

From prescription to practice: How intersen phase mathematics teachers mobilize curriculum materials in reform-oriented instruction

Thandeka Ncube¹ , Kathleen Fonseca^{1*} 

¹ University of Johannesburg, Johannesburg, SOUTH AFRICA

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Abstract

This study examines how four intersen phase (grade 4-grade 7) mathematics teachers at one South African school interpret and use prescribed textbooks and teacher guides in planning, enacting, and reflecting on reform-oriented mathematics lessons. Drawing on Leshota's (2015) framework of curriculum mediation and Remillard's (2005) and Brown's (2009) conceptualization of curriculum use and pedagogical design capacity (PDC), the study employed a qualitative case study design. Data were generated through pre-and post-lesson interviews and lesson observations with four teachers and analyzed inductively using the constant comparative method. Findings indicate that teachers' reliance on curriculum resources was shaped primarily by their mathematical content knowledge and was consistent across both textbooks and guides for a given teacher, suggesting that PDC functions as a knowledge-driven disposition rather than a resource-specific response. Teachers frequently struggled to articulate how their practice supported 21st century competencies, while adaptations to curriculum materials, although sometimes enhancing instruction, occasionally introduced content errors when undertaken without sufficient subject knowledge. The study contributes a fine-grained, resource-differentiated account of curriculum mediation, clarifying the knowledge-dependent conditions under which reform-oriented mathematics teaching is enabled or constrained in a highly prescriptive curriculum context.

Keywords: curriculum enactment, teacher-resource relationship, pedagogical design capacity, 21st century skills, mathematics textbooks, and teacher guides

INTRODUCTION

Efforts to reform mathematics education globally have emphasized a shift from rote learning and procedural fluency toward deeper conceptual understanding. Midgett and Eddins (2001), for example, has long argued that effective mathematics teaching must balance content knowledge with process standards such as problem-solving, reasoning and proof, communication, connections, and representation. Similarly, within South Africa, the curriculum and assessment policy statement (CAPS) reflects these curricular shifts by embedding mathematical processes alongside prescribed content (Department of Basic Education [DBE], 2011, 2018). Assessment guidelines

require learners not only to recall facts but also to analyze, justify, and apply mathematics in real-life scenarios, thereby aligning with international calls for curricula that prepare learners to think critically and flexibly (DBE, 2011; Midgett & Eddins, 2001). By foregrounding mathematical processes such as problem-solving, reasoning, communication, and representation, CAPS aligns with the mathematical process standards long advocated by Midgett and Eddins (2001). These process standards are mathematics-specific; they describe how learners should engage with mathematical content, rather than general dispositions transferable across subjects. A related but distinct construct is the 4Cs: critical thinking, communication, collaboration, and creativity, commonly used to describe broader 21st

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✉ thandekancube36@gmail.com ✉ kfonseca@uj.ac.za (*Correspondence)

Contribution to the literature

- This study contributes to research on the use of curriculum resources in mathematics education by providing fine-grained empirical evidence of how pedagogical design capacity (PDC) mediates the relationship between prescribed curriculum materials and classroom practices.
- While prior studies have established that textbooks do not function as neutral or deterministic artefacts, this study extends that work by demonstrating how offloading, adapting, and improvising operate as situated responses to policy prescriptiveness, content knowledge demands, and perceived learner constraints within a highly regulated curriculum system.
- It contributes to international debates on reform implementation by foregrounding teachers' curriculum use as a critical site where policy intentions, instructional knowledge, and classroom realities intersect.

century learning outcomes across subject areas (Herlinawati et al., 2024). The two constructs overlap but are not identical. The 4Cs framework is domain-general, while CAPS's process standards are specific to mathematical activity. In this study, we use 21st century competencies to refer specifically to the 4Cs, and we treat mathematical reasoning, communication, problem-solving, and representation as mathematics-specific process standards through which 4C-type competencies may or may not be realized in mathematics classrooms. Higher-order thinking, a related but separate construct describing the cognitive demand of a task (Stein et al., 1996), is used in this study to describe the level of cognitive engagement a task or lesson affords learners and is treated as an indicator that may co-occur with, but is not equivalent to, either CAPS process standards or 4C-type competencies.

However, while CAPS sets out a vision that integrates these competencies, the extent to which teachers can translate this into practice remains uneven, highlighting a persistent gap between the intended and enacted curriculum. Thus, it limits learners' opportunities to engage in higher-order thinking and collaborative problem-solving. Studies have shown that teachers continue to rely on traditional, content-driven pedagogical practices that privilege procedural fluency (Botha et al., 2023; Theron, 2025) and examination preparation over the cultivation of higher-order skills (Okitowamba et al., 2018). This gap between policy intent and pedagogical enactment underscores the importance of examining teachers' use of mathematics curriculum materials¹, such as lesson plans, teacher guides, and textbooks. Since teachers' interpretations and implementation of these materials directly influence whether the curriculum's emphasis on higher-order thinking skills is realized in the classroom, their engagement with them is a critical focus. In disadvantaged contexts, where textbooks and teacher guides often serve as the sole instructional tools, this relationship becomes even more critical.

Understanding the relationship between mathematics teachers and curriculum materials is crucial, given that high value and confidence have been placed on the power of curriculum materials to improve the quality of teaching, learner achievement, as well as the learning of teachers (Cobb & Jackson, 2012; Collopy, 2003; Moore et al., 2021). Mathematics curriculum materials, including textbooks and teacher guides, are integral to teaching and learning practices. Textbooks are designed for learners to use through exercises, problems, definitions, and examples, and are therefore the central source for learning mathematics outside the classroom. They provide frameworks for what is taught, how it might be taught, and the sequence for how it could be taught (Fan et al., 2021; Nicol & Crespo, 2006). On the other hand, teacher guides are written to communicate with teachers, supporting and informing their instruction (Remillard et al., 2016). They are meant to guide actions and decision-making, which depend on the development of mathematical understanding in others (Remillard et al., 2016). Thus, as mediators between the intended curriculum and classroom instruction (Stein & Kim, 2009; Valverde et al., 2002), curriculum materials such as textbooks have been identified as the primary instrument that affects instructional reform (Cai & Howson, 2012; Remillard & Kim, 2020; Stein & Kim, 2009). Mathematics textbooks are crucial during the implementation period of reform because they are major conveyors of the curriculum (Fan et al., 2013) and facilitate the transformation of policy into practice (Valverde et al., 2002). Similarly, mathematics teacher guides play an equally important role, as they provide teachers with the assistance needed to respond to curriculum changes (Gracin & Matić, 2021).

