



## Towards Proactive Accountability Framework for Improving Grade 12 Mathematics Performance

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### ABSTRAK

Studi ini bertujuan untuk mengembangkan Kerangka Akuntabilitas Matematika Proaktif untuk meningkatkan kinerja Matematika Kelas 12 di sekolah menengah pedesaan di Distrik Capricorn, Provinsi Limpopo. Studi ini juga berupaya menjelaskan bagaimana risiko awal yang berkontribusi terhadap kinerja yang kurang baik dapat diidentifikasi dan diatasi melalui proses akuntabilitas yang terkoordinasi. Kinerja Matematika yang kurang baik di sekolah pedesaan seringkali berkembang melalui kelemahan kumulatif dalam kesiapan murid, penempatan mata pelajaran, penggunaan teknologi, penyediaan sumber daya, kolaborasi profesional, dan dukungan eksternal. Praktik akuntabilitas yang ada seringkali hanya merespons setelah hasil yang buruk terjadi, sehingga membatasi peluang untuk intervensi tepat waktu. Studi ini menggunakan desain kualitatif multi-kasus yang melibatkan empat sekolah menengah pedesaan. Informan dipilih melalui pengambilan sampel bertujuan berbasis kriteria dan berpartisipasi dalam diskusi kelompok fokus semi-terstruktur. Data dianalisis menggunakan analisis tematik buku kode dan analisis kerangka lintas kasus. Tiga tema muncul: risiko jalur pembelajaran dan keterlibatan digital, kondisi pendukung yang tidak memadai dan kolaborasi profesional yang lemah, serta dukungan sirkuit dan distrik yang terbatas. Temuan ini menjadi dasar kerangka kerja yang mengintegrasikan identifikasi risiko awal, respons guru, eskalasi tingkat sekolah, intervensi kolaboratif, pemantauan berkelanjutan, umpan balik, dan tindakan korektif. Studi ini menyimpulkan bahwa akuntabilitas harus bersifat timbal balik, berorientasi pada pengembangan dan dukungan, bukan bersifat menghukum.

### ABSTRACT

*This study aimed to develop a Proactive Mathematics Accountability Framework for improving Grade 12 Mathematics performance in rural secondary schools in Capricorn District, Limpopo Province. It further sought to explain how early risks contributing to underperformance could be identified and addressed through coordinated accountability processes. Mathematics underperformance in rural schools often develops through cumulative weaknesses in learner preparedness, subject placement, technology use, resource provision, professional collaboration and external support. Existing accountability practices frequently respond only after poor results have occurred, limiting opportunities for timely intervention. Guided by an interpretivist perspective, the study employed a qualitative multiple-case design involving four rural secondary schools. Informants were selected through criterion-based purposive sampling and participated in semi-structured focus group discussions. Data were analysed using codebook thematic analysis and cross-case framework analysis. Three themes emerged: learner pathway and digital-engagement risks, inadequate enabling conditions and weak professional collaboration, and limited circuit and district support. These findings informed a framework integrating early risk identification, teacher response, school-level escalation, collaborative intervention, continuous monitoring, feedback and corrective action. The study concludes that accountability should be reciprocal, developmental and support-oriented rather than punitive.*

## 1. Introduction

Improving Grade 12 Mathematics performance remains a major priority in South African education system. Success in Mathematics expands learners' access to higher education, specialised training and careers in science, technology, engineering, commerce and other scarce-skills fields. It also develops analytical reasoning, logical thinking and problem-solving skills. However, opportunities to succeed in Mathematics remain unequally distributed across the schooling system. Learners in rural and historically marginalised schools often study under conditions that differ substantially from those in well-resourced schools. Arends et al. (2021) argue that the South African schooling system continues to reproduce inequality through uneven educational opportunities. Similarly, Mkhize and Davids (2023) identify persistent challenges in mobilising resources for rural schools. Furthermore, limited access to qualified teachers, learning materials and sustained institutional support continues to affect marginalised communities internationally (Buabeng & Amo-Darko, 2024; Gruijters & Behrman, 2020; Peña & Galigao, 2024). Thus, Grade 12 Mathematics performance should not be understood only as the result of learner ability. It is a cumulative educational outcome shaped by classroom instruction, school conditions, teacher collaboration, learner support and the broader education system.

Teachers occupy a central position within these interconnected conditions because they work directly with learners and implement the Mathematics curriculum. They also observe how subject-choice decisions, learner readiness, attendance, motivation and academic support influence performance. Learners do not begin preparing for Grade 12 Mathematics in their final year of schooling. Their performance develops through foundational knowledge, subject selection, curriculum exposure, assessment feedback and continuous support. Therefore, the subject-choice decisions are important. However, some learners enter the Further Education and Training (FET) phase without accurate career information and a clear understanding of the demands associated with Mathematics. Chen et al. (2021) maintain that alignment between educational aspirations and career plans supports coherent learner pathways. Moreover, Keshf and Khanum (2022) emphasise the importance of career guidance in enabling informed educational decisions. Subject placement may also influence academic interest and subsequent performance (Obeng, 2025). Gelbgiser and Alon (2024) demonstrate that academic mismatch can have long-term consequences for educational

progression, while Hastings and Noyes (2024) show that discontinuities between educational pathways may weaken later learning. Therefore, teachers' experiences are important for understanding how learner readiness and subject-selection practices affect Grade 12 Mathematics performance.

