

# Perceptions of secondary school mathematics teachers and the challenges faced in implementing grade 9 curriculum: A case of two schools in Lesotho

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## ABSTRACT

The recent curriculum reform in Lesotho included localization of the secondary school curriculum, part of which meant a shift from a 5-year to a 4-year program. This affected the mathematics curriculum in terms of what was to be taught at different levels, thus affecting teacher preparedness for implementing the new curriculum. This study seeks to investigate the challenges faced by the teachers of mathematics in implementing the Lesotho general certificate of education mathematics curriculum in grade 9, and the perceptions that the teachers have about this curriculum. A qualitative case study approach was employed. Interviews, classrooms observations and document analysis were used for data collection. Data was analyzed thematically. Results indicate the challenges teachers experienced which included inadequate training for the reform, lack of monitoring and insufficient resources; leading teachers to mostly using teacher-centered approaches in their classrooms. These results suggest that teachers need capacitation for curriculum reform implementation.

**Keywords:** LGCSE mathematics, curriculum implementation, perceptions, challenges

## INTRODUCTION

Mathematics has been treated as a core subject at secondary school level in Lesotho and allocated more time than most subjects, per week. Changes in the curriculum to fulfil the aim of localization included introduction of the Lesotho General Certificate of Education (LGCSE) as Cambridge Overseas School Certificate (COSC) was phased out, shortly after the 2009 inception of the Lesotho Curriculum and Assessment Policy (CAP) framework. The process of introduction of the LGCSE included development of syllabi in several subjects including mathematics and the localized LGCSE syllabi for these subjects were first disseminated in 2012 and first examined in 2014 (Raselimo & Thamae, 2018). In 2018, another reform took place where the junior certificate qualification was phased out and the LGCSE became a three-year program extending from grade 9 to grade 11. The secondary school years then reduced to four years, from grade 8 to grade 11, with grade 8 being part of the integrated curriculum to allow for transition from primary level to secondary level. Literature indicates necessity of these reforms (Bantwini, 2010; Raselimo & Mahao, 2015). The reforms which include redesign of the curricula have a potential to promote a shift from didactic teacher-centered approach to the learner-centered approaches, as supported by the Lesotho CAP framework (Ministry of Education and Training [MOET], 2009).

While mathematics education in sub-Saharan Africa has had challenges that include lack of resources (Luneta, 2022), the implementation of the new curriculum in Lesotho has had its own challenges. Raselimo and Mahao (2015) indicated one of the key challenges being existence of tension between policy intentions and implementation in relation to the Lesotho CAP, with focus on the curriculum, pedagogy and assessment, something which could have also been the case in the context of the study (on mathematics education) reported by this paper. According to Ahmadi and Lukman (2015), a well-designed curriculum that is not followed by well-orchestrated and supported implementation cannot guarantee effective teaching and learning.

There have been changes in mathematics curriculum as part of the overall curriculum reform which took place in Lesotho following the beginning of the process of localization of COSC examinations in 2012 and the inception of LGCSE qualification in 2014 replacing COSC. With this change, part of the grade 9 mathematics syllabus was taken from higher level syllabus such as the form D syllabus. Grade 9 was previously known as form B while grade 11 was previously form D. Therefore, grade 9 learners began to work with this content which was previously taught at a higher level even though they worked with integrated curriculum at

primary school level which did not fully emphasize mathematics as a subject. This kind of change brought about by changes in curriculum seemed to be a big call in terms of cognitive demand on the learners. It equally required adjustments on pedagogical approaches from the teachers. Such could have partly come from efforts in training teachers on the new curriculum and continuously providing professional development sessions. Literature also points to the need in studies focusing on curriculum reform over time, deviating from focus on aspects of teaching of some topics and recurring learners' challenges with learning of mathematics (Vithal & Shimizu, 2023).

The paper reports on how the mathematics teachers in the related study implemented the grade 9 LGCSE mathematics curriculum. The study investigated the teachers' perceptions about the curriculum, and the challenges that the teachers faced in implementing the mathematics curriculum, and how those challenges affected the teaching and learning of mathematics.

The study addressed the following research questions:

1. What are the teachers' perceptions about the grade 9 LGCSE mathematics curriculum?
2. What are the challenges faced by mathematics teachers in the implementation of grade 9 LGCSE curriculum?

The paper contributes in conscientizing stakeholders about mathematics teachers' experiences on curricular implementation and influences of related challenges on teaching and learning in a country with a developing economy, which is experiencing several educational reforms in a short space of time. Hence, the need for stakeholders to consider the issues of policy and practice on the implementation of curricular reforms.

## LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Curriculum reforms take place to improve the quality of education with reforms taking place in various forms including changing the content taught, how it is taught and assessed. Various authors define curriculum in various ways. It is considered as the knowledge, skills, values and societal trends that students acquire in educational settings (Ahmadi & Lukman, 2015). While on the other hand it is viewed as a plan of action together with the experiences that the learners encounter at school (Remmillard & Heck, 2014). For purposes of this paper, three areas related to curriculum are discussed in this section. These are curriculum implementation perspectives, teachers' perceptions about curriculum and challenges of curriculum implementation.

### Curriculum Implementation Perspectives

Curriculum implementation refers to how schools and teachers plan for and deliver the instruction and conduct assessment through use of selected resources from the curriculum documents, an experience which literature has indicated to be complex and full of challenges (Gouédard et al., 2020). Success of delivery is influenced by how well the implementing agents understand what their roles are in the process, hence the critical importance of interactions among these agents. Furthermore, some elements of innovation by the schools and teachers as the key implementers can prove useful in the process.