While the importance of textbooks and teacher guides as facilitators of instructional reform has been highlighted, they must be effectively utilized if the advantages of instructional reform are to be fully realized (Choppin et al., 2022). Changes in innovative practices and content to be taught do not depend on the

¹ By curriculum materials, we not only refer to mathematics textbooks and teachers' guides, but all materials such as lesson plans and instructional kits that can communicate ideas and practices that can inform classroom activity (Brown, 2009).

materials themselves, which are lifeless objects, but on teachers' interpretations and use of curriculum materials (Adler, 2021; Brown, 2009). Furthermore, although the change in curriculum often begins with new textbooks, the change in teachers' pedagogical practices depends on teachers' orientation towards the curriculum and how it is represented in the textbook (Olsher & Cooper, 2021), as well as the relationship teachers build with the curriculum materials (Brown, 2009; Remillard, 2005). The role of teachers in using curriculum materials to guide and reform pedagogical practices is therefore central to curriculum implementation. Research consistently shows that teachers play an active mediating role as they interpret, select, adapt, and sequence mathematical tasks in ways that reflect curriculum demands and classroom conditions (Ball & Cohen, 1996; Remillard, 2005). In the South African context, where reforms have emphasized conceptual understanding, problem-solving, and learner-centered pedagogies, teachers' engagement with curriculum materials becomes a critical site for negotiating tensions between reform-oriented practices and established instructional routines (Adler et al., 2001; DBE, 2018; Motseki et al., 2025). However, while research has extensively examined curriculum reform and classroom practices, far less attention has been paid to how teachers use mathematics textbooks and teacher guides to mediate these reforms in everyday teaching (Fan et al., 2025; Rezat et al., 2021). Limited empirical research has focused on how intersen phase mathematics teachers (grade 4-grade 7) interpret, adapt, and mobilize textbooks and teacher guides to shape pedagogical decisions.

This study contributes to the PDC literature by providing a more differentiated account of how teachers' professional knowledge shapes curriculum use. Previous research has established that teachers actively interpret and adapt curriculum materials rather than implementing them in a purely faithful manner (Brown, 2009; Remillard, 2005). Building on this work, the findings show how variations in mathematical content knowledge, pedagogical content knowledge, and curriculum knowledge are reflected in patterns of offloading, adapting, and improvisation during lesson planning and enactment. The study further contributes to research on curriculum resources by examining teacher guides alongside learner textbooks, demonstrating how curriculum mediation is shaped by the interaction among teacher knowledge, policy expectations, and classroom realities. Together, these findings refine understanding of how PDC operates within a highly regulated curriculum context.

Accordingly, this study aims to explore how mathematics teachers interpret and use prescribed mathematics textbooks and teacher guides, and to what extent their practices support the development of higher-order thinking skills envisioned in the

curriculum. To address the research aim, the following main research question was set:

How do intersen phase teachers mobilize prescribed textbooks and teacher guides to enact reform-oriented mathematics teaching?

And the following sub-questions were set:

- (1) *What self-reported practices characterize teachers' use of prescribed textbooks and teacher guides in planning and lesson preparation?*
- (2) *How do teachers mobilize the affordances of prescribed textbooks and teacher guides through the selection, adaptation, and improvisation of tasks, and how do these practices influence the cognitive demand of enacted mathematics teaching?*

The following review of relevant literature explores how teachers' use of curriculum materials has been studied, the frameworks that guide this work, and its implications for reform-oriented mathematics teaching.

LITERATURE REVIEW

Teachers' Use of Prescribed Textbooks and Teacher Guides in Planning and Preparation

Across international contexts, studies consistently suggest that teachers use textbooks as planning frameworks rather than as pedagogical prompts for higher-order thinking. Beyond relying on textbooks for content coverage, teachers frequently use them to determine lesson flow, pacing, and examples, often reproducing the epistemic structure of the textbook in their plans. For instance, Choppin et al. (2022) found that US middle school teachers' lesson plans closely followed the thematic sequencing and grammatical structure of textbook tasks, especially in ratio and proportional reasoning. Teachers reproduced textbook representation and task order even when alternative sequencing may have supported deeper conceptual engagement. Similarly, Pepin et al. (2013) showed that teachers' planning was shaped by accumulated "documentational systems", in which textbooks formed the core resource around which other materials were organized. Importantly, teachers seldom reworked textbook tasks to increase cognitive demand unless explicitly supported to do so through professional learning.

In a European context, Lepik et al. (2015) demonstrated that planning patterns varied by national tradition, yet across contexts, teachers used textbooks primarily to ensure curricular alignment and time efficiency. Less experienced teachers reported dependence on teacher guides to clarify what was important and accessible, reinforcing compliance-driven planning rather than pedagogical exploration.

South African studies mirror these international trends. Ramoshebi (2017) found that intermediate phase teachers planned lessons largely by selecting examples and exercises sequentially from CAPS-approved

textbooks, with minimal consideration of CAPS cognitive levels. Teachers indicated that completing textbook sections was equated with curriculum fidelity. Similarly, Setati et al. (2009) reported that planning in mathematics classrooms prioritized procedural progression over opportunities for learner explanation, even where textbooks offered contextual or open-ended tasks. While planning studies reveal strong textbook dependence, they rarely examine how teachers interpret higher-order affordances embedded in textbooks and teacher guides during planning, particularly in the intersen phase. This gap motivates a closer examination of teachers' pedagogical reasoning during lesson preparation.

Mobilization of Textbook Affordances During Classroom Enactment

Patterns observed in classroom enactment suggest that teachers do not treat textbooks as fixed scripts but rather actively select, adapt, or suppress affordances, which frequently coincide with reduced opportunities for cognitive engagement. Internationally, Stein et al. (1996) documented the phenomenon of *cognitive decline*, whereby high-level textbook tasks were routinely transformed into procedural exercises during enactment through teacher demonstration or premature scaffolding. Son and Kim (2015) demonstrated that teachers frequently lowered the cognitive demand of reform-oriented textbook problems by narrowing the range of solution strategies or by converting exploratory tasks into worked examples.

