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Secondary school mathematics teaching evaluations by students: A report card for the mathematics teacher

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Abstract

This study presents findings from multiple case studies undertaken in three secondary schools in South Africa's Limpopo Province. The goal was to collect input from students on mathematics teaching practices in their classrooms. The study included a self-selected sample of eleven grade 12 students. Unstructured individual interviews and students' written reports were used to collect data, which was then analyzed based on emerging themes. Students expressed genuine concerns about teachers' lesson preparation, subject and pedagogical knowledge, classroom management, attention given to slow learners, quality of classwork and homework tasks given to students, exam preparation, class attendance, and utilization of contact time, teachers' attitudes, and their emotional intelligence, among others. Based on the study's findings, the author suggests that student evaluation of teaching be used in secondary schools to help teachers reflect on their teaching practices in order to create learning environments that most students would enjoy.

Keywords: students, evaluation, teaching, mathematics, reflection

INTRODUCTION

Many elementary and secondary school students suffer from mathematical anxiety, which is characterized by fear, tension, and worry when confronted with mathematics (Zhang et al., 2019). This situation is exacerbated by a top-down education system in which the content, methodology, assessment, pacing, and sequencing of topics is done by so-called experts who sit at the top of the vertical education system, far removed from classroom realities (Okoth, 2016).

Teachers, who sit in the middle of the vertical continuum, administer the mathematics curriculum in accordance with the syllabus and policy guidelines provided by the employer. Teachers in South Africa, for example, are required to cover specific topics within a set time frame in order to prepare students for common assessments and examinations. New topics are incorporated into the curriculum when teachers are not fully prepared to teach those topics. A noteworthy example is the inclusion of Euclidean geometry in South Africa's curriculum and assessment policy statement. As a result, teachers' operations may become constricted and limited.

Primary and secondary school students, who are supposed to benefit from the curriculum imposed on them, have no say in its design, implementation, or evaluation (Jagersma & Parsons, 2011). Skeptics think that students are too young to offer relevant, fair, and reliable curriculum evaluations (Lafee, 2014). Lafee (2014) further argues that students are the clients of the education system and hence their inputs matter. Unfortunately, most education systems seem to condition students into believing that teachers are experts whose behavior, activities, and practices in the classroom should not be questioned or critiqued (Sarzynski, 2018). Students are left to blame themselves for their failures in mathematics. Teachers, on the other hand, are disappointed by the high number of students who struggle to understand mathematics. Finding a strategy to teach mathematics in a way that ensures success for the majority of students remains a challenge for both novice and experienced teachers (see Schoenfeld, 2022). There is an increasing call for education systems to allow students in elementary and secondary school to evaluate teachers and their approaches in order to improve teaching. According to Ogbonnaya (2019), students, particularly those in secondary school, are capable of providing trustworthy

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Contribution to the literature

- The study shows that student evaluation of teaching (SET) can be successfully implemented in secondary schools to assist mathematics teaching and learning.
- Secondary school mathematics teachers can use SET to realign their teaching techniques in order to match their students' learning needs. Thus, SET may enhance reflective teaching practices and mathematical knowledge of teaching.
- When conducted anonymously, SET allows secondary school students to express their concerns about the way they are taught without fear of being mistreated.

evaluations of their teachers and how they teach. After all, no one spends more time observing teachers at work than students, therefore students are obviously in a better position to evaluate teaching in their classrooms (Lafee, 2014). They are aware of what works and does not work for them in terms of school teaching and learning (Lafee, 2014). The following section's literature emphasizes the significance of student evaluation of teaching (SET) in schools, colleges, and universities.

LITERATURE REVIEW

The Origin and Growing Interest in SET

SET is more widespread at universities and colleges, and less common in primary and secondary schools (Ogbonnaya, 2019). SET instruments include open and closed anonymous questionnaires, as well as structured, semi-structured, and unstructured interviews (Constantinou & Wijnen-Meijer, 2022; Pan et al., 2021). Historically, interest in SET began in the early 1970s in the USA, spread to Germany, Austria, and Switzerland in the 1990s, and proceeded to China and Latin America in the early 2000s (Pineda & Steinhardt, 2020). SET is increasingly gaining worldwide attention. SET is widely used in American universities and colleges to collect data for performance evaluation, reappointment, promotion, tenure, and self-improvement (Hornstein, 2017; Ubong & Okpor, 2019). SET is used in higher education institutions in Europe and China to improve individual and departmental teaching quality (Pineda & Steinhardt, 2020; Ubong & Okpor, 2019). In Jordan, SET is utilized to improve teaching as well as to promote employees (El-Sayed et al., 2018).

The use of SET in Africa ranges from non-existent to minimal. Attempts to apply SET as a tool for personnel management at Nigerian public universities and secondary schools, for example, have failed due to a lack of support from employees' unions (Ubong & Okpor, 2019). Anti-SET advocates argue that SET should not be utilized for tenure and promotion decisions because the evaluations are influenced by factors such as race, gender, age, accent, and physical attraction, among others (Bakx et al., 2015; Farr, 2018; Gatwiri et al., 2021; Zhang et al., 2017). This is not to say that the use of SET in education should be abandoned entirely. According to Gannon (2018), while SET methods may be imprecise, they are the best accessible means of measuring teaching effectiveness, which correspond positively with student learning.

SET is beneficial for teacher professional development. A fascinating example is the practice at South Africa's University of the Witwatersrand, where lecturers are encouraged to give questionnaires to students in order to elicit feedback on the quality of their teaching (Ubong & Okpor, 2019). The questionnaires are returned to individual lecturers (Ubong & Okpor, 2019). Thus, rather than using SET to determine who should be promoted and whose salary should be increased, the purpose is to utilize it to enhance individual lecturers' teaching and learning techniques. Teachers support the use of SET to improve teaching and learning (Almutairi & Shraid, 2021). However, they are opposed to its usage for promotion and salary increases. There is mounting evidence to suggest that SET should be used in secondary schools as well.

Arguments for Using SET in Secondary Schools

Several scholars have advocated for the use of SET in secondary schools. According to Pearson et al. (2022), SET can assist teachers recognize their existing strengths and shortcomings and provide insights that will help them become better at their jobs and address areas that require development. Elstad et al. (2017) have a similar viewpoint, stating that SET provides constructive feedback that leads to self-reflection on one's teaching techniques, which in turn promotes personal growth and development. SET enables teachers to detect their own inadequacies early enough to prevent additional harm to themselves, their students, the institution, and society as a whole (Ubong & Okpor, 2019). Students' feedback can assist teachers in achieving a 360° picture of their teaching in order to minimize potential blind spots (Ferlazzo, 2019). Furthermore, SET directs teachers to provide learning experiences that students truly like (Pearson et al., 2022). Teachers are less prone to feel complacent in their work if they know they will be evaluated on a frequent basis (Pearson et al., 2022). SET also assists students in feeling totally involved in their education (Pearson et al., 2022).

Students should not be passive beneficiaries of what the educational system has to offer, but rather active participants (Jagersma & Parsons, 2011). If we think of

education as a business transaction, with teachers as service providers and students as direct consumers, there should be no question about whether or not secondary school students should be allowed to evaluate teachers for purposes of improving the quality of teaching and learning (Ubong & Okpor, 2019).

Several studies have found consistency in student evaluations of teachers at the elementary and secondary school levels. Peck et al. (1978) contrasted students' evaluations of teaching with ratings of trained observers in a research comprising 1128 grade 6 students from various schools in America. With a correlation coefficient of 0.68, the results demonstrated that students' assessments were substantially in agreement with those of trained observers. As a result, it was established that primary school student evaluations can be used to generate valid and trustworthy judgments of teachers' classroom behavior and activities.

Richardson and Thomas (1989) did a similar study in Barbados, an eastern Caribbean island in North America, later in 1989. 160 elementary students, 60 high school students, 60 elementary school teachers, and 30 high school teachers participated in the study. Participants were asked to identify the qualities that constitute good and effective teachers. The study's findings indicated parallels in the comments supplied by students and teachers. The study revealed that students, regardless of age, can provide insights into what constitutes good teaching.

Stroh (1991) contrasted the evaluations of student teachers by university professors, high school classroom teachers, and high school students in another American study conducted in Illinois. The study discovered that high school students' ratings were equivalent to those of more expert evaluators. These findings are consistent with previous publications by Peck et al. (1978) and Richardson and Thomas (1989).

