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A Comparative Analysis of Sindh Board vs Oxford Grade 2 Mathematics Textbooks Using Bloom's Taxonomy

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Abstract

This study explores a comparative qualitative content analysis of the Grade 2 Mathematics textbooks published by the Sindh Textbook Board and Oxford University Press employing the framework of Bloom's Revised Taxonomy. Adopting a directed qualitative content analysis design, all exercises and activities in both textbooks were analyzed and coded across six cognitive levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating. The analysis consisted of 82 exercises from the STBB textbook and 127 from the OUP textbook. Findings highlighted that both textbooks predominantly emphasize lower-order thinking skills (LOTS), with STBB allocating 90.2% and OUP 74.0% of exercises to LOTS. Nevertheless, OUP demonstrated broader inclusion of higher-order thinking skills (HOTS), allocating 26.0% of exercises across Analyzing, Evaluating, and Creating, whereas STBB allocated only 9.8%, bounded to the Analyzing level. The findings suggest revising the STBB textbook to integrate more higher-order cognitive tasks.

Keywords: Bloom's revised Taxonomy, textbook analysis, Grade 2 Mathematics, STBB, OUP, higher-order thinking skills, Sindh, Pakistan, qualitative content analysis, educational equity

Introduction

Educational systems vary across the globe in their underlying philosophies, curriculum frameworks and teaching and learning materials used at elementary levels. In Pakistan, this is most apparent in the differences between public sector provincial textbooks and private school textbooks with international perspectives. The Sindh Textbook Board (STBB) produces curriculum-relevant textbooks for public schools in the province that cater to a large and socioeconomically diverse student base. By contrast, the mathematics textbooks of Oxford University Press (OUP) are popular among elite and semi-elite private schools that aspire to global standards. The co-existence of these two parallel systems within a unified educational structure begs questions about the equity of access, the cognitive demands, and the quality of the learning experiences afforded to children at the early years of school.

Primary mathematics education is crucial in defining a child's educational journey. The benefits of high-quality mathematical tasks and exercises for primary school children are well documented: they

shape the reasoning and problem-solving skills and cognitive flexibility of the children involved (Malle, 2005). It is important to offer students meaningful and well-designed problem- solving tasks already at primary school, and teachers play a vital role in providing students with a range of strategies to solve different mathematical problems - a task that is complicated when learning is limited to the tasks provided in mathematics textbooks (Kaitera & Harmoinen, 2022). This makes the content, design, and cognitive focus of the textbooks extremely important.

Research on the mathematics education in public schools in Sindh has gained momentum in recent years. While there has been a significant increase in the number of primary schools in the province, a rapid expansion has resulted in classrooms with multiple grades with teachers unable to take full account of the different learning ability levels, especially in rural settings, which may impact negatively on students' learning (Jamaldini, 2022; Numajiri & Kosaka, 2025). In this context, the textbook is not just an aid, but often the main, if not the only, source of instruction. It's therefore crucial to examine what is being offered by these textbooks in terms of cognitive challenges for young students.

Bloom's Taxonomy has become a well-established and rigorous approach to analyzing textbooks in terms of the cognitive challenges they present to students. The higher the proportion of higher-order thinking content within a textbook, the greater the potential for developing students' higher-order thinking skills (Huang, 2025). Benjamin Bloom's Taxonomy (1956) - later revised by Anderson and Krathwohl (2001) - offers a six-tier hierarchical classification of educational objectives and cognitive processes, ranging from basic lower-order thinking skills (Remembering, Understanding) to more complex higher-order thinking skills (Analyzing, Evaluating, Creating). The revised version of the taxonomy states that in order to understand a concept, a student must first remember it; to apply a concept, one must first understand it; to evaluate a process, one must first analyze it; and to create, one must first complete an evaluation (Anderson & Krathwohl, 2001). The progressive nature of Bloom's framework makes it a effective tool for primary-level textbook analysis, where knowledge building is crucial.