In Japan, Shinno and Mizoguchi (2021) found that during *kyouzai kenkyuu* (lesson planning), teachers began with textbook tasks but substantially re-designed them to foreground conceptual trajectories and mathematical structures. However, this form of adaptive mobilization was strongly mediated by the lesson study tradition and collective professional discourse, highlighting that productive use of textbooks is not automatic but socially learned. Qi et al. (2025) provide further evidence of this point by showing how Chinese teachers engaged in curricular noticing, attending to, interpreting, and re-contextualizing textbook tasks for project-based learning. Teachers combined multiple textbook elements and restructured tasks to support modelling and reasoning. Crucially, misalignment between conventional textbook formats and reform pedagogy required teachers to actively redesign materials. South African studies suggest that such adaptive mobilization is less prevalent. Leshota (2020) identified dominant enactment patterns of *offloading* (direct teaching from the textbook) and omission of cognitively demanding tasks, especially in schools with limited resources. Teachers often skipped word problems and relied on textbook examples to model procedures, leaving little room for learners' sense-making or justification. While enactment studies show

that textbook affordances are constrained or activated in practice, very little work explicitly focuses on the intersen phase or examines enactment across *both learner textbooks and teacher guides*.

Teacher Guides as Mediators of Pedagogical Reasoning

Although teacher guides are designed to support pedagogical decision-making, their role in shaping higher-order instruction remains under-examined. Fan et al. (2021) demonstrated that teacher guides supported teachers' content transformation more effectively than learner textbooks, particularly by providing learning goals, representations, and anticipated misconceptions. However, this influence was uneven during instructional enactment. In related studies, Davis and Beyer (2011) found that prospective teachers used teacher guides primarily to confirm procedural correctness rather than to deepen conceptual explanations, limiting their potential as educative resources. Roth McDuffie et al. (2018) showed that teachers drew on teacher guides to structure discourse routines only when the guides aligned with their existing beliefs; otherwise, the guides were ignored. This selective uptake suggests that teacher guides do not inherently promote higher-order thinking unless teachers possess the PDC to leverage them.

In South Africa, empirical research on teacher guides remains scarce. While CAPS-approved series include detailed pedagogical commentary, studies such as those by Leshota (2020) suggest that teachers often treat guides as administrative support rather than as instructional tools. Where continuing professional development does not explicitly focus on guide use, their potential to support reform-oriented teaching remains largely untapped. There is a lack of South African research on how teacher guides are used in planning and enactment, particularly in relation to higher-order thinking. This study positions teacher guides as central analytic objects rather than materials.

Textbooks, Higher-Order Thinking, and Assessment Pressures

A recurring theme across the literature is that assessment regimes strongly mediate how teachers use textbooks, often narrowing instructional goals. Blazar et al. (2020) found that curriculum materials alone were insufficient to generate substantial improvements in learner achievement, suggesting that their effectiveness depends on how teachers interpret and enact them in classroom practice. Teachers aligned tasks with assessment formats, which limited engagement with non-routine reasoning. Doan et al. (2025) found that teachers supplement textbooks with internet resources to meet accountability demands, further fragmenting access to coherent higher-order tasks.

In South Africa, assessment research reinforces this point. Spaull and Kotze (2015) and Hoadley and Galant (2016) reported that classroom assessment practices emphasized procedural correctness, reinforcing teacher reliance on low-level textbook tasks despite CAPS' cognitive demands. Teachers adapted textbook use to align with assessment expectations rather than with curriculum intentions. Subsequent studies confirm that assessment practices continue to privilege procedural testing over conceptual and investigative tasks, limiting the enactment of higher-order learning opportunities envisioned in the curriculum (Ekol & Mlotshwa, 2022; Sibanda & Rambuda, 2021). Few studies systematically explore how assessment pressures reshape teachers' mobilization of textbook affordances, especially in the intersen phase where foundational reasoning is critical.

CONCEPTUAL FRAMEWORK

This study is guided by a conceptual framework that integrates three complementary perspectives on curriculum and teacher-resource interaction. Together, these perspectives foreground teachers' active role in interpreting, transforming, and enacting curriculum materials within specific classroom and policy contexts.

Remillard (2005) conceptualizes curriculum use positions teachers as active interpreters of curriculum resources rather than passive implementers. She identified four forms of curriculum use: following or subverting the text, drawing on the text, interpreting the text, and participating with the text (Remillard, 2005). These forms highlight the variability in how teachers mobilize textbooks and teacher guides, ranging from close fidelity to adaptation, interpretation, and collaborative engagement. Remillard's (2005) framework provides the interpretive lens that emphasizes how teachers' interactions with curriculum materials are mediated by their knowledge, beliefs, and classroom contexts.

Building on this interpretive view, Brown (2009) introduces the concept of PDC to explain how teachers transform curriculum materials into instructional opportunities during planning and enactment. PDC extends beyond teachers' possession of content knowledge to include their capacity to use that knowledge adaptively for instructional purposes (Ball & Cohen, 1999). Brown (2009) conceptualizes teachers' curriculum engagement as varying along three forms: offloading, adapting, and improvising. This perspective frames curriculum use as a dynamic, non-linear process that accounts for variation in enactment, even among teachers working with similar resources.

Brown's (2009) notion of PDC is situated within a broader body of scholarship that views teaching as drawing on multiple forms of professional knowledge and resources rather than subject-matter expertise alone. Within this study, teacher knowledge is operationalized

in terms of three domains: mathematical content knowledge (understanding the mathematics itself), pedagogical content knowledge (knowledge of how to represent and teach mathematical ideas, including anticipating learner difficulties), and curriculum knowledge (understanding how curriculum resources sequence and structure content in relation to policy requirements) (Ball et al., 2008; Shulman, 1986, 1987). Distinguishing between these knowledge types is analytically useful because teachers in this study varied not only in how much mathematics they knew but also in how confidently they could translate that knowledge into instructional decisions and anticipate learner difficulties, the capacities Brown (2009) identifies as central to PDC. These domains are used throughout the Findings and Discussion to specify where the data permit, which kinds of knowledge appeared to shape a given teacher's use of curriculum.

Leshota (2015) empirically extends Brown's (2009) theoretical framework by examining how PDC is made visible through teachers' mobilization of mathematics textbooks during planning and classroom enactment. She conceptualizes mobilization in terms of degrees of appropriation (offloading, adapting, improvising) and opportunities for mediation, including injections and omissions introduced during instruction. While robust injections and productive omissions are associated with higher levels of PDC, distractive injections and critical omissions signal constraints in curriculum mediation. In this study, Leshota's (2015) framework provides a relational lens, illuminating how teachers position themselves in relation to curriculum materials and how these positioning practices shape the pedagogy they enact.

Together, the perspectives of Remillard (2005), Brown (2009), and Leshota (2015) provided an integrated conceptual framework for examining mathematics textbook use as a contextually mediated design process. This framework foregrounds how differences in PDC shape teachers' appropriation, transformation, and enactment of curriculum resources, and informs analysis of the conditions under which higher-order thinking and 21st century competencies are supported or constrained in classroom practice.