Ogbonnaya (2019) analyzed the reliability of students' evaluations of mathematics teaching in eight secondary schools in South Africa's Northwest province. There were 194 grade 11 students and eight teachers in the study. A SET questionnaire was used to collect data, which was then analyzed using average deviation indices (ADI) and the intraclass correlation coefficient (ICC). The study's findings revealed that the ADI values ranged between 0.6 and 0.9, with an average ICC value of 0.865. The study concluded that secondary school students can provide accurate assessments of mathematics instruction in their classes. These findings, together with those reported in the USA, give substantial evidence that students can be good evaluators of their teachers and that their ratings of teaching correlate well with other expert evaluations. So, why is SET so uncommon in secondary schools? This question is addressed in the following section.

Why SET is Rare in Secondary Schools

One of the reasons why SET is uncommon in secondary schools is teacher resistance. Joshua and Joshua (2004) polled 480 secondary teachers from 20 Nigerian schools about their attitudes toward SET. The study discovered that teachers had a substantial negative attitude toward SET, regardless of how the findings of such evaluation will be used. Teachers voiced worries about students' proclivity to grade teachers based on factors other than teaching quality and performance. Teachers were concerned that the students' ages and social backgrounds would render SET invalid, untrustworthy, and ungeneralizable. However, there was no evidence to back up these perceptions.

Based on 15 years of experience working in over 150 secondary schools in New Zealand, Thailand, and the UK, King (2007) discovered that many secondary school teachers are concerned about the consequences of SET. On the one hand, teachers believe they have authority over their students, and allowing those students to have any influence over their teaching methods would undermine that authority (King, 2007). Teachers, on the other hand, are simply worried that if they open up to SET, they will receive unfavorable feedback about their teaching (King, 2007). However, negative comments should be viewed as a chance to enhance one's own teaching. Teachers cannot expect solely positive feedback from SET. That would be unusual. Another reason for the rejection of SET in schools is the intended use of the results. As indicated earlier, many teachers feel that students should be permitted to evaluate teaching in order to improve the quality of teaching and learning (Akpotu & Oghuvbu, 2004; Almutairi & Shraid, 2021; Debroy et al., 2019; Lafee, 2014; Okoye et al., 2020; Pearson et al., 2022). However, they are against the use of SET for other purposes such as employee appraisal and promotion (Arreola, 2007; Cashin, 1999). So, how can SET be successfully implemented in secondary schools?

Implementing SET in Secondary Schools

SET, when executed properly, can assist middle and high school teachers in improving the quality of teaching and learning (Hoffman, 1992). The rationale for implementing SET in secondary schools has already been made in a previous section of this report. Mertler's (1997) experimental study in North Florida, America, can be used to draw lessons for the successful application of SET in high school. During the 1995-1996 school year, Mertler (1997) presented an anonymous questionnaire called SE3T to volunteer students from seven high schools in two school districts in North Florida on two occasions. The surveys were then gathered by someone who was not one of the teachers being evaluated. Within one week, the data were

collected, analyzed, and given back to the teachers. The teachers only received the mean and range of replies for each item on the questionnaire. The questionnaire included both open-ended and closed-ended questions. The written responses to the open-ended questions were delivered verbatim to the teacher and typed up so that no handwriting identification was possible. Each teacher received their own data with no relation to other teachers, and no one else had access to their data. Following the second administration of the SE3T, all teachers were polled on their thoughts on the process's usefulness, efficiency, and whether the feedback they got had influenced their teaching practice in any way.

The findings indicated that SET was extremely beneficial to teachers who voluntarily participated in the process. SET was perceived as something done for teachers rather than against them, in contrast to the norm of teacher evaluation in which administrators visit classrooms seldom. It was also discovered that once teachers become acquainted with the evaluation process, they could make it self-sustaining. The teachers' attitudes toward SET were extremely positive, with some indicating that they would begin utilizing SET for personal growth on their own.

As a result, more secondary school teachers can begin to use SET to reflect on their methods and develop ways to make teaching and learning more pleasurable for the majority of their students. However, there are few empirical studies to back up the urge for SET implementation in secondary schools. The current study aims to contribute to this area. Given the misalignment of teaching and students' learning style preferences in many classes, the author of this study feels that using SET could give critical information that individual teachers can use to realign teaching in order to reach the majority of their students. This aligns with the philosophy underlying reflective practice in education.

Based on the foregoing discussion, the application of SET at the secondary school level can be implemented as follows: the department of education may develop anonymous SET questionnaires with both open-ended and closed-ended questions for use in different subjects; the questionnaires may be administered by someone who is not one of the teachers being evaluated; and the collected data may then be processed by an expert data analyst appointed by the department. The final SET report should be typed to protect the respondents' identities. The SET report may then be given to individual teachers for their personal and professional growth. This practice can be repeated twice or three times a year. According to the findings of Mertler's (1997) study, secondary school teachers are willing to adopt SET if it is utilized to develop individual teachers' practices rather than as an administrative tool. The following section discusses the theoretical foundations for this work.

THEORETICAL FRAMEWORK

The theoretical foundation for this study is drawn from the ideas of mathematical knowledge for teaching (MKT) and reflective teaching practice (RTP).

Mathematical Knowledge for Teaching

MKT is described as the applied knowledge utilized by a mathematics teacher to recognize, understand, and respond to mathematical problems and tasks encountered in the course of teaching the subject (Phelps & Howell, 2016). It is made up of subject matter knowledge and pedagogical content knowledge (PCK) (Ball et al., 2008). Knowing students, knowing the curriculum, and knowing how to teach it are all aspects of PCK.

Teachers' lack of MKT affects their practice and, in some situations, student achievement (Chua, 2020). Teachers who lack MKT will struggle to explain mathematical ideas in a way that the majority of students will grasp, thereby depriving students of mathematical learning opportunities (Hill et al., 2008). A strong MKT saves a teacher from the difficulties that teachers with a low MKT must confront (Hill et al., 2008). Although mathematics teachers spent several years in academic institutions acquiring MKT, they must continue to learn even after they enter the field. Mathematics teaching is not a static art (Sudhakar, 2018), and as a result mathematics teachers must adapt their teaching approaches to keep up with the latest developments in the subject. Anyone who has spent a significant amount of time working in education recognizes that there is always something new to learn (Sudhakar, 2018). For example, mathematics syllabi in many countries are evaluated on a regular basis, and new mathematical content may be introduced that some teachers are inexperienced with, necessitating the learning of new teaching methodologies. Furthermore, various groups of students may necessitate distinct, even novel techniques to teaching mathematics. SET can assist mathematics teachers in determining how successfully they adapt their MKT to meet the intricacies of mathematics classroom.

Reflective Teaching Practice

RTP applies to all aspects of learning, including mathematics, which is the emphasis of this research. Reflective teaching entails assessing one's underlying teaching and learning beliefs as well as their alignment with real classroom practice before, during and after a lesson is taught (Yale University, 2021). Schön (1991) describes reflection during teaching as 'reflection-in-action' and that which occurs after teaching as 'reflection-on-action.' Reflective teaching is a systematic review process that teachers can use to create links from one teaching experience to the next and ensure that students achieve the most success possible (Cambridge

Assessment International Education, n. d). Procedure is cyclical and ongoing. There are several models of reflective teaching in the literature, all with the same goal: to achieve the best results for both the teacher and the students (Cambridge Assessment International Education, n. d). Kolb's (1984) reflective cycle, Gibbs' (1988) reflective cycle, Schön's (1991) reflective model, and Boud et al. (1985) model of reflection are all examples. Although the number of phases involved in the reflection process varies amongst models, they all appear to expand and adapt Kolb's (1984) model.

The author chose Kolb's (1984) reflective model for this study, which consists of four stages in a cycle: concrete experience, reflective observation, abstract conceptualization, and active experimentation. During the concrete experience stage, teachers mentally and physically encounter different scenarios in their classrooms (Kolb, 1984). Teachers then recognize the importance of systematic reflection on their teaching in order to learn something new or improve on their existing abilities and practices based on their mental and physical experiences in the classroom. The need to reflect on teaching in this scenario is a result of the teachers themselves, not of an external force. Individual teachers initiate the process for personal growth and development rather than for administrative considerations. Kolb (1984) encourages teachers to take notes on what they think and feel about various circumstances in the classroom.