Learner readiness alone cannot explain persistent underperformance. Teachers in rural schools often work within unequal material and organisational conditions. The availability of textbooks, study guides, assessment materials, photocopying facilities and digital resources affects the quality of Mathematics teaching and learning. These resources also determine whether learners can practise independently and whether teachers can offer differentiated support. Mejía-Rodríguez and Kyriakides (2022) found that system-level conditions shape learners' opportunities to learn. Similar forms of structural and regional inequality have been reported in rural education contexts (Kumar et al., 2024; Song, 2023; Ying & Hatta, 2025). Additionally, digital technology presents both opportunities and risks. Digital tools can improve access to explanations, exercises and immediate feedback. Nevertheless, technology may contribute to distraction, cyberloafing and unethical academic behaviour when it is poorly regulated (Nguyen et al., 2025; Pérez-Portabella et al., 2026; Taçain, 2026). Thus, technology does not automatically improve Mathematics learning. Its value depends on purposeful integration, teacher guidance and responsible monitoring.

Professional relationships within schools also influence Mathematics performance. Individual teacher effort is unlikely to produce sustained improvement where collaboration is weak. Mathematics departments require joint planning, assessment moderation, resource sharing and regular analysis of learner performance. Methlagl (2022) associates teacher collaboration with professional learning and improved teaching practices. Saks et al. (2025) similarly show that movement from professional isolation to teamwork depends on supportive organisational conditions. Furthermore, collaboration enables teachers to identify learning difficulties early and coordinate appropriate interventions. It also allows less experienced teachers to benefit from the expertise of their colleagues. In the context of this study, professional collaboration is therefore viewed as an accountability practice. Teachers are responsible not only for classroom instruction but also for departmental planning, learner support and collective Mathematics improvement.

Support provided beyond the classroom is equally important. Teachers depend on school

leadership, circuits and districts for curriculum guidance, professional development, monitoring, resources and timely intervention. Yet external assistance is not always sustained or responsive to the needs of rural schools. Diba et al. (2023) call for stronger departmental support for teachers working in rural settings. Moreover, weaknesses in system-level support may intensify the challenges experienced by teachers and school leaders (Steyn & Fuller, 2023). Circuit managers can influence learner performance through regular monitoring, relevant guidance and consistent follow-up (Mthembu et al., 2024). Mthembu and Bhengu (2025) further identify district leadership as an important component of teaching and learning support. Therefore, teachers' accounts can provide valuable insight into how school-based and external support structures operate in practice.

Educational accountability has traditionally been associated with reporting, compliance, performance measurement and consequences applied after results have been released. Although these mechanisms may promote transparency, they remain inadequate when underperformance develops gradually. Poor Mathematics results often emerge from interconnected weaknesses in learner readiness, resource provision, professional practice and external support. Barber et al. (2020) conceptualise accountability as a relationship connecting educational inputs, processes, outputs and outcomes. Saputra et al. (2020) similarly associate effective educational governance with public participation, proactive oversight, transparency and accountability. Consequently, accountability should not be reduced to assigning blame after learners have failed. It should support improvement throughout the teaching and learning process. Democratic accountability further emphasises professional responsibility, equity and stakeholder participation rather than narrow compliance (Cochran-Smith et al., 2017). Khanal (2018, 2019) also positions accountability as a process-based relationship among members of the school community. In essence, proactive accountability requires risks to be identified early, responsibilities to be clarified, support to be mobilised and progress to be monitored continuously.

Existing literature provides valuable knowledge about learner pathways, resource inequality, digital behaviour, professional collaboration and district support. Nevertheless, these dimensions are often examined separately. Research on subject choice focuses on educational aspirations, career guidance and learner placement (Chen et al., 2021; Keshf & Khanum, 2022; Obeng, 2025). Rural education studies

emphasise material inequality and uneven learning opportunities (Mkhize & Davids, 2023; Peña & Galigao, 2024; Ying & Hatta, 2025). Technology scholarship examines both digital agency and the risks associated with misuse (Nguyen et al., 2025; Passey et al., 2018; Pérez-Portabella et al., 2026). Moreover, collaboration studies focus on professional learning, resource sharing and supportive organisational conditions (Desta et al., 2023; Methlagl, 2022; Saks et al., 2025). District-support research highlights leadership, curriculum assistance and institutional responsiveness (Diba et al., 2023; Mthembu & Bhengu, 2025; Mthembu et al., 2024). A significant gap remains in integrating these conditions through teachers' experiences within one accountability framework for rural Grade 12 Mathematics improvement.