Three viewpoints are discussed in this paper to put curriculum implementation into perspective. These are *fidelity of implementation (FI)*, *mutual adaptation* and *enactment*. Fidelity refers to the extent to which actual use of the curriculum corresponds with the intended use. In this case actual use must concur with intention (Cobbold, 2017). FI is a top-down approach in that it specifies objectives, content, means of achieving and assessing pre-determined outcomes and thus leaves teachers as simple carriers and deliverers of the curriculum, a practice which compromises the motivation and self-confidence that teachers need for effective implementation (Cobbold, 2017; Karakuş, 2021). That role becomes a huge demand because over and above need to understand the curriculum, teachers may not innovate as this may change how implementation is to be done and hence compromise the quality.

Mutual adaptation, like FI, requires that teachers implement the curriculum as it is though it allows for some modification to cater for the local context and demand. Such a modification may be in some cases a result of challenges met in the local context. Hence there is mutual respect for both the curriculum developers and the implementers (Cobbold, 2017). Classroom interactions are a result of attempts to enact the curriculum. According to Remmillard and Heck (2014), such interactions happen between teachers and learners in the processes of teaching and learning. In the process of enacting the curriculum, teachers have flexibility to meet the demands of the learners. The enactment gives teachers opportunity to make decisions on the pedagogic approaches to be used to meet the needs of the learners.

The curriculum implementation in the two schools could have been aligned to one of the three forms. The perceptions and challenges reported by this paper indicate which form seems to be displayed.

### Teachers' Perceptions about Curriculum

Perceptions refer to ideas, beliefs or images that one makes because of how they see or understand something (Turmudi, 2012). Teachers' perceptions about the curriculum emanate from their knowledge and experience related to teaching (Gouédard et al., 2020; Vithal & Shimizu, 2023). How teachers perceive the curriculum may have an influence on its implementation. According to Maba (2017) positive perceptions seem to support implementation through providing a basis for such things as teacher readiness to implement the curriculum while negative perceptions may deter motivation on the part of the teachers as implementers of the curriculum. However, Aboagye and Yawson (2020) cautions that even though we may expect positive outcomes following positive perceptions we must be cautious of exceptions in some cases. Given the possible influence that perceptions may have on implementation of the curriculum, such may give an indication of how successful implementation happens and what possible challenges may be encountered in the process.

## Challenges of Curriculum Implementation

Literature has documented issues that affect implementation of the curriculum. These include inadequate training of teachers who are the implementers at school level, lack of resources in schools, lack of motivation, and teacher resistance to change.

There is need for teachers to be knowledgeable and confident for successful implementation of the new curriculum (Karakuş, 2021). Given that change is not always easy and that new curricula usually come with new innovations and possible changes in approaches, then teachers who are school based implementers need enough time and support (Ross, 2024) related to training on the changes in the curriculum including related goals. Inadequate training can possibly lead to misinterpretation of the curriculum and lack of basic skills in teachers and uncertainty on what to do in class which can work against effective curriculum implementation.

Resources are equally critical to successful implementation of the curriculum (Coles et al., 2023; Tibani et al., 2024). This aspect has proved to be a global challenge. Availability of resources such as books has proved useful in allowing teachers to use a wider range of strategies and ability to give extra work to learners who complete certain tasks faster, while the teacher assists the other learners.

Teacher motivation is another crucial aspect in successful implementation of the curriculum (Cobbold, 2017; Karakuş, 2021). Its failure is usually a result of unreasonable demands from the administrators, failure to develop team spirit, neglecting rewards and other forms of support from the teachers. The failure leads to poor implementation of the curriculum (Ahmadi & Lukman, 2015).

## Theoretical Framework

This study was guided by the theoretical framework based on the model of curriculum implementation by Rogan and Grayson (2003). The theory is underpinned by three constructs: the outside influencers, the capacity to innovate and the profile of implementation.

Since teachers are key implementers of new innovations related to curriculum, their professional development for skilling is important. Hence, it is needed for external support of teacher development. Support related to resources, monitoring of processes related to implementation of the curriculum and availability of physical resources such as students' textbooks are also key (Taole, 2015). Therefore, the outside influencers include support from parents and government (Lesotho) departments such as the National Curriculum Development Center (NCDC), Examinations Council of Lesotho, and teacher associations such as the Lesotho Science and Mathematics Teachers' Association.

The other construct, capacity to innovate, refers to the factors that can support or hinder implementation of new ideas. These factors include teacher factors, learner factors, physical resources and school ecology and management. Teacher factors include their qualifications, knowledge, experience, and level of commitment. Learner factors include learners' willingness to learn, cooperation, and proficiency in the language of learning and teaching. Physical resources include what already exists in schools such as infrastructure, furniture, mathematics and curricular materials for teaching and learning. The importance of physical resources is emphasized by Karakuş (2021) in stressing that teachers' knowledge and skills are not enough without necessary resources for effective curriculum implementation. Effective curriculum implementation in the participants' schools can therefore be influenced by these school's capacities to innovate. Success or failure of the mathematics curriculum implementation could be seen from the participants' views about their schools' capacities to innovate.

The third construct, the profile of implementation, refers to the types and the extent to which the ideas of the curriculum are put into place. According to Rogan and Grayson (2003) the profile of implementation entails classroom practices and interactions, mathematics practical work and assessment strategies employed in curriculum implementation processes. These profiles include learner-learner and learner-teacher interactions, classroom teaching-learning activities and assessment strategies. The study tried to establish, through participants interviews, the nature of profile of mathematics curriculum implementation the participants felt were in place at the time of the curriculum reform in Lesotho.

## METHODOLOGY

### Research Design and Sampling

This study was qualitative, and it followed a case of two schools in one mountainous district of Lesotho. Multiple sources of data were used for the purpose of enhancing authenticity of the data through triangulation.