Reflective observation is the second step of Kolb's (1984) reflective model. This is the stage at which teachers ask themselves what went well, what failed, what explains the successes and failures, and why students and teachers behaved the way they did (Kolb, 1984). The teacher attempts to develop alternative techniques to improve in future situations during the abstract conceptualization stage. This includes conducting peer reviews, soliciting feedback from students, and consulting literature to obtain a deeper knowledge and produce new ideas. While Kolb's (1984) approach recognizes the importance of student feedback in the reflection process, it does not specify how students' input is acquired. Because of this ambiguity, students' participation in the reflection process may be sidelined and seen less significant. The author believes that using SET instruments with open-ended questions that allow students to freely express themselves anonymously could be very helpful in guiding teachers on how to realign their teaching techniques to fulfill students' learning needs.

The teachers use the newly gained theoretical information to plan how to do things differently in the future in the fourth stage of Kolb's (1984) reflective model. This is known as active experimentation because the teacher must put their reflections, theories, and new tactics into action. Some of them will work, while others will not, establishing the foundation for a new cycle to begin. The experiences gained during the active experimental stage become the new concrete experiences. According to Kolb's (1984) model of reflection, teaching is an ever-changing activity that strives to improve the quality of future lessons based on what happened in the past. Furthermore, students, who are the key stakeholders in the teaching and learning process, should also be key players in the reflective process. As a result, the concept of SET is compatible with reflective teaching philosophy. Last but not least, reflection can only have beneficial effects if teachers are willing to implement new ideas and theories that emerge from their reflective process. The next chapter defines the study's purpose.

The Purpose of the Study

In this study, students' feedback on mathematics teaching practices in their classes is elicited using SET in three secondary schools. The study's findings may help mathematics teachers in those schools reflect on and improve their teaching approaches for the benefit of the students they teach.

METHODOLOGY

This study used a qualitative research approach, which is consistent with the interpretivist research paradigm. The qualitative research approach entails gathering non-numerical data from participants in the form of texts and audio recordings via methods such as open-ended interviews and written reports. Because the study's purpose was exploratory in nature, this approach was appropriate. Furthermore, characteristics such as students' perspectives, experiences, motivations, values, attitudes, and beliefs about mathematics teaching in their classes are difficult to quantify because they differ from one student to the next (see Chandra & Shang, 2019).

Research Design

The multiple case study design was adopted in this investigation. A case study is an in-depth investigation of a current phenomenon in its actual environment (Yin, 2017). It is a qualitative method of inquiry that examines multiple dimensions of a single entity (Trochim et al., 2015). Its distinguishing characteristic is the collection of data from multiple sources in each case (Carolan et al., 2016). A 'case' in this study refers to a specific secondary school, and 'multiple sources' refers to the students who attend that specific school. Because schools are complex institutions with a wide range of educational attributes, the multiple case study design was found appropriate. Furthermore, data from multiple-case studies may be stronger and more trustworthy than evidence from single-case research (Halkias & Neubert, 2020). The different viewpoints of students at a certain school gave extensive, rich, and valuable data, allowing the

researcher to obtain a comprehensive picture of the state of mathematics education in the selected classes. Rather than generalizing findings, the goal was to acquire thorough explanations of the different realities of mathematics teaching and learning experiences as viewed by particular students in a specific setting (Bhawna & Gobind, 2015). In educational contexts, multiple case studies can be used to assist teachers, principals, and schools in assessing, reflecting on, and adapting their own practices in order to improve school effectiveness (Tomaszewski et al., 2020).

Participants, Sampling, and Context

11 grade 12 students, seven males and four females, were chosen for this study from a population of 66 grade 12 students enrolled in the researcher's after-school mathematics and science program. The 66 students came from three separate secondary schools in Seshego Township, Limpopo Province, South Africa. Students received extra mathematics and science teaching through the program established by the researcher to assist students who had difficulty understanding mathematics and science in school. 61 of the 66 students in the researcher's mathematics and science program attended school A, two attended school B, and three attended school C. The study included six students from school A, two from school B, and three from school C. The participants were recruited through self-selection, a form of convenience sampling method in which participants volunteer to participate in the study. Self-selected individuals were assumed to be more committed and willing to engage in the study than those recruited through persuasion.

The recruitment process began with the researcher sharing project information with prospective participants when they arrived for their after-school mathematics and science lessons. The objective of the research, its benefits to mathematics education, how and when data would be collected, how the data will be used, and issues of anonymity and confidentiality were all covered in the project information. Students were informed that they had the right to decline participation without explanation, and that participation was fully voluntary and based on informed consent. After their extra lesson, interested participants were asked to register their names with the researcher. Participants were informed that names of the students and schools would not be used in the publication of the research findings. As a result, students' real names were substituted with codes. Participants from school A were assigned the codes A1, A2, A3, A4, A5, and A6. Participants from school B were assigned the codes B1 and B2, whereas those from school C were assigned the codes C1, C2, and C3. At school A, three teachers were in charge of grade 12 mathematics. One teacher was in charge of grade 12 mathematics at school B, and one teacher was in charge of grade 12 mathematics at school C. Thus, the perspectives offered by the study's participants refer to the five teachers who were in charge of grade 12 mathematics in the three schools. The study's findings should so be considered in this light.

A number of concerns raised by several of the grade 12 students enrolled in the researcher's program for mathematics and science extra tuition motivated this investigation. For a variety of reasons, the students were unable to discuss their concerns with their respective mathematics teachers at their respective schools. The primary reason for this is that in South African secondary schools, SET is not used. As a result, there is no forum for students to share their opinions about mathematics teaching and learning in their schools. The students also stated that they were afraid of being victimized and hence could not express their concerns directly to their specific teachers. Students discussed their mathematics teaching and learning experiences with the researcher due to their confidence and trust in the researcher. After hearing some of their stories, the researcher realized that the students had legitimate concerns that needed formal investigation, hence the study.

Data Collection Methods and Procedures

This study gathered data on students' input on mathematics teaching and learning in their classrooms and respective schools using unstructured interviews and students' written reports. The original goal was to use just unstructured interviews, however several students preferred to express themselves in writing rather than verbally. As a result, written reports from students were integrated to satisfy those students. Unstructured interviews gather qualitative data by asking open-ended questions in a non-fixed order (McLeod, 2014). This strategy is adaptable, allowing the researcher to modify questions based on the responses of the respondents. It allows the interviewer to seek for clarification while also allowing the respondent to lead the conversation (McLeod, 2014). Students' written reports in this study were first-hand accounts, detailed stories, and evaluations of the students' own experiences. The written reports served the same purpose as the unstructured interviews but had the added advantage of not putting respondents under pressure because students did not have to compose their reports in front of the researcher. This gave participants enough time to reflect, recall, and properly compose their reports, which increases the trustworthiness of the reports. Written reports do not, however, allow the researcher to ask the narrator for clarification because the researcher will be away during report's preparation.

Before the data gathering process began, participants were requested to sign consent forms. Parental permission was also requested, and it was granted. Participants were advised that they may opt out at any

time during the research process. Six of the 11 grade 12 students who registered for the study chose to express their opinions in writing, while five were interviewed. Those who chose the written report technique were given information on the research topic. That is, to assess mathematics teaching and learning in their classes, concentrating on the issues they believe need to be addressed by their specific mathematics teachers. Each of the six participants was given a pen and a 32-page notepad on which they could write whatever they wished without regard for length. The students were directed to submit their reports within two weeks, which was regarded sufficient because they were reflecting on their previous teaching and learning experiences. All six students completed and returned their written reports within the time frame specified.

Interviews were conducted one-on-one at the mathematics and science learning center on a day and time that each of the five participants liked. Each interview session began with the researcher reaffirming the study's goal and emphasizing the need of anonymity and confidentiality. Following that, participants were informed that their responses and remarks will be recorded and transcribed. Before the voice recorder could be turned on, participants were required to sign consent to the interview and recording of their comments. Participants were then invited to share their thoughts and opinions about the state of mathematics teaching and learning in their various mathematics classrooms, concentrating on what they thought teachers needed to improve. When students spoke, the researcher did not interrupt them and only asked for additional facts and clarification when necessary. Participants spoke confidently about their learning experiences and evaluated their teachers without fear or favor. The researcher concluded each session by thanking and expressing gratitude to the participants for their participation in the study. The interview sessions lasted 20 to 30 minutes.