The use of Bloom's Taxonomy to evaluate textbook problems and activities has become more prominent in international research. Alayont et al. (2023) applied Bloom's Taxonomy to the analysis of mathematics textbook problems, and Chavda et al. (2024) investigated the matching of learning objectives in learning materials and question papers using Bloom's Taxonomy to demonstrate the value of the taxonomy as an assessment tool at all levels of education. At the same time, research on Cambridge primary mathematics textbooks has shown that higher-order thinking skills (analyze, evaluate and create) can and should be embedded within all major themes in mathematics even at primary level. A directed qualitative content analysis of Cambridge Primary Mathematics Grade 4 textbooks showed that all levels of higher-order thinking skills were identified and these skills were spread across four major themes of mathematical content: number, measure, data handling, and geometry (Rochmatillah, 2023). This research provides a strong case for the type of analysis undertaken in this study for Pakistan.

The use of comparative textbook analysis has increasingly emerged in Pakistan's educational context as a way of examining curricular inequity in the public and private sectors. Bhutto et al. (2022) carried out a comparative analysis of the alignment between the secondary school English textbooks and the national curriculum in Pakistan's public and private sectors of Sindh, demonstrating a rich tradition of comparative analyses of textbook content in the province. Likewise, Afzal et al. (2024) conducted a comparative study of the Punjab Textbook Board and Oxford English textbooks, revealing that comparative studies of this nature can provide insights into curricular shortcomings and inequity. But to our knowledge, no prior study has specifically compared the Sindh Textbook Board and Oxford Grade 2 Mathematics textbooks, using Bloom's Taxonomy as an analytical framework - particularly in terms of the nature of the exercises and activities they contain. This represents the major gap, and

the purpose, of this study.

The present study seeks to qualitatively compare the Sindh Board and Oxford Grade 2 Mathematics textbooks, focusing specifically on the type, diversity, and cognitive level of the exercises and activities in each textbook. Mapping these activities across the levels of Bloom's revised Taxonomy, the research will attempt to establish whether the textbooks provide equitable cognitive opportunities for Grade 2 students, and what the differences (or similarities) observed might have for mathematics education, textbook development and educational policy in Sindh. In a classification system where textbooks often serve as the sole teaching resource, the cognitive complexity of textbooks is not just of academic interest instead it is an issue of equity.

Research Objectives

General objectives

The aim of the study is to compare Sindh Board and Oxford University Press (OUP) Grade 2 Mathematics textbooks through a comparison of the types, nature and cognitive levels of the exercises and activities in the textbooks based on Bloom's revised Taxonomy.

Specific Objectives

1. To classify the types of exercises and activities in the Sindh Board and Oxford Grade 2 Mathematics textbooks into the six cognitive levels of Bloom's revised Taxonomy (Remembering, Understanding, Applying, Analyzing, Evaluating and Creating).
2. To assess the proportion and frequency of lower-order thinking skills (LOTS) and higher-order thinking skills (HOTS) in the exercises and activities of both textbooks.
3. To explore the effectiveness of exercises and activities in both textbooks in fostering critical thinking and cognitive growth in Grade 2 students in Sindh's educational system.

Research Questions

The research questions are:

1. RQ1 (General): What are the differences between the Sindh Textbook Board's and Oxford's Grade 2 Mathematics textbooks in terms of exercise and activity types and cognitive demands (as defined in Bloom's revised Taxonomy)?
2. RQ2 (Specific): What are the proportions of lower order thinking skills (LOTS) and higher order thinking skills (HOTS) in the exercises and activities of the Sindh Board and Oxford Grade 2 Mathematics textbooks?
3. RQ3 (Specific): How do the textbooks' exercises and activities contribute to the cognitive growth of Grade 2 students in Sindh's public and private schools?

Rationale of the Study

This study is motivated by both theoretical and practical considerations. Pakistan's education sector is characterised by a significant and well-documented disparity between public and private sector schools. A disparity that is starkly evident in the province of Sindh. Shaikh and Benedetti (2024) contend that despite federal policies intended to reform the education system, such as the Single National Curriculum, the underlying structural inequities in Pakistan's education system continue to persist, with public and private sector schools continuing to follow different curricula and standards of learning. In the case of Sindh, the province has formally withdrawn from the Single National Curriculum and instead opted for a provincial curriculum administered by the Sindh Textbook Board, an exercise that makes the study of the STBB and OUP textbooks not only academic but also relatable to the educational experiences of children in the province (Shaikh & Benedetti, 2024).

