and opinions contributes to enriching the professional learning of his teacher colleagues.

Isile expressed similar observation, saying that "the autonomy of communicating ideas and that of endorsing something contributes to making the learning of teachers happen." He sees the need for mathematics teachers to realize avenues to offer their recommendations on what can be done to situate powerful professional learning experience within the group. Through such a way of leading teacher professional learning, as he added during an interview, teacher learning effectively attend to the needs of mathematics classrooms. On the other hand, Mazengo, like other MTLs, expressed similar sentiments:

> In my view, the freedom that teachers experienced, compared to their experience of other kinds of PD [professional development] made them feel they are indebted to ensure that they use it well so that to benefit out of it. So, the freedom was essential as it acted as a catalyst for encouraging teachers to do more.

He uses a metaphor of a catalyst to describe how freedom of ideas and opinions stimulates the participation of mathematics teachers in their professional learning. Indeed, the metaphor is quite informative about the positive contribution that the aspect can make to shape the engagement of teachers in advancing their professional growth. In a sense he is making, it is visible that during his leadership of teacher learning Mazengo experienced the contribution of giving teachers the freedom they deserve during their professional learning.

What is apparent in the MTLs' experiential descriptions, is their excitement of how teachers benefited from having the liberty to voice their interests, needs, and even their frustrations related to the teaching of mathematics. They are visible that the freedom that mathematics teachers experience during their learning sessions has the potential to shape the nature of teachers' engagement in their learning. The MTLs are also categorical about how the aspect is instrumental in inviting mathematics teachers to connect their professional learning with their classroom experiences, allowing them opportunities to reflect upon their classroom practices and work to devise ways to improve student mathematics learning.

Wise teacher leadership.

Nearly all the teacher leaders viewed wise teacher leadership as encouraging mathematics teachers to effectively engage in learning to expand their professional knowledge base. For them, wise leadership entailed but was not limited to, leading the teacher learning through sound decisions that take teachers in the direction of sustaining their professional growth. Mazengo's description is quite informative about what it is like to facilitate the professional learning while wise leadership is at the heart of the process. As he pointed out:

> I treated all teachers with respect; I made decisions that were meant to improve them, not to harass anybody. In doing so, the teachers became friends and felt well to embark on

their learning. I think this is one of the things that I will continue to rely on in order to make learning possible in our sessions.

From Gabby's perspectives, such a dimension played a role in motivating mathematics teachers to persevere and thrive in learning different pedagogical strategies they can use to improve practice in mathematics classrooms. He considered "value[ing] the participation of everyone" to be one of the tenets of wise teacher leadership that ultimately stimulate teachers to work to promote their professional growth. For him, the act of valuing one another about what they contribute to the collective—implicated the exposition of nuances of the wise leadership of teacher learning. As he described, he revealed the need for him, as a mathematics teacher leader, to create conditions that could help teachers develop senses of respecting one's ideas or opinions but also become tolerant to views that do not fall within their realms of consciousness and comfort.

Anne conceived wise teacher leadership to trigger mathematics teachers to have "*muitikio chanya* [positive reception] of and readiness in participating in their [professional] learning to improve their teaching." She also believed the same to contribute towards situating long-standing collaborations among teachers as teachers realize being reasonably treated by a teacher leader. As she explained, she considered wise leadership of teacher learning to have a bearing on retaining mathematics teachers in a network established for them to regularly support the professional growth of one another beyond their learning sessions.

For Pili, one aspect that permits mathematics teachers to engage in the process of enriching their professional growth is the prudence of a mathematics teacher leader. In that sense, she viewed "wise leadership of teacher learning to be more about ensuring that mathematics teachers spend their time learning to be able to make a difference in their classrooms." Wise leadership of the professional learning, as she described, has the potential to ensure that the needs of mathematics teachers are realized for them to influence the upshot of student mathematics learning. It became explicit to her that teachers need to see leadership of their learning which focuses on improving practice and not something else.

In their accounts, the MTLs deliberated their acknowledgment of the contribution of wise teacher leadership in ensuring the success of the professional learning of mathematics teachers.

The teacher leaders are categorical about how such an aspect has the potential to motivate teachers to embark on their quest to improve their professional knowledge. From such a noteworthy observation, it is manifest that the MTLs see wise teacher leadership key in providing mathematics teachers with the rewarding professional learning experience during their learning sessions. For them, the aspect helps teachers to feel encouraged to promote their professional growth. Such views agree with those shared by Stoll and Louis (2007) about the contribution of wise teacher leadership on the professional learning of mathematics teachers. For Stoll and Louis (2007), wise leadership of teacher learning is crucial in promoting what they termed "[s]trong and sustainable professional learning" (p. 191) and also in prolonging interactions among mathematics teachers beyond learning sessions.

Teacher leader availability and accessibility.

The other factor that the MTLs reflected to impact the bottom line of the professional learning of mathematics teachers is the accessibility and availability of teacher leaders. They regarded the aspects essential in situating ongoing teacher professional learning within and outside their schools. For them, teacher leader accessibility and availability play a substantial role in enabling mathematics teachers to easily receive support and assistance they need to improve practice. As a case in point, Mazengo, with an experience of 36 years of teaching, considered accessibility and availability of teacher leaders to attract mathematics teachers to engage in an ongoing professional learning. As he shared:

> In fact, … our availability to the teachers has been another reason as to why teachers these days are participating in the learning even when we are not together as one group. I live close to many teachers, so, it's easy for us to remain connected.

Perhaps the most revealing issue speaks to the fact that teacher leaders are accessible because most of them reside in the same localities with their teacher-colleagues. As such, mathematics teachers experience plentiful of opportunities for interacting with the MTLs but also of working with them to address pedagogical complexities that transpired in their classrooms. It is in this sense, Mazengo recounted seeing teachers benefitting from learning alongside a teacher leader with whom they work together in the same or nearby schools.

Twofold aspects are visible in Kenny's account of experiencing the input of teacher leader accessibility and availability in teacher learning. First, he made it clear that it was a strange situation for schools to have the MTLs who engage in the leading the professional learning of their colleagues in the district. The second aspect speaks to his realization of a situation in which teachers engaged in ongoing professional learning through their interactions with teacher leaders from within their schools or from those working in nearby schools. From such an observation, it is noteworthy that teachers continue to further their professional growth by seeking assistance and support from teacher leaders who they work together as teachers of mathematics.

Likewise, other MTLs are informative about the position of the aspect in improving the professional learning of mathematics teachers. Gabby, as a case in hand, noted:

> The situation whereby teachers and teacher leaders are nearby even after sessions was a powerful thing that promoted the growth of teachers in a professional sense. Chances existed for teachers to easily link up with their colleagues anytime compared to those officers.

What is clear from the MTLs' experiential accounts is the affirmation of the contribution of accessibility and availability of teacher leaders in situating ongoing professional learning of mathematics teachers in schools. The accounts reveal how the teacher leaders were connected to teachers beyond their face-to-face learning sessions. Appealingly, they viewed such a situation to have helped them locate teacher-led professional learning in their schools. From the MTLs' perspectives, it is apparent that by having teachers who are knowledgeable and skilled in engaging their colleagues in professional learning becomes the first important step in making teacher learning not just an ongoing practice in schools but also an integral part of teacher responsibilities. Also, such an aspect, as explicit in the MTLs' comments, turns out to be one of the promising ways of tying teacher leaders and teachers together, becoming attracted to engage in ongoing meant to promote their professional growth.

Use of respectful language.

Language use is another aspect that drew the attention of all the MTLs. For them, such an aspect has the potential to situate effective communications and interactions among teachers

during their learning sessions. Anne, for example, shared her observation about the influence of the dimension in teacher professional learning of mathematics teachers. She believed that such language has the potential to bring teachers together as it is a language that does "not discriminate teachers or favor a particular group of teachers is fundamental in the professional learning of teachers." In the following quote, Kenny echoes Anne's sentiment:

> I believe that the language we used during the sessions and our communications through phone calls and text messages motivated teachers to wholeheartedly engage in their professional learning.

Kenny's account is enlightening about the power of respectful language in motivating mathematics teachers to constructively partake in the process of promoting their professional growth throughout their interactions. Evident in the account is the connection between the language used and teachers' sense of feeling invited to participate in learning to improve practice. It is also clear that the former has a significant influence towards the latter, animating mathematics teachers to direct their focus on improving practices through working with colleagues.

Isile, similarly, considered the same to play a sizeable role in what he termed, "urging teachers to accept and receive changes to the way professional learning needs to be conducted." For him, respectful language is instrumental in informing teachers about the new way in which their professional learning was organized, unlike what was the case in the traditional model they were used to. It is because of the language, as he described, that teachers could be encouraged to actively engage in the process of fostering their professional growth.