Issues of Reliability and Validity of Research Tools

To enhance trustworthiness of qualitative data findings, rich and thick verbatim extracts from participants' responses were used in reporting the study's findings (Korstjens & Moser, 2018). Member-checking was also used, where participants were asked to confirm that their opinions were accurately represented in the research report (Korstjens & Moser, 2018). A comprehensive and unambiguous description of the research process from the initial outline to the development of methodologies and reporting of findings is given as an audit trail to enhance dependability and confirmability of the study. Unstructured interviews are considered to generate more credible research outcomes than structured interviews because they delve deeply into the various knowledge and experiences of the research respondents in order to accurately portray the study phenomena (Chauhan, 2022). However, unstructured interviews suffer low 'reliability' because there is no consistency in how questions are posed to different respondents (Thompson, 2016). The irregularity of questioning renders replication of the study unfeasible.

Data Analysis

The researcher transcribed the audio recordings of the individual interviews, which were then audited by the researcher's peer. To maintain confidentiality, students' written accounts were typed to conceal their handwriting (see Mertler, 1997). The interview transcripts and written reports were saved in three distinct files on the researcher's computer and were labelled school A, school B, and school C. The researcher then read the material multiple times to develop familiarity with the data and to determine the important ideas that emerged from the students' perspectives (see Kiger & Varpio, 2020; Nasheeda et al., 2019). The qualitative data were then coded using MAXQDA, version 2022, computer-assisted qualitative data analysis software. MAXQDA includes tools for importing documents, coding, and categorizing text segments, and extracting coded segments for report writing. Coding is the process of identifying information that addresses the variables of interest and assigning a label (word or phrase) to the information that best characterizes it. A single word, a phrase, a full sentence, or an entire page of text can be coded (Elliott, 2018). Lesson preparation, content knowledge, classroom management, attention provided to underachievers, quality of classwork and homework activities, usage of contact time, teaching methods, attitudes, and emotional intelligence were some of the labels used to categorize the qualitative data. The coded text segments of data were then extracted from MAXQDA and saved as a word document for further examination. The researcher then read the retrieved segments to identify the emerging themes. An excel template was created in which the identified themes were inserted, and the accompanying text segments were pasted. Each school's data were organized using the same processes.

The use of more than one student evaluation per teacher enhanced the credibility of the findings (see Stahl & King, 2020). Furthermore, the researcher and the students had a good rapport because they were used to each other and had been working together for a long time. This raised the likelihood of participants disclosing sensitive information and providing honest responses. By asking participants to verify whether the research report accurately reflected the perspectives they offered, the confirmability of interview and written report findings was enhanced (see Busetto et al., 2020). Direct quotations from students' interviews and written reports were also included in reporting the findings of the study. The findings are presented and discussed in the next

section. The discussion goes beyond simply describing codes and themes to constructing a narrative that provides a clear, concise, and logical interpretation of the data in order to appropriately address the research objectives (Kiger & Varpio, 2020).

RESULTS

Case 1: School A

Students' evaluations of mathematics teaching at school A revealed the following themes: poor topic introduction, focusing on fast learners and ignoring slow ones, teaching to cover the syllabus, inflexible teaching, inadequate content, inadequate pedagogical knowledge, lack of emotional intelligence, missing lessons, insufficient exam practice and relying too much on textbooks, overworking learners, poor time management, and suggestions for improvement.

Poor topic introduction

Participants A6 and A1 from school A expressed dissatisfaction with how their mathematics teachers introduced mathematics topics. They stated that the introductions are inadequate and based solely on what the teachers are comfortable with. The following comments reflect these points of view:

> We are not thoroughly introduced to a topic before we are given activities. We are given limited information (A1, para. 2).

> First of all, I have a problem with the way they introduce math topics. They just start with the part they are comfortable with (A6, para. 21).

Focusing on fast learners and ignoring slow ones

Participants A1, A4, A5, and A7 complained about their mathematics teachers focusing on fast learners, whom they regarded as the teacher's "favorites," while ignoring struggling students. The following comments attest to this:

> The way they teach us math at school disadvantages some learners because they give more attention to learners who are good at math and ignore those that are struggling … Learners who get high marks are favored more than those who score low marks … he thinks that learners who perform poorly in math cannot tell him anything constructive. Only those that perform well are given a chance to say something in class … Some of us live with parents who do not have knowledge of math. We rely on our math teacher for help. So just imagine what will happen if the teacher does not give you attention at school and there is nobody to assist you with math at home. Some learners do not attend extra lessons outside school, they only attend math at school. Now if the teacher does not help such learners at school, then obviously those learners will fail (A7, para. 24).

> … if a few learners in our class understand a topic then the rest of the learners' confusion is not considered (A1, para. 2).

> … our math teacher has his own favorites in class, and he only focuses on those learners. If you are not one of his favorites, he does not mind whether or not you are paying attention in class … The teacher does not mind us as long as his favorite learners understand. He only explains problems that his favorite learners fail to do. The teacher does not ask us whether we have understood or not. Even when you try to raise your hand, he will not give you the attention … He does not give slow learners a platform to participate in class because he always think that their answers are wrong … they take learners who are performing well for camps, where they are taught by experts and leave us behind. For example, if there is only space for one learner at the camp, they take the one who is getting 100 out 100 and not the one who is getting 1 out of 100 (A4, para. 14).

> For example, when they teach three dimensional problems in trigonometry, they focus on the fast learners. They just write on the chalkboard and only the smart learners are able to follow, and some of us are left behind (A5, para. 17).

Teaching to cover the syllabus

Participant A6 indicated that their mathematics teachers are more concerned with completing topics than with ensuring that students understand the material. The following comment expresses this view:

> They do not focus on making sure that a learner understands what they are teaching. They just focus on what they are teaching and whether or not learners understand, they do not mind. They focus too much on finishing the topic as long as they taught you (A6, para. 21).

Inflexible teaching

A rigid approach to teaching mathematics was identified as a major concern by all seven school A participants. Participants indicated that their mathematics teachers forbid the use of alternative methods of solution and limit students to a single method presented in class that they believe is the simplest. Furthermore, participants stated that their math teachers do not entertain questions and are unwilling to repeat explanations or reteach work from earlier grades. The following comments reflect these:

> Our teacher does not want learners to express their steps … The other problem with our math teacher is that when you are struggling with something that was taught in previous grades, say grade 9, the teacher will be like: "They taught these things in grade 9, so there is no need for me to teach you these things now, so I am passing." Now, the moment you pass those things is the moment you are leaving others out because maybe I did not understand teacher so and so when I was in grade 9, and I want to listen to how you present it, maybe I can get it through you (A3, para. 10).

> They do not allow us to use other methods of solving problems besides those that they have taught us … We are not given a platform to write things the way we understand (A4, para. 14).

> They do not give us a chance to come up with our own methods. They want us to present our answers the way they have taught us. They do not mind about alternative methods of solving math problems. Now, if I am not comfortable with the method that the teacher has taught us, then it will be a problem … Sometimes when I use the method that the teacher has taught me, I get wrong answers, meaning that method is difficult for me. But when I use the alternative method I have learnt outside school, I get correct answers, meaning that's the method that is easier for me. So, they should allow us to use many methods to solve math problems which I think will help many other learners. As long as the method does not violate math rules, then I think it should be accepted. You cannot expect 130 or 150 learners to use and love the same method. When the teacher insist that we should use one method, it disadvantages some of us. Let's take for example, when solving quadratic equations, the teacher forces us to use the quadratic formula even when the equation is easy to factorize, and I can factorize it in 20 seconds. When I use the quadratic formula, I have to write down many steps: writing the formula, substituting, and simplifying before I get to the answers, and I will be wasting time for other questions (A7, para. 24).

> Mathematics teachers should not prohibit learners to give their own different methods as those different methods may help other learners (A2, para. 6).

> What I have experienced during mathematics lessons is that we are not given the platform to ask questions. I am not allowed to solve questions using alternative methods. If I use alternative methods, they say I am trying to act better than others and I am accused of confusing his class (A1, para. 2).

> Some of us raise our hands many times and teacher does not give us the chance to ask questions (A5, para. 17).

> The other thing is, we are not given a chance to ask questions about something that they have taught us (A4, para. 14).