Although much research has focused on matters of access, enrolment and teacher training Sindh's

schools, there is a relative lack of research on the textbook, the most accessible and persistent learning resource in the classroom. This is especially important in Grade 2, where children are first exposed to formal mathematical concepts. Early mathematical success has been shown to strongly correlate with future academic performance, problem-solving skills and cognitive growth (Kaitera & Harmoinen, 2022). If the problems and exercises presented in a Grade 2 Mathematics textbook limit their focus largely to lower-order tasks such as memory recall and basic computations, this could miss the opportunity to engage in more advanced reasoning processes.

This is particularly pertinent in Pakistan, where the education system has been widely acknowledged to favour rote memorization and lower-order tasks. Latafat (2024), in particular, discussing mathematics classrooms in Pakistan, reports a common culture where lessons are predominantly focused on memorization and lower-order understanding. These trends suggest it is important to explore the extent to which elementary mathematics textbooks, especially those in Sindh, are perpetuating or mitigating this systemic tendency.

The decision to use the revised Bloom's Taxonomy as the analytical framework is theoretically and methodologically sound. Bloom's Taxonomy, as revised by Anderson and Krathwohl (2001), offers a well-defined, hierarchical and universally recognized framework for categorizing the cognitive levels of educational activities from lower levels of Remembering and Understanding, to higher levels of Analyzing, Evaluating and Creating. Using this framework to compare exercises and activities in both textbooks allows the study to move beyond simple comparisons of the content of the textbooks, and consider the question of what type of learning is required by the textbooks.

The use of a comparative design, juxtaposing the STBB textbook with the OUP textbook, is strategic. Sindhi public school children are virtually the only students who learn from STBB textbooks, whereas their peers in private schools learn from OUP textbooks aligned with international standards. Numajiri and Kosaka (2025) confirm that while primary school enrolment rates have improved in Sindh, they continue to face challenges in providing quality instruction, especially in resource-poor public schools. Assessing the extent to which these two textbooks differ in the cognitive demands of their activities therefore directly speaks to equity. If they do, then this provides evidence to support curriculum change. If they are more similar than they are thought to be, that's also an important and comforting finding for Sindhi policymakers and teachers.

Study's Significance

This research is significant at several levels: theoretical, practical and policy.

Theoretical Significance: This study adds to the existing literature on textbook analysis in developing countries, and to studies that use Bloom's revised Taxonomy to assess the cognitive quality of primary school textbooks. Its emphasis on Grade 2 Mathematics textbooks used in Sindh, an area that has not been extensively studied enhances the understanding of textbook quality across Pakistan and offers a method for analyzing textbooks that can be replicated across different grades, topics and provincial curricula in Pakistan.

Practical Significance: The findings of this study are useful to teachers in both public and private schools in Sindh as they provide insights into the cognitive affordances and deficiencies of the textbooks they use in the classroom. The knowledge of the shortcomings of their textbooks with respect to higher-order thinking activities can guide them in supplementing their curriculum with other tasks that require students to engage in higher-order thinking. Curriculum and teacher educators may also use this study to inform their pre-service and in-service teacher training.

Policy Significance: On the policy front, this study may help the Sindh Textbook Board make informed decisions about the next edition of the Grade 2 Mathematics textbook. For example, if the study shows that the STBB textbook is biased in favor of lower cognitive tasks, this information can be a basis for a call for curriculum change that gives greater attention to tasks that align with higher

levels of Bloom's Taxonomy. Likewise, the results may inform policy debates about the cognitive demands of textbooks that are freely available to the public in Sindh and Pakistan, especially as the country moves to implement and refine the Single National Curriculum (SNC).

Social Significance: Fundamentally, this study is about educational equity. Children who study in public schools in Sindh, and whose only source of textbooks are STBB textbooks, are entitled to learning materials that are as engaging and challenging as those found in private schools. If there is a substantial gap between the two textbooks in the thinking skills promoted, this is not just an academic concern but also it is a reflection of an inequitable learning environment that has implications for the life chances of thousands of Grade 2 students in the province.

Literature Review

Bloom's Taxonomy: Development, Revisions and Educational Applications

Bloom's Taxonomy is a framework frequently used in educational research, curriculum development and textbook analysis. First conceived by Benjamin Bloom and his colleagues in 1956, the taxonomy proposed a hierarchy of educational objectives from foundational knowledge recall to higher-order synthesis and evaluation. But the original taxonomy has been considerably revised by Anderson and Krathwohl (2001), who updated the language and structure of the taxonomy to reflect current knowledge about the learning process. The new taxonomy classifies cognitive processes into six hierarchical categories: Remember, Understanding, Applying, Analysing, Evaluating and Creating. Importantly, the new version used categories of action (verbs) instead of categories of knowledge (nouns), making it more useful for analysis of curriculum tasks, exercises and tests (Anderson & Krathwohl, 2001).