Mazengo, like other MTLs, brought to light another dimension that speaks to opportunities behind using clear language during the professional learning of mathematics teachers. He reported pondering such language to help teachers to understand what they were required to do while completing learning tasks but also in presenting ideas of their groups to the collective. As he expanded:

> The language, of course, helped us to have excellent discussions because teachers understood what they expected of them during the sessions. I decided to use clear language because I didn't to make my teachers experience ambiguity or something like that.

What is explicit in the accounts above is the MTLs' experiences of discerning the power of using respectful language in engaging mathematics teachers in the professional learning. The descriptions delineate how such language is effectual in affording mathematics teachers with a constructive learning experience while interacting with teacher leaders and themselves. As MTLs described, respectful language helps mathematics teachers to become mindful of their role in learning and how they are expected to execute it during actual learning sessions. Perhaps the most revealing issue is that the language is helpful in bringing mathematics teachers together as a collective but also in motivating them to keep learning to expand their professional knowledge and skills.

Dispositions and Skills Needed for Leading Teacher Learning

After becoming immersed in teacher leadership, the MTLs talked about dispositions and skills needed by teacher leaders for them to be effective in their work of leading teacher professional learning in rural and remote communities. In a literal sense, while skill means the ability to accomplish something as expected, disposition refers to "both how teacher leaders should behave and what they should believe" (Levin & Barbara, 2017, p. 36) as leaders of professional learning of mathematics teachers. Taken together, skills and dispositions connote abilities and conduct that teacher leaders are expected to demonstrate to become successful in leading teacher learning. The cross-case analysis of interview transcripts and vignettes revealed four skills and dispositions that the MTLs deemed instrumental for any mathematics teacher who wishes to step into leading teacher professional learning. They include readiness and commitment to lead, honesty, patience, and communication skills— speaking and listening. The next sections offer descriptions of the dimensions as revealed by the MTLs' experiences of leading teacher professional learning.

Readiness and commitment.

Nearly all the MTLs shared about the need for teacher leaders to demonstrate readiness and commitment to the work of leading teacher professional learning. For them, such aspects are crucial as the leadership work evolves as a life-commitment work of working with adults, adding new responsibilities to the work of teaching students. The background of their arguments is that any mathematics teacher, who steps into teacher leadership, does not stop teaching mathematics in the school, but instead, continues to facilitate the learning of students as well as the learning of teacher-colleagues within or outside the school. As Thea shared:

> This work needs somebody who is devoted to helping others develop their professional knowledge. I think it's not a work for every teacher because other teachers are not that much dedicated to teaching students and the same could be true with working with teachers. I wonder how somebody who is not committed to teaching student could be willing to accept more responsibilities.

Here, Thea is informative that not every mathematics teacher could become a teacher leader because the nature of teacher leadership work calls for a teacher who is enthusiastic about working with colleagues, an attribute that not all teachers may possess. It is reasonably explicit that Thea's claim is shaped by her experience of working with teachers who were initially less committed to promoting their professional growth. As such, she views the work of leading teacher professional learning to call for a teacher who is passionate about facilitating the learning of students. From Thea's viewpoints, the endeavor, furthermore, calls for a mathematics teacher who is willing to assume the responsibilities of making sure that teachers realize opportunities to grow throughout their career.

Isile, likewise, described the work to plea for a devoted mathematics teacher because it is challenging in the sense that it requires lots of groundwork before engaging in the actual work of leading teacher learning. In connection to that, he remembered years he spent participating in a program that prepared them to become leaders of the professional learning of their colleagues. As he expanded:

> For a teacher to be successful in this work, I think she or he should be a very committed teacher. I'm saying that because out there he/she needs to be ready to attend year-long preparations before starting to the job. So, it's a long journey … not easy for teachers who are not committed.

The MTLs, moreover, talked about the work required by a dedicated mathematics teacher since it is not just an intellectually demanding responsibility but also a continuous commitment. For them, teacher leadership requires investing thoughts as well as the integration of experience for it to become efficacious in improving schools and schooling. As Senzini expanded:

> From preparing plans up to leading the learning itself, a teacher leader is compelled to do a lot of thinking about how teachers could learn something out of their participation. This is something that I see to require a teacher who is ready in too much thinking for the sake of helping colleagues learn.

The MTLs were categorical about one aspect that mathematics teachers need to be successful in leading teacher professional learning. Their descriptions are quite clear that teacher leadership calls for mathematics teachers' willingness and commitment to the work as it requires them to work beyond teaching students. From their experience of working as both mathematics teachers and teacher leaders, they believe that the work of facilitating student and teacher learning could be inherently overwhelming to an uncommitted mathematics teacher. For the MTLs, in order for teacher learning to improve schooling and school, teacher leaders need to be people who are innately ready for and committed to the work.

Honesty.

The MTLs revealed that the work of leading teacher learning requires a mathematics teacher who is honest while working with other teachers. For them, as they described, such a disposition is highly needed because teachers feel encouraged to work with a colleague who is honest throughout their interactions. The MTLs were confident that by possessing such a disposition, a teacher leader could naturally motivate colleagues to wholeheartedly work to promote their professional growth. As Gabby expanded:

> One more aspect which I think is very important for a teacher leader is a sincerity. Here I mean … a teacher leader needs to be sincere to teachers for them to develop trust in him or her. This is important because without that teachers can easily be discouraged to be led by someone who is showing some conducts of dishonest.

Similarly, Thea expressed that a mathematics teacher leader "needs to be honest with what he or she is saying in the faces of the teachers who they work together with during their professional learning." For her, such a disposition is critical because it helps teachers to "develop confidence in their leader but also in what they are learning." Here, Thea is instructive about the need for having a teacher leader who, indeed, demonstrates nuances of honesty while working with colleagues. Moreover, she suggests teacher leaders be mindful of the need to be sincere with teachers for them to develop confidence in them and their leadership of teacher learning. The idea, as Thea said, is to create an environment where mathematics teachers feel comfortable to actively uphold their professional growth.

The MTLs, on the other hand, viewed honesty to play a substantial role in situating active professional learning of mathematics teachers during learning sessions. For them, such a disposition offers teacher leaders spaces to witness effective and continuing collaborations among teachers as they navigate their professional learning journeys. With such a contribution to teacher learning, the MTLs considered honesty influential in sustaining the professional learning of mathematics teachers. As Kenny expanded further in an interview:

> From my experience, I think honesty increases faithfulness among people not just in a session but everywhere. So, when teachers find their leader is honest all the time, then there is a great chance for these people to cooperate for a long time. So, it's important that a leader be a someone who is capable of saying what is appropriate without lies and things like that. I think teachers will be happy to work with someone who demonstrate such behaviors.

Other MTLs expressed similar observations regarding the need for a mathematics teacher leader to be honest. For Pili, for example, the disposition should be one of the attributes of any mathematics teacher leader as they are required to work with adults who could feel embarrassed working with someone who demonstrates nuances of being insincere to them and their

participation in learning. In emphasizing the need for a teacher leader to possess such a trait, Pili cautioned about the possibility for teachers to opt out of their professional learning when finding themselves working alongside a dishonest colleague. As she added, "in all the qualities that a teacher leader needs … being faithful and honest to teachers is … important."

The MTLs' experiences add a critical dimension to the understanding of the dispositions that are essential to teacher leaders and their work of leading teacher professional learning. It has become more evident that for a teacher leader to be successful in such a work, she or he needs to be honest to him/herself, to colleagues, to what teachers learn, and to their engagement in learning. The idea is for the MTLs to help mathematics teachers to develop confidence throughout their entire journey of promoting their professional growth. Perhaps the more enlightening observation comes from Kenny who attributed honesty to the emergence of professional relationships between a teacher leader and teachers who participate in their learning. Lieberman and Miller (2008) are in favor of this disposition, stressing that honesty creates a compelling learning environment for teachers, an environment which has the potential to encourage active teacher participation in learning. The most considerable gain in teacher professional learning, according to Lieberman and Miller (2008), occurs in a group where its members continually engage in honest conversations, discussions, and actions.

Patience.

The MTLs spoke about the need for a mathematics teacher leader to demonstrate patience while working with other teachers within and beyond learning sessions. For them, such a disposition is pivotal since in accomplishing their responsibilities they interact with teachers and other educational stakeholders who may likely possess differing views, interpretations, and understandings of what they are learning. From their experience in working with teachers, these MTLs became aware that patience is essential in ensuring that mathematics teachers, regardless of any circumstances surfacing during the process, work to achieve the goal of influencing their colleagues to promote their professional growth. As such, they perceived the dimension to play a significant role in upholding sustainable, healthy interactions and relationships beyond learning sessions. As Gabby shared:

> I think this work is about interacting with people. And through the interactions, many things may happen that are sometimes discouraging in some ways. So, I believe that it is important for a leader to be able to tolerate some of the issues in the course of doing this work with teachers.

