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Exemplary Leadership Qualities of Mathematics Teacher Leaders

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ABSTRACT

In theorizing teacher leadership, little is known about the leadership qualities teachers are likely to learn or model within their community of practice. This descriptive qualitative study examined 12 graduate teacher candidates to describe the exemplary leadership qualities of mathematics teacher leaders. After thematic analysis, two categories of exemplary leadership qualities of mathematics teacher leaders were revealed: the leadership qualities they exhibit for students to imitate and the qualities they model from significant others in their community of practice. We conclude that exemplary leadership qualities are a function of role modeling and social learning. Implications for teacher leadership in mathematics education are discussed further in this paper.

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1. INTRODUCTION

Leadership is a process of influencing the activities of others to achieve an objective [1]. In the school setting, teacher leadership has attracted much research attention. This is because teachers are closer to the classroom context. Therefore, involving them in leadership can quickly help to implement decisions to improve teaching and learning [2]. Teacher leadership has undergone several reforms. In the 1970s, it was limited to a teacher's competency in fulfilling formal roles. It involved how a teacher could evaluate teaching and learning or the curriculum in the 1980s. Distributed leadership emerged in the 1990s. With this concept, teacher leadership involves teamwork, collaboration, and lifelong learning [3]. Teacher leadership has taken a transformational look – they are to participate in decision-making and contribute to meeting the school's visions, missions, and general improvement [4].

The determinants of teacher leadership continue to be debated. However, contemporary definitions extend beyond the classroom to the general school culture and the community [5, 6]. Teacher leadership was defined by [7] as the "process by which teachers, individually and collectively, influence their colleagues, principals, and other members of school communities to improve teaching and learning and learning practices to increase students' learning and achievement." (pp. 287–288). It implies how teachers lead students and others to improve practice and accept responsibilities to achieve school success [8]. It also means how teachers perform instructional responsibilities and other managerial roles [9, 10] and the willingness to share instructional and management skills [11].

Teacher leadership is vital for several reasons. Effective leadership skills are associated with student motivation and instructional success [12, 13]. It improves school climate, school-community relationships [14, 15], and effective teaching in STEM classrooms [16]. Learning outcomes, student interest, and performance are also improved due to effective teacher leadership [17, 18]. Therefore, an increasing attempt has been made to explore teacher leaders' ideal traits that make them more effective in promoting teaching and learning.

Teachers should exhibit transformational and transactional leadership styles. In the former, they bring desirable changes in the classroom and the school [19, 20]. They use rewards to achieve learning goals [21]. Democratic and autocratic leadership skills have also been emphasized [22, 23]. Teacher leaders should be committed and maintain a classroom environment that promotes student-centered learning [24]. They must integrate technology into teaching [25] and have adequate pedagogical and content knowledge [10, 26]. Teacher leaders should show care, respect, fairness, and enthusiasm for teaching [27] and use effective assessment practices [28, 29].

Beyond the classroom, teachers should understand how the school works. They should understand the community and respect its values and customs [30]. This understanding encourages community-school relationships and helps teachers explore and accumulate resources for effective teaching and learning [31]. Teacher leaders should support, mentor, and motivate others in and outside the school [6].

In theorizing teacher leadership, much attention has been focused on the inherent characteristics that make teacher leaders effective. Little is known about the leadership qualities teachers are likely to learn within their community of practice. The leadership traits that make them role models or essential for students or others to imitate have not been fully explored. Given this emphasis, this study focused on exploring the exemplary leadership qualities teacher leaders should possess to improve teaching and learning. Exemplary leadership is used in two ways. Teachers can learn leadership qualities from significant others in the school, including mentors or superiors, and the qualities teachers should exhibit for their students to imitate.

1.1. Role modeling and teacher leadership

Role modeling develops leadership skills [32]. Most people imitate the behavior of others, especially those in authority [33]. Leaders whose authority is sourced from actions,

roles, or rank serve as role models [34]. These role models influence their followers' moral and ethical perspectives [35]. This happens when followers take clues from their leaders to shape their behavior.

Role models inspire imitation and influence others who work with them to develop new skills. They share knowledge on modeling practices and help others to be innovative by demonstrating self-leadership [36]. Role modeling builds a strong school culture through informal and formal interactions. Effective teacher leaders with role-modeling attributes contribute to a positive school climate [3]. They are organized, trustworthy, confident, and innovative facilitators of student learning [37]. Teachers must be good role models to influence students and others to achieve their full potential [7, 38]. Additionally, effective teacher leaders exemplify effective communication skills and exhibit professionalism, passion, and integrity [9, 10]. This shapes student behavior and attitudes [35].