In response to this gap, the study develops a Proactive Accountability Framework for improving Grade 12 Mathematics performance in rural secondary schools in Capricorn District, Limpopo Province. Proactive accountability is treated as an emerging theoretical lens combining early risk identification, role clarity, shared responsibility, enabling support, continuous monitoring, feedback and timely corrective intervention. The study draws exclusively on the experiences and interpretations of teachers in underperforming rural secondary schools. The central research question is: How can a proactive accountability framework be developed from teachers' experiences to improve Grade 12 Mathematics performance in rural secondary schools in Capricorn District, Limpopo Province? The study further asks: What school-based and perceived system-level accountability conditions do teachers identify as influencing Grade 12 Mathematics performance? How do teachers understand their own responsibilities and the responsibilities of other stakeholders in supporting Mathematics improvement? What proactive accountability dimensions can be derived from teachers' experiences? Therefore, the study contributes to Mathematics education, rural-school improvement and accountability scholarship by foregrounding teachers' experiences and shifting attention from retrospective judgement towards the processes, responsibilities and support mechanisms required to prevent underperformance.

## 2. Materials and Methods

The study was guided by an interpretivist perspective, which assumes that educational realities are constructed through participants' experiences, interactions and interpretations. Grade 12 Mathematics accountability was therefore not treated as a fixed or objectively

measurable condition. Instead, the study examined how Mathematics teachers understood learner underperformance, professional responsibility, resource provision, collaboration and external support within their school contexts. Aspers and Corte (2021) explain that qualitative research is appropriate when researchers seek to understand how participants construct meaning around a social phenomenon. Similarly, Lim (2025) maintains that qualitative inquiry enables the investigation of complex and context-dependent experiences.

A qualitative approach was appropriate because the study sought detailed explanations of how accountability challenges developed and were experienced by Mathematics teachers in rural schools. Qualitative research is particularly suitable when complex social problems are best explored through participants' experiences rather than numerical measurement (Bhangu et al., 2023; Rogo, 2024). The study adopted a qualitative multiple-case study design. Each school constituted a bounded case because its organisational, material and instructional conditions shaped Grade 12 Mathematics teaching and accountability. Case study research is appropriate when a phenomenon must be examined within the context in which it occurs (Nasri, 2023). Comparing the four school cases enabled the researchers to identify recurring patterns while preserving differences among the schools.

### Study setting and school selection

The study was conducted in four rural secondary schools in Capricorn District, Limpopo Province. The schools were assigned the pseudonyms School A, School B, School C and School D to protect their identities. School E, which formed part of the broader research project, was excluded from the teacher-focused analysis because no Mathematics teacher data were available from that school. Criterion-based purposive sampling was used to select the schools. The selection criteria were that each school was located in Capricorn District, offered Grade 12 Mathematics and had been classified as underperforming within the district context. The final manuscript should specify the exact performance measure used to classify the schools, such as a Grade 12 Mathematics pass rate below

the district target over a defined period. Purposive sampling was suitable because the study sought information-rich cases rather than statistical representation. Ellis (2021) explains that qualitative sampling should prioritise the information potential of selected cases. Moreover, Tisdell et al. (2025) argue that purposive sampling strengthens qualitative inquiry when cases and participants are selected because of their direct relevance to the research questions.

### Participants and sample distribution

The study involved 17 Mathematics teachers drawn from four rural secondary schools in Capricorn District. The participants were selected through criterion-based purposive sampling because they were directly involved in Mathematics teaching, curriculum implementation, learner assessment and academic support. Their professional experiences positioned them to provide detailed accounts of the conditions influencing Grade 12 Mathematics performance and accountability practices within their schools. Aurini et al. (2022) explain that qualitative participant selection should be guided by the relevance of participants' experiences to the research problem rather than by statistical representativeness. Therefore, only teachers with direct experience of Mathematics teaching and learner support were included in the revised analysis.

The participating teachers had different levels of professional experience. Twelve teachers had more than five years of Mathematics teaching experience, while five had less than five years. This variation enabled the study to capture both long-standing and more recent perspectives on learner readiness, curriculum implementation, resource availability, professional collaboration and institutional support. Table 1 presents the distribution of the 17 Mathematics teachers across the four participating schools. It shows the number of Mathematics teachers included from each school and distinguishes the participants according to whether they had less than five years or more than five years of teaching experience. The table therefore provides an overview of the sample composition and demonstrates the range of professional experience represented in the study.