In the description, Gabby reveals the occurrence of situations that are likely to distress teacher leaders when attending to their responsibilities of leading the professional learning of their colleagues. Given such a possibility, he emphasized the need for a teacher leader to demonstrate the ability to bear with any "discouraging" situations caused as well as conducts demonstrated by mathematics teachers that may intentionally or unintentionally occur during learning sessions. However, it is apparent from the comment that such a disposition is essential for any teacher leader since it has the potential to sustain the work of promoting the professional growth of mathematics teachers.

Other MTLs echoed Gabby's observation, emphasizing the need for a teacher leader to demonstrate the ability to tolerate any circumstance that is out of her or his feelings, experience, and understanding during their leadership work. Mazengo shared that the "work is not as smooth as one could imagine … it's demanding in some ways … it's a work that calls for patience largely to the part of the teacher leader if you want to enjoy it and make it something helpful to teachers. For the MTLs, then again, patience is crucial for teacher leaders, considering the realities of working with mathematics teachers who might have varying worldviews about teacher learning and mathematics teaching and learning. An example of a situation where the MTLs demonstrated patience is the way they worked around criticisms from teachers they worked together with during their sessions. As Isile described:

> You know during working with teachers in learning tasks that we provided I realized that teachers had varying points of view during our small group discussions. As a leader, I was personally not in harmony with some of the ideas and views expressed by some teachers. But I was careful not to interrupt or confront any of them. So, from this small example, you can realize why patience is needed when you work with people.

Here, Isile is articulating one of the situations that have the potential to discourage teacher leaders who do not possess the ability to accept criticism from other human beings. From the

experience he briefly shared, it is quite explicit that teacher leadership requires a mathematics teacher who respects and is ready to take opposing ideas from colleagues. As such, the work calls for someone who feels comfortable to be criticized by other people. For him, teacher leaders of such caliber are needed because of their ability to lead teacher learning without being embarrassed with criticisms from teachers.

The MTLs are categorical about the importance of patience in enabling effective teacher professional learning. Drawing from their experiences, they are informed that the work of leading the professional learning of mathematics teachers demands someone who is naturally capable of continuing to focus on teacher learning even when experiencing sentiments, situations, actions, and conducts that do not conform to his or her expectations or frame of thinking. They are confident that teacher leaders need to demonstrate tolerance over any emerging situations during their interactions and communications with teachers during a learning session and beyond. The idea behind such a disposition, as they shared, is for teacher leaders to be able to focus on teacher learning since such situations might take the whole process to a different direction that could not significantly enable teachers to promote their professional growth.

Communication skills: Speaking and listening.

The MTLs talked at length about one more attribute needed for teacher leadership. They contemplated the work of leading teacher learning to require the possession of communication skills for it to achieve its practical meaning. By communication skills, they meant twofold capacities. First is the capacity to situate effective speaking through expressing ideas clearly for mathematics teachers to understand what is communicated. The second, connectedly, entails the capacity to listen attentively, so to understand and motivate teachers to express thoughts and opinions about what they are learning. In the following quote, Anne expresses her thoughts regarding the attribute:

> A teacher leader should be someone who is good at communicating with teachers all the time they are interacting. This is someone who talks in such a way that teachers become aware of a message conveyed. This is important because as a leader you need to be able to let those who follow you to understand you well.

Here, Anne articulates the importance of effective speaking during the professional learning of mathematics teachers. It is visible that she realized the need for teacher leaders to be competent speakers to help teachers understand their instructions, ideas, suggestions, and, most importantly, the direction of their professional learning at a specific moment. As Anne described, this is substantial as it could help teachers to make sense of the message communicated to them in relation to their learning. Kenny echoed Anne's sentiment, saying that a mathematics teacher leader needs to have the ability to communicate clearly to his teacher-colleagues. He is cautious about the danger of having a teacher leader who could make mathematics teachers experience ambiguity and confusion to the point of not fully engaging in learning. As he expanded:

> … most of the time a leader is required to share his/her thoughts about what teachers are doing, and sometimes to provide a way forward. So, if that leader is not able to express his or thoughts clearly, teachers might be disoriented because they don't understand what their leader is trying to communicate to them.

Other MTLs expressed similar observations, emphasizing teacher leaders to be those who can speak eloquently while leading teacher learning. Pili, for example, pondered attentive listening to be an important attribute for a teacher leader as it facilitates incorporation of mathematics teachers' feelings, views, and opinions about teacher professional learning. She considered the skill a source of information about what needs to be taken into consideration so as to improve the professional learning of mathematics teachers. For Pili, on the other hand, by not listening carefully, a teacher leader is likely not to capture the feelings, wonders, and bumps that mathematics teachers are experiencing in their learning journey. As she expanded:

> The leadership work requires integration of teacher thoughts for it to improve the knowledge of mathematics teachers. So, listening is something that can help that integration to occur. It helps a leader to know what teachers are facing in their learning. It is in this way I'm saying teacher leaders need to be good listeners all the time.

Thea expressed that teacher leadership needs a mathematics "teacher who listens not just for the sake of listening but listens for the sake of listening to understand what teachers are saying." For her, effective listening is an inherent skill for any teacher leader since it allows them to develop a better understanding of mathematics teachers' viewpoints but also, using her words,

it “motivates teachers as they find themselves being highly valued by [their] leader.” As Thea continued, by listening attentively to what teachers are communicating, a teacher leader could be in a position to realize avenues to know what is to be done to improve teacher learning. One aspect that can be gleaned from Thea’s account is the issue that effective listening plays a motivational role as it encourages teachers to view themselves as valued by a teacher leader during their learning sessions.

The MTLs’ accounts are quite illuminating, speaking about the need for teacher leaders to possess effective communication skills, which entails the ability to speak effectively but also to listen attentively during their interactions with mathematics teachers during sessions. They considered the skill to help teacher leaders to express their views and feelings regarding teachers’ professional learning journeys. They also acknowledged the same to help teacher leaders to make sense of what mathematics teachers are experiencing during their professional learning. As such, the MTLs openly admitted the skills to be indispensable among teacher leaders considering its potentiality in locating teacher professional learning in the direction that could help mathematics teachers to promote their professional growth. They reported the same to have a bearing on leveraging mathematics teachers’ participation in professional learning.

Summary

This chapter described perspectives of TLPL among teacher leaders involved in this study. In illuminating the perspectives, the chapter began with the description of five dimensions of the perspectives as informed by the MTLs’ experiences of their teacher leadership work. Then, I unpacked each dimension to make sense of its implications for teacher professional learning in Tanzania and beyond. The chapter offered a broad reflection on the perspectives that highlighted critical insights gleaned from the MTLs’ accounts. Professional learning outcomes and factors that contribute to the success of the professional learning of mathematics were presented. The aspects are helpful in developing an understanding of the practice and how it helps mathematics teachers promote their professional growth. The chapter ended with an overview description of the dispositions and skills for leading the professional learning of mathematics teachers who are working in rural and remote communities in Tanzania. The next chapter offers a summary of the study, implications for practice, suggestions for future research, and conclusions.

Chapter 9

Concluding Thoughts

Summary of the Study

This study aimed to explore the experiences of mathematics teacher leaders (MTLs) in leading the professional learning of mathematics teachers in rural and remote communities in Tanzania. The study was guided by the research question: *What are the experiences of mathematics teacher leaders in leading the professional learning of primary school mathematics teachers in rural and remote communities in Tanzania?* Given that the MTLs led the professional learning of teachers in different contexts, the study employed multisite case study methodology (Stake, 2010 & Merriam, 2009) grounded within constructivist philosophical stance. As such, the study was situated within relativist ontology and subjectivist and transactional epistemology. The design, implementation of the study and interpretation of research data was informed by a combination of theoretical perspectives, including symbolic interactionism (Blumer, 1969), perspective consciousness (Hanvey, 1982), and Dewey's theory of experience (Dewey, 1938). The study gathered experiences of eight mathematics teachers from their real-life contexts through a range of sources, including an open-ended questionnaire, in-depth interviews, focused interviews, metaphors, and vignettes.

The findings of the study revealed the MTLs' leadership of teacher professional learning to be highly influenced by notions of leadership that informed and continue to inform leadership practices in their local communities. The notions are leadership by inheritance (Anne), leadership by age (Mazengo), leadership by prudency (Isile), leadership by wealth (Senzini), leadership by fame (Gabby), leadership by uniting (Kenny), leadership by shrewdness (Pili), and leadership by heroism (Thea). The study demonstrated the influence of these notions on the MTLs' leadership of the professional learning of mathematics teachers in their districts. Emerging from this study was that the MTLs' view of what their local leaders did and are still doing in leading community members determines how they might interact with and engage mathematics teachers in professional learning contexts.

The study unearthed that the MTLs differently experienced their leadership of the professional learning of mathematics teachers in their rural and remote communities. Based on the findings of this study, such a situation was largely shaped by dimensions that include teacher leaders' place of work, working experience, and age. Other dimensions revealed by the study are teacher leaders' gender, nature of mathematics teachers they worked with, and their preparation in teacher colleges. The study demonstrated the influence of these dimensions on how the MTLs perceive themselves as leaders of the professional learning of mathematics teachers in rural and remote communities.