The population comprised 5 schools in one district, which piloted grade 9 LGCSE curriculum. The participants were selected from the pilot schools although there are twenty secondary schools in that district. The reason for this decision was that the teachers in the pilot schools had some experience in the implementation of the new curriculum. Hence sampling was purposive (Cohen et al., 2011). This decision fitted with the need for the participants to be knowledgeable about the subject at hand or objects that are typical or representative of the study phenomenon. The sampling was also based on convenience in terms of geographical proximity and availability (Cohen et al., 2011) of the participants at their schools during data collection. Two teachers and the head of department were chosen for each of the two schools. It was ideal to include the heads of departments of the two schools for two reasons: their teaching experience as teachers and their roles in their schools as academic leaders. **Table 1** shows the demographic information of the study participants

**Table 1.** Demographic information of the participants

| Teachers/HODs           | Pseudonym | Qualifications | Number of years in service |
|-------------------------|-----------|----------------|----------------------------|
| Teacher 1 from school A | T1A       | Diploma        | Less than 5                |
| Teacher 2 from school A | T2A       | Degree         | Between 5 and 10           |
| HOD from school A       | HODA      | Degree         | More than 10               |
| Teacher 1 from school B | T1B       | Diploma        | Between 5 and 10           |
| Teacher 2 from school B | T2B       | Diploma        | More than 10               |
| HOD from school B       | HODB      | Degree         | More than 10               |

### Data Collection and Analysis

Three methods were used to collect data; these were observations, interviews and document analysis. The tools included a classroom observation guide which was used during the observations. It included the following themes: teachers' actions, learners' actions and classroom conditions. These themes were generated based on the profile of implementation, which is the last constructs of Rogan and Grayson (2003) theory. There was also an interview guide.

The interviews were face-to-face. These interviews were, therefore, relevant for this study as they gave the respondents an opportunity to express, in their own words, their views and experiences pertaining to the implementation of the new mathematics curriculum. This provided information on how they understood the curriculum as well as the challenges they faced during the implementation phase. The interviews contained semi-structured and open-ended questions.

Two interviews were conducted for each participant, the initial interview before classroom observation, which was focused on the perceptions of the teachers about the curriculum and the school capacity to innovate. Post-observation interviews were conducted immediately after classroom observations, mainly focusing on the profile of implementation of the curriculum. This teacher's responses were then transcribed. Where some teachers responded in their mother tongue Sesotho the interviews were transcribed in the same language and later translated to English.

Key documents for document analysis were the grade 9 syllabus and the form B (grade 9 equivalent) syllabus. The intention of the document analysis was to check for alignment between syllabi and the planned lessons, and similarities and difference between the two syllabi.

Data analysis followed thematic analysis (Maguire & Delahunt, 2017; Nowell et al., 2017) to make sense of the data in terms of the participants' definitions of the situations, noting patterns, themes, categories and regularities (Cohen et al., 2011). Audio recordings were transcribed verbatim, and data thematically coded using the following themes, guided by the research questions and theoretical framework:

1. Teachers' perception about the LGCSE curriculum.
2. Challenges experienced by the teacher in the LGCSE implementation.

The challenges were classified under the three constructs defined in Rogan and Grayson's (2003) curriculum theory of implementation.

### Reliability and Validity

To ensure the credibility of the results, the questions for the interview were submitted to the supervisor to review. The questions were then pre-tested with the teachers who were not included in the study to ensure that they were clear. The research supervisor provided help in editing and validating the data collection instruments and data collected in the research project. Furthermore, the report was sent to the language editor to ensure that the translation of the interviews did not deviate in meaning from words of the participant. This was important for validity purposes because the language editor has the expertise in both languages. To ensure validity of the data collected in this study, methodological triangulation was employed, which is the use of more than one method of data collection. Consequently, semi-structured interviews, observations and document analysis were used in this study. Data collected through observations were checked against the interviews and document analysis to ensure the credibility and validity of the research findings.

### Ethical Considerations

This study observed ethical considerations (Cohen et al., 2011) on issues such as anonymity, confidentiality, fair treatment and protection from discomfort and harm. Permission to conduct the study was granted by the district education office and the principals of the schools concerned. The participants were informed that their participation was voluntary, and that they had the right to withdraw from the study at any time. The participants were further assured that all the information which they provided, would be kept confidential and used strictly for the purpose of the study, and that their identity would be kept anonymous. Pseudonyms were used to protect the identity of the participants and the schools (see [Table 1](#)).

## RESULTS

### Perceptions of Teachers About the Curriculum

Perceptions about the grade 9 Lesotho mathematics curriculum implementation were obtained from the participants' interviews. Two broad perceptions were deciphered; that the curriculum is good though it is too broad; on the other hand, that it is at a higher level for learners in the indicated grade.

### The curriculum is good but too broad

Two participants, T1A and T2A, had a common view that while the mathematics curriculum appears good, the syllabus content coverage is too much for just one year, grade 9 in this case. T1A said,

The syllabus is fine and very clear indicating skills, values and attitudes that the learners need to have acquired during the teaching and learning of mathematics, and this was not indicated in the previous curriculum. However, it seems like there is too much content.

In agreement, T2A said,

I think the structure of the curriculum is good, but it's too broad. It has so many different topics within a year, thirty-four learning outcomes (LOs) to be precise.

### The curriculum is complex for the learners

According to T1A, algebra included in the new grade 9 curriculum, made the syllabus a bit complex for the level:

... and it is too elevated for the standard of the learners in grade 9. For example, looking at the algebra part, there is too much to be covered, of which some of the content to be covered is too complex. Word problems are included in this new curriculum, but the learners at grade 9 have not yet developed skills such as reading for understanding, interpretation and analysis.

T2A agreed by indicating a challenge with the unpreparedness of learners for the changes in the new curriculum:

When you teach, you find that there are other concepts, which the learners should have known before they get into the LO, but the learners are not familiar with them. Now you spend a lot of time trying to familiarize the learners with those concepts. For instance, I am teaching the LO that deals with solving linear simultaneous equations. I expected that the learners would know how to change the subject of the formula and basic operations on directed numbers, but they do not know. As a result, I spent a lot of time dealing with this other concepts before getting to the LO itself.