> They do not like explaining something that they previously explained (A6, para. 21).

Inadequate content knowledge

Participants A3 and A6's comments show that mathematics teachers at school A lack subject matter understanding in areas such as financial mathematics, Euclidean geometry, trigonometry, and functions. As a result of these deficiencies, participant A6 reported that teachers spend more time on topics in which they excel and less time on areas in which they are not good at. In some cases, challenging topics are assigned to high-performing students for peer teaching in class. Alternatively, the teachers make use of videos. The following comments reflect these points of view:

> Teachers do not focus too much on topics they are not good at, they focus too much on topics that they are good at. They can take the whole term teaching a topic that they are comfortable with and when it comes to a topic that they are not comfortable with, it's either they do not touch it at all, or they just rush through it without making sure that learners understand the topic. In most cases these are the topics that are challenging to learners, so our teachers focus too much on topics that are not challenging. When we come to topics that are challenging like Euclidean geometry, financial math, trigonometry, especially problems in 3D's, trig graphs and functions and inverses, they give them to learners and delegate a learner to do them in class (A6, para. 21).

> Our teacher is struggling with paper 2 topics, especially trigonometry and Euclidean geometry and he teaches these topics through videos (A3, para. 10).

While delegating high-performing students to teach their peers, as well as using videos are useful techniques for mathematics teachers to compensate for their subject knowledge deficiencies, the following comments capture the drawbacks of these strategies:

> The problem is that the learner is not well equipped to stand in front of the class and present the lesson the same way a teacher would do. Although the learner may have the knowledge of

> the content, they are not competent enough for the level of teaching (A6, para. 21).
>
> Some topics are taught through videos and projector whereas some of us do not understand (A1, para. 2).
>
> The problem with videos is that they are not contact classes and we do not even get to see the image of the person who will be speaking in the video. Some of the videos are too short so they do not get to clarify too much. In most cases you only understand at that time when they are teaching you, the moment you step out of the class, you forget about the information and you do not have any notes to refer to since the videos are too fast for us to write notes during the presentation (A6, para. 21).
>
> Now, you cannot bring a video from Google, YouTube or somewhere and you want us to learn through that certain video and you bring it in June when during January, February, and March, we have been listening to your voice and we are still trying to adapt to the teaching style you are using, then you bring a video and you want us to learn through watching and listening to a video, we would not understand, unless you are bringing that video for clarity, that will be understandable. So, they must first teach us then bring video afterwards so that if the teacher did not touch a certain part of a topic then the video can clarify or if you did not understand a certain part of the topic when it was taught by the teacher, the video can also clarify (A3, para. 10).

Inadequate pedagogical knowledge

The comments provided by participants A2 and A6 point to shortcomings in the mathematics teachers' approaches to teaching mathematics at school A:

> There are different types of learners, and they all have different concentration spans. Some learners are auditory (understand more by listening), some are visual (understand more by seeing), while others are body-kinetic (understand more by moving/creating objects). So, learners cannot be taught using the same method and still expected to all get high marks. That is definitely not sensible and also demotivates other learners as they are constantly shouted at and told that they are failures because they failed a mathematics test. I think it is important for a mathematics teacher to be well trained, to be versatile, and to use different teaching methods that will accommodate all types of learners (A2, para. 6).
>
> Another thing is that they do not have patience in order to teach math. Most of them do not focus on making sure that a learner understands what they are teaching. They just focus on what they are teaching and whether or not learners understand, they do not mind … In some instances, they take us straight to questions … (A6, para. 21).

Lack of emotional intelligence

Emotional intelligence is defined as the ability to positively perceive, comprehend, and control our own emotions as well as the emotions of others (The Institute for Health and Human Potential, 2019). It helps to motivate others, foster a collaborative atmosphere, and strengthen our bonds with those we care about. There is no doubt that emotional intelligence is required for effective mathematics education in the classroom. The remarks given by participants A1, A3, A4, A5, A6, and A7 show that the mathematics teachers at school A lack emotional intelligence. The grade 12 mathematics teachers at school A were evaluated as having a bad attitude, a lack of empathy, discouraging slow learners, avoiding criticism, and getting upset with students who asked questions. The following comments reflect these points of view:

> The teacher has an unpleasant attitude towards the learners. As a math learner, I have been bullied and teased by the teacher. There was a time when I got sick and could not come to school. I came to school the following day and my mathematics teacher told me that my reason for being absent was not valid. He then told the class that there are some people who fall sick for one day. So as learners, are we not allowed to be absent from school when we are not feeling well? (A1, para. 2).
>
> They make jokes and laugh at learners who are not performing well … When we try to seek for help from the teacher he would tell us that we do not pay attention in class (A7, para. 24).
>
> When I raised my hand to ask a question in class, the teacher said I should go and join the ladies who are cooking food for the learners because the only thing that I am good at is eating. Just imagine sir! How am I going to improve when the teacher is busy discouraging us and making jokes of our performance? ... Sometimes when they mark our test scripts, they just cross out everything because they have the impression that we do not know anything. When they teach, they tell some of us that we cannot master certain math topics … When you ask the teacher what's going on, he tells us that this topic is not for us and that we should just know how to solve for x, get at least level 2 [minimum pass], and become a social worker or plait women's hair to get money. He tells us that

> we should stop aspiring to be doctors because we are not good at math. (A5, para. 17).

> The teacher always makes jokes of our poor performance. For instance, I remember the math teacher telling one learner that: 'You cannot solve these problems, you should just go and sell drugs. Maybe you will make money that way. Even if you try to do it, you will not manage.' When you give a wrong answer in class, the teacher will tell you that you do not listen, I taught those things long ago … If you ask questions many times, they will label you as a dull learner … The teacher does not like being challenged. When you tell them that they have made a mistake in their presentation, they will ask you, 'Who is the teacher here? Is it me or you?' They even chase you out of the class as if you are disrespecting them (A4, para. 14).

> If they teach something and a learner does not understand, and ask them to explain what they have explained, they become angry and I do not know the problem (A6, para. 21).

Participants A3 and A4's comments indicate how some students have been impacted by the teachers' lack of emotional intelligence:

> Now, we are afraid of sharing our personal problems with him because when you make a mistake in class, he tells the whole class about your personal problems and make it a joke … As a result of the teacher's attitude, I no longer participate in class during mathematics lessons (A3, para. 10).

> They always say that these kind of questions are for learner so and so, who are his favorite learners. So, when they give us problems to solve, I usually skip those questions which they said I cannot do (A4, para. 14).

Missing lessons

Participants A7 and A5 reported that their mathematics teacher did not routinely attend class. According to participant A7, this discourages students because there is no one to assess whether what they are doing is accurate or incorrect when they practice mathematics:

> The other thing is the teacher does not attend class; he comes to class when he likes. Maybe it is because he has authority over the math department. If you count the number of days he came to class, you will wish they should have been the days on which he was absent. The number of days he does not come to class are more than the days on which he came to class and very soon we will be writing exams. We informed the principal about it but then nothing has changed. The principal does nothing about it. It seems the principal and the teacher understand each other. The principal would argue that learners are performing well not knowing that most of those learners who are performing well in math in our class are attending extra classes outside the school and credit is given to that teacher who does not come to class, yet it is not his effort. Learners who are failing math are failing dismally because they do not attend extra classes outside the school … Although we practice math on our own when the teacher does not come to class, we feel discouraged because we do not know whether our answers are correct or wrong. You cannot even go to his staffroom and when he comes to class you can even ask him questions because he thinks you are fighting with him. This creates a negative relationship between the teacher and the learners. Many learners hate math because of him, and you cannot pass a subject that you hate (A7, para. 24).

> The teacher does not come to class regularly. He skips class a lot. They just give work to the best performing learners and assign them to help the class. Now, the problem is those learners do not help us because they just write solutions on the chalkboard without explaining and some of us do not understand (A5, para. 17).

Insufficient exam practice and relying on textbooks

Participant A6 feels that the teacher does not provide students with exam skills training and focuses too heavily on textbooks, which the students believe are inadequate for enhancing students' exam abilities:

> Another thing is that our math teachers do not focus on examination writing skills. They do not focus too much on previous question papers. They use textbook methods and textbooks are not good at training learners to be ready for examination. That's one of the main issues that we struggle with (A6, para. 21).