This study has revealed a series of activities that a mathematics teacher leader can undertake when charged with the responsibility of leading the professional learning of other teachers. Such activities include those that are assumed before, during, and after professional learning sessions. Activities that the MTLs reported undertaking before the sessions involve designing professional learning plans along with mobilizing resources and creating materials to be used to facilitate meaningful learning among mathematics teachers. In-session activities included greeting teachers, introducing self, others, and big ideas, distributing learning tasks and engaging teachers, motivating teachers, and collecting information about teacher learning. Others are moderating discussions and facilitating consensus among participating mathematics teachers. On the other hand, activities that the MTLs accomplished after the sessions included networking with mathematics teachers and (re)designing professional learning plans for next sessions. It emerged in this study that such a series of activities challenge those who define professional learning of teachers in simplistic terms but also view it as a one-time event instead of an ongoing process of assisting teachers to deepen their pedagogical knowledge and skills.

Nearly all participants viewed teacher-led professional learning (TLPL) valuable in helping other mathematics teachers to deepen their professional knowledge. In particular, the MTLs considered the practice useful in facilitating teacher participation and engagement in learning, encouraging long-term collaboration among teachers, inviting integration of classroom experiences, inviting contextualization of professional learning, and situating ongoing professional learning of mathematics teachers in schools. Participants' experiential descriptions, on the other hand, revealed that not all mathematics teachers could efficiently assume leadership of TLPL. The MTLs considered teachers who could become successful teacher leaders as those

possessing skills and dispositions that include readiness and commitment to lead, honesty, patience, and communication skills—speaking and listening. As emerged in this study, encouraging mathematics teachers to become leaders of the professional learning of their teacher colleagues without helping them to develop, but not limited to, such skills and dispositions may not be enough in situating TLPL in schools.

The study has brought to light the outcomes of the professional learning of mathematics teachers as observed by the MTLs. Based on the findings of the study, the practice has improved mathematics teachers' pedagogical knowledge and skills that they need to help students effectively learn mathematics in their schools. It became clear in this study that the MTLs pondered professional learning experience to have assisted mathematics teachers to become more confident in continuing to teach mathematics in their respective districts. They also considered the same to have raised awareness of gender-sensitive pedagogy among teachers who participated in learning, allowing them to become informed about how they can situate the pedagogy in their mathematics classrooms. One more outcome is the way the professional learning experience increased collaboration and networking among mathematics teachers, enabling them to continue to work together beyond learning sessions.

The findings of the study revealed a number of factors that the MTLs considered as contributing to the successful leadership of TLPL. The factors include long-term collaborative preparations, availability of resources, ongoing collaborations, and freedom of ideas and opinions. Other factors reported by the MTLs are wise teacher leadership, teacher leader accessibility and availability, and use of respectful language. This study, however, has also raised two challenges that the teacher leaders encountered while working with mathematics teachers in professional learning contexts. While the first challenge is the traditional conception of teacher professional learning among mathematics teachers, the second is the issue of mixing languages during learning sessions, a situation that led other teachers not to make sense of what was communicated during the sessions.

Implications for Practice

This study has described what it is like for a mathematics teacher to lead the professional learning of other mathematics teachers within and outside a school in rural and remote contexts.

The MTLs' experiences, in summary, highlight the need for giving mathematics teachers the control of their own professional growth, so to make teacher professional learning to directly speak to what teachers need to effectively help students to learn the subject. This study has demonstrated that it is important to allow mathematics teachers spaces to monitor their own professional growth since they are the one more informed of what is needed to improve practice. As such, the education system of Tanzania is challenged to reconsider the position of mathematics teachers in leading the professional learning of other mathematics teachers to benefit from the potentials of the practice. At the heart of this challenge is to shift from implementing professional learning initiatives that orient mathematics teachers to assume a passive role in learning to those that allow them avenues to play an active role in the process of promoting their professional growth.

This study has demonstrated the MTLs' engagements in developing learning plans to attend to the needs of mathematics teachers of their districts. This thesis commends the process of designing the professional learning of mathematics teachers to pay closer attention to aspects that speak to MTLs' lives as teachers but also as human beings. At the heart of this suggestion is to customize teacher professional learning, so to match the interests, needs, and experiences of not just teacher leaders and also of teachers as they work to promote their professional growth. The intent is to have a teacher voice in teacher professional learning as it has the potential of bringing to light the needs of mathematics classrooms.

As emerged in this study, the first step in giving mathematics teachers control and voice over their professional learning is to empower them to become leaders and educators of the learning of other teachers within and outside their schools. The idea is to support their transition to becoming mathematics teacher leaders who can make a difference in helping mathematics teachers to promote their professional growth and thereby improve student mathematics learning in schools. Education systems, Tanzania's being no exception, need to embark on empowering mathematics teachers to develop a sense of what it means and takes to work as a leader of teacher professional learning for them to be able to support the professional growth of other teachers. Such empowerment is undeniably crucial as TLPL is quite a novel practice in Tanzania. Empowering mathematics teachers to become leaders capable of taking charge of teacher professional learning without helping them to negotiate the place of local leadership notions has

the potential for the MTLs to experience a complicated transition to teacher leadership. This thesis has argued for creating spaces for those teachers who wish to step into leading teacher learning to make sense of the prior leadership experiences they have lived within their local communities as well as those they undergo within their schools.

This thesis, again, has argued for the Tanzania education system to encourage mathematics teachers to become mindful of a broad view of teacher professional learning. The intent is to help teachers to see themselves capable of facilitating their own professional learning through working alongside others within and outside their schools. Likewise, I have recommended the education system to encourage the use of the language that can enable teachers to efficiently and effectively communicate during their professional learning and beyond. This might well help promote the use of language that would allow mathematics teachers to be on the same page during their conversations and discussions that are focused on finding ways to improve practice in schools.

At odds with what is practiced in the Tanzanian education context, where professional learning of teachers is commonly offered to teachers of all subjects, this thesis argued for shifting to subject differentiated professional learning. This recommendation is provoked by the observation that the conceptions the MTLs attributed to mathematics teaching and learning shaped their experiences of leading the professional learning of their colleagues. Time is now for teachers who teach mathematics to experience professional learning opportunities that explicitly engages them in matters of teaching and learning of mathematics for them to ultimately develop the capacities they need to engage students in meaningful mathematical activities.

Offering the same professional learning to teachers who teach all subjects expecting them to figure out how such learning can match the needs of their classrooms but also the nature of the discipline, may discourage them from talking about what they are experiencing in their specific classrooms. As such, professional learning becomes something that narrowly helps teachers to address pedagogical challenges they encounter alongside their students. For example, instead of having professional learning of teachers with a theme “how to teach difficult topics” or “how to teach a large class,” this dissertation submits having, possibly, “how to teach difficult math topics” or “how to teach math in a large class.” This might help not to isolate mathematics

teachers from other teachers nor is it about changing the titles of learning sessions. Instead, this dissertation suggests designing and implementing teacher professional learning that allow teachers spaces to exchange thoughts about what they do in their classrooms and what can be done to improve mathematics teaching and learning in schools.

One more noteworthy implication of this study would be rethinking teacher education curriculum and how it might be redesigned to help pre-service teachers attend to the demands of the contemporary landscape of education. Teacher education curriculum needs to be redesigned in order to provide prospective mathematics teachers with the skills they need to engage in the ongoing work of deepening their professional knowledge. The intent is to allow teacher educators spaces to more explicitly engage in preparing pre-service teachers who could be able to monitor their own professional growth while in schools, so to improve mathematics education in classrooms. In particular, the curriculum might include opportunities for pre-service teachers to explore the leadership notions and stories of their local communities. As such, it could potentially shift the context of where pre-service teachers are educated as well as expand the knowledge of teacher education as inclusive of people and places not yet commonly considered.

Suggestions for Future Research

Through this research study, I have explored experiences of the MTLs in leading the professional learning of their teacher colleagues in rural and remote communities. It is with these experiences I feel that more research needs to be done to broaden our understanding of TLPL. Future study could involve mathematics teachers who attended the professional learning sessions led by MTLs in their respective districts for them to share their stories of experience of participating in a professional learning program led by their teacher colleagues. Such a study has a potential to further inform our understanding of TLPL as lived and felt by mathematics teachers within their rural and remote contexts. Even though this study has attempted to investigate what the MTLs think of teachers' participation and engagement in TLPL based on the interactions they had during and after their professional learning sessions, there is a need to hear from teachers themselves. Work in this direction could help unearth teachers' feelings of the work they did with the MTLs in promoting their professional growth but also of the presence of a fellow teacher as a leader of their professional learning. The intent is to understand how they

make sense of TLPL and what they think should be taken into consideration to efficiently situate the practice in schools for them to engage in an ongoing process of promoting their professional growth. The essentiality of their thoughts about the practice lies on the understanding that "[t]eachers need to feel they are part of the system and have a voice in the decisions that directly affect their ability to teach" (Balka, Hull, & Miles, 2010, p. 13).