In agreement with both T1A and T2A, T1B indicated that the level of understanding of the grade 9 learners does not align with the expectations of the curriculum:

The learners are expected to know the content that is higher than their level of understanding. Content that is taught in grade 9 is at a more advanced level. The curriculum requires the learners to formulate and solve fractional equations, but the learners cannot solve simple linear equations. Furthermore, word problems are challenging for the learners because for the learners in grade 9, reading for understanding is still a challenge.

The participants also indicated they had challenges related to the complexity of the curriculum. T1B said,

This grade 9 syllabus also has some of the terminology that I am not familiar with; for example, in the calculation of area of n-sided polygons, there is 'apothem', I did not know it. Really, this syllabus is even complicated for us.

Comparison of coverage of algebra content in the new (grade 9) and the old (form B) syllabi indicated some differences as the participants argued. **Table 2** indicates the comparison in summary.

**Table 2.** Algebraic content in grade 9 (MOET, 2018) and form B (MOET, 2002) syllabi

| Grade 9   | Form B  | Higher than form B (i.e., form C/D/E)   |
|---|---|---|
| LO5 Find a general rule of arithmetic sequences                           | <i>Topic 1: Types of numbers, their sequences, and patterns</i><br>• Finding the rule for a sequence of integers  |   |
| LO7 Expand and factorize algebraic expressions                            | <i>Topic 12: Algebraic representation and formulae</i><br>• Expansion of expressions of the form $a(b+c)$<br>• Factorization of expressions of the form $ab+ac$   |   |
| LO21 Solve linear fractional equations with algebraic denominators        | <i>Topic 15: Solutions of equations and inequalities</i><br>• Solution of fractional linear equations having one unknown and numerical denominator<br>• Finding graphical solutions of linear equations |   |
| LO22 Solve simultaneous equations using graphing and substitution methods |   | <i>Topic 15: Solution of equations and inequalities</i><br>• Solving of simultaneous linear equations in two unknowns (form C)  |
| LO23 Change the subject of the formula involving two or more operations   |   | <i>Topic 15: Solution of equations and inequalities</i><br>• Changing of the subject of the formulae for linear equations (form C)  |
| LO30 Demonstrate understanding of relations and functions                 |   | <i>Topic 11: Coordinates, graphs, relations and function notation</i><br>• Recognition of a function as a special relation<br>• Use of function notation and evaluation of functions (form C) |

**Table 2 (Continued).** Algebraic content in grade 9 (MOET, 2018) and form B (MOET, 2002) syllabi

| Grade 9  | Form B  | Higher than form B (i.e., form C/D/E)   |
|--|---|---|
| L031 Solve linear inequalities up to two variables | Topic 15: <i>Solution of equations and inequalities</i><br>• Finding graphical solutions of linear inequalities | Topic 15: <i>Solution of equations and inequalities</i><br>• Solving of linear inequalities with one variable (solution by listing of integers only) (form C) |

LOs 5, 7, and 21 in the new grade 9 syllabus have corresponding content from the old form B syllabus but LOs 22, 23, 30 and 31 have the corresponding content at higher levels (form C and form D) of the old syllabus as seen from **Table 2**, hence, the participants' argument that the new syllabus is more loaded with content at grade 9 than the old one.

Another comparison from the learners' textbooks used alongside the old and the new syllabi yielded what we present in **Figure 1** and **Figure 2**.

**Exercise 12 Solve fractional equations**  
Solve for the unknown in the following equations:

- $\frac{x-3}{2} = \frac{4x+3}{3}$
- $\frac{x+2}{5} = \frac{x-4}{2}$
- $\frac{3x+1}{2} - \frac{4x-1}{3} = 1$
- $\frac{x+1}{x} - \frac{2}{3} = \frac{1}{2}$
- $\frac{2x+1}{4x} - \frac{3}{5} = \frac{1}{4x}$
- $\frac{x+5}{3} - \frac{x+7}{6} = \frac{1}{4}$
- $\frac{x-5}{2x} - \frac{1}{3} = 1$
- $\frac{1-x}{x} - \frac{x+2}{3x} = \frac{3}{x}$
- $\frac{x-3}{2} - 1\frac{1}{2} = 2x$
- $\frac{x+2}{3} - x = \frac{1}{2}$

**Figure 1.** Algebraic equations for grade 9 in new complete mathematics for grade 9 (Makhetha et al., 2020, p. 119)

**Exercise 15.3**  
Solve for x in the following:

- $12 - \frac{x}{2} = x$
- $1 + \frac{x}{3} = 3x$
- $2 + \frac{x}{4} = x$
- $\frac{x}{3} - 6 = \frac{x}{4}$
- $\frac{x+2}{4} - 4 = \frac{x}{8}$
- $\frac{2x+3}{3} = \frac{x-2}{2}$
- $40 - \frac{x}{5} = \frac{x}{4}$
- $3 + \frac{x}{6} = \frac{x}{5}$
- $\frac{2m}{3} - m = 1$
- $\frac{z}{5} - \frac{z}{8} = 3$

**Figure 2.** Algebraic equations for form B in trends in mathematics (Polaki et al., 2005, p. 173)

Algebraic problems in the 2020 learners' textbook used with the new syllabus are more complex than those in the 2005 learners' textbook used alongside the old syllabus.

Given the teachers' (participants') perceptions that the curriculum is too complex for the learners and the teachers themselves there was a chance that its implementation would be challenging because among a number of factors, the schools' capacity to innovate (teacher knowledge and experience) appear to be suspect (Rogan & Grayson, 2003).