Participant A3 adds that:

> If you just teach us and you do not bring exam questions, we do not know how the question is formed and we will just see it in the exam paper. We will not be able to answer such type of questions because what they give us is just basic and the complex questions they did not touch them (A3, para. 10).

Overworking learners

Participant A2 describes how their mathematics teacher pressures them to work nonstop and for long

hours. The student claims that this takes away time from focusing on other subjects.

> I understand that our final/matric years comes with a lot of pressure and stress. I also understand the frustrations and concerns of our mathematics teacher about our performance as this year's marks are going to determine how our future many unfold. But that does not mean learners should work all day without rest and enough sleep. I think this is a mistake our mathematics teacher makes, thinking that coming to school seven days a week is helpful and overworking will produce good marks. Our teacher needs to understand that as much as mathematics is important to us, it is not the only subject we do. Attending mathematics classes every day, seven days a week, for long hours makes us to lack our other subjects and without passing your home language and English, you will not go anywhere. I think that we should come to school Monday to Friday, and Saturday and Sunday should be the days of resting and revising what was being taught during the week. Learners may attend during Saturdays when exams are near to revise and write tests to prepare them (A2, para. 6).

Poor time management

Teachers in South African schools are normally provided work schedules and pace setters that specify how much time should be spent on each topic. Given the practice of administering common exams and assessments across schools, time management is critical. Participant A6 remarked that their mathematics teacher devotes more time to grade 10 and grade 11 work, leaving less time to address grade 12 curriculum:

> They spent a lot of time focusing on grade 10 and grade 11 work and when they come to grade 12 work, they will just spend very little time on it, skipping some sections in some topics. They can take five weeks teaching work from previous grades but when they get to grade 12 work they would not spend even five days then we are done with a topic (A6, para. 21).

Suggestions for improvement

The participants from school A made several suggestions for improving the quality of mathematics teaching and learning in the grade 12 classroom.

> When we do Saturday classes, we should not be taught by the same teachers that are teaching us during the week in our respective classes. We must be taught by different teachers so that maybe we can understand a different voice. When Teacher A who is teaching me during the week taught me a certain math topic and I did not understand, maybe I will get it from Teacher B during the Saturday class (A3, para. 10).

> The teacher should stop focusing on the high achievers and focus on the struggling learners. The teacher cannot be focusing on learners who get 69 out of 70 when there are learners who are getting 2 out of 70 … The teacher should be patient with us and help us to improve. He should stop labeling us dull learners (A4, para. 14).

> To get things right, I think the first thing is that the teacher should come to class regularly. Secondly, the teacher should not focus too much on the smart learners. We all need his attention. The other thing is they should build and not destroy our self-confidence because when they tell you that this topic is difficult for you, then I will develop the mentality that I would not be able to do it. When we fail, they will say we do not listen in class, yet they are the ones who said we cannot do math … They should stop making jokes of our poor performance (A5, para. 17).

> The teacher should give us different methods of solving math problems and allow each learner to choose the method they prefer. Then we will be able to get correct solutions and improve our marks (A7, para. 24).

> If you are a math teacher, you should be open and allow all learners to come to you and ask questions about anything that they do not understand, and even share with you problems they are facing within the school or outside the school … I think if a teacher allows learners to express their personal views, it is the more you can learn because a teacher can learn through a learner and a learner can learn through a teacher. So, both of us must be given a chance, the teacher, and the learner … So, the teacher should allow learners to express themselves because we are learning math. If we are learning then we should be allowed to make mistakes … Our teacher should learn from the best. He must learn from the best because there are many teachers out there that have started with learners that are from level 1 and they are at level 4 or somewhere above. Our teacher should stop telling himself that he knows something when he does not know it. He should just seek for help and swallow his pride. The other thing is if our teacher does not understand Euclidean geometry, he must give others a chance. The teacher must be honest with us that he does not understand Euclidean geometry and at least promise that he will look for somebody who understands the topic to teach us (A3, para. 10).

> I understand that our mathematics teacher is qualified with a degree, but he should not be so strict to the point, where learners are scared to ask questions … Corporal punishment and aggressiveness towards learners may have worked in the 90's but it is meaningless in these days. This generation needs a patient mathematics teacher who is willing to repeat topics over and over again. A mathematics teacher should be a listener. He should be transparent and be able to understand the views of the learners without being aggressive. There are many ways to discipline a learner. Teachers should learn to control their emotions at all times as it might end their careers and lives … One last point is that mathematics teachers should not prohibit learners to give their own different methods as they may help other learners (A2, para. 6).

> The teacher should know that learners do not understand math in the same way. If I have my own method of solving math problems and if the method gives a correct answer, then the teacher should accept it instead of restricting us to one method. Sometimes when I use the method that the teacher has taught me, I get wrong answers, meaning that method is difficult for me. But when I use the alternative method I have learnt outside school, I get correct answers, meaning that's the method that is easier for me. So, they should allow us to use many methods to solve math problems which I think will help many other learners. As long as the method does not violate math rules, then I think it should be accepted. You cannot expect 130 or 150 learners to use and love the same method (A7, para. 24).

Case 2: School B

Several themes emerged from students' evaluations of mathematics teaching at school B. These included: assumed knowledge, collective punishment, inadequate content knowledge, focusing on fast learners, lack of preparation, laziness, and misuse of contact time, missing lessons and blaming students, overreliance on textbooks, being oblivious to students' concerns and dismissing their voices, and suggestions for improvement.

Assumed knowledge

Participants from school B reported that their mathematics teacher thinks that all students are familiar with previously taught ideas. As a result, the teacher will not redo work from prior grades or a previously covered topic. When students raise questions about mathematical ideas that the teacher believes are simple, the teacher "gets bored." The following remarks represent the views expressed:

> If there is a particular topic that we are currently on it, we are told that we did it the previous year so this year we are not going to do it, so we have to do other topics since we know that topic (B1, para. 2).

> When we got to the topic of financial math, he told us that we did it during our winter classes at this other school where we were attending, of which some of us did not understand the topic because they did not teach the topic well. So, we expected our teacher to repeat the topic. The teacher just passed the topic and said he would not repeat it. When we wrote a test on finance, we did not even have an idea of what was going on (B3, para. 8).

> The first problem is that our math teacher expects all learners to know everything from the previous grades. That's why he does not want to help some learners to solve problems that he thinks are easy … So, when learners ask questions on simple things, sometimes the teacher gets bored. He forgets that some learners are slow learners and find math to be hard to learn (B2, para. 5).

Collective punishment

When the entire class is penalized for the behavior of a few students, this is known as collective punishment (Pereira & van Prooijen, 2018). Participants B1 and B3 from school B reported that their mathematics teachers discipline the entire class for one student's misconduct:

> If there is a problem in the class caused by a particular learner the teacher does not address the matter in a good manner as he should. Instead, of solving the matter, the whole class is punished, which affects learners who are dedicated to learning, and it is a disadvantage to them (B1, para. 2).

> The other problem is that when one learner disrespects the teacher, the whole class is punished because of that single learner. He can even chase us from his class and make us to clean the school yard for the whole week without being taught (B3, para. 8).

Inadequate content knowledge

Deep subject matter knowledge is required for effective mathematics teaching. Participants B1 and B3 provided remarks indicating that the teacher lacked subject matter competence. The following comments reflect this point of view:

> Firstly, I am not happy about the way I'm being taught math. The reason being my teacher is not confident enough to give response to learners who

> have problems on particular topics. Frequently, learners seek help from the teacher and the response that they get is avoidance because learners are told to come the next day due to tight schedule (B1, para. 2).

> Sometimes he tries to solve a problem on the chalkboard and fail to get the answer. We do not have a problem with that because maybe he has forgotten how to do it, but we expect him to go home and do it and bring us the solution the next day. But he never come back to us with the solution. He just moves on to other concepts, ignoring the problem that he failed to solve, of which there is a high possibility that we may encounter that problem in our tests and exams (B3, para. 8).

Focusing on fast learners

According to participant B2, their teacher focuses on fast learners and is unconcerned about the rest of the class. As a result of such teaching methods, it is reported that the majority of grade 12 students are failing mathematics at school. The following comment expresses these points of view:

> Another thing is that our teacher does not teach us fairly. He focuses his attention on learners who understand faster and for the rest of the learners, it's not his problem, and he just leaves the situation like that. As a result, many learners fail math and only a few learners who are his favorites pass the subject (B2, para. 5).