Medical students have reported imitating committed teachers interested in student learning [39]. They also preferred teachers who maintained a good student-teacher relationship. This is unsurprising because role modeling encompasses respecting the behavior of others, offering guidance, and setting expectations. It also includes mentoring students and demonstrating positive morals and character traits [40]. Teacher leaders also imitate students' and others' exemplary professional and character traits [35].

Teachers should live exemplary lives that can influence the behavior of students. They are to learn the positive behaviors of significant others that can shape their leadership qualities [37]. Given this analysis, role modeling helps explain teacher leadership qualities that students can emulate and the qualities teachers imitate from significant others.

1.2. Social learning and teacher leadership

Learning occurs through social interactions; through these interactions, we find meaning in actions, thoughts, and objects [41]. From the social cognitive theory [42], followers imitate the behavior of their leaders to achieve the expected actions. Individuals, including teachers, will likely model their behavior on their leaders. This is because the leaders have the power and authority to control them [42]. It is also because teachers are motivated to learn prosocial behaviors from their leaders and engage in affiliative behaviors [43].

In the school, exemplary leadership qualities are shaped through social learning [44]. As students imitate the behaviors of their teachers, the behaviors of significant others are also mimicked by teachers [45, 46]. Attractive and desirable leaders can be good role models whose attitudes and behaviors can be learned by others [45]. For this reason, we agree with Wenger's [41] position that learning is a social activity that occurs within a community of practice. It is expected that teacher leadership qualities are shaped by the behaviors of others within their community of practice, which is the school. This makes social learning theory important for understanding the exemplary leadership qualities of mathematics teachers as they socialize and work in the school.

1.3. The context of this study

All teachers must exhibit leadership qualities that promote effective teaching and learning. This study extends the discourse on exemplary teacher leadership to mathematics education in Brunei Darussalam (henceforth, Brunei). Mathematics remains a poorly performed subject for most students in Brunei [47, 48, 49]. Several factors from students, teachers, home, and schools can explain students' performance in mathematics [49, 50, 51]. However, this study draws ideas from the literature on the positive relationship between teacher leadership and student performance.

Teacher leadership is associated with higher student performance, motivation, interest, and learning [12, 13]. It positively influences inquiry-based teaching in STEM classrooms [16]. Participatory leadership qualities of mathematics teachers improve the performance and belief of girls to study mathematics [17]. Mathematics teacher leadership contributes to creating a classroom environment that supports mathematics teaching and learning [24]. There is a good body of knowledge regarding mathematics teacher leaders in Brunei. This includes leadership practices [14, 52, 53, 54], leadership styles [12], and ideal leadership traits [6]. However, the investigation into the exemplary leadership qualities of mathematics teachers is not widespread. Mathematics teachers work within their community of practice. They may model their leadership behavior through social learning. They are expected to exhibit exemplary leadership qualities that students and others can learn. Additionally, teachers may model the leadership qualities of their superiors or significant others. Under this lens, this study answers the question: What are the perceived exemplary leadership characteristics of secondary school mathematics teacher leaders?

2. METHOD

We adopted a descriptive qualitative research approach to explore prospective teachers' views on the leadership qualities of mathematics teacher leaders. This helped provide a systematic description of the exemplary qualities mathematics teacher leaders should possess in their natural setting (the school), which is their community of practice [55].

Convenience sampling was employed to select 12 Graduate Teacher Candidates (GTCs). The GTCs were Master of Teaching students specializing in secondary school mathematics. The programme aims to equip prospective teachers with the professional skills to teach and learn mathematics effectively. Of the 12 GTCs, two were males, while ten were females.

An open-ended online questionnaire was developed and distributed to the GTCs. Open-ended questions improved participants' depth of information on their exemplary leadership qualities [56]. We asked, "How will you describe the characteristics and best practices of an exemplary secondary mathematics teacher leader?" Before data collection, we ensured that the GTCs agreed to willingly participate in this study by completing an informed consent form. A detailed information sheet about this study was provided to each GTCs, providing them with a comprehensive understanding and expectations of this study. During data collection, the rights and privacy of the GTCs were respected. Their identity and the information they provided have been kept anonymous and confidential. After

transcription, the GTCs were contacted again to validate the trustworthiness of the data [57]. The transcribed interviews were thematically analyzed [58]. We thoroughly read the data set to understand the data comprehensively. We then coded the data and generated and formed suitable themes to answer the research question.