### Challenges in the Implementation of the Curriculum

The mathematics teachers in the study faced several challenges that may have contributed to inappropriate implementation of the new curriculum. These include *inadequate time for training, inadequate resources, lack of monitoring and declining learners' academic ability*.

#### Inadequate training

One of the factors that may have contributed to teachers' lack of knowledge of the new innovations with the new curriculum was inadequate training on the curriculum by the NCDC and related departments. T2A said,

There has been only one workshop ever since we started implementing this curriculum. This workshop took only three days, where we were asked to sit in groups and make lesson plans of which very few were presented. According to me those days were wasted because as a teacher I had expected that maybe we could be asked to go through the syllabus, identify some challenging topics and discuss ways that could be employed in teaching those topics.

While some teachers may have attended at least one workshop as indicated by T2A, others showed that they did not get an opportunity, as T1B argued,

I have not been to any workshop because only one teacher was requested from each school. However, by the time the other teacher came back from the workshop, she explained to me what is expected, most especially relating to planning for class. Although I had wished to get some pamphlets maybe for reference, there was none. However, we still meet with other teachers to help one another.

Although there seemed to be inadequacy in training on the new curriculum, T1B indicates they still try to learn from one another through meetings they organize among themselves as teachers.

### ***Inadequate resources***

Inadequate resources lead to failure in realizing successful implementation of the curriculum. Participants shared their experiences that their schools do not have some of the needed infrastructure and materials. T1B said,

... we lack mathematical instruments and tools to teach math, in particular. For example, there are no square boards, protractors and compasses used on the board. Truly, the hired books that are provided by the ministry are available, but the learners do not pay for them efficiently, so that issue is problematic.

HODA concurred by referring to inadequate buildings and mathematics teachers amidst congested classrooms as some of the factors hindering effective implementation. He added,

The teachers also have a problem trying to give the learners some work to do at home due to lack of resource materials such as textbooks. The textbooks that are available are rented to the learners, but not all the learners access them because they do not pay the rental amount. Some of the learners learn better when they read for themselves and follow examples done in the books, but there are no books.

Challenges of access to resources include complete unavailability from schools, but also failure to access resources which may be available at schools due to non-payment of book rental fees by some parents. Learners' textbooks come as external support (outside influencer) from the MOET, and payment of rental fee may be way cheaper than buying all books. So, failure to pay the rental fee means learners won't have access to the books.

### ***Lack of monitoring***

The participants indicated that since the implementation of the grade 9 syllabus, visits by the MOET inspectorate teams including subject specialists with the purpose of monitoring the curriculum implementation process and related activity has not happened. That apparently left them with no knowledge whether their task of implementing the curriculum is done effectively or not. One participant T2A said,

Ever since we came back from the workshop, no one has visited to check whether or not we are still making the lesson plans, which they suggested and may ask us if we come across any challenges. Since the curriculum is new, one would expect to see the officers from the Ministry of Education and Training regularly checking the progress and seeing how we cope with the new syllabus and no textbooks.

One other participant T1B further said,

The support that I get comes from colleagues. We often chat to give one another support on how to present or handle the topics that seem to be challenging to the learners.

Experiences shared by these participants indicate that they hardly got any external support in implementing the curriculum, leaving them to rely on one another's support in their schools. Monitoring by MOET, as one of the forms of external support, seemed lacking, which left teachers with no options but to organize their own local teacher professional development support systems.

### ***Declining learners' academic abilities***

Learner challenges included lack of basic content knowledge. Participants attested to this matter with examples of their experiences, as follows. T2A said,

I think that the level of content in the curriculum is far higher than the learners who are in grade 9. You teach a topic with the expectation that the learners have prior knowledge to some extent, but you find that they are perplexed. For example, when I was teaching algebraic expressions when collecting like terms, the learners had a problem because they did not know how to add and subtract directed numbers.

T1A concurred, sharing his experience in teaching a different topic:

Although some of the content in this new syllabus seem too high for these learners, the learners also seem to be academically very weak since some of the content that they do not know should have been done in lower classes. When I was teaching fractions, I had expected that the learners in grade 9 know types of numbers; hence, they can differentiate between factors and multiples, but the learners could not write the equivalent fractions.

Another participant T1B explained that learners' seemingly declining abilities were partly attributed to the new promotions policy at primary school level which allows learners to proceed to next classes with significantly low competencies in reading and speaking English (a language of instruction in secondary school level) which compromises learners' development of critical thinking and problem-solving skills.

HODA echoed the contribution of policy through removal of the primary school leaving examinations from the primary school system and said,

[t]he assessment that was taken by the learners at grade 7, which used to determine whether the learner proceed to grade 8 has been withdrawn. The learners move freely to grade 8, and due to this, some of the learners joining secondary education are of a very low quality, and they cannot read and write ... The teachers have reported several cases where some of these learners have a problem of copying what is written on the board; let alone answering the questions.

Some learner factors under the schools' capacity to innovate seem to work against supporting effective curriculum implementation in that learners appear to have a deficit in the language of learning to an extent that some cannot read. This poses a bigger likelihood of learners' failure to learn effectively.

### ***Classroom activity and learner participation***

Classroom interactions were dominated by teacher-led activities. In one observed lesson in school B the teacher taught through explanation, writing notes, giving examples and giving learners work to do in class and at home. The teacher also spent part of the time in class marking work given during the lesson. When asked to reflect on classroom activity in the observed lesson T1B explained that learners do not participate, as required:

Whenever I try to follow the learner-centered approach, the learners do not participate, not because they are not willing, but because they do not know what to say or do; so it is time consuming trying to give them a chance to respond, yet there is a lot to cover in the syllabus ... When you give group work, very few participate while the rest do something else.