The revised taxonomy acknowledges a pedagogic assumption that higher-order cognitive processes cannot be effectively taught and learned unless lower-order processes are in place. One must know something before one understands it; understands before one applies it; analyses and evaluates before they create it (Anderson & Krathwohl, 2001). This hierarchical approach makes Bloom's Taxonomy a useful guide not only in setting learning objectives, but also in assessing the cognitive skills required by textbook problems and activities. Amjad (2024) notes that Bloom's Taxonomy remains a valuable tool for educators to design learning experiences and assessment tasks that help students engage in a sequence of increasingly sophisticated understanding and critical thinking skills, and is thus vital for both curriculum and textbook design.

In the context of mathematics education, the revised Bloom's Taxonomy has been acknowledged as a suitable tool. Alayont, Karaali, and Pehlivan (2023) used Bloom's Taxonomy to assess mathematics textbook problems, showing that it can help differentiate between tasks at the procedural level and those at the conceptual or higher level that require innovative problem-solving. Likewise, Kaitera and Harmoinen (2022) stress the importance of higher-level mathematics tasks, those that require justification, strategy selection and non-routine problem solving in developing students' long-term mathematical thinking habits, compared to lower-order tasks that only require memorization and calculation.

Textbook Analysis as a Research Methodology

Textbooks play a pivotal role in education, simultaneously serving as teaching materials, curriculum artefacts and windows into national educational ideologies. Zeynivandnezhad, Saralar-Aras, and Halai (2024) proposed a more sophisticated framework for qualitative content analysis of mathematics textbooks, which includes six broad themes of analysis: language and communication, content analysis, pedagogical approach, cultural sensitivity and inclusivity, assessment and exercises, and visual aids and presentation. Their framework, which builds on a rich body of international textbook research, highlights that textbook analysis needs to move beyond the surface coverage of the content to consider the pedagogical approaches and cognitive load of textbook tasks.

Qualitative content analysis has been increasingly used in textbook studies across various disciplines and countries. Seddighi, Yousefzadeh, and López López (2021) confirm that qualitative content analysis of textbooks enables the researcher to examine textbooks' explicit and implicit educational goals, and is especially suitable for comparative textbook studies across different education systems or class levels. Mathematics education has seen this methodology used to investigate the levels of cognitive demand, problem representation and the balance between higher- and lower-order thinking tasks in mathematics textbooks from different countries (Zeynivandnezhad et al., 2024).

Bloom's Taxonomy in Pakistan

The use of Bloom's Taxonomy in Pakistani textbooks and curricula has received growing attention in recent years, with an emerging trend across various studies: the overrepresentation of lower-order thinking skills in Pakistani textbooks and curricula. Amjad (2024), in her analysis of Bloom's Taxonomy and pre-service teachers' preparation in Pakistan, identified the cognitive culture embedded in the educational materials in Pakistan heavily favors the lower-level thinking skills of remembering and understanding over the higher-order thinking skills of analyzing, evaluating and creating. This has implications for both students and teachers, who are products of an education system that does not encourage critical and analytical thinking.

Ahmed, Lashari, and Golo (2023), in a content analysis of primary-level English textbooks based on the Single National Curriculum, found that of the textbook items, 89.8% were classified as lower-order thinking tasks, with a relatively small share allocated for higher-order thinking tasks. This research examined textbooks of the English language, but its observations are generally reflective of a pattern in Pakistani curriculum design to favor lower-order cognitive tasks involving recall and reproduction of facts, procedures and processes. Butt (2022), using Bloom's Taxonomy to analyze textbooks for Grades X and XI of the KPK Board, also observed a predominant focus on lower-order tasks, with higher-order tasks such as those involving analysis, evaluation and creation being absent. These studies collectively suggest an overall national curriculum culture where LOTS are abundant and HOTS underdeveloped, a situation that needs to be explored further at the primary level where these cognitive skills are developed.