Another question that needs to be re-explored in the future is the MTLs' experiences of leading the professional learning of mathematics teachers in their districts. Building on the findings of this study, such research has the potential to illuminate how the MTLs continue to experience the work they do alongside mathematics teachers in promoting their professional growth. My suggestion for this research study is provoked by Dewey's (1938) teaching that "[a]n experience is always what it is because of the transaction taking place between an individual and what, at the time, constitutes his[/her] environment" (p. 43). I am confident that these MTLs will work with many mathematics teachers who have varying conceptions and experiences of teaching mathematics and also about engaging in professional learning, especially, professional learning led by a teacher. More significantly, as they work in varying social and contextual situations other than those they were experiencing at the time of this study, the MTLs may share similar or different stories of experience of leading the professional learning of mathematics teachers in their districts.

Conclusions

This study has developed an understanding of the experiences of the MTLs in leading the professional learning of mathematics teachers in rural and remote communities in Tanzania. With such an understanding, I have made informed recommendations to inform the transition towards situating ongoing teacher professional learning in Tanzanian primary schools. Based on the findings of this study, it is evident that mathematics teachers are capable and relish the opportunity of taking charge of their own professional learning when empowered to understand what it means and takes to lead the learning of other teachers. This study has brought to light mathematics teachers' feelings of the work of leading other teachers, roles, and perceived impacts of teacher-led professional learning to teachers' professional growth. The same is also explicit about the dispositions and skills that mathematics teachers need to possess to effectively engage other teachers in the process of expanding their professional knowledge base. This study

demonstrates the influence of local leadership notions on the leadership of teacher professional learning sessions. Based on the findings of this study, I maintain that it is crucial to attend to what mathematics teachers have experienced and are still experiencing in their local communities for teacher learning practice to speak to who they are but also reflect realities of their contexts. I conclude that a description of the MTLs' experiences of leading the professional learning of mathematics teachers is an opportunity to practically rethink teacher learning and how it can be situated in the hearts, hands, minds, and bodies of teachers themselves.

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Appendices

Appendix A

(Re)Introducing Tanzania

Geographic Context and Socio-Economic Situation

Tanzania was founded on April 26th, 1964, following the union of two supreme and sovereign states—the Republic of Tanganyika and the Republic of Zanzibar. Before the union, the Republic of Tanganyika became an independent state on December 9th, 1961 from British and the United Nations trusteeship. On the other hand, the Republic of Zanzibar became an independent state on December 10th, 1963 from the British colonial rule. Tanzania is located between longitudes 290 and 410 East, and latitudes 10 and 120 South (United Republic of Tanzania (URT), 2015). It shares borders with eight countries: Mozambique in the South; Kenya and Uganda in the North; Rwanda, Burundi, and Democratic Republic of Congo in the West; and Zambia and Malawi in the South West. To its East lies the Indian Ocean, an important resource to the country and neighboring countries.

Tanzania is the largest country in the East African region with an area of approximately 886.1 million square kilometers (URT, 2015). According to the 2014 census, the population of Tanzania was estimated to be 47.4 million, approximately 97 percent are living in Tanzania mainland and three percent in Zanzibar (URT, 2015). The majority of people (76.9 percent) are residing in rural and remote areas, with only 23.1 percent in urban areas (URT, 2015). In 2014, the annual growth rate in Tanzania was estimated to be 2.9 percent (URT, 2015). The country's climate is characterized by high temperatures and humidity on the coast and islands, with daytime temperatures average of about 23° Celsius from June to September, and 27° Celsius in the rest of the year (URT, 2015). Tanzania, like other East African countries, is biotically diverse with a wide variety of animal and plant species.

The economy of Tanzania has been recorded to grow in the face of "limited exposure to global financial markets, high gold prices and continued flow of foreign direct investments to the extractive sector" (United Nations Development Programme (UNDP), 2016). In recent years, some improvements have been made in terms of advancing living conditions and improving

access to basic education, nutrition, and health. According to the World Bank (2016) reports, the gross domestic product growth is estimated at 7 percent for the 2015 financial year, suggesting a substantial economic growth of the country. The ongoing discoveries and exploration of oil and natural gas in the South Coast of Tanzania both on- and off-shore are expected to boost the country's economy in years to come (UNDP, 2016). The people of Tanzania are largely reliant on agriculture for employment. Over the past few years, however, quite many Tanzanians have been employed in other sectors, including construction, trade, and transport. Figure 10.1 below is a map of Tanzania.

Figure 10.1: Map of Tanzania (URT, 2014)

Cultural context.

Tanzania is a diverse country, composed of numerous tribal, linguistic, and religious sects. In particular, it has more than 120 ethnic groups, with Sukuma, living in the lake zone, being identified as the largest group. Indeed, each ethnic group has its own tribal language, which means that Tanzania includes more than 120 tribal languages spoken around the country. The tribal languages are commonly used at home and in village activities while Swahili, the national language, is used a medium of instruction in primary education and as the language in government offices (URT, 2015). In that way, a large portion of the people in Tanzania are bilingual, speaking a local language and Swahili (Grosjean, 1984). People who had an opportunity to attend post-primary education and higher levels of education are likely to be able to speak a third language, English, as it the language of instruction in post-primary education. The literature on history has been appreciating the lingua franca, Swahili, for playing a key role in uniting the ethnic groups during the period of seeking national independence from the colonial rule (Taylor, 1963). Tanzania has two major religions that are Muslims and Christians.

Many people in Tanzania have been said to demonstrate a great sense of cooperation and togetherness despite their tribal and religious differences. This situation has been considerably associated with *ujamaa* (socialism) ideology, an important dimension of post-independence life in Tanzania. Under the leadership of Julius Kambarage Nyerere, socialism came into view in 1967 following the Arusha Declaration (Kassam, 1983). The idea around the embracement of the ideology was to eradicate selfishness and individualism among Tanzanians, an aspect that was highly privileged during the entire period of colonial rule. With such a dimension of life, no individual interests were left to outshine the societal interests (Blommaert, 2014).

The literature on the history of Tanzania and Africa, in general, is replete with information on how socialism contributed to making people continue to cooperate in many societal undertakings regardless of gender, race, religion, color or ethnic group differences (Blommaert, 2014). It is on such ground, Malmberg and colleagues (2001) once considered culture in Tanzanian to bring people together. Today, my experience of growing and living in Tanzania shows that people in many places, including workplaces, still address each other as *ndugu* (a relative), a sign of warm relationship and appreciation of humankind. This situation is commonplace in many schools where teachers work together as friends to ensure the learning of

students. It is important to acknowledge that even though socialism is considered politically nonexistent, people in Tanzania still embrace the spirit of socialism.

Educational system.

The educational system of Tanzania is founded on the mission of having well-educated citizens with knowledge, skills, abilities, and attitudes required to become potential citizens capable of contributing to the national development (Jamhuri ya Muungano wa Tanzania (JMT), 2014). With such a mission, accordingly, education in Tanzania is superintended by two ministries namely, the Ministry of Education, Science, and Technology and the President's Office—Regional Administration and Local Government. The ministries are charged with the responsibility of ensuring the provision of quality basic education in schools, including primary schools. Broadly speaking, while the Tanzania Institute of Education has the responsible for preparing the curriculum, the National Examination Council of Tanzania (NECTA) assesses the centralized curriculum through different national examinations as I will describe them in the following paragraphs.

The educational system of Tanzania is predominantly academic in nature, with two major routes—public education and private education. There are five different levels of education of Tanzania—pre-primary education, primary education, ordinary level secondary education, advanced level secondary education, and higher education. Indeed, the Tanzanian "educational system is tightly centralized and strongly hierarchical" (Malmberg et al., 2001, p. 580) in nature. The existing education system of Tanzania is structured around the number of years, 2 - 7 - 4 - 2 - 3+ (JMT, 2014). That is, pre-primary education, 2 years; primary education, 7 years; ordinary level secondary education, 4 years; advanced secondary education, 2 years; and higher education is 3+ years (depending on the discipline a student is pursuing at the university). The following paragraphs offer an overview of the levels of the educational system of Tanzania.

As alluded to above, the pre-primary education is made up of two years. Participation of children in this program is largely voluntary, considering that it was designed to prepare children for their primary education. In theory, the pre-primary education is designed for children of the age ranging from five to six years, but in fact, children below five years of age have been admitted into the program in many schools (Mtahabwa & Rao, 2010). Some scholars in

Tanzania, including Mbise (1996) and Mtahabwa and Rao (2010), have raised concerns over the quality of pre-primary public education, claiming that it is of less quality when compared to similar programs in the private educational system. One reason that has been frequently cited in the research on early childhood education is a situation of offering pre-primary education as a voluntary education for children. In addressing the problem, some scholars, including Mtahabwa and Rao (2010), have advised the government of Tanzania to make pre-primary education a mandatory education committed to prepare children for their primary education.