RESEARCH METHODS AND DESIGN

Research Approach

This study was underpinned by an interpretive research approach grounded in the view that social reality is constructed through participants' meanings and inseparable from the context in which it is produced, rather than being objectively given (Creswell, 2009). Understanding teachers' use of mathematics textbooks, therefore, requires attention to how teachers interpret, negotiate, and enact curriculum resources within their

specific instructional settings. Interpretive research prioritizes participants' sense-making and recognizes that knowledge is co-constructed through social interaction and language (Charmaz, 2014; Denzin & Lincoln, 2017). Accordingly, teachers' self-reported accounts were used to examine how they explained and justified their engagement with textbooks, while classroom observations provided insight into how these interpretations were enacted in practice.

Data Generation

Data were generated in three sequential phases between July and November 2022: pre-lesson semi-structured interviews (July-August 2022), lesson observations (27 August-6 September 2022), and post-lesson semi-structured interviews (November 2022). Each of the four teachers participated in one pre-lesson and one post-lesson semi-structured interview, yielding eight interviews in total, with durations ranging from 23 to 44 minutes. Each teacher was observed teaching one mathematics lesson, generating 235 minutes of observation data across four topics (analogue time, 2D shapes, 3D objects, and algebraic equations). Interviews were audio-recorded and supplemented with field notes documenting participants' responses. Lesson observations were video recorded to enable repeated viewing of teachers' interactions with curriculum resources during enactment.

Semi-structured interviews were employed because they facilitate rapport between the interviewer and participants and enable the collection of detailed, descriptive accounts of participants' meanings and reasoning (Creswell, 2013). Pre-lesson interviews focused on how teachers planned instructional tasks, selected and interpreted curriculum materials, and anticipated their use during lessons. Teachers were asked to bring the textbooks and teachers' guides they used for planning and teaching to the interviews. These materials served as discussion prompts, grounding teachers' reflections on the actual resources they used, but were not formally collected or analyzed as data sources. The dataset, therefore, consisted solely of interview and observation data. Post-lesson interviews captured teachers' reflections on observed lessons, providing opportunities to explain instructional decisions, adaptations, and the role of textbooks and teacher guides during enactment.

Lesson observations complemented these interviews by providing direct insight into classroom practice that could not be captured through self-report alone (Merriam, 2009). Observations focused on task sequencing, instructional interactions, and the use of textbooks and teacher guides during lesson enactment. Each teacher was observed teaching a single mathematics lesson that they identified as representative of their typical topic-based planning and use of

curriculum materials. This approach aligned with the study's bounded case study design (Stake, 2000), which prioritized understanding variation across cases rather than repeated observation of individual teachers. The case was bounded by one school, one subject, and four purposively selected teachers, with breadth across cases prioritized over depth within a single case. Although only one lesson per teacher was observed, each observation formed part of a broader dataset that included pre-and post-lesson interviews. This enabled the examination of teachers' planning, instructional decision-making, and classroom enactment as an integrated process. To strengthen the trustworthiness of the findings, observation data were triangulated with interview data from the same teacher, enabling a comparison between reported and enacted practices to assess consistency.

Participants and Sampling

Participants were selected through purposive sampling, with the defining criterion being mathematics teaching in the intersen phase (grade 4-grade 7) within the same school. A no-fee paying quantile-one primary school in an informal settlement in Gauteng, South Africa. Four teachers ($n = 4$), reported here under pseudonyms, were selected to represent a range of teaching experience, qualifications, and confidence in content knowledge. Purposive sampling involves the deliberate selection of information-rich cases based on their relevance to the research focus (Creswell, 2013). Four teachers ($n = 4$) were selected to represent a range of teaching experience, from novice to experienced. This approach enabled the exploration of diverse perspectives on mathematical knowledge, pedagogy, and the use of curriculum resources across grade levels.

The selection of teachers from grade 4-grade 7 was intended to capture how textbooks and teacher guides were interpreted and mobilized across the intermediate phase, with particular attention to the affordances and constraints these resources presented. Textbooks, teacher guides, and DBE workbooks were treated as curriculum artifacts examined through teachers' planning and enactment practices rather than as independent units of analysis. The demographic characteristics of the participating teachers are presented in [Table 1](#).

As shown in [Table 1](#), the participants represented a range of teaching experience, qualification pathways, and grade-level responsibilities across the intersen phase. This variation enabled the study to explore diverse approaches to the use of curriculum resources in mathematics teaching. The inclusion of teachers from grades 4-grade 7 further allowed examination of how textbooks and teacher guides were interpreted and mobilized across the intersen phase. Textbooks, teacher guides, and DBE workbooks were treated as curriculum

Table 1. Participant teacher demographics

Teacher (pseudonym)	Grade(s)	Gender	Age	Teaching experience	Qualification
Mr. Desmond	4	Male	26	2 years	Bachelor of commerce in statistics; post-graduate certificate in education
Ms. Mary	5	Female	36	2 years	Diploma in office management & technology; post-graduate certificate in education
Ms. Nancy	6	Female	47	9 years	Teacher's diploma
Mr. Alex	4 & 7	Male	45	5 years	Diploma in engineering and technology; Bachelor of Education honors

artefacts examined through teachers' planning and enactment practices rather than as independent units of analysis.

Trustworthiness and Methodological Rigor

Several strategies were used to strengthen the trustworthiness of the analysis. First, an audit trail was maintained throughout the coding. Every code was traceable to its exact data source, participant, page, and line number (e.g., IT1/VN/P3/L3 for an interview transcript), allowing the analytic process to be reconstructed and verified. Second, all interviews and lesson observations were transcribed verbatim, preserving participants' own language and enhancing transparency in data preparation. Third triangulation was achieved by coding interview and observation data separately and comparing codes across data sets for recurring regularities, allowing teachers' reported practices to be checked against their observed classroom enactment. Fourth member checking was conducted by sharing interview transcripts and interpreted themes with participants, allowing them to verify the accuracy of the transcripts and comment on the researchers' interpretations before the analysis was finalized. Finally, reflective and analytical notes were maintained alongside observation transcripts to support thick descriptions, providing sufficient contextual detail for readers to assess the transferability of findings to similar settings.

Coding was undertaken by one author and independently reviewed by a second author. Although no formal inter-rater reliability check was conducted, the audit trail, member checking, and author review process provided safeguards against researcher bias. This single-school, four-teacher design also means that Angel Primary's specific institutional context, including its no-fee, quantile-one status, may have shaped the findings in ways that limit the transferability to schools with different resourcing, staffing, or professional support structures. The findings are therefore presented as context-bound and analytically generative rather than statistically generalizable.