For T1B decision about the kind of classroom activity and interactions seems to be influenced by need to move fast and finish the syllabus. One other perception T1B had is that learners from rural primary schools differ from those from urban primary schools. He said,

Maybe this could be because the learners in our schools come from the government primary schools, unlike those learners from the urban areas where there are private schools, where the teachers, learners and parents work collaboratively to develop the child's education, so these ones arrive here in high school not understanding their responsibility.

T1B seems to believe that learners from urban primary schools join secondary schools much more developed and matured through support from collaboration between teachers and parents. This suggests that T1B's classroom practice and interactions get influenced largely by what he sees as need to finish the syllabus and hence need to 'save' time by avoiding engaging learners more in classroom interactions. The profile of implementation appears to shift more to teacher dominated classroom.

## **DISCUSSION AND CONCLUSION**

This study intended to explore the perceptions, and the challenges experienced by mathematics teachers as they implemented the LGCSE curriculum in grade 9 classrooms in one district in Lesotho.

The study found out that although the implementation of the new grade 9 LGCSE curriculum may have been a good intention for national curriculum reform at that time, it did not happen smoothly and effectively in the two schools; that it was marked by challenges associated with a variety of factors as discussed below.

The findings based on the participants' responses reveal considerable increase in the content covered and in the difficulty level of the content taught to the grade 9 learners in the new curriculum reform. The participants believed that the new curriculum demands the teachers to teach abstract mathematics at a lower grade level (grade 9). The participants viewed the mathematics curriculum for grade 9 class as complex (Remillard & Heck, 2014) in certain areas which include dealing with algebra concepts that have been shifted from higher levels to grade 9, hence making the taught curriculum appear to be too abstract for the level. That was even though the curriculum in the current study seemed relevant in terms of the values, attitudes and skills that can potentially be imparted to the learners. Tibane et al. (2024) also identified positives in terms of attitudes among teachers regarding the mathematics curriculum in their study.

A compounding factor for learners' failure to cope with the curriculum is a belief that the standard of learners' knowledge has declined over time to an extent that some of the learners at this level can hardly read and write; there is also a belief that the cognitive level of the learners does not align with the content taught in this class. Issues of resource constraints, teacher capacity and infrastructure limitations as also pointed out by Tibane et al. (2024) might have made the situation more dire because teachers were rendered less helpful in some situations possibly due to limited external support in terms of resources and teacher professional development.

Moreover, teachers believed that it was practically impossible to implement this curriculum, owing to, among several factors, minimal support in terms of inadequate training by the curriculum developers. Literature indicates that insignificant support compromises the implementation process (Taole, 2015; Tibane et al., 2024). It is, therefore, not surprising that mathematics taught in the classes observed was dominated by the teacher-centered approach. This approach diverges from the pedagogical approaches suggested by the CAP framework (MOET, 2009), which recognize significant learner engagement in classroom activities. The CAP framework suggests that there should be "a shift from teaching to facilitating, from transfer of facts to the learners' construction of knowledge, from memorization of information to analysis, synthesis, evaluation and application, from didactic teaching to participatory activity-based and interactive methodologies" (p. 6).

As discerned from classroom observations, there was a mismatch between classroom practice and what the curriculum prescribes; what Bantwini's (2010) study interpreted as formulation of curriculum reform meanings that deviate from vision and



goals of the new curriculum. Teaching became a one-way dialogue where the teacher did all the talking and the learners listened, possibly because of the apparent difficulty of part of the grade 9 mathematics content. Classroom observations further suggested that teachers were not seen to be using the teaching strategies that promote problem-solving skills, an act that contrasted with Mukhtar et al. (2020)'s argument that school leaders should ensure that teachers are supported to incorporate problem-solving in their teaching. The teachers mostly used the three methods of teaching namely exposition, question and answer, and demonstration. These teaching methods exclude other methods indicated in the grade 9 syllabus, which are group work, use of practical exercises and activities involving the wider community (MOET, 2018).

This study also revealed learners' low proficiency in reading and writing thus possibly leading to unsatisfactory performance in mathematics classrooms in the early grades at secondary school level. The relationship between reading and writing and mathematics performance has been argued for. Jindra et al. (2022) argued that learners' reading proficiency positively impacts learners' mathematical competences. Similarly, Powell and Herbert's (2016) study found out that learners' writing abilities and computation skills are significantly related to their mathematics writing outcomes. Teachers shared their dissatisfaction about the situations of the learners who transit from primary to secondary school level with no competencies in reading and writing. This observation highlights challenges that the mathematics classrooms are likely to face. One of the requirements for effective learning of mathematics is for the teacher to pay attention to ways of using language to support development of mathematical knowledge, which could be achieved partly through use of strategies that move learners from informal ways of talking about mathematics, to development of registers that carry more technical and precise mathematical meanings (Jourdain & Sharma, 2016).

One of the challenges of the enactment of the grade 9 LGCE mathematics curriculum was apparent modification of the implementation of the curriculum. Implementation in terms of the pedagogy used appeared to be different from what is stipulated in the Lesotho CAP framework (MOET, 2009). The possible reason could be teachers' lack of clarity about how learner-centered approaches to teaching and learning could be implemented according to the new curriculum, something that Hughes and Lewis (2020) argued when they indicated that teachers need expert support on developing new pedagogical approaches related to enactment of the curriculum. It could have been interpreted narrowly as the use of questioning to engage learners in classroom activity. Ross (2023) argues that enactment of curriculum text is filtered through the teacher's subject matter knowledge acquired from their education and serving as a reference for their curriculum interpretation. According to Ross the interpretation may be different from what curriculum developers would have intended.