Unlike pre-primary education, the primary education in Tanzania is compulsory and free education for all children. In principle, children are required to start their primary education at the age of seven years. The medium of instruction in public primary schools is Swahili and in private schools, it can be either Swahili or English, depending on the choice of the owner of a school. In 2014, Tanzania had 16,365 primary schools around the country, of which 15,596 (95.3 percent) were public schools, and 769 (4.7 percent) were privately owned schools (URT, 2015). Today it is projected that every village in Tanzania has at least one primary school, opening-up more chances for children to attend primary education.

The primary education is examined in standard seven where students are required to sit for the national examination called Primary School Leaving Examination (PSLE), prepared and governed by NECTA. The practice is that students who attain higher grades in that examination are posted to secondary schools for their ordinary level secondary education. In that way, PSLE works as a tool for selecting students for the post-primary education (Malmberg et al., 2001). The participants in this proposed research study were mathematics teachers teaching in primary schools located in rural and remote communities in Tanzania.

Like primary education, secondary education in Tanzania is currently free for all children who are successful in their PSLE. In 2014, Tanzania had 4753 secondary schools around the country, of which 3692 (77.7 percent) were public schools and 1062 (22.3 percent) were private schools (URT, 2015). Secondary education is divided into two levels—ordinary level secondary education and advanced level secondary education. As introduced above, the former is four years while the latter is two years. The medium of instruction at both levels is English, with Swahili taught as a lingua franca. The ordinary level secondary education is examined at the end of the fourth year where students sit for the national examination called Certificate of Secondary

Education Examination (CSEE), prepared and administered by NECTA. The arrangement regarding students' assessment is that students are assessed in two ways—continuous assessment and the CSEE, each contributing 50 percent of students' final grade.

Teachers in primary and secondary schools are responsible for preparing, administering, and marking the continuous assessments. Students who pass the CSEE are posted to secondary schools for their advanced level secondary education. Such a situation makes the CSEE, like PSLE, play a gatekeeping role in the Tanzanian educational system. The advanced level secondary education is examined at the end of the second year by an examination called Advanced Certificate of Secondary Education Examination (ACSEE). Like the CSEE, the ACSEE is prepared and governed by NECTA and is the gateway to post-secondary or university education. That is to say, students who pass the ACSEE are eligible to apply for admission into higher education institutions within or outside the country. The structure of education of Tanzania is illustrated in Figure 10. 2.

According to 2014 statistics from the Government of Tanzania (2014), the budget for education has ranged from 17 percent to 23 percent of the gross national budget, with the large share being allocated to higher education students' grants and loans. As such, the remaining funds have been allocated to support pre-primary, primary, and secondary education. The government of Tanzania is cognizant that the funds it has been allocating over the years to finance education do not match with the actual needs of improving the quality of education. The government is also mindful that the situation has "contributed to the education sector to fail to fully implement its obligations, and therefore, affecting the attainment of the set objectives" (JMT, 2014, p. 56).

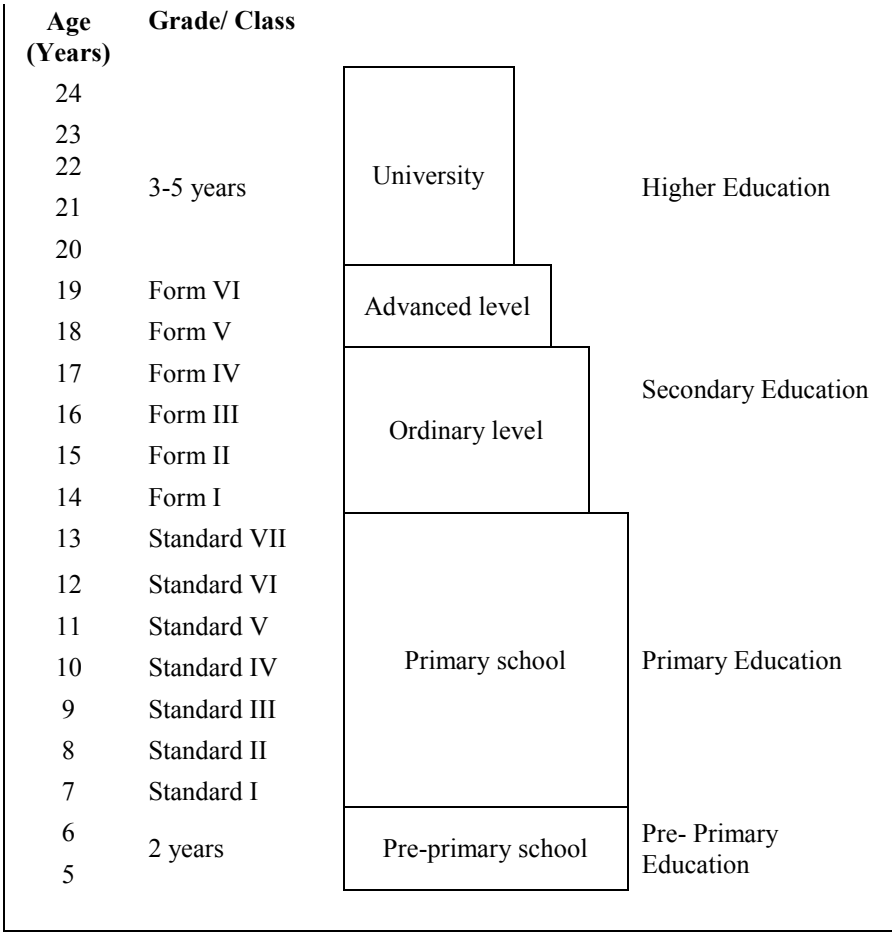

Figure 10.2. Education system of Tanzania, modified from Malmberg and Hansén (1996, p. 23)

Appendix B

Invitation Letter

Dear Potential Participant:

I would like to kindly invite you to participate in a research project entitled, *Teacher Professional Learning in Tanzania: Experiences of Mathematics Teacher Leaders.* This study is a partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Secondary Education of the University of Alberta, Canada. The Principal Investigator is Calvin Zakaria Swai, a doctoral student at the University of Alberta, Canada. The purpose of this project is to explore the experiences of mathematics teacher leaders in leading the professional learning of mathematics teachers in rural and remote communities in Tanzania. Findings of this study are expected to help improve future professional learning of primary school mathematics teachers and may inform relevant teacher professional learning research in Tanzania as well as in other parts of the world.

Your participation in this project is purely optional. By agreeing to participate in this study you would be asked to (a) participate in an open-ended interview that will last for not more than 60 minutes, (b) write vignettes in a six-week period, (c) participate in the second interview (focused interview) that will last for not more than 60 minutes, and (d) generate metaphors in relation to your work of leading professional learning of mathematics teachers, followed by a conversation about the metaphors generated; both lasting for approximately one hour. It is crucial for this study to collect rich data in a relaxed and friendly environment and that you would be able to choose the location you think you will be comfortable to share your leadership experiences. You would have the option to withdraw from the study at any point up to one month after the data is collected.

Findings of this study will appear in a doctoral dissertation at the University of Alberta and may also appear in academic and professional journals. Possibilities exist for results of this research to be presented at academic and professional conferences. In addition, results of the study could inform the preparation and teaching of teacher education courses at the University of Dodoma, Tanzania.

Your participation will be confidential that your personal identifiers such as your names and the school you are working will be omitted in the final research report. Research data will be secured in a protected cabinet, with electronic data protected with a password and secured on the hard drives of the computer of the principal investigator. The data will be stored for at least five years after the publication of a doctoral thesis and will then be ethically destroyed by the Principal Investigator.

Should you have any questions or concerns about this study please feel free to contact: Calvin Zakaria Swai 1-780-999-8136 or 255-719-340-014, czakaria@ualberta.ca

Thank you for considering participating in this study.

Sincerely,

Calvin Zakaria Swai

A Doctoral Student (Department of Secondary Education, University of Alberta, Canada)

Appendix C

Open-ended Questionnaire Guide

1. What was it like for you when you were invited to the program to be prepared to be a leader of professional learning of other mathematics teachers?
2. Please describe notions of leadership that you experienced in your growing up in your local community?
3. Are you interested to have further conversations about your work of leading the professional learning of other mathematics teachers?