Lack of preparation

Participant B3 tells how their mathematics teacher shows up to class unprepared and asks students to fix their continuous assessment (CASS) files for the duration of the lesson only to keep them occupied. The following comment reflects this:

> Today, he came to class without preparing and asked the learners if anyone had some material which we could use for the lesson and we told him that we had nothing. He then told us to fix our CASS files during his period and I know that we are going to spend the whole week fixing our CASS files during the math periods. We did this on Monday and Tuesday and even today, we are still doing CASS. I expect our math teacher to come to class prepared, but it seems he comes to class not knowing what he is going to teach. He expects us to bring material for him to use in class (B3, para. 8).

B3 adds that:

> As a grade 12 learner, I am not happy with the way they teach us math at school. The teacher only becomes serious when it's time to write tests and exams and he puts us under extreme pressure. For instance, in term 1, we wrote a test that included problems in 3D. We were never taught this concept before the day of the test. He tried to teach us 3D's in the morning of the day we were supposed to write the test. The test was supposed to be written at 12 noon. Although he showed us how to solve problems in 3D in the morning, we did not have a chance to go home and practice the concept to see if we understood him or not. So, we just wrote the test using the little information we had grasped but we were not happy (B3, para. 8).

Laziness and misuse of contact time

Participants B2 and B1's comments imply that their mathematics teacher is lazy and does not carry out his duties well:

> The other problem is our teacher is lazy. He just comes to class and gives us work on things that he did not teach us. Then, it creates a problem because many learners are failing math and he blames the learners and not himself. He accuses us of being disrespectful and inattentive in class, yet he is the one not doing his duties well … Sometimes he just comes to class to give us corrections on the work he gave us and then leave the class. He does this many times … The other problem is that the teacher simply gives us a brief introduction to a topic and tells us that we are grade 12 learners, and we should go an extra mile. Of course, we are grade 12 learners, but he should at least give us full information so that we can go an extra mile. You cannot go an extra mile when you do not know where you are going (B2, para. 5).

> When he gets the chance to come to class he does not say anything to any learner, he whistles while doing the corrections of the work he has given us without teaching us anything … During lessons he suggest peer learning which does not accommodate everyone as he just sits down and play games on the phone (B1, para. 2).

Missing lessons and blaming students

There is no doubt that when teachers miss classes, students suffer. When students fail mathematics, teachers often place the blame on students for a lack of practice. Participants B1 and B2's comments imply that the teacher misses class for several days and criticizes students for not practicing enough:

> The teacher does not come to class for days or even weeks (B1, para. 2).
>
> He always blames us of not practicing enough (B2, para. 5).

Over reliance on textbooks

The mathematics textbook is a significant teaching resource, but it should not be used as the only teaching and learning resource available to the teacher and the students. Participant B2 believes that the teacher should complement the textbook with handouts containing previous exam questions in order for students to become accustomed to the exam's standard. B2 claims that the standard of questions in the textbook does not correspond to the standard of the exam. The following comments reflect on these points of view:

> The other problem is that our math teacher relies too much on the textbook and according to my view, the information in the textbook does not match the standard of the exam. All our classwork and homework activities come from the textbook and when it comes to tests and exams, you will find that the questions will be different from those from the textbook. So, it's like the things they teach us do not help us. I think they should also use handouts with past exam paper questions so that we get used to the standard of the exam. Textbooks should just help us to get the basics, but I am against the use of textbooks for classwork and homework activities because textbooks do not have enough information to match the standard of the exam and tests (B2, para. 5).

Being oblivious to the concerns of students and dismissing their voices

According to the remarks provided by participants from school B, their mathematics teacher does not allow students to express their concerns, and when they do, the principal simply dismisses them:

> The teacher thinks he knows what is best for the learners without giving us a chance to tell the problems that the learners are having (B1, para. 2).
>
> The other challenge is that when we launch a complaint at the principal's office, the principal tells us that teachers know their job and what is best for learners (B2, para. 5).
>
> The other thing is that when we inform the principal about our dissatisfaction with the math teacher, the principal simply says that "our math teacher is a good teacher" and insists that he cannot change him and give us another one. So, it's useless for us to take our challenges to the principal because they do not do anything about them and they do not listen to what the learners are saying (B3, para. 8).

Suggestions for improvement

Participants B1 and B2 gave the following suggestions for how to address some of their challenges:

> I think they should give us a chance to suggest ways to improve our performance instead of telling us that they know what is best for learners. This is important so that when things go wrong, we know that we have all contributed unlike when they take all decisions by themselves. They should listen to our ideas because we are the ones attending school. If things are not working, we should all contribute towards suggestions on how to improve the situation instead of them deciding everything without involving us. So, these are some of the problems we are experiencing at school (B2, para. 5).
>
> The kind of teaching that I would like is my teacher should teach us using previous question papers and making sure that every learner in class understands. The main focus should not be on learners who achieve better but should focus on everyone so that at the end of the day everyone can do better and produce great results (B1, para. 2).

Case 3: School C

The data collected at school C revealed the following themes: wrong assumptions, missing lessons and labelling students, a lack of communication, neglecting average and slow learners, not listening to students' concerns, poor teaching, and suggestions for improvement.

Wrong assumptions

The grade 12 mathematics teacher at school C thinks that all students are familiar with the material covered in prior grades and that they all have the same degree of mathematical understanding. The following comments reflect these points of view:

> The teacher always assumes that learners have the knowledge of the previous grades … Her experience of teaching clouds her judgement and makes her think that she knows the mentality of a learner (C2, para. 6).
>
> Our math teacher thinks we all have the same level of understanding (C1, para. 3).

Missing lessons and labelling learners

The grade 12 mathematics teacher at school C is often absent from class and prefers sports to teaching. According to participant C1, the teacher "criticizes learners according to their looks and performance." The following comments reflect these points of view:

> We are dissatisfied with our math teacher (name withheld) as she does not attend her periods more often (C3, para. 9).

> She misses class more often and criticizes learners according to their looks and performance … She prefers sports more than teaching us (C1, para. 6).

Lack of communication and non-conducive learning environment

It is the teacher's obligation to ensure that students are aware of any upcoming tests so that they can prepare ahead of time. Teachers must also ensure that the classroom atmosphere promotes effective teaching and learning. According to comments from participants C2 and C3, students are not notified of upcoming tests, and teacher's voice is reportedly very loud for the students:

> We even write tests without being informed and without being taught some of the topics in the test (C2, para. 6).

> She is also too loud when she teaches (C3, para. 9).

Neglecting the average and slow learners

According to comments made by participants C3 and C2, the grade 12 mathematics teacher at school C does not attend to all students when teaching. The following comments reflect this point of view:

> She does not pick average learners up but instead discriminates them from the top learners (C3, para. 9).

> She does not cater for all learners. She thinks everyone knows basic concepts such as solving for x (C2, para. 6).

No room for students' voices and inflexible teaching

Participant C2 believes that their mathematics teacher does not allow students to express their views when solving problems. The teacher instead criticizes the students. Furthermore, the teacher restricts students to the use of specific methods, which is a trait of rigid teaching. The following comments reflect these points of view:

> She does not give learners a chance to express their views in a certain questions … In fact, she criticizes them … In other topics, she restrict learners to use other certain methods (C2, para. 6).

Poor teaching

Participants C2 and C1 commented on their mathematics teacher's shortcomings, as follows:

> She has the inability to bring interest of math to learners … The teacher speeds … She has the inability to break a huge topic/chapter into simple pieces … The repetition of the same problems result in time wastage … She comes to class without preparation (C2, para. 6).

> She skips important parts of every topic's introduction and always jumps to questions (C1, para. 3).

Suggestions for improvement

School C participants made multiple suggestions for addressing their concerns in the mathematics classroom. These are captured in the comments below (extracted from the students' written reports):

> She should teach to accommodate slow learners as we all are different and grasp information differently. We hope she simmers down on the rudeness so that learners can easily approach her whenever they come across a question or section that puzzles. She should respect our time and stop story-telling us her life challenges (C3, para. 9).