Data Analysis

Data analysis followed the constant comparative method (Glaser & Strauss, 1967), enabling the inductive development of categories, patterns, and themes across

multiple sources of evidence (Miles et al., 2013; Saldaña, 2009). Data were organized into three sets: pre-lesson interview transcripts, lesson observation transcripts, and post-lesson interview transcripts. All data were transcribed verbatim, and each extract was labelled by data type, participant, page, and line number to create a traceable audit trail.

Interview transcripts were coded line by line using a discovery sheet of recurring words, phrases, and emerging ideas. These units of meaning were subsequently assigned descriptive codes. Lesson observation transcripts were analyzed by lesson phase rather than line by line, reflecting the interactional and sequential nature of classroom talk, with each episode accompanied by a reflective analytic note. Interview and observation datasets were initially analyzed separately and subsequently compared to identify recurring patterns across data types.

Codes with similar meanings were grouped using the "look/feel-alike" method (Lincoln & Guba, 1985; Maykut & Morehouse, 1994), producing eleven provisional categories, each governed by an explicit rule of inclusion. These provisional categories were iteratively refined and merged into broader categories. In the final stage of analysis, relationships and patterns across categories were explored to develop the overarching themes reported as the findings. Categories and themes were developed inductively, without reference to a predetermined coding framework. The conceptual categories drawn from Remillard's (2005) forms of curriculum use, Brown's (2009) offloading, adapting, and improvising, and Leshota's (2015) concepts of injections and omissions were introduced only after stable themes had emerged through inductive analysis. These concepts were then used as an interpretive lens to classify and make sense of patterns already identified, rather than to drive the initial coding process.

Ethical Consideration

Ethical approval for this study was obtained from the relevant institutional ethics committee (reference no. Sem 2-2020-164). Participants gave written informed consent in accordance with the Declaration of Helsinki. To protect confidentiality, pseudonyms were used and identifying details were removed from transcripts and reports. Furthermore, particular attention was paid to

Table 2. Case over of teacher participants

Teacher (pseudonym)	Grade(s)	Experience	Content-knowledge confidence	Dominant mode of curriculum use	Teacher guide reliance
Mr. Desmond	4	9 years (experienced)	Low: relied on textbook for content understanding	Offloading with limited adaptation	High: answer-checking
Ms. Mary	5	2 years (novice)	Low: relied on textbooks to build her own understanding before teaching	Offloading with some improvisation (video)	High: solutions, topic understanding
Ms. Nancy	6	2 years (novice)	Higher: used textbooks to confirm rather than build his teaching approach	Improvising: blended textbook, self-designed, and Internet sources	Low: relied on own mathematical skills
Mr. Alex	4 & 7	5 years	Higher: confident, articulate about content	Improvising: instructional designer, judged textbook activities as insufficient	Low: relied on own skills, supplemented with past papers

teachers' professional context. Care was taken to respect participants' workload and classroom responsibilities, ensuring that interviews and observations did not interfere with teaching. Power dynamics between researchers and participants were acknowledged, and efforts were made to foster a collaborative, non-judgmental environment. Data were stored securely and used solely for research purposes. These measures ensured that participants' dignity, autonomy, and professional integrity were safeguarded throughout the study.

FINDINGS

The four teacher participants, Ms. Nancy, Ms. Mary, Mr. Desmond, and Mr. Alex, varied in teaching experience, mathematical content knowledge, confidence, and patterns of curriculum engagement. **Table 2** summarizes these differences and previews the forms of curriculum mediation (offloading, adapting, improvising; Brown, 2009) evident in each case, which are examined in detail below. Notably, years of teaching experience alone did not appear to explain patterns of curriculum use. The most experienced teacher, Ms. Nancy, and one novice teacher, Ms. Mary, both showed substantial reliance on curriculum resources, whereas the other novice teacher, Mr. Desmond, displayed a contrasting pattern. This suggests that teachers' confidence in their mathematical content knowledge may have been more influential than years of experience in shaping curriculum mediation practices within this sample.

Teachers' Selection and Interpretation of Curriculum Resources

Analysis indicates that the four participating teachers' selection and use of prescribed textbooks and teacher guides were shaped by their teaching experience, instructional intentions, and beliefs about

curriculum enactment (Brown, 2009). Although all participating teachers selected textbooks from the DBE's (2011, 2018) approved list, alignment with CAPS and annual teaching plans (ATPs) emerged as the dominant organising principle for guidance resource choice. Alignment was valued not merely for compliance but also for its role in regulating pacing, sequencing, and assessment within a highly prescriptive curriculum.

This alignment orientation was particularly pronounced for Ms. Mary, one of the two novice teachers in this study, who interpreted tightly structured textbooks as pedagogical support that reduces instructional uncertainty. The other novice teacher in the sample did not show the same pattern. As Ms. Mary explained, textbooks vary in how deeply they reflect policy requirements, with some "going exactly with the ATP" (interview). This reliance suggests that textbooks functioned less as instructional design tools and more as mediators of policy enactment, a pattern first identified in large-scale curriculum studies and later confirmed across classroom-based research on teachers' interactions with curriculum materials (Remillard, 2018; Rezat et al., 2021; Valverde et al., 2002).

The teachers in this study also positioned CAPS and ATPs themselves as primary curriculum resources, emphasizing their role in shaping lesson objectives, cognitive weighting, assessment demands, and pedagogical approaches. Rather than viewing policy and textbook as separate resources, teachers understood them as a tightly coupled system. This perception is consistent with research suggesting that strong policy alignment may contribute to curriculum coherence, particularly in contexts of ongoing mathematics underperformance (Hoadley & Galant, 2016). However, it also points to a narrowing of teachers' engagement with curriculum beyond issues of coverage and compliance.

To manage gaps and inconsistencies between textbooks and policy documents, teachers reported drawing on multiple curriculum resources when planning and enacting lessons. This multi-text use allowed teachers to compensate for perceived misalignment, supplement content, or access alternative task types. Such practice indicates active curriculum mediation rather than mere textbook dependence, although the extent and quality of this mediation varied substantially across participants.

These patterns are illustrated directly in participants' accounts of curriculum resource use. Teachers consistently emphasized alignment with CAPS and the ATP when selecting and evaluating curriculum materials. Ms. Nancy explained her preference for a textbook closely aligned to policy requirements: "Platinum, go exactly with the ATP" (pre-lesson interview). Similarly, Mr. Alex described CAPS and the ATP as guiding both content coverage and assessment: "The policies are the ones that guide us about the objectives of the lesson ... and with the weighting for cognitive levels" (pre-lesson interview). Mr. Desmond likewise prioritized the policy document over any single textbook: "the most important is the CAPS document and the ATP ... because the policy tells you exactly what you should teach learners and when" (pre-lesson interview).