Table 1. Distribution and Teaching Experience of Mathematics Teachers

| Schools  | Mathematics teachers | Less than 5 years' experience | More than 5 years' experience | Experience range                         |
|----------|----------------------|-------------------------------|-------------------------------|------------------------------------------|
| School A | 5                    | 1                             | 4                             | 1 Less than 5 years; 4 more than 5 years |
| School B | 3                    | 0                             | 3                             | 3 More than 5 years                      |
| School C | 5                    | 2                             | 3                             | 2 less than 5 years 3 more than 5 years  |
| School D | 4                    | 2                             | 2                             | 2 Less than 5 years; 2 more than 5 years |
| Total    | 17                   | 5                             | 12                            | 12 Less than 5 to more than 5 years      |

The sample was considered adequate because the teachers possessed direct and specialised knowledge of the phenomenon under investigation. Lim (2025) maintains that qualitative sample adequacy depends on the relevance, richness and specificity of the information generated rather than on numerical size alone. Furthermore, the inclusion of teachers from four bounded school cases made it possible to compare recurring and contrasting experiences across different institutional contexts. Thus, the sample supported analytical and contextual understanding rather than statistical generalisation, as emphasised by Roald et al. (2021).

### Data collection

Data were generated through semi-structured focus group discussions. A semi-structured guide ensured consistency across the four school cases while allowing the researchers to probe teachers' experiences in greater depth. Neupane et al. (2026) explain that qualitative instruments should allow participants to describe issues that are important to them and enable researchers to pursue relevant matters emerging during the discussion. The guide was developed from the research questions, literature review and proactive accountability lens. Questions explored learner readiness, subject selection, Mathematics resources, technology use, professional collaboration, curriculum implementation and teachers' perceptions of district or circuit support. Probing questions included: "Can you provide an example?", "What happened after the concern was reported?" and "Who was responsible for following up?" The theoretical lens sensitised the researchers to early identification, responsibility, support, monitoring and corrective intervention without restricting teachers' responses to predetermined categories. Jackson and Mazzei (2022) caution that theory should guide qualitative interpretation without silencing unexpected evidence.

The discussion guide underwent three stages of refinement as discussed by Coker & Akande, (2025). First, each question was aligned with the central research question and sub-questions. Repetitive, unclear or irrelevant questions were revised or removed. Second, specialists in qualitative research, educational leadership and Mathematics reviewed the guide for relevance, neutrality and logical sequencing. Third, the revised guide was piloted with Mathematics teachers who had characteristics similar to the intended participants but were not included in the final sample. The pilot assessed question clarity, sequence, duration and the usefulness of

the probing questions. Brod et al. (2024) explain that a qualitative instrument should adequately represent the phenomenon and its main experiential domains. One Mathematics teacher focus group was conducted at each participating school. The groups consisted of five teachers at School A, three at School B, five at School C and four at School D as indicated on table 1.

### Data analysis and framework development

The data were analysed using codebook thematic analysis as noted by Naeem, et, al., (2023) followed by cross-case framework analysis. Thematic analysis enabled the researchers to identify patterned meanings across the Mathematics teachers' accounts while preserving the context of each school case (Ahmed et al., 2025). Analysis proceeded through six interrelated stages. First, the researchers became familiar with the data by reading the transcripts, reviewing field notes and listening repeatedly to the recordings. Initial observations were recorded in analytical memoranda. Vanover et al. (2021) emphasise that familiarisation enables researchers to understand the breadth and depth of qualitative data before formal coding begins. Second, descriptive and interpretive codes were assigned to relevant data segments. Initial codes included learner unpreparedness, subject-placement difficulties, resource shortages, delayed provision, unproductive technology use, weak teacher collaboration and inadequate circuit follow-up. The codes were recorded in a working codebook.

Third, related codes were grouped into provisional themes. Fourth, the themes were reviewed against the coded extracts and the complete dataset. Overlapping themes were combined, broad themes were refined and poorly supported categories were removed. Contradictory and negative cases were also examined. Fifth, each theme was clearly defined and named. Ahmed et al. (2025) argue that themes should represent patterned meanings rather than function merely as short topic headings. Finally, the themes were interpreted in relation to the research questions, literature and theoretical lens. Direct quotations were used as evidence for the interpretations. A cross-case matrix was then developed, with the four schools represented as cases and the emerging themes as analytical dimensions. Goldsmith (2021) explains that matrix-based analysis supports systematic comparison while preserving contextual variation. A summary was prepared for each school before the cases were compared to identify recurring, contrasting and school-specific patterns. The thematic and cross-case findings informed the development of the Proactive

Mathematics Accountability Framework. Each theme was examined in relation to the accountability challenge, early warning indicators, teacher responsibility, required institutional support, monitoring processes and potential corrective action. The analytical progression moved from teacher accounts to codes, from codes to themes and from themes to framework constructs. This approach is consistent with Gioia's (2021) argument that qualitative studies should show how empirical evidence is transformed into more abstract concepts.

Trustworthiness was addressed through credibility, dependability, confirmability and transferability. Zhang et al., (2024) and Ahmed (2024) identifies these principles as central to rigorous qualitative research, while Christou (2025) emphasises transparency, reflexivity and methodological consistency. Credibility was strengthened through the inclusion of Mathematics teachers from four schools, variation in teaching experience, repeated engagement with the transcripts and comparison across cases.