> She must prepare for lessons … She should form a strong basic [base] on each and every topic …, which can be related to real life applications to bring interest, and for the learners to love and enjoy practicing mathematics. She should tone down. She must stop restricting learners to use certain methods. Instead, let it be the individual's preference. She should allow the learners to express themselves during the session and about the session. She should avoid repetition of the same problems. She must come to class and attend all her periods. She does not need to be strict all the time in order to cheer the lesson and to prevent exhaustion and boredom during the session. She should provide an exam guideline and timetable for test … (C2, para. 6).

> Math teachers should have love and passion for teaching math and sharing their knowledge. An active math teacher encourages learners to be active and makes them curious to learn. Math is a language of its own, so it needs enjoyment and fun of its own. So, things like memorizing songs can be used to help learners improve. Practical work can also help learners understand more as we are

> not the same. Accommodating every learner is very important because we as learners are different and have different levels of understanding. A clear introduction is needed in every topic because it helps learners to attempt questions having a background. A new topic needs to be broken down into more understandable way. The math teacher should adapt his teaching to the question paper method as it serves as preparation to what learners could expect in exams and tests (C1, para. 3).

DISCUSSION OF FINDINGS

Based on the findings reported in the preceding section, it is obvious that secondary school students are outstanding observers and judges of how mathematics is taught and learned in the classroom (see Lafee, 2014). They can identify critical concerns that teachers must address immediately in order to improve teaching and learning in the mathematics classroom. The key findings from the study can be summarized and discussed under the following broad themes: lack of professionalism, lack of MKT, and lack of classroom management and emotional intelligence skills.

Lack of Professionalism

Failure to attend lessons and being unprepared to class demonstrate a lack of professionalism on the part of the mathematics teacher. Lesson preparation is important to both the teacher and the students. On the one hand, it helps the teacher to avoid embarrassing themselves in front of the students while still teaching them what they need to know. On the other hand, it shows professionalism and shows kids that their teachers actually care about them. Students appreciate teachers who come to class prepared because they provide an example of well-organized work for students to follow. (Sabah, 2020). Missing lessons and leaving students unsupervised is far worse than coming to class unprepared because a lot of unpleasant things can happen in class while the teacher is absent. It is considered to be a professional suicide. Students will take advantage of the teacher's absence and misbehave if they are left alone without supervision (Dabell, 2021). They can fight and hurt each other during the teacher's absence and the teacher will be totally responsible. Teachers who leave their classes unattended are habitual offenders who need to be reminded of their professional obligations (Dabell, 2021). Similarly, playing games on your phone during mathematics lessons is an act of misconduct on the part of the teacher. Cellphones are only permitted in the classroom if they are being used to enhance teaching and learning, and not for private use (Ngesi et al., 2018). Teachers are fully aware that not attending classes, failing to prepare for class, and conversing on your phone during teaching time are all classified as acts of misconduct in the employer's policy documents. When they do such activities, they take advantage of the fact that the school administration are not there. As a result, some schools have placed cameras that record activity in various classrooms during sessions as a form of supervision. According to the findings of this study, SET could assist teachers in acting professionally at all times while being aware that they are under the surveillance of the students they educate.

Lack of Mathematical Knowledge for Teaching

Focusing only on the fast learners and ignoring slow learners shows lack of MKT on the part of the teacher. Being a slow learner does not preclude one from learning mathematics, and such students should not be left behind. Slow learners want to learn mathematics as well. Their only issue is with the technique of instruction and learning. Slow learners should be permitted to learn at their own pace rather than not learning at all. It is unfortunate that most mathematics teachers give little or no thought to the requirements of slow learners in their classes (Yusha'u, 2012). A mathematics teacher who has adequate MKT gives slow students, personalized attention (Singh, 2004). Other ways for assisting slow students to learn mathematics include making more time for mathematics, using practical lessons to explain mathematics ideas, rewarding positive responses, teaching in small groups, employing multimedia representations, and improvising when teaching mathematics (ArapToo, 2020). It is critical to use a variety of teaching methods in order to accommodate students' varied intelligences and learning styles (Werrell, 2021). Making fun of students' low performance and labelling them will not help.

Students get the wrong impression about mathematics and problem solving when they are forced to apply a specific solution method. The adoption of multiple solution techniques is alternatively advised since it improves students' self-regulation (Yusof et al., 2021). Mathematics teachers that limit their students to adopting a single solution approach often have weak content knowledge, which is also an aspect of MKT (Ball et al., 2008). Sometimes students will devise their own solutions that the teacher is unfamiliar with. Instead of confining students to a single solution strategy, mathematics teachers should be prepared to systematically assess students' methods to see if they are legitimate and acceptable. After all, mathematics is a living, evolving body of knowledge, not a static form of art. Students should be allowed to experiment with mathematical ideas in order to identify techniques that work best for them as individuals, rather than being restricted to the method recommended by the teacher. Mathematics teachers, on the other hand, should be lifelong learners who constantly update their MKT to keep up with new discoveries and developing trends in mathematics education (see Aykac et al., 2020).

Students develop learning gaps in their mathematical knowledge when they progress from one grade to the next, from one mathematics teacher to another and as a result of inadequate teaching and the lack of formalized remedial programs. If mathematics teachers in grade 12 want their students to improve their mathematics performance, they must be willing to reteach concepts learned in prior grades when the situation demands them to do so. A rigid approach to mathematics teaching in which the teacher simply teaches to cover the syllabus without addressing the students' learning requirements may be a pointless effort. Curriculum coverage is a required but insufficient intervention since teaching to the syllabus may jeopardize teaching quality (Bertram et al., 2021). If you are rigid, you may find that your students are unable to understand what you are attempting to teach them since it is not tailored to their specific needs. No matter how well teachers know their subject or how many times they have taught it, teachers cannot predict how their students will react to specific topics and concepts (Netcom, 2017). The more adaptable a teacher's approach, the better he or she may alter their teaching to meet the requirements of their students, increase student participation and engagement, and ensure that no child lags behind (Netcom, 2017).

Lack of Classroom Management and Emotional Intelligence Skills

There are various reasons why students may exhibit disruptive behavior in class. It could be due to lack of attention, a reaction to the teacher's behavior, or other factors. In any case, dealing with ill-discipline in the mathematics classroom requires tact on the part of the teacher. The use of collective punishment signals a lack of classroom management skills on the part of the teacher and is severely criticized in the education system. It is unjust, as it harms and demotivates "good students" who behave properly yet are still punished for the misdeeds of others (Learning Liftoff, 2018). Apart from the issue of collective punishment, how mathematics teachers communicate with their students may promote or destroy good relationships between the teacher and the students. Labelling students based on their appearance, bad performance or ill-discipline is strongly discouraged in educational circles. According to labelling theory, if a teacher labels a student in a certain manner, the student will accept it and it will become true (Thompson, 2017). In the teaching profession, emotional intelligence is required (Parker et al., 2009). Teachers must control their emotions in order to avoid demotivating and harming their students by bad language expressions.

CONCLUSION & RECOMMENDATIONS

The study found that secondary school students can evaluate teaching and learning in their classrooms in a relevant and honest way. The study's findings revealed various areas for improvement in MKT and teacher professional development. Students expect their mathematics teachers to:

1. Introduce mathematics topics in a way that piques students' interest,
2. Make use of a variety of mathematics teaching and learning resources rather than relying primarily on the mathematics textbook,
3. Have adequate knowledge of mathematics content,
4. Create a classroom learning environment in which students may freely express their opinions without fear of being ridiculed,
5. Give adequate attention to slow learners and ensure that they are not left behind,
6. Reteach some mathematical concepts even if they were covered in previous grades,
7. Cover all mathematics topics adequately without skipping any sections,
8. Use contact time wisely for the benefit of students rather than private business,
9. Be flexible and allow students to use alternative methods of solution that may differ from those presented by the teacher in class,
10. Teach for understanding rather than simply covering the mathematics syllabus,
11. Adequately prepare for lessons and avoid missing classes unnecessarily, and
12. Be emotionally intelligent and understand how to regulate their own and the students' emotions.

There is no doubt that SET might assist secondary school teachers if it is introduced at this level for the right reasons. As a result, this study recommends that SET be introduced in secondary schools as a technique to aid teachers in reflecting on their teaching practices, professional conduct, and MKT rather than as an administrative tool. This, in turn, would make it easier for mathematics teachers to identify areas where they need to improve in order to satisfy the learning needs of their students. As a result, SET can be utilized as a personal report card for teachers.

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