3. RESULTS AND DISCUSSION

Two themes emerged from the analysis of the interview data on the perceived exemplary qualities of secondary school mathematics teacher leaders. First, the qualities mathematics teacher leaders should exhibit for their students to emulate. Second, the qualities they learn from significant others, such as their mentors or superiors. Generally, the GTCs predominantly perceived exemplary leadership as qualities that significant others can learn or imitate. Nine of them mentioned exemplary qualities mathematics teacher leaders learn from significant others. In contrast, three of them reported the qualities mathematics teacher leaders are to exhibit for students to emulate.

3.1. Exemplary qualities of mathematics teacher leaders that students can imitate

As leaders in mathematics classrooms, mathematics teachers are role models for students. Through social learning, most actions and behaviours of these teachers have the potential to shape the behaviours of students [1, 42]. Three of the GTCs mentioned several leadership traits mathematics teacher leaders should possess to control the behavior of their students. The prevalent qualities are professionalism, honesty in communicating and interacting, admitting mistakes, addressing misunderstandings, and providing value judgment.

According to the GTCs, teachers should directly or indirectly teach students how to exhibit good morals and treat a person appropriately. This can be achieved when the teachers put up attitudes and behaviors that show high moral standards. These qualities align with the ones reported by Danielson [9] and Muijs and Harris [10]. They explained that teacher leaders should exhibit professionalism and integrity in the classroom. The earlier qualities also corroborate [40], who found that teachers should demonstrate positive morals, exemplary professional dispositions, and mentor students.

As role models, teachers' behaviors strongly influence student attitudes [40]. They also influence students to achieve their potential [7, 38]. The appropriate and acceptable qualities teachers exhibit are mimicked mainly by students. Arguably, there is a high possibility that students will be honest, accept their mistakes, and minimize, if not avoid, misunderstanding with their peers if they find that their teachers continuously exhibit these behaviors and encourage them to do so. Therefore, it is not surprising that the GTCs perceived these qualities as part of the exemplary traits of mathematics teacher leaders.

> *GTC1: Mathematics teacher leaders should communicate and interact professionally with students. They should admit any unexpected errors and clarify misunderstandings. These qualities should be exhibited so that students can learn from them.*

GTC6: The behavior of the exemplary mathematics teacher leader should be an example for his or her students. Morally, this individual should always greet the student first and then continue teaching the students. He or she should be calm and attract the attention of the students.

One of the GTCs voiced that mathematics teacher leaders should be responsible for what they say and do, be kind and respectful, and entertain the views of others. These are important in inculcating democratic principles in students [12]. They are also necessary to shape the attitudes and behaviors of students not only in the classroom but also in the community at large.

GTC9: They are confident, responsible for what they say and do, and treat everyone with kindness and respect. They consider the opinions of others. These qualities are essential to guide the behavior of the students.

We are emphatic that students model their teachers because teachers can control students [42], which helps students develop new and acceptable behaviors [43]. The modeling role of teachers for students involves accepting and respecting the behaviors of students and other school community members [40]. It also encompasses being trustworthy and confident, showing care and respect, and fairness to students in and outside the classroom [37]. These traits can shape students' behaviors [35] to bring about desirable changes [20]. It helps train students who value and respect authority and the cultural norms of the community in which they are trained.

3.2. Exemplary qualities of mathematics teacher leaders imitated from significant others

The GTCs reported that the exemplary leadership qualities of mathematics teachers could be shaped by their mentors. This confirms that teachers can imitate the behavior of significant others [45, 46]. Teacher leadership qualities are a function of role modeling and social learning in their community of practice [41, 42, 44]. In the school, leadership power is based on a legitimate source. Teachers are more likely to be influenced by those in authority and imitate the desirable behaviors of their mentors through social learning [32] and finally engage in these behaviors [43].

Some of the modeled exemplary leadership qualities mentioned by the GTCs are the ability to meet the needs of students, positive personality, and motivation. The GTCs reported that they had learned these leadership characteristics from their mentors, influencing their teaching and learning as prospective mathematics teacher leaders. They mentioned that a good role model listens, gives mentees, teachers, and students the needed advice, and uses an accommodating personality to engage followers. Mentees who learn these skills from their mentors can motivate and support their students to learn.