Textbooks and Performance in Public and Private Schools in Pakistan

School type and educational performance in Pakistan have been the focus of extensive research. In a large-scale, nationwide study comparing students from 15,391 students in 153 schools, Bhutta, Ahmad, and Ansari (2024) found that private school students performed better in mathematics and science than their peers in public schools, with this trend observed across all grade levels and regions. The authors attribute these differences, at least in part, to the pedagogical practices and teaching resources used in each type of school, with private schools typically using more interactive and student-oriented pedagogies and public schools using more traditional teacher-focused pedagogies and the textbooks provided by the government (Bhutta et al., 2024).

In this regard, Shaikh and Benedetti (2024) expand these differences to structural educational inequality in Pakistan and contend that the differences between public and private schools in Pakistan are not just related to resource allocation but also pedagogical ideologies. In the case of Sindh, the province's rejection of the Single National Curriculum (SNC) means that STBB textbooks will remain the primary teaching resource for the majority of public school students while textbook-based private schools affiliated with Oxford University Press follow a different curricular philosophy, which is more internationally aligned. This difference in structure makes a comparative study of the two textbooks not only important but also crucial in unpacking the nature and scale of the educational inequities between public and private primary students.

Comparative Textbook Analysis in Pakistan

Comparative textbook studies have been a fertile methodological ground for investigating educational inequities in the dual systems of education in Pakistan. Bhutto, Syed, Rajput, Shah and

Chachar (2022) compared secondary English textbooks from public and private schools in Sindh against the national curriculum. They identified substantial differences in both content and cognitive demand in the two sets of textbooks, providing a key precedent for the inter-sector comparative analysis of primary mathematics textbooks in this study. Similarly, studies such as Afzal, Durr-E-Nayab, and Noor (2024) have compared secondary level Punjab Textbook Board and Oxford English textbooks, highlighting important differences in the educational philosophies and cognitive demands of the two sets of textbooks. These studies demonstrate that the textbook decision, whether provincial board or Oxford is not an insignificant one, but an important decision that has implications for the range of learning opportunities in terms of cognitive demand.

The results of international textbook comparisons further confirm that textbooks from different educational systems, even within a country, vary in terms of the level of cognitive demand, problem representations, and the types of exercises provided. Yang and Sianturi (2022), for instance, compared the cognitive demand, problem representation and types of problems (open vs. closed) in elementary textbooks from five countries and found that there were significant variations across countries in these aspects of algebraic problems. These results validate the academic rigor of textbook analysis and the approach taken in this research.

Primary Mathematics Education: An Argument for Cognitive Demand

The early primary school years are a pivotal time for the development of basic mathematical reasoning, pattern recognition and problem-solving skills. Kaitera and Harmoinen (2022) stress the importance of engaging students with meaningful problem solving tasks from the early days of primary schooling, in order to develop not only a mathematical competence but also a general, transferable and reasoning capacity for future learning. Research on cognitive development also shows that early mathematics achievement is highly correlated with executive function, spatial and numerical knowledge, which is best learned through a range of cognitively stimulating tasks rather than repeated procedural practice (Kaitera & Harmoinen, 2022).

Latafat (2024), writing in the context of primary mathematics classrooms in Pakistan, reports a culture of rote learning and repetition in mathematics teaching, which he claims is mirrored and supported by textbooks. If a textbook offer activities that predominantly focused on the Remembering and Understanding levels of Bloom's Taxonomy (such as writing numbers, completing sequences, or copying number facts) then it is actively retarding the cognitive development that early mathematics education should promote. Numajiri and Kosaka (2025) verify that while primary school enrolment rates have improved in Sindh, inequities in quality of instruction and cognitive outcomes continue to disadvantage students in public schools, with the quality of materials used in these schools named as one of the major factors.

Rochmatillah (2023), using Bloom's Taxonomy to analyse textbooks in Cambridge Primary Mathematics Grade 4, revealed that higher-order thinking skills - analysis, evaluation and creation represented across the four key content themes of mathematics: number, measure, data handling and geometry. This indicates that it is possible and desirable to include HOTS in primary mathematics textbooks, and offers a standard against which we might assess the STBB and OUP Grade 2 textbooks. Likewise, Huang, Han and Liu (2025), in their study of higher-order thinking skills in Chinese high school mathematics textbooks, found that the frequency and distribution of HOTS tasks across chapters and content areas is a key factor in determining whether textbooks actively nurture or neglect students' abilities to engage in analysis and evaluation.