Reflexive notes were maintained throughout data collection and analysis. The researchers considered how their professional backgrounds, assumptions about rural schooling and interest in accountability could influence interpretation. Care was taken not to explain underperformance through deficit assumptions about teachers. Instead, teacher practices were interpreted alongside material, organisational and system-level conditions. Negative-case analysis challenged premature conclusions, while comparison across transcripts and field notes enabled the researchers to examine convergence and divergence in the evidence (Meydan & Akkas, 2024).

### **Ethical considerations**

Ethical approval was granted by the University of South Africa (UNISA) ethics committee, and permission was obtained from the Limpopo Department of Education and participating schools. Participation was voluntary, and all Mathematics teachers provided written informed consent. School and participant pseudonyms were used throughout data collection, transcription and reporting. Audio recordings, transcripts, field notes and analytical documents were stored in password-protected electronic folders. Identifiable consent forms were stored separately from anonymised research data. Access was restricted to authorised research-team members, and data retention and destruction followed the requirements of UNISA. Sadeghi and Smith (2024) note that qualitative data may contain contextual information capable

of identifying individuals and institutions, even after names have been removed. The study generated detailed contextual evidence but did not permit statistical generalisation to all Mathematics teachers in Capricorn District.

### **3. Result and Discussion**

The analysis of the focus group discussions with 17 Mathematics teachers generated three interconnected themes: learner pathway and digital-engagement risks, inadequate enabling conditions for Mathematics teaching, and perceived weaknesses in circuit and district support. The themes illustrate how underperformance developed through conditions that extended beyond individual classroom instruction. Although some concerns were specific to particular schools, comparison across the four cases showed that teachers viewed Mathematics performance as the cumulative outcome of learner readiness, available support, professional practice and institutional responsiveness.

#### **Learner Pathway and Digital-Engagement Risks**

Teachers identified subject-selection practices as an early risk to Grade 12 Mathematics performance. At School D, one teacher explained that learners sometimes followed their peers when selecting subjects and observed that some entered Mathematics without the required foundational readiness: "learners come to school to learn they follow other learners when choosing subjects" (TCDA, School D). This account suggests that Mathematics difficulties may begin before learners reach Grade 12. Subject choice should therefore involve consideration of prior achievement, learner interest, career aspirations and support needs. Teachers also raised concerns about the unproductive use of digital devices. A participant from School D reported that Grade 12 learners had access to tablets, but that "the grade 12s have tablets but it gets abused" and the devices "need to be used for the purpose it was intended for" (TCDA, School D). The concern was not technology itself, but the absence of structured academic use and monitoring. Thus, learner readiness and digital engagement emerged as early accountability areas requiring teacher guidance, continuous observation and timely intervention.

#### **Enabling Conditions and Professional Collaboration**

Teachers indicated that their ability to improve Mathematics performance was constrained by limited learning materials and weak professional collaboration. At School A,

participants identified a “Lack of resources (Textbooks, not sufficient/not available)” as a barrier to teaching and learning (TCAA, School A). Insufficient textbooks and related materials limited independent practice, lesson preparation and learner access to additional exercises. Consequently, accountability for learner performance could not be separated from the availability of the resources required for effective instruction. Professional relationships also influenced the capacity of Mathematics departments to respond to learner difficulties. Teachers at School B reported that “teachers are divided and don’t support each other” and indicated that competition or jealousy sometimes prevented the sharing of useful materials (TCBA, School B). This finding positioned collaboration as a professional accountability practice. Joint planning, assessment moderation, resource sharing and coordinated learner support were necessary for sustained Mathematics improvement. In essence, individual teacher responsibility required collective professional structures and adequate institutional support.

#### Perceived Weaknesses in Circuit and District Support

Teachers perceived circuit and district support as inconsistent and insufficiently responsive to the needs of underperforming schools. At School B, teachers reported a “Lack [of] support from circuit and district that affects the overall functioning” of the school (TCBB, School B). Similarly, teachers at School D identified limited circuit and management support concerning curriculum implementation and staff wellness (TCDA, School D). These accounts suggest that accountability often operated downwards, with teachers and schools expected to explain poor results without receiving consistent external assistance. Since circuit and district officials were not direct

participants, the finding represents teachers’ perceptions rather than an independently verified assessment of those structures. Nevertheless, the recurrence of the concern across Schools B and D indicates the need for clearer support schedules, documented follow-up and reciprocal accountability between schools and external education structures.

#### Development of the Proactive Mathematics Accountability Framework

The thematic and cross-case analyses lead to the generation of the Proposed Proactive Mathematics Accountability Framework presented in Figure 1. The framework emerged from Mathematics teachers’ accounts of the conditions influencing Grade 12 Mathematics performance across the four participating rural schools. Its development followed a transparent analytical progression from teachers’ statements to initial codes, from related codes to themes, and from themes to broader accountability dimensions. This progression reflects Gioia’s (2021) assertion that rigorous qualitative research should demonstrate how empirical evidence is systematically transformed into higher-order conceptual categories.