Monitoring of the curriculum implementation process is considered important in supporting the process (Cobbold, 2017) and it serves a dual purpose of accountability and development (Gouédard et al., 2020). Gouédard et al. (2020) further argued that when perceived as a learning tool, monitoring can increase trust among the stakeholders but on the contrary when viewed as a control mechanism it could bring mistrust and lead to diminished motivation. This study established that monitoring by the MOET through its departments such as the inspectorate did not happen for teachers from the two schools to feel supported. Therefore, the teachers depended more on colleagues who managed to attend the initial workshops on the introduction of the new curriculum, for ideas needed during the implementation process. According to Karakuş (2021) and Taole (2015) school principals have a role to play in monitoring and support of curriculum implementation. The importance of the roles of school leaders including heads of departments have also been presented elsewhere (see Munje et al., 2020). The study does not report indications of teachers being resistant to change as similarly argued by Chimbi and Jita (2019). The implication of this study is that teachers need to be supported and empowered to implement the curriculum. This is supported by the findings in Chimbi and Jita's (2019) study.

In conclusion, evident challenges related to the implementation of the new grade 9 mathematics curriculum in Lesotho seemed to impede the success of the curriculum implementation during teaching and learning. Those challenges include lack of proper training for implementation, lack of monitoring, unavailability of the resources, lack of pre-requisite content knowledge by learners and their readiness which is questionable. These highlight some of the challenges that literature (Cobbold, 2017; Gouédard et al., 2020; Karakuş, 2021) points to. Some of the stakeholders who are expected to support curriculum implementation, such as the MOET departments and schools, needed to do more on execution of their roles. That would be in relation to failures in certain areas linked to outside influencers (professional development, monitoring, and physical infrastructure), capacity to innovate (learner factors and physical infrastructure) and the profile of implementation (learner-learner and learner-teacher interactions and classroom activities).

We note that while MOET and schools were expected to have supported teachers with further professional development aligned to implementation of the new curriculum, that did not happen, leaving teachers to find ways to function, leading to teachers organising ways of local support amongst themselves as individuals and in smaller groups. Hence, implication for localized teacher professional development.

## **Recommendations**

The study recommendations are two-fold. Recommendations on school support through structures such as policy issues on various aspects including resources, teacher training and professional development, and recommendations on further research.

### ***Recommendations regarding school support and teacher capacity***

Teachers' roles for successful implementation of a new curriculum may not be underestimated. Hence, the need for professional development in order to enhance professional skills development and knowledge construction on issues of implementing the new curriculum. The following aspects of support are needed to enhance the realization of aspects related to

outside influencers from stakeholders such as MOET and parents, school's capacity to innovate and the school's profile of implementation.

1. Teachers should be involved at various stages of curriculum development and implementation to allow them to experience the reform from planning phase for enhancement of understanding of expected changes and possible challenges during the implementation.
2. Regular school visits by inspectors and subject advisors could provide much needed support on implementation. The visits could provide the needed professional growth for teacher capacity to understand their roles and develop necessary knowledge and skills.
3. The institutions of higher learning should equip the teachers with skills on interpreting aspects of the curriculum documents including syllabi. Dempsey and O'Shea (2019) argue that pre-service teachers can be trained to appreciate taking critical role in issues of curriculum development, with an example shared from their study on involvement of PSTs on mathematics task classification and design.
4. Grade 7 assessment should still be used for purposes of promotion to grade 8 to deter allowing transitioning of learners who are not ready for secondary school mathematics, who in the extreme cases cannot even read and write.

### Recommendations for future research

1. The future studies' sites could include the urban areas to explore teachers experiences of the curriculum reforms and how issues such as resources play a part in those areas compared to the rural areas.
2. One of the areas that could be of interest for future research is to explore how curriculum reform impacts on transitioning of teaching and learning of mathematics from primary school level to secondary school level. The successful teaching and learning of secondary school mathematics is premised on its solid foundation at primary level.

### Limitations

The study was conducted on a small scale comprising two mathematics teachers and the head of department in each of the two schools selected in one district out of the ten districts of the country. Therefore, the results are not generalizable to all the schools in Lesotho but gives an indication of what may be expected in schools in similar contexts. The time for which the study was done was limited although the results of this study may be crucial to inform further studies on processes of curriculum reform. This study did not include parents as participants so teachers' claims that some parents did not pay book rental fee and reasons for the failure to pay could not be confirmed, hence also warranting need for inclusion of parents in future studies for corroboration of information about parental support on similar issues.

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## REFERENCES

- Aboagye, E., & Yawson, J. A. (2020). Teachers' perceptions of the new educational curriculum in Ghana. *African Educational Research Journal*, 8(1), 6-12.
- Ahmadi, A. A., & Lukman, A. A. (2015). Issues and prospects of effective implementation of new secondary school curriculum in Nigeria. *Journal of Education and Practice*, 6(34), 29-39. <https://doi.org/10.7176/JEP>
- Bantwini, B. D. (2010). How teachers perceive the new curriculum reform: Lessons from school district in the Eastern Cape Province, South Africa. *International Journal of Educational Development*, 30, 83-90. <https://doi.org/10.1016/j.ijedudev.2009.06.002>
- Chimbi, G. T., & Jita, L. C. (2019). Willing but unable? Teachers' sense-making of curriculum-reform policy in the early implementation stage. *Pedagogika*, 135(3), 52-70. <https://doi.org/10.15823/p.2019.135.3>
- Cobbold, C. (2017). Moving from page to playground: The challenges and constraints of implementing curriculum in Ghana. *Research on Humanities and Social Science*, 7(4), 1-11.
- Cohen, L., Manion, L., & Morrison K. (2011). *Research methods in education* (7th ed.). Routledge.
- Coles, A., Rodríguez-Muñiz, L. J., Mok, I. A. C., Ruiz, Á, Karsenty, R., Martignone, F., Osta, I., Ferretti, F., & Nguyen, T. T. A. (2023). Teachers, resources, assessment practices: Role and impact on the curricular implementation process. In R. Vithal, & Y. Shimizu (Eds.), *Mathematics curriculum reforms around the world* (pp. 291-321). Springer. <https://doi.org/10.1007/978-3-031-13548-4>