Summary

The studies reviewed in this section provide a consistent body of research that supports and informs this study. Bloom's revised Taxonomy is a well-evaluated and widely used tool for assessing the thinking tasks in textbooks. This is appropriately done through qualitative content analysis. Numerous studies show that textbooks used in Pakistan across subject areas, levels of education and

types of schools are largely centered on lower-order thinking tasks, especially at primary level where cognitive patterns are formed. Pakistani and international textbook comparisons confirm that there are differences in cognitive level in between public and private sector texts. Also the research on primary-level mathematics highlights the critical role of cognitively rich activities for children's development. In this context, the lack of a specific study comparing STBB and OUP Grade 2 Mathematics textbooks, using Bloom's Taxonomy, is clearly a significant gap in the literature, which is addressed by this study.

Methodology

Research Design: Qualitative Research

This research uses a directed qualitative content analysis design - a systematic and interpretive method for analysing the cognitive complexity of informative texts (Mayring, 2022). Qualitative content analysis is an effective approach to analysing educational documents like textbooks, allowing researchers to examine content priorities in a systematic way, both explicitly and implicitly (Seddighi et al., 2021). The "directed" qualifier indicates the deductive approach of using a pre-defined coding framework - in this study, Bloom's revised Taxonomy (Anderson & Krathwohl, 2001) - to code all textbook exercises and activities. The design also adopts a comparative approach, comparing the two textbooks using a comparative analytical approach (Zeynivandnezhad et al., 2024). These two design components offer a consistent, theoretically and methodologically well-aligned approach to meet the goals of this study.

Population

The population of this study is all the exercises and activities in the Grade 2 Mathematics textbooks used in formal primary schools in Sindh, Pakistan - namely, those textbooks mandated in Government schools (Sindh Textbook Board) and those used in private English-medium schools (Oxford University Press). The population in document analysis research is not people, but the entire body of content from which the sample for analysis is drawn (Mayring, 2022).

Sample and Sampling Strategy

The sample is two textbooks, chosen through purposive sampling, a non-probability sampling technique where the material is deliberately selected because of its relevance to the research questions and its ability to yield important data (Ahmad & Wilkins, 2025):

1. Grade 2 Mathematics Textbook by the Sindh Textbook Board (STBB) - the official textbook for primary schools in Sindh, published by the Sindh Textbook Board, Jamshoro.
2. Oxford University Press (OUP) Grade 2 Mathematics Textbook - used in private English-medium primary schools in Sindh that follow the OUP curriculum, published by Oxford University Press Pakistan.

The researcher accessed and acquired these textbooks for this study. These textbooks have been chosen as they represent the two most influential teaching and learning frameworks used in Grade 2 in Sindh, are designed for the same age group, and are used as the only or primary teaching and learning resource in the respective types of schools, thus making them comparable to each other. The unit of analysis for this study is each exercise and activity presented in the textbooks, for each chapter and unit.

Research Instrument

The main research tool is a Bloom's Taxonomy Classification Rubric designed by the researcher to assist in the classification of exercises and activities. The rubric is structured according to the six levels of Bloom's revised Taxonomy (Anderson & Krathwohl, 2001), with criteria and indicators for action verbs and descriptive words framed in the context of Grade 2 Mathematics, as adopted by Rochmatillah (2023) and Alayont et al. (2023).

Bloom's Level Descriptions as Applied to Grade 2 Mathematics Examples of Tasks Remembering: Retrieving facts, numbers or procedures from memory, Write, list, identify, name, fill in the blank
Understanding: Explaining concepts or classifying numerical ideas Describe, sort, compare, classify, select
Applying: Applying procedures to solve problems Solve, calculate, use, demonstrate, complete Analyzing Decompose problems; look for patterns or trends Find the pattern, arrange, examine, what is different
Evaluating: Justifying or judging a solution or method Test, check, is this right? why? Creating: Invent problems, strategies, or representations Make up your own, design, invent, write a word problem

Data Collection

Four steps were taken to collect the data:

- Step 1: Retrieve the textbooks: The textbooks were physically acquired. The STBB textbook was obtained directly and the OUP textbook was obtained through a private school in Sindh that is currently using the series.
- Step 2: Initial Review: Both textbooks were first read completely to get an overall picture of their structure, units and content prior to the analysis, as suggested by Mayring (2022).
- Step 3: Units of Analysis: The units of analysis were identified as all exercises and activities provided for the students in each chapter and unit of both textbooks. Exercises and activities within worked examples, teacher instruction, or teacher notes were not included.
- Step 4: Classification and Coding: All identified exercises and activities were classified based on the Bloom's Taxonomy Classification Rubric into one of six cognitive levels. In cases where an exercise included several sub-tasks at varying cognitive levels, they were coded separately. Coded data were entered into a data sheet with columns for textbook, chapter, unit and Bloom's level.