Name: _____

Telephone Number: _____

Appendix D

Open-ended Interview Guide

1. What was it like for you when you were invited to the program to be prepared to be a leader of professional learning of other mathematics teachers?
2. What is like for you to lead the professional learning of mathematics teachers?
3. What is like for you to prepare learning materials and resources for supporting professional learning for mathematics teachers?
4. Can you remember an experience when you realized primary school mathematics teachers were looking to you for their professional growth?
    i) Can you tell a story about that experience?
    ii) How has that experience changed you as a mathematics teacher and as a human being?
5. Can you tell a story about your interactions with mathematics teachers in your professional learning sessions?
6. How do you feel when you work with mathematics teachers with whom you work together in the same school or those teaching in a nearby school? How has that feeling(s) changed you as a leader of professional learning of teachers and as a primary school teacher?
7. What is it like for you to return to your school and work with teachers you have been together with in the professional learning sessions?
8. What do you think your teacher colleagues think of you as a leader of their professional learning?
9. Can you remember an experience when you were happy and joyful in your work of leading the professional learning?
    i) Can you tell a story about that experience?
    ii) How has that experience changed you as a leader of professional learning of mathematics teachers?
10. Can you remember an experience when you became frustrated, stressed, annoyed or upset in your work of leading the professional learning?
    i) Can you tell a story about that experience?
    ii) How has did you address that situation?

iii) How that experience affects you as a leader of professional learning of other teachers?

iv) How did that experience change you as a leader of professional learning of mathematics teachers?

11. Have you heard stories from the teachers you have been working with? What do they say about your leadership and about their learning?

12. Would you like to share any experience you remember in relation to your work of leading the professional learning of mathematics teachers?

Appendix E

Focused Interview Guide

1. Can you share a story about your leadership of professional learning of primary school mathematics teachers?
2. How your leadership of the professional learning of mathematics teachers changed? What shaped this change?
3. What role do you play in the professional learning sessions with other mathematics teachers?
4. What have you learned in your work of leading the professional learning of mathematics teacher? What do you think you will do differently in the coming professional learning sessions?
5. What events, situations, and circumstances have made it difficult for you to make progress or achieve planned objectives? Can you tell a story about how you dealt with those events, situations, and circumstances?
6. From your experience as a leader of teacher learning, do you think any primary school teacher can do what you are doing (leading the professional learning of teachers)?
7. In view of your experience of leading the professional learning of teachers, what qualities do you think a mathematics teacher needs to be able to lead other teachers in their professional learning?
8. From your experience as a leader of teacher learning, what do you think are the challenges of leading the professional learning of mathematics teachers?

Appendix F

Outline of the Vignette

You can start with any question.

The context

Think about the professional learning sessions you were leading alongside the mathematics teachers. Tell a little about the context of your work.

Hopes

What did you hope would happen when you were leading the professional learning of mathematics teachers?

People I worked with

In the professional learning sessions, were you working with one mathematics teacher, or a group of mathematics teachers or both?

What I did

Think about the work you have been doing with mathematics teachers during the professional learning sessions. What were the specifics of your work as a leader of the professional learning of mathematics teachers?

The outcomes

What was the reaction or results of the work to an individual mathematics teacher and to the larger group of mathematics teachers?

Why did it happen

In view of the outcomes of your work, what do you think were the factors or reasons that contributed to the outcomes? What leadership strengths helped you to achieve what you have achieved?

Other comments

Please comment on anything else such as expectations for the future, predictions, what was learned, and so on.

Appendix G

Metaphor Generation Guide

1. Please recall your experience of starting to lead the professional of primary school mathematics teachers. From that experience, starting to lead teacher professional learning is like _____

2. For you, leading the professional learning of primary school mathematics teachers is like _____

3. From your experience of interacting with primary school mathematics teachers, a leader of professional learning of mathematics teachers is like _____

4. Please recall the way you engaged in preparing yourself for leading the professional learning of primary school mathematics teachers. For you, the preparation for that work is like _____

5. From your experience, teacher-led professional learning of mathematics teachers is like _____

6. In general, working with mathematics teachers on professional learning basis is like _____

Appendix H

Case Level Display of MTLs Vignettes

Research participant	Verbatim	
	What did you hope would happen when you were leading the professional learning of mathematics teachers?	*What did you do as a leader of the professional learning of mathematics teachers?*
Mazengo	I expected them to talk about different strategies, and in so doing, they come to learn new ways of teaching from others. And even the program was designed to help teachers become aware of many teaching strategies.	One of my jobs is to go around to see what teachers actually do. So, I normally make quick movements from one group to another. Another thing that I also do after we finish our face-to-face sessions is to keep in touch with the teachers who want some help with the tasks that they were given as something like homework.
Senzini	Teachers who had a chance to attend before were used to play a very minimal role in their learning. So, I said to myself that this program is going to be something new to many if not all teachers as they are not used to it. I expected them to take long time to think about what to do.	The first thing I always do is to salute the members of our group by asking them what is going on their side. After that we start our session I always introduce myself, telling teachers my name, the name of my school, and probably the standard I'm teaching at the specific moment.
Kenny	Because this program requires teachers to actively participate in their learning, and not listening to me as their leader, I knew that I need to work with them to understand their position. You know I experienced the same at the first time I was introduced to this kind of teacher learning.	I normally prepare modules for the teachers beforehand to be used during our professional learning. I always start the learning session with learning activities. So, it's my work to provide teachers with the activities in their tables and I ask them to respond to them

Anne	I was wondering how they will think of me because we are in the same level of education as teachers and in fact teaching in the same kind of locality.	Because I know teachers need motivation for to keep on learning, I always throw some words that I know could encourage them to accomplish the learning tasks but also to learn to improve themselves.
Thea	In fact, I anticipated a change of understanding in teachers after their professional learning. I was quite sure that by working together they could learn from the experiences of one another and I expected that to be a powerful way of learning several tactics of teaching the subject.	One of the things that we should do before sessions begin is to prepare what we call a module. This is like a tool to initiate the process of teacher learning. To facilitate the discussions during sessions by making sure that teachers present and synthesize ideas.
Gabby	My expectation was to see them becoming poised to teach any mathematical concept in any standard they can be asked to teach. I was expecting them to question about what they were to get out of my leadership.	To lead a large group discussion of the learning tasks that teachers have been working on them as well as making sure that we conclude our discussions by teachers and for me to provide ideas that are going to help us in teaching well the subject in our classrooms.
Isile	The program was well prepared that I hoped mathematics teachers will learn something new and something concrete from one another… that could help them make a difference on how they teach their students.	And because we are well supported with the resources from the project, I have created so many materials within a short period of time since becoming a leader in the district.
Pili	Honestly, I expected to see teachers learning different strategies and methods for teaching mathematics but also for using teaching and learning materials to improve what they do in their classrooms.	Before anything, I have to make sure that I prepare a module that stands for us to use during the session and even after the sessions. Also, before teachers come in, I and my colleagues we have to prepare some tasks that guide our discussions

Appendix I

Research Clearance

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

Tel: +255 211-3139, +255 2110146-10
Fax: +255 22 2135486
Email: info@moe.go.tz
Fax: +255 22 2135486
Website: www.moe.go.tz

P.O.Box 9121,
7 Magogoni Street,
11479 DAR ES SALAAM.

In reply please quote:

Ref. No. ED/EP/ERC/VOL.VII/04

15th August, 2016.

The: Regional Administrative Secretary – **Singida, Dodoma, Morogoro, Iringa**

ATT: Regional Education Officers

RE: RESEARCH CLEARANCE FOR MR. CALVIN ZAKARIA SWAI

The captioned matter above refers. The mentioned is bonafide student of The University of Alberta-Canada who is conducting research on the topic titled **"Leading Teacher Professional Learning in Tanzania: Exploring the Experiences of Mathematics Teacher Leaders"** as part of his course program for the award of PhD Degree of Philosophy in the Department of Secondary Education. Specifically a researcher wants to explore the experiences of Mathematics teacher leaders in leading the professional learning mathematics teacher in rural and remote communities in Tanzania.

For the purpose of accomplishing this study, a researcher will therefore need to collect data and necessary information related to the research topic from the sampled municipalities namely: Iramba, Manyoni, Bahi, Mvomero, Chamwino, Gairo, Kilosa, Kilolo, and Kongwa.

In line with the above information you are being requested to provide the needed assistance that will enable him to complete this study successfully.

The period by which this permission has been granted is from **August to December, 2016.**

By copy of this letter, **Mr. Calvin Z. Swai** is required to submit a copy of the report (or part of it) to *the Permanent Secretary, Ministry of Education and Vocational Training* for documentation and reference.

Yours truly,

Gerald Mweli
For: PERMANENT SECRETARY

CC: Mr. Calvin Zakaria Swai- University of Alberta- Canada

Appendix J

Teacher Preparation in Tanzania

Teacher preparation in Tanzania has quite a long history that can be traced back to the 1890s during the German colonial rule. It was in 1899 the colonial rule introduced a teacher-training department at Tanga School (Hirji, 1979). During that time, the teachers were prepared to be able to "inculcate a liking for order, cleanliness, diligence and dutifulness and a sound knowledge of German customs and patriotism" (Hirji, 1979, p. 208). At that time teachers were prepared in such a way that they become capable of producing knowledgeable and skilled school leavers to work for the interests of the colonialists (Mbilinyi, 1979). It seems fair to argue that the teacher preparation was predicated on the idea of having teachers who could implicitly perpetuate colonial mentality and interests among students.