Consistent with the literature, students feel secure and motivated to learn when teachers have a personality that encourages motivational and supportive skills [6]. Another GTC mentioned that her teaching skills were influenced by a mentor she worked with. The

mentor was interested in developing and using technology to improve teaching and learning. She was also interested in sharing ideas and advice with teachers and students. These leadership qualities of the mentor have shaped her behavior to develop and use technology in her future mathematics classroom. In the 21st century, teachers should integrate technology into teaching and learning. This helps sustain student interest, collaboration, and accessibility of instructional content [25].

> *GTC 2: The mathematics teacher leader listened and advised students and teachers. She had a positive personality trait. She motivated students when they were struggling with their classroom work.*
> *GTC 3: The teacher leader I met conducted professional development programs on technology in teaching. She shared her ideas and advice to improve teaching and learning. She made her lessons exciting for students.*

Other leadership qualities that the GTCs learned from their mentors are pedagogical content knowledge, collaboration, passion, encouraging students, effective feedback, and multiple teaching approaches. These qualities agree with existing studies. Mathematics teacher leaders should have adequate knowledge of content and pedagogy [10, 26]. This helps explain instructional concepts to the understanding of students and uses different instructional approaches to improve student learning. They are responsible for creating a collaborative instructional environment that enhances teaching and learning [59]. Ali Mashod et al. [6] mentioned developing the needed passion for teaching while using assessment information as feedback to support student learning [28, 29].

> *GTC 4: The exemplary teacher leaders I came across were knowledgeable and passionate. They encouraged teachers and students and used different teaching approaches.*
> *GTC 7: Exemplary teacher leaders were open to all teachers and students. They discussed lesson plans with me and suggested ways for improvement. They introduced several teaching strategies that I still incorporate in my lessons.*

Dedication and commitment to teaching, participatory teaching, and making time for students and other teachers are learned leadership skills mentioned by the GTCs. They reported that the teaching and learning of mathematics come with many responsibilities. In mindful of this, teacher leaders should be committed and dedicated to executing their professional roles. Teachers must make time for students and apply participatory or democratic principles in the classroom. At the same time, teachers should be firm in their decisions, which suggests some extent of autocracy in the classroom [22, 53]. However, they are encouraged to use participatory or democratic instructional approaches since they improve student participation, performance, and beliefs in studying mathematics [17, 23]. Teacher commitment and dedication to investing time and encouraging participatory instruction to improve student-centered learning in mathematics [12].

GTC 5: My mentor was firm but approachable. Even though he was busy, he made time whenever other teachers or a new teacher approached him. He listened to people's ideas and shared his thoughts about these ideas without condemning them.
GTC 8: The exemplary leader I came across was very dedicated and committed to teaching. She always shared her teaching experiences with other mathematics teachers.

The GTCs mentioned that they learned leadership skills such as showing compassion and guiding and counseling students from other experienced teachers. These are important for effective teaching. Teachers need to develop these essential qualities to be more empathetic to students and teachers in their community of practice [6]. Compassion and empathy are necessary to understand students through the instructional process. This encourages teachers to develop effective instruction that has the potential to address the needs and interests of students.

GTC 10: When I was a new teacher myself, many experienced teachers guided me. They helped me develop lesson plans and taught me the need to have compassion for teachers and students.

Other exemplary characteristics that are modeled are creating a classroom environment that promotes teaching and learning and the ability of the teacher to use alternative assessment tools. Callingham et al. [24] stated that mathematics teachers must maintain effective teaching and learning environments that support student learning. Teachers should exhibit instructional management roles. This includes adequately controlling the classroom and ensuring students enjoy the lessons [11]. Unlike traditional assessment, alternative assessment helps the teacher assess what learners can do. When teachers use authentic and alternative evaluation, they arrive at holistic information on students about learning outcomes [51].

GTC 11: Exemplary mathematics teacher leaders created a harmonious environment that improved student learning. This motivated most of the teachers to develop favorable mathematics classrooms. Most of the mentors used alternative assessments such as peer assessments.

Lumpkin, Claxton, and Wilson [37] shared that teacher leaders should be trustworthy. This helps them build the right academic relationship with students and boost students' confidence in their teachers. Therefore, being trustworthy is one of the learnable leadership traits reported by GTCs. They also shared that mathematics teacher leaders should make mathematics meaningful and relevant to students' lives. Naturally, when students find helpful mathematics and can apply it in their daily lives, they develop proper study habits.