Figure 1 illustrates the interconnected processes through which risks to Grade 12 Mathematics performance can be identified, addressed, monitored and reviewed. The framework begins with early risk identification, where Mathematics teachers recognise emerging concerns such as weak learner readiness, inappropriate subject placement, unproductive technology use, resource shortages, incomplete curriculum coverage and declining assessment performance. Teachers occupy a central position in this stage because their direct engagement with learners enables them to detect changes in participation, conceptual understanding and academic achievement.

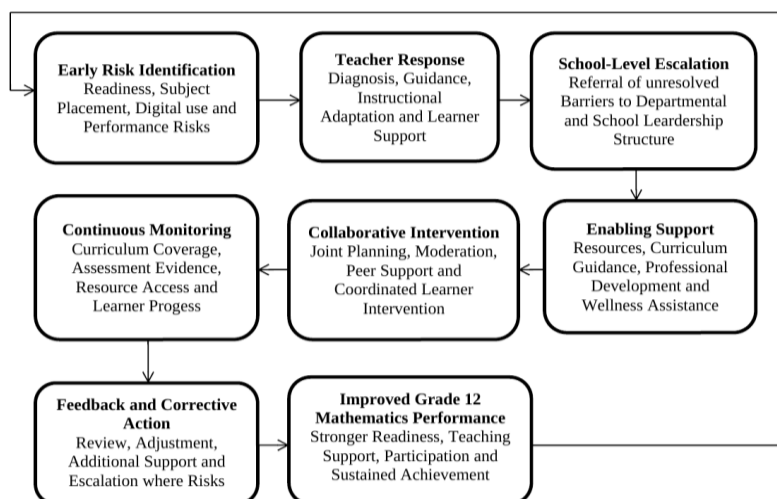


Figure 1. Proposed Proactive Mathematics Accountability Framework

Following the identification of a risk, the framework proceeds to teacher response. Appropriate responses may include diagnostic assessment, differentiated instruction, additional explanations, learner guidance, structured digital activities and targeted intervention classes. These responses require clearly defined professional responsibilities and documented evidence of action. Aithal and Kumar (2019) maintain that accountability becomes more effective when participants understand their responsibilities and take ownership of improvement processes. Accordingly, the framework positions teachers as professional agents who identify emerging problems, initiate interventions and evaluate learner progress rather than merely implementing externally imposed decisions.

Where a challenge exceeds the authority or capacity of an individual teacher, the framework moves to school-level escalation. Concerns may be communicated to the Mathematics department, head of department or school management team. Escalation becomes particularly important where additional resources, timetable adjustments, learner-support services or management intervention are required. Bilodeau et al. (2019) associate partnered educational governance with the meaningful participation of individuals directly involved in educational processes. School-level escalation therefore establishes a formal connection between classroom evidence and institutional decision-making.

The next stage involves enabling support. Teachers' accounts demonstrated that professional accountability cannot be separated from access to textbooks, study guides, assessment materials, digital resources, curriculum guidance and responsive leadership. School management, circuit and district structures are therefore expected to provide the conditions necessary for effective Mathematics teaching and learner support. Hughes et al. (2020) show that proactive policy and leadership can extend beyond compliance by promoting collaboration and timely institutional action. Within the framework, accountability is therefore reciprocal. Teachers remain answerable for their instructional responsibilities, while school and external support structures remain answerable for the resources, guidance and interventions they provide.

Enabling support facilitates collaborative intervention, including joint lesson planning, assessment analysis, moderation, resource sharing and coordinated learner-support activities. Cochran-Smith et al. (2017) locate democratic accountability within professional participation, equity and shared responsibility.

Similarly, Khanal (2018, 2019) conceptualises accountability as an ongoing relationship among members of a school community rather than a single reporting event. The framework consequently assumes that sustained Mathematics improvement cannot depend solely on isolated teacher effort. It requires coordinated professional action within Mathematics departments and across school-support structures.

The effectiveness of interventions is assessed through continuous monitoring. Teachers and school leaders review curriculum coverage, learner attendance, assessment performance, intervention participation, resource availability and the implementation of agreed support. Monitoring should prioritise leading indicators of underperformance rather than relying exclusively on final Grade 12 examination results. Langeveldt (2021) highlights the importance of data-informed educational leadership, while Fenwick and Edwards (2016) demonstrate that digital technologies increasingly shape professional responsibility and monitoring practices. Where technology is used, monitoring should ensure that digital tools support Mathematics learning rather than contribute to distraction. Passey et al. (2018) further argue that digital agency can strengthen educational participation when technology is used purposefully and equitably.