Multi-text use was evident across all four teachers. For example, Ms. Mary reported using "head start, premier teacher's guide and learner's guide, and viva and DBE" (pre-lesson interview), while Mr. Alex listed "mathematics today, platinum, solution for all, Sasol Inzalo and DBE" (pre-lesson interview).

The DBE Workbook as a Curriculum Mediator

The DBE learner workbook (Rainbow Workbook) emerged as a central curriculum resource, particularly for practice, remediation, and homework. Most of the four teachers described the workbook as supportive due to its accessibility, alignment with CAPS, and ease of marking. Some teachers reported using the workbook across multiple lesson phases, including mental activities, classwork, and homework, whereas others used it primarily as a consolidation tool.

At the same time, teachers expressed concerns about the cognitive demands of workbook activities, noting that the tasks were often procedurally oriented and insufficiently challenging. These perceptions align with Hoadley and Galant's (2016) argument that while DBE workbooks promote coherence and coverage, they do not provide differentiated learning opportunities or make underlying mathematical ideas explicit. Consequently, teachers predominantly treated the workbook as a supplementary rather than a substitutive resource, reinforcing the view that no single curriculum

material can support conceptual development in isolation (Matthews et al., 2014; Rezat et al., 2021).

Perceived Affordances of Curriculum Resources

The four teachers' interactions with curriculum materials revealed differing understandings of the affordances embedded in textbooks and teacher guides. Mathematical content was widely cited as a key affordance, particularly among teachers who reported limited confidence in specific topics. For these teachers, definitions, worked examples, and explanations were essential for building their own understanding prior to instruction. In contrast, teachers with stronger content knowledge used textbooks primarily to confirm content and sequencing, rather than to shape instructional design.

Lesson observation data further showed that textbooks influenced not only content selection but also instructional sequencing and task progression. In some cases, teachers closely followed textbook structures, including definitions and ordering of mathematical objects, thereby producing the author's intended curriculum trajectory (Remillard, 2005). In other cases, teachers deviated from textbook sequencing based on perceived learner needs, indicating active mediation rather than fidelity-driven enactment.

Beyond content explanations, teachers identified mental mathematics activities, classwork tasks, and homework as key textbook affordances. Although teachers valued structured mental activities provided in certain textbooks, observed lessons revealed inconsistencies between stated beliefs and classroom practice. While teachers frequently articulated the importance of mental mathematics, they sometimes replaced textbook activities with self-designed tasks or omitted them entirely, illustrating the fluid nature of enacted curriculum.

Teacher Guides, Solutions, and Authority

Two primary functions of teacher-guide use were evident in the data:

- (a) answer-checking to avoid content errors and
- (b) pedagogical content clarification for lesson and question preparation.

Teachers with lower confidence in their mathematical content knowledge relied on guides primarily for the first function. Ms. Nancy explained: "I also got the answer from the teacher's guide of the textbooks I was using that day" (post-lesson interview), adding that without this check, "you as a teacher can think that 'I know this sum' only to find it is wrong ... you delivered it wrong" (pre-lesson interview). Ms. Mary additionally used guides for the second function, preparing discussion questions in advance: "the teacher's guide helped me again with understanding the topic because it

has some questions that I can ask prior to the lesson" (post-lesson interview).

In contrast, teachers with greater confidence in their mathematical content knowledge explicitly rejected the use of guides for either function. Mr. Alex stated, "I trust my mathematical skills, that is why I don't refer to the teacher's guide" (pre-lesson interview), adding that he found some prescribed methods "difficult for the learners" compared to his own. Mr. Desmond, while also reporting limited reliance on teacher guides, offered a more cautionary view: "the disadvantage would be that some teachers tend to rely too much on the guide either for answers or guidance" (pre-lesson interview), suggesting that guide avoidance is not unambiguously positive either.

These contrasting positions reflect broader tensions in the curriculum-use literature, where teacher guides can both support instructional accuracy and constrain pedagogical agency, depending on teachers' knowledge and beliefs (Remillard, 2018). Importantly, classroom observations showed that reliance on guides did not guarantee conceptual clarity and that avoiding them did not necessarily yield stronger instruction. Rather, effective use depended on teachers' capacity to critically interpret and integrate curriculum resources. The available data provide evidence of teacher-guide use for answer-checking and for lesson or question preparation. However, the data did not provide sufficient evidence to identify guide use related to anticipating learner misconceptions, selecting representations, or designing classroom discourse. These areas are therefore treated as beyond the scope of the present analysis.

Reconciling Curriculum Goals, Teacher Capacity, and Learner Needs

Teachers' curriculum use was shaped by ongoing negotiations between intended curriculum goals, teacher knowledge, and perceived learner capabilities. While teachers frequently justified task simplification as a response to learner struggles, such accommodation often resulted in reduced cognitive demand rather than scaffolding toward reasoning and conceptual understanding. This tendency reflects patterns observed in prior research, where curriculum mediation is constrained by teachers' confidence and content knowledge (Remillard, 2018; Stein et al., 1996).

Teachers also reported tensions between textbook-prescribed methods and locally preferred instructional approaches. In several cases, teachers replaced policy-aligned methods with alternatives they perceived as more accessible for learners. While such adaptations demonstrate responsiveness, they also raise questions about whether perceived learner limitations reflect actual learner needs or the boundaries of teachers' own pedagogical confidence.

Pedagogical Design Capacity and Curriculum Use

Observed classroom practices revealed varying degrees of PDC (Brown, 2009). Some teachers largely offloaded instruction to textbooks, closely following provided definitions, examples, and tasks. This approach supported coverage alignment but limited opportunities for learner reasoning. Other teachers adapted or improvised curriculum materials, modifying tasks, introducing supplementary resources, or designing original activities in response to learner feedback.

Improvisation, however, was not uniformly productive. While some adaptations supported conceptual understanding, others led to omissions, inappropriate content injections, or conceptual inaccuracies, consistent with Leshota's (2015) analysis of curriculum mediation risks. These findings underscore that pedagogical agency alone does not guarantee instructional quality; rather, effective curriculum use depends on the interplay between agency and content knowledge.