In addition, the school-community relationship was mentioned by the GTCs. This aligns with the literature suggesting that the leadership characteristics of teacher leaders

should go beyond the classroom to the community level [6, 7, 9, 60]. Since the school is in the community, the teacher must understand its cultural and value systems. What is taught in the school should reflect the community's educational goals. This will balance the school curriculum and the practical skills students need to function in the community [61]. Ensuring a healthy school-community relationship is helpful in this regard.

> *GTC 12: My mentor used real-life situations when teaching mathematics. She liaised with other stakeholders, such as local police officers and mental health workers, to discuss the welfare and progress of students and other teachers.*

4. CONCLUSION

This study explored the exemplary leadership qualities of Brunei secondary school mathematics teacher leaders. We conceptualized exemplary leadership through role modeling and social learning theory in two ways. Firstly, the leadership qualities teachers are to exhibit for students to emulate. The key to these qualities is honesty in communication and interactions, admitting mistakes, addressing misunderstandings, valuing judgment, and good morals. Others include confidence, being responsible, kind, respectful, and accepting the views of others. When teachers exhibit these traits, they can shape students' moral consciousness. This contributes to training students who value and respect cultural norms. Secondly, the leadership characteristics teachers imitate from significant others in their community of practice. The specific leadership characteristics they learned are to guide and encourage students and teachers, exhibit a positive personality, and develop and integrate technology into teaching and learning. They also include developing pedagogical content knowledge, collaboration, passion, using multiple and participatory teaching approaches, dedication, and commitment to teaching. Other learned traits are showing compassion, creating a conducive classroom environment, using alternative assessment tools, trustworthiness, and maintaining a school-community relationship.

The findings suggest that role modeling and social learning play an important role in developing the exemplary leadership qualities of mathematics teachers. As we expected, mathematics teachers as role models believe that students imitate the behavior they exhibit. Therefore, it is necessary to demonstrate leadership qualities worth mimicking to students. Similarly, as teachers find themselves in their community of practice, the desirable characteristics of those in authority, such as their mentors, are expected to be learned. This influences their personal and classroom leadership behaviors as mathematics teacher leaders.

This study adds to the literature that several leadership qualities of teachers are learned or modeled from their community of practice through social learning. Teachers eventually use their learned behavior in teaching and learning. This implies that in theorizing teacher leadership and what accounts for it, the characteristics of significant others, the ones teachers learn from their mentors and those teachers should exhibit for students to emulate, should be considered. The findings of this study also imply that role modeling and social learning remain essential. They explain how students and teachers

directly or indirectly learn specific skills to shape their leadership behavior. For this reason, the school should arguably consist of actors with acceptable leadership behavior that others can model. This calls for teachers and others who hold leadership positions to develop and showcase practical leadership qualities in mathematics classrooms, other teaching subjects, the school, and the entire community in which the school is located.

This study had limitations. We used a relatively small sample size due to the descriptive qualitative design we adopted. It would have been interesting to collect quantitative data from a wide range of respondents to improve the generalization of our findings. In addition, the results are based on the perspectives of prospective mathematics teacher leaders in Brunei. This limits the generality of the findings to other subjects and in different educational contexts. Regardless of these limitations, this study provides satisfactory results since we sought to obtain an in-depth description of exemplary teacher leadership in the teaching and learning of mathematics. Data redundancy was noticed after interviewing 12 participants, suggesting that in-depth information was attained [62].

Furthermore, effective teacher leadership is needed regardless of educational context. Mathematics is also associated with several subjects. The exemplary qualities we have explored may apply to other study contexts and school subjects. However, generalizing this study's findings should be done carefully by carefully considering the context in which the generalization is made.

The following research and policy recommendations are made. Stakeholders in mathematics education, such as school leaders, heads of departments, and mathematics teachers, are encouraged to develop and learn effective leadership qualities. To achieve this, school leaders must respect and value the work of mathematics teacher leaders and provide opportunities that support leadership. School leaders, significant others, and teachers should learn from each other and embrace change in their community of practice. Future studies should consider using mixed methods to explore mathematics teacher leaders' exemplary characteristics and replicate this study in other teaching subjects in different local and international contexts.

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