Monitoring generates feedback, enabling teachers and institutional support structures to determine whether an intervention is producing the intended improvement. Where progress is evident, successful practices may be sustained or expanded. Where progress remains limited, the framework activates corrective action. Corrective measures may include revising instructional strategies, providing additional learner support, reallocating resources, increasing subject-adviser involvement or escalating unresolved concerns to higher levels of the education system. Proactive accountability should not, however, become punitive or place excessive pressure on teachers. Tikkanen et al. (2017), Pyhäntö et al. (2021), and Zhang et al. (2022) demonstrate that sustainable professional engagement depends on supportive environments that strengthen proactive self-regulation and reduce burnout.

The framework functions as a continuous cycle rather than a linear sequence. Feedback and corrective action return the process to early risk identification, where new evidence is reviewed and emerging concerns are detected. For example, weak learner performance identified through diagnostic assessment may lead to instructional intervention, resource requests, collaboration with colleagues and subsequent

monitoring. Where evidence shows limited improvement, the intervention is revised and the learner's support needs are reassessed. The cycle continues until the identified risk is addressed or further institutional escalation becomes necessary. Proactive accountability therefore operates through recurring processes of identification, response, support, monitoring, feedback and adjustment.

Table 2 operationalizes the conceptual relationships represented in Figure 1. While the figure presents the overall cycle of proactive accountability, the table specifies the practical meaning of each dimension. It connects teacher-identified conditions with the actions required to address them and the evidence needed to monitor implementation. The table therefore transforms the framework from an abstract conceptual model into a practical accountability instrument capable of guiding school-level planning, implementation and review. The monitoring-evidence column is particularly significant because proactive accountability requires responsibilities and interventions to be documented. Resource registers, curriculum trackers, diagnostic assessments, departmental minutes and follow-up reports provide evidence that identified concerns were not merely reported but acted upon. Barber et al. (2020) conceptualise accountability as a relationship connecting educational inputs, processes, outputs and outcomes. Within the proposed framework, monitoring evidence links these components by showing what support was provided, which

intervention was implemented and whether learner performance improved.

Figure 1 and Table 2 should therefore be interpreted as complementary elements of the same framework. Figure 1 demonstrates the dynamic and cyclical movement of proactive accountability, while Table 1 identifies the operational responsibilities, responses and evidence associated with each stage. Together, they demonstrate that improving Grade 12 Mathematics performance requires more than evaluating final examination results. Sustained improvement depends on early risk identification, clearly defined professional responsibility, enabling institutional support, teacher collaboration, continuous monitoring and timely corrective action. The proposed framework is teacher-derived but system-oriented. It originates from Mathematics teachers' experiences while recognising that teachers cannot independently resolve every condition contributing to underperformance. School management, circuit and district structures are incorporated as enabling actors because teachers perceived their support as essential to sustained Mathematics improvement. However, these stakeholders were not direct participants in the study. Their proposed responsibilities therefore represent teachers' professional interpretations and should be validated through future research involving learners, parents, school managers, subject advisers and district officials. Consequently, the framework remains a provisional model requiring piloting, evaluation and refinement before broader implementation.

Table 2. Operational Dimensions, Teacher-Identified Conditions, Proactive Responses and Monitoring Evidence

| Operational dimension          | Teacher-identified conditions                                                                                                  | Proactive responses                                                                                            | Monitoring evidence                                                                             |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Early risk identification      | Weak foundational knowledge, inappropriate subject placement, declining assessment performance and unproductive technology use | Conduct readiness profiling, diagnostic assessment, learner guidance and structured digital activities         | Diagnostic results, subject-guidance records, learner-support profiles and digital-task records |
| Teacher responsibility         | Inconsistent learner support, incomplete curriculum coverage and delayed intervention                                          | Adapt instruction, provide targeted support, monitor curriculum progress and maintain intervention records     | Lesson plans, curriculum trackers, assessment records and intervention registers                |
| School-level escalation        | Challenges exceeding the authority or resources of an individual teacher                                                       | Report concerns to the Mathematics department, head of department or school management team                    | Referral records, departmental minutes and management action plans                              |
| Enabling support               | Shortages of textbooks, study guides, assessment materials and professional assistance                                         | Conduct resource audits, allocate materials, provide curriculum guidance and arrange professional development  | Resource registers, distribution records, training attendance and support plans                 |
| Collaborative intervention     | Teacher isolation, weak resource sharing and fragmented learner-support practices                                              | Establish subject teams, joint planning, moderation, peer support and common intervention programmes           | Meeting minutes, moderation reports, shared plans and learner-intervention schedules            |
| Continuous monitoring          | Limited follow-up on learner progress, curriculum implementation and institutional support                                     | Review learner achievement, curriculum coverage, attendance, resource delivery and intervention participation  | Progress reports, assessment analyses, curriculum records and attendance registers              |
| Feedback and corrective action | Repeated underperformance, ineffective interventions or unresolved support needs                                               | Revise interventions, provide additional support, escalate concerns and adjust resource or teaching strategies | Review reports, revised action plans, follow-up records and evidence of corrective intervention |