Case-level evidence illustrates this interplay directly. Ms. Nancy largely offloaded her lesson on 3D objects onto the Platinum textbook, following its definitions and sequencing of shapes, while omitting two objects without stating a reason. During enactment, she repeatedly misnamed a pentagonal pyramid as a "pentagonal prism" and introduced the term "vertex" before the CAPS-prescribed "apex". This injection diverted attention from the lesson's intended vocabulary focus (Leshota, 2015). Ms. Mary's stated belief that "the textbook helps me to plan a lesson that is up to standard ... I don't have to create my own activities" (post-lesson interview) contrasted with her observed practice. Although she relied on the textbook, she opened the lesson with a video not included in the text and introduced above-grade-level content, constituting a substantial injection that built on learners' existing knowledge (Leshota, 2015). However, her worksheet contained incorrect definitions of regular and irregular polygons, replacing the textbook's accurate definitions with an inconsistent explanation during enactment.

By contrast, Mr. Desmond's improvisation was grounded in anticipation of learner difficulty. After observing learners struggle with clock intervals, he shifted to a self-devised symmetry strategy: "this number, 11, was going to lie on top of 1 if we were to fold the clock ..." (lesson observation), demonstrating pedagogical content knowledge through an adaptive instructional response. Mr. Alex similarly drew on strong content knowledge to judge the prescribed textbook inadequate for teaching algebraic equations and assembled his lesson from past examination papers instead: "the previous question papers gave me exactly the sums that I needed, which are the ones I didn't get from the textbook" (post-lesson interview).

Across the four cases, adaptation and improvisation were neither inherently productive nor inherently problematic. Rather, their consequences appeared to depend on the knowledge base underpinning them. Mr. Desmond's and Mr. Alex's departures from prescribed curriculum materials were informed by strong mathematical content knowledge and, in Mr. Desmond's case, pedagogical content knowledge, enabling responsive instructional decisions. In contrast, Ms. Nancy's and Ms. Mary's adaptations were associated with content and curriculum knowledge gaps that contributed to inaccuracies and departures from intended content. The findings, therefore, suggest that the educational value of curriculum adaptation depends not on teacher agency alone, but on the knowledge resources that teachers bring to the adaptation process.

Curriculum Resources and 21st Century Skills

Although CAPS emphasizes the development of 21st century competencies, these goals were weakly explicit in teachers' curriculum use. Teachers tended to equate 21st century skills primarily with critical thinking, often enacted through questioning rather than through situated collaboration, communication, or problem-solving. This partial enactment reflects broader international findings on the difficulty of operationalizing such competencies without explicit curricular and pedagogical support (Choppin et al., 2022; Rezat et al., 2021). Where textbooks made reasoning pathways visible, teachers were more likely to engage learners in cognitively demanding work. Where such affordances were implicit or weak, instruction reverted to procedural fluency. These patterns suggest that curriculum materials alone cannot advance reform goals without teachers' sustained support in interpreting and mobilizing them strategically.

DISCUSSION

This study examined how intersen mathematics teachers mobilize prescribed textbooks and teacher guides within a strongly policy-regulated curriculum context. The findings demonstrate that curriculum materials neither ensure reform-oriented teaching nor function as neutral instructional tools. Instead, their influence is mediated through teachers' pedagogical intentions, mathematical knowledge, and capacity to interpret and adapt resources in situated classroom contexts.

Consistent with international research, textbooks in this study were primarily used to manage curriculum alignment, pacing, and assessment requirements rather than as tools for pedagogical inquiry (Choppin et al., 2022; Rezat et al., 2021). Alignment with CAPS and ATPs emerged as a dominant organising principle, particularly among novice teachers, confirming South African findings that textbooks often function as

instruments of policy compliance (Hoadley & Galant, 2016; Ramoshebi, 2017). While such alignment promotes coherence, it can also constrain engagement with cognitively demanding instruction when alignment becomes the overriding criterion for resource selection.

The findings on teacher guides extend this picture of alignment-driven curriculum use in ways that have received comparatively little attention in the literature. Teachers' guide use generally followed the same knowledge-confidence pattern evident elsewhere in the data. Teachers with lower confidence in their mathematical content knowledge relied on guides to verify solutions and avoid delivering incorrect content, treating the guides as authoritative checks on their own knowledge, consistent with Remillard's (2005) account of teacher guides as authoritative supports. Teachers with stronger content knowledge, by contrast, treated the guide as unnecessary or even constraining, trusting their own mathematical judgment over the guide's prescribed methods. Critically, this reliance pattern held consistently across both textbooks and guides for each teacher, suggesting that PDC operates as a knowledge-driven disposition a teacher brings to curriculum resources generally, rather than a response calibrated to the specific resources in hand. This finding sharpens Gracin and Matic's (2021) observation that guides' educative potential depends on how teachers take them up. In this study, that uptake was shaped less by the guides' design than by what teachers already knew.

The DBE workbook's role further illustrates how resource type shaped, without determining, teachers' curriculum use. Unlike textbooks and guides, the workbook was consistently positioned by teachers as a supplementary practice and remediation tool rather than a primary source of content or pedagogical guidance, reflecting Hoadley and Galant's (2016) caution that the workbook's coherence and accessibility do not extend to differentiated or cognitively demanding tasks. This consistent, secondary positioning, in contrast to the more polarized reliance patterns seen with textbooks and guides, suggests that teachers exercised a shared, tacit understanding of what the workbook was for, even where their broader PDC diverged. This distinction reinforces the argument, developed further below, that curriculum mediation in this study was not a single undifferentiated practice but varied systematically by the specific resource and the knowledge it demanded of teachers.

Teachers' varied patterns of offloading, adapting, and improvising highlight the central role of PDC (Brown, 2009). The teachers who largely offload instruction treated textbooks as authoritative scripts, prioritizing fidelity over responsiveness. This supports prior evidence that script-oriented use often reduces opportunities for learner reasoning and higher-order thinking (Stein et al., 1996). In contrast, teachers who adapted or improvised exercised greater pedagogical

agency, modifying or designing tasks in response to learners' needs. However, such agency did not uniformly lead to stronger instruction. Improvisation sometimes resulted in omissions, inappropriate content injections, or conceptual inaccuracies, underscoring Leshota's (2015) argument that curriculum mediation involves both opportunity and risk, a pattern also documented in subsequent classroom-based studies (Leshota, 2020).

These patterns of offloading, adapting, and improvising were visible across the specific affordances teachers drew on. Content explanations supported teachers' own understanding prior to instruction, and textbook sequencing shaped the order in which topics and examples were enacted. Mental mathematics activities, however, were the affordance most frequently omitted in practice, despite teachers' stated belief in their value. Underscoring that even a teacher's stated valuation of an affordance did not reliably predict its enactment.