- Dempsey, M., & O'Shea, A. (2019). The role of task classification and design in curriculum making for preservice teachers of mathematics. *The Curriculum Journal*, 31(3), 436-453. <https://doi.org/10.1002/curj.18>
- Gouëdard, P., Pont, B., Hyttinen, S., & Huang, P. (2020). *Curriculum reform: A literature review to support effective implementation*. OECD Publishing. <https://doi.org/10.1787/efe8a48c-en>
- Hughes, S., & Lewis, H. (2020). Tensions in current curriculum reform and the development of teachers' professional autonomy. *The Curriculum Journal*, 31(2), 290-302. <https://doi.org/10.1002/curj.25>
- Jindra, C., Sachse, K. A., & Hecht, M. (2022). Dynamics between reading and math proficiency over time in secondary education—Observational evidence from continuous time models. *Large-scale Assessments in Education*, 10, Article 22. <https://doi.org/10.1186/s40536-022-00136-6>
- Jourdain, L., & Sharma, S. (2016). Language challenges in mathematics education: A literature review. *Waikato Journal of Education*, 21(2), 43-56. <https://doi.org/10.15663/wje.v21i2.269>
- Karakuş, G. (2021). Solutions for barriers in curriculum implementation. *African Educational Research Journal*, 9(2), 591-599. <https://doi.org/10.30918/AERJ.92.21.084>
- Luneta, K. (2022). Special challenges in mathematics education in Sub Saharan Africa. *Current Opinion in Behavioral Sciences*, 48. <https://doi.org/10.1016/j.cobeha.2022.101211>
- Maba, W. (2017). Teacher's perception on the implementation of the assessment process in 2013 curriculum. *International Journal of Social Sciences and Humanities*, 1(2), 1-9. <https://doi.org/10.29332/ijssh.v1n2.26>
- Maguire, M., & Delahunt, B. (2017). Doing a thematic analysis: A practical, step-by-step guide for learning and teaching scholars. *All Ireland Journal of Higher Education*, 8(3), 3351-3359.
- Makhetha, J. M., Van Niekerk, K., Du Toit, J. M. E., Potgieter, R., & Dlangamandla, Z. (2020). *New complete mathematics for grade 9*. Oxford University Press.
- MOET. (2002). *Junior secondary mathematics syllabus*. National Curriculum Development Center.
- MOET. (2009). *Curriculum and assessment policy framework*. The Age Multimedia Publishers.
- MOET. (2018). *Grade 9 mathematics syllabus*. National Curriculum Development Center.
- Mukhtar, S., Hameed, A., & Arif, S. (2020). Factors influencing the successful curriculum implementation in secondary schools of Punjab. *Global Educational Studies Review*, 5(3), 340-349. [https://doi.org/10.31703/gesr.2020\(V-III\).33](https://doi.org/10.31703/gesr.2020(V-III).33)
- Munje, P. N., Tsakeni, M., & Jita, L. C. (2020). School heads of departments' roles in advancing science and mathematics through the distributed leadership framework. *International Journal of Learning, Teaching and Educational Research*, 19(9), 39-57. <https://doi.org/10.26803/ijlter.19.9.3>
- Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, 16(1). <https://doi.org/10.1177/1609406917733847>
- Polaki, M., Ramollo, M., Makara, M., Ntsohi, M., Seboka, T., & Taolane, B. (2005). *Trends in mathematics*. Heinemann Lesotho.
- Raselimo, M., & Mahao, M. (2015). The Lesotho curriculum and assessment policy: Opportunities and threats. *South African Journal of Education*, 35(1), Article 1041. <https://doi.org/10.15700/201503070025>
- Raselimo, M., & Thamae, C. G. (2018). Content analysis of the LGCSE geography and Lesotho syllabi for alignment with the Lesotho curriculum and assessment policy. *South African Journal of Education*, 38(3), Article 1481. <https://doi.org/10.15700/saje.v38n3a1481>
- Remillard, J. T., & Heck, D. J. (2014). Conceptualizing the curriculum enactment process in mathematics education. *ZDM Mathematics Education*, 46, 705-718. <https://doi.org/10.1007/s11858-014-0600-4>
- Rogan, J. M., & Grayson, D. (2003). Towards a theory of curriculum implementation with particular reference to science education in developing countries. *International Journal of Science Education*, 25, 1171-1204. <https://doi.org/10.1080/09500690210145819>
- Ross, E. (2024). Teachers' interpretation of curriculum as a window into 'curriculum potential'. *The Curriculum Journal*, 35(1), 38-55. <https://doi.org/10.1002/curj.239>
- Taole, M. J. (2015). Towards a meaningful curriculum implementation in South Africa schools: Senior phase teachers' experiences. *African Education Review*, 12(2), 266-279. <https://doi.org/10.1080/18146627.2015.1108005>
- Tibane, C. C., Mafa-Theledi, O. N., Masebe, T. P., & Mathye, P. (2024). Challenges experienced by mathematics teachers in the implementation of grade 12 mathematics curriculum in community learning centres: South African perspective. *International Journal of Learning, Teaching and Educational Research*, 23(7), 141-166. <https://doi.org/10.26803/ijlter.23.7.8>
- Turmudi, T. (2012). Teachers' perceptions towards mathematics teaching innovation in Indonesian junior high school: An exploratory factors analysis. *Journal of Mathematics Education*, 5(1), 97-120.
- Vithal, R., & Shimizu, Y. (2023). Key messages and lessons from mathematics curriculum reforms around the world. In R. Vithal, & Y. Shimizu (Eds.), *Mathematics curriculum reforms around the world* (pp. 551-564). Springer. <https://doi.org/10.1007/978-3-031-13548-4>