The British (who replaced the German rule) Mandate in 1920 imposed the introduction of the directorate of education, with the responsibility of overseeing matters related to education, including teacher preparation (Taylor, 1963). By 1945 teachers were prepared in 24 teacher training colleges across the country, eight training centers owned and run by the government, 16 owned and run by missionaries (Mbilinyi, 1979). With the increased number of centers, the number of student teachers enrolled by 1946 increased to 1100 in all teacher training centers in Tanganyika (Mbilinyi, 1979). Missionaries had a great influence over teacher preparation in Tanganyika given the large number of training centers they owned and operated.

In 1962, one year after national independence, the Government of Tanganyika passed an Education Act that canceled and substituted the Education Ordinance of 1927 instituted by British mandate (URT, 1995). With the Act, nevertheless, teachers were still prepared in teacher training centers established during the colonial period. What changed with the implementation of the Act was the goal of teacher preparation. Unlike teacher preparation in the colonial era, the government sought to prepare teachers skilled in helping students "be able to read and write, and in future … [to] use this little knowledge, this literacy, to improve themselves" (Nyerere, 1966, p. 32). The intent of introducing the Act was to revamp the education inherited from the colonialists (Kassam, 1983) and that skilled teachers were needed to facilitate a smooth

transition from colonial education to an education that characterized Tanzania as an independent state.

In November 1963, the Government of Tanganyika established the Dar es Salaam University College, a constituent college of the University of East Africa, with a department of education. The Dar es Salaam University College became the University of Dar es Salaam in July 1970 (Maliyamkono et al., 1982) and the department of education became a Faculty of Education in 1989. It was at that point that the University started to prepare teachers who graduated with a Bachelor of Education degree. At that time, the decision to offer teacher education in the university was meant to prepare teachers who could investigate, analyze, and scientifically describe educational problems that faced the nation (Nyerere, 1973). Teachers prepared at the university were required to consider their future works of teaching as a service to the society, and in so doing, to consider their work as repayment of their debt to society (Nyerere, 1973). The preparation of teachers at the university helped Tanzania to have two major routes of teacher preparation—the university teacher education and the college teacher education.

Teacher education in Tanzania underwent significant changes between 1967 and 1978. One of the decisions was to expand teacher education programs offered in teacher education colleges (URT, 1995). This decision is related to the demands of the Education for Self-Reliance (ESR) philosophy established in 1967 (Hyden, 1969). The philosophy demanded the educational system "to include collective values and attitudes, over and above individual ones" (Malmberg & Hansen, 1996, p. 24). As such, the teacher education program was redesigned, and content changed to prepare teachers capable of creating learning conditions for students to become self-reliant, responsible, and hardworking citizens (Kassam, 1983). In a similar vein, the larger goal of changing the content was rooted in the need to have teachers who could be able to help students develop a sense of community support and love of work much needed after national independence (Nasongo & Musungu, 2009). I believe that, in policy, teachers were considered key players in helping the country to have a workforce capable of building an independent growing nation.

In 1977, following the directives reached in the Musoma Resolution[7] of 1974, the Government of Tanzania adopted and started the implementation of the universal primary education program. Central to this program was compulsory enrollment of all children of ages seven to thirteen years in primary schools, a condition which increased the numbers of students in primary schools (URT, 1995). Consequently, primary schools experienced an acute shortage of teachers forcing teacher colleges to produce many teachers within a short period of time (Galabawa, 2001). To reach the target of producing appropriate number of teachers in primary schools, teacher colleges enrolled students who completed seven years of primary education to attend a teacher education program for one year in a college and spend another year in a school to practice teaching (Bennell & Mukyanuzi, 2005; Komba & Nkumbi, 2008). After completion, the teachers were offered a grade 'B' certificate, and, in due course, they were licensed to teach in primary schools. This category of teachers was abolished in 1996 following increasing concerns from parents, scholars, and the public over the quality of its teachers (Sumra, 2004).

In 1981, the Presidential Commission on Education was established with the goal of preparing Tanzania's smooth transition to the Millennium. One of the Commission's tasks was to review the teacher preparation programs. One major recommendation brought forward by the Commission and implemented by the government was the introduction of a new curriculum package in teacher colleges (URT, 1995). The package was intended to change teacher preparation so that teachers had a deep understanding of their respective disciplines, new pedagogical practices, and competence in using performance-based assessment strategies (URT, 1995). In a similar vein, the idea behind the reform was the need to prepare competent teachers with essential and adequate knowledge and skills for preparing Tanzania's workforce for the ongoing development of the nation in the Millennium (URT, 1995).

In 1995, building on recommendations advanced by the Presidential Commission on Education, the Government of Tanzania launched and started the implementation of the Education and Training Policy. The policy was instituted to oversee, amongst other things, the

[7] "In November 1974, the National Executive Committee of the Tanganyika African National Union (TANU) met in Musoma to review Tanzania's progress in its policies of socialism and self-reliance ... It was resolved at that time: that, from then on, formal education would basically end at the secondary school level. Secondary school graduates would serve one year in the National Service. Following National Service, these graduates would work several years before. They would be admitted to any post-secondary institution" (Biswalo, 1985).

provision of teacher education in the country (URT, 1995) and necessitated some changes in teacher preparation to include new developments in curriculum, pedagogy, assessment, and technology. The grade 'B' certificate as a minimum qualification for primary school teachers in Tanzania was abolished when this policy was implemented (Komba & Nkumbi, 2008). In its place the grade 'A' certificate became the minimum qualification to teach in primary schools. Grade 'A' teachers had higher academic backgrounds because they had to complete ordinary level secondary education before attending a teacher education program. By abolishing the grade 'B' certificate, it appears that the government was trying to address the issue of teacher quality.

Early in the millennium there was an increase in enrollment in primary schools which caused a shortage of teachers. In 2006, the Government of Tanzania instituted a crash program designed to train advanced secondary school leavers for twelve weeks, or three months, to become teachers (Hakielimu, 2008; Makulilo, 2012). Teachers were dispatched to primary schools across the country to start the work of teaching after they completed the three-month program. The most disturbing concern with such a program would be related to the quality of teachers prepared within a short period of time given the complexity of the work of teaching. It appears that the program was concerned with increasing the number of teachers in schools and less concerned with producing well-prepared teachers who can facilitate effective student learning. Because of the widespread criticism from scholars, educators, parents, and the public over the quality of teachers, the program lasted only for one year, leaving Tanzanian schools with many ill-prepared teachers (Meena, 2009).

Today, Tanzania has public and private universities and teacher colleges that have the responsibility of preparing teachers. While the former prepares teachers, who complete Bachelor of Education degrees, the latter prepares grade 'A' certificate and diploma teachers. In principle, while teachers who hold a diploma are expected to teach Form I and II in secondary schools, those with Bachelor of Education degree, are expected to teach Form III through VI. Moreover, teachers who hold grade 'A' certificate are expected to teach primary school students. From my experience, however, teachers with different qualifications have been teaching different standards and forms because there is a shortage of teachers in schools. A teacher with a diploma, for example, is likely to teach Form III and IV when there are not enough teachers with Bachelor

of Education degrees. This involved mathematics teachers who hold grade 'A' certificates and teach in primary schools.

All teacher colleges in Tanzania use a centralized teacher education curriculum prepared by the Tanzania Institute of Education and assessed by National Examination Council of Tanzania (Hardman et al., 2015). The government has been taking several initiatives to ensure effective preparation of teachers in its public teacher colleges. In 2005, for example, "tutors were trained in computer literacy and tutor technicians received training in technical maintenance support and networking essentials" (Swarts & Wachira, 2010). However, these efforts have been hampered by problems related to lack of power in many places across the country. In a recent study, Hardman and colleagues (2015) have revealed another problem facing teacher preparation, that is, selection of low-achieving secondary school leavers with division four pass to join teacher colleges. As it turns out, the teaching force in Tanzania will continue to be characterized by teachers who have weak academic backgrounds. At another level, Sumra and Katabaro (2014) help us become aware of another problem, that is, most of the public teacher colleges lack basic teaching and learning materials and resources needed to prepare teachers.

The brief history of teacher preparation in Tanzania is explicit about how teachers have been prepared since the independence. It has become clearer that the teaching force in Tanzania is characterized by some mathematics teachers who received little preparation for teaching. There is a temptation to argue that the shortage of teachers in schools has been the main reason for recurring problems in teacher preparation in Tanzania. In cases like these, Darling-Hammond and Cobb (1996) once warned that "when shortages of qualified teachers occur … the [government] has the obligation of not staffing classrooms but doing so in a manner that does no harm to students" (p. 52). What seems an alternative route towards having competent teachers is to situate ongoing professional development of teachers in schools for teachers to engage in enriching their professional knowledge and skills needed to enhance meaningful student learning (Hardman et al., 2012). As Darling-Hammond and Lieberman (2012) once emphasized, investing in the ongoing professional development of teachers is one way of helping them become confident and successful in their work of facilitating student learning.