Table 3. Proposed Proactive Mathematics Accountability, Responsibilities and Monitoring Mechanisms

| Recommended action                                                       | Responsible actor                                     | Monitoring evidence                                     | Review period |
|--------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------|---------------|
| Conduct Mathematics readiness profiling before FET subject placement     | Mathematics teachers and school management            | Diagnostic results and placement records                | Annually      |
| Provide structured digital Mathematics activities and monitor device use | Mathematics teachers and school leadership            | Digital tasks and learner participation records         | Monthly       |
| Conduct Mathematics resource audits and escalate shortages               | Mathematics department, school management and circuit | Resource registers and procurement records              | Termly        |
| Formalise joint planning, moderation and intervention analysis           | Mathematics department                                | Meeting minutes, moderated tasks and intervention plans | Monthly       |
| Provide differentiated curriculum and professional support               | Subject advisers, circuits and districts              | Visit reports, support plans and follow-up records      | Termly        |
| Review unresolved performance risks and adjust interventions             | Teachers, school management and support officials     | Progress reports and revised action plans               | Termly        |

## Discussion

The findings show that Grade 12 Mathematics underperformance was not understood by teachers as a single classroom problem. It developed through interconnected weaknesses in learner placement, technology use, resource provision, professional collaboration and external support. Teachers' accounts therefore support a shift from reactive accountability, which focuses on poor final results, towards proactive accountability that identifies risks and mobilises support before failure becomes entrenched. Subject-choice concerns reinforce research showing that educational placement and pathway alignment influence later attainment. Chen et al. (2021) emphasise the importance of aligning educational aspirations with career plans, while Keshf and Khanum (2022) identify career guidance as essential for informed decision-making. Obeng (2025) similarly associates placement decisions with academic performance and subject interest. The present study extends these arguments by locating subject selection within teacher accountability. Teachers are often the first professionals to observe that a learner lacks foundational readiness. Therefore, proactive accountability requires mechanisms through which such concerns can be recorded, communicated and addressed early.

The resource and collaboration findings further demonstrate that accountability must include the conditions enabling teachers to perform their responsibilities. Resource shortages in rural schools have been linked to unequal learning opportunities and limited instructional support (Mkhize & Davids, 2023). Cobbold (2020) and Chatterjee (2021) similarly show that unequal access to educational and knowledge resources can constrain achievement. Moreover, Methlagl (2022) associates teacher collaboration with professional learning and improved teaching practices, while Saks et al. (2025) show that teamwork depends on enabling

organisational conditions. Thus, holding individual teachers accountable without ensuring resources and collaborative structures would reproduce the inequalities that contribute to underperformance. Teachers' concerns about technology also support the need for digital accountability. Nguyen et al. (2025) associate technology misuse with cyberloafing, while Taçain (2026) identifies ethical and behavioural risks linked to uncontrolled digital use.

However, Passey et al. (2018) demonstrate that digital agency can promote participation and equity when technology is used purposefully. Therefore, the framework does not discourage technology use. Instead, it requires teacher-guided digital activities, monitoring and feedback. These findings translate proactive accountability into specific actions, responsibilities and monitoring mechanisms. As shown in Table 3, the proposed actions address learner readiness, digital engagement, resource provision, professional collaboration and external support. Together, they shift accountability from reacting to poor results towards identifying and addressing risks early.

Finally, teachers' perceptions of circuit and district support reveal the need for reciprocal accountability. Diba et al. (2023) call for stronger departmental assistance in rural schools, while Mthembu et al. (2024) demonstrate that circuit managers can influence learner performance through appropriate support and monitoring. Mthembu and Bhengu (2025) also highlight the significance of district leadership. The findings therefore extend accountability beyond teacher compliance. Schools should account for curriculum implementation, while circuits and districts should account for the timeliness and quality of the support they provide. In this respect, the proposed framework reflects democratic and process-based accountability by combining professional responsibility, participation and enabling support (Cochran-Smith et al., 2017; Khanal, 2018, 2019).

#### 4. Conclusion and Suggestions

This study developed a teacher-derived proactive accountability perspective for improving Grade 12 Mathematics performance in rural secondary schools in Capricorn District. Teachers identified learner pathway and digital-engagement risks, inadequate enabling conditions, weak professional collaboration and inconsistent external support as interconnected influences on performance. These findings indicate that accountability should begin before final examination results are released. The proposed framework connects early risk identification, teacher responsibility, enabling support, collaborative intervention, monitoring, feedback and corrective action. It shifts accountability from retrospective blame towards prevention and coordinated improvement. However, because the framework was derived exclusively from Mathematics teachers' accounts, it should be regarded as provisional. Future research should validate and pilot the framework with additional stakeholders and examine its influence on Mathematics teaching and learner outcomes over time.

The recommendations are organised according to the main dimensions of the proposed framework. The framework should initially be piloted in the four participating schools. Its implementation should be reviewed through teacher feedback, learner-performance evidence and documented support from school and district structures. Thereafter, the framework should be validated with learners, parents, school managers, subject advisers and district officials before wider adoption.

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