The study also reveals tensions surrounding the enactment of cognitively demanding tasks and 21st century competencies. Although these goals are explicit in CAPS, they were weakly articulated in teachers' instructional decision-making. Higher-order thinking emerged indirectly through task selection rather than as an explicit decision goal and was frequently diluted during enactment. This mirrors international findings on the fragility of cognitive demand in classroom implementation, particularly under conditions of time pressure and assessment accountability (Son & Kim, 2015; Stein et al., 1996). Importantly, the tendency observed among some teachers in this study to lower task complexity in the name of learner accommodation raises questions about whether perceived learner constraints reflect actual learning needs or the boundaries of teachers' own instructional confidence and capacity, a pattern consistently documented in studies of cognitively demanding task enactment (Parrish & Bryd, 2022; Stein et al., 1996).

Taken together, these findings reinforce the view that curriculum reform cannot be achieved solely through the provision of aligned materials. Instead, reform depends on teachers' capacity to work productively with curriculum resources, interpreting, adapting, and sometimes resisting them to design instruction that balances policy demands with mathematical sense-making.

Contribution to Research

This study contributes to research on the use of curriculum resources in mathematics education by providing fine-grained empirical evidence of how PDC mediates the relationship between prescribed curriculum materials and classroom practices. While prior studies have established that textbooks do not

function as neutral or deterministic artefacts, this study extends that work by demonstrating how offloading, adapting, and improvising operate as situated responses to policy prescriptiveness, content knowledge demands, and perceived learner constraints within a highly regulated curriculum system. The findings suggest that, for teachers working under similarly prescriptive curriculum conditions, curriculum alignment may simultaneously constrain engagement with cognitively demanding instructional and instructional design unless supported by strong PDC. By tracing how lesson planning and enactment diverge even when teachers work with the same prescribed materials, the study advances understanding of curriculum mediation as a dynamic, knowledge-intensive practice rather than a fidelity-compliance process. In doing so, it contributes to international debates on reform implementation by foregrounding teachers' curriculum use as a critical site where policy intentions, instructional knowledge, and classroom realities intersect.

Limitations

This study is subject to several limitations that should be considered when interpreting its findings. First, the study involved a small number of intersen phase mathematics teachers, which limits claims of statistical generalizability. However, the purpose of the study was not to produce representative findings but to generate in-depth insight into teachers' curriculum-use practices through close analysis of planning and enactment across cases. In this sense, the findings are offered as analytically generative rather than generalizable, contributing to theory-building on curriculum mediation and PDC.

Second, the study focused on teachers' interactions with curriculum resources rather than on a systematic analysis of the curriculum materials themselves. Although teachers were asked to bring their textbooks and teachers' guides to the pre-lesson interviews, these materials were used as prompts for discussion rather than formally collected and analyzed as data documents. As a result, claims about the cognitive demand or pedagogical affordances of specific textbooks are grounded in teachers' perceptions and enacted practices rather than in formal textbook analysis. Future research could strengthen these findings by combining teacher-focused analyses with a systematic examination of curriculum materials.

Finally, the study captured curriculum use at a particular moment in teachers' professional trajectories. Teachers' interaction with curriculum resources is likely to evolve over time, particularly in response to professional development, policy shifts, or changing assessment demands. Longitudinal research would therefore be valuable in examining how PDC develops

and stabilizes through sustained curriculum engagement.

CONCLUSION AND IMPLICATIONS

This study set out to examine how intersen phase mathematics teachers mobilize prescribed textbooks and teacher guides in the enactment of reform-oriented teaching with a strongly regulated curriculum context. The findings from these four cases show that curriculum materials do not automatically drive instructional reform for these teachers. Rather their pedagogical value is realized through teachers' situated interpretations and their capacity to work productively with the materials under policy and classroom constraints.

Across cases, curriculum alignment with CAPS and ATPs strongly shaped teachers' selection and use of resources. While alignment supported coherence and coverage, it also narrowed instructional decision-making for some teachers, particularly those with limited content confidence. Teachers differed markedly in how they offloaded, adapted, or improvised curriculum materials, even when teaching similar topics with the same prescribed textbooks. These differences highlight PDC as a crucial mediator between curriculum resources and classroom practice.

Importantly, the study suggests that, in these cases, pedagogical agency alone was insufficient to guarantee reform-oriented instruction. While adaptive and improvisational practices can create opportunities for conceptual understanding and learner engagement, they may also introduce omissions, inappropriate content injections, or conceptual inaccuracies when not well grounded in mathematical knowledge. Conversely, fidelity-oriented use of textbooks may support procedural accuracy but limit opportunities for higher-order reasoning. This tension illustrates that reform enactment is not a binary choice between fidelity and flexibility, but a knowledge-intensive balancing act shaped by teachers' confidence, experience, and professional support.

The enactment of higher-order thinking and 21st century competencies emerged as a fragile outcome rather than an explicit instructional goal. Although these competencies are central to CAPS, they were often interpreted narrowly and enacted indirectly through task simplification or questioning practices. This finding underscores the limits of curriculum alignment as a reform strategy and highlights the need for stronger pedagogical support to translate policy aspirations into classroom practice.

Implications for Practice

For professional learning, the findings suggest that supporting teachers' PDC should be prioritized over promoting fidelity to curriculum materials. Professional development initiatives should explicitly focus on

helping teachers learn to interpret, adapt, and repurpose curriculum resources that foreground conceptual understanding and cognitive demand. Teacher guides, in particular, represent an underutilized resource with potential to make pedagogical intentions visible and to support task design that promotes learner reasoning, discussion, and sense-making.

Implications for Policy and Research

For curriculum policy, the study highlights the need to complement highly prescriptive curriculum frameworks with resources and professional guidance that support adaptive curriculum use. Alignment alone cannot ensure quality enactment; instead, policies must recognize teachers as active curriculum designers whose knowledge and interpretive capacity are central to reform implementation.

For research, the study demonstrates the value of fine-grained, classroom-based analyses of curriculum use that trace the relationship between planning, enactment, and instructional decision-making. Future research should examine how teachers' PDC develops over time and how professional learning interventions support teachers in working productively with curriculum materials, particularly in phases of schooling where learners transition towards greater abstraction and independence.

While based on a limited number of cases, the study contributes to international scholarship by illustrating how reform intentions are mediated in everyday practice. It reinforces the need to view curriculum materials not as fixed instructional scripts, but as sites of negotiation where policy, pedagogy, and teacher knowledge intersect.

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