Data Analysis

Data analysis involved four steps:

- Stage 1: Counting: The total count of exercises at each of the six Bloom's levels was calculated for each textbook to establish a cognitive distribution profile for each textbook.
- Stage 2: LOTS vs. HOTS Distribution: The distribution of exercises at Lower-Order Thinking Skills (LOTS: Remembering, Understanding, Applying) and Higher-Order Thinking Skills (HOTS: Analyzing, Evaluating, Creating) levels were compared proportionally in both textbooks, addressing SO2 and RQ2 directly.
- Stage 3: Qualitative Analysis: The cognitive profiles of both textbooks were compared qualitatively, looking at the types, diversity and pedagogic focus of tasks at each level, and what this reveals about the cognitive opportunities afforded to Grade 2 students, addressing SO3 and RQ3.
- Stage 4: Synthesis: The results of all stages were integrated to develop an overall comparative picture of the textbooks, which informed conclusions and implications. This is in line with directed qualitative content analysis (Mayring, 2022) and the methodology used by Zeynivandnezhad et al. (2024).

Study Limitations

- Same grade only: This study is only about Grade 2 Mathematics textbooks. The recommendations and conclusions cannot be applied to other grade levels or subjects without further research.

- Two textbooks only: Only a single textbook from each sector has been studied. There may be differences between editions, reprints or series within the STBB or OUP textbooks that this study has not taken into account.
- Qualitative content analysis: This study uses qualitative content analysis, which, although systematic and rigorous, still contains some level of interpretation in the classification of the exercises especially those that are borderline between adjacent Bloom's levels. While attempts are made to reduce this subjectivity through the use of a coding rubric and peer debriefing, some will remain.
- Examination of textbooks only: This study focuses exclusively on the textbooks used and does not take into consideration how textbooks are used and supplemented in the classroom. The demands on students' cognition observed in the textbook may not be the same as those actually experienced by students.
- No student or teacher input: The study does not include input from students, teachers or curriculum designers, which may limit the analysis of the results

Results

The results of the qualitative content analysis conducted on the Grade 2 Mathematics textbooks of the Sindh Textbook Board (STBB) and Oxford University Press (OUP) are presented in this section. In the STBB textbook, a total of 82 exercises and activities were recognized and coded, whereas 127 exercises and activities were identified and implied in the OUP textbook. All exercises were classified according to the six cognitive levels of Bloom's revised Taxonomy (Anderson & Krathwohl, 2001). The findings are presented in response to each of the three research questions by which this study was conducted.

Distribution of Cognitive Levels in the Exercises and Activities of Both Textbooks

STBB Grade 2 Mathematics Textbook

Across all nine units of the STBB Grade 2 Mathematics textbook, a total of 82 exercises and activities were identified and classified according to Bloom's revised Taxonomy. The distribution is presented in Table 1.

Table 1: Cognitive Distribution of Exercises — STBB Grade 2 Mathematics

Bloom's Level	No. of Exercises	Percentage (%)
L1 — Remembering	18	22.0%
L2 — Understanding	24	29.3%
L3 — Applying	32	39.0%
L4 — Analyzing	8	9.8%
L5 — Evaluating	0	0.0%
L6 — Creating	0	0.0%
Total	**82**	**100%**

As is demonstrated in Table 1, a heavy concentration at the lower three levels of Bloom's Taxonomy is maintained by the STBB textbook. The most represented level is found to be L3 Applying, with 32 exercises (39.0%) accounted for; this focus is driven primarily by the large volume of procedural column computation drills in Unit 2 (Number Operations) and measurement exercises in Unit 6. Additionally, 24 exercises (29.3%) are claimed by L2 Understanding, while 18 exercises (22.0%) are attributed to L1 Remembering. In this first level, tasks such as writing missing numbers in sequences, matching numbers in words with figures, reading ordinal positions, and naming place values of digits are included. Together, 74 exercises are made up by these three lower-order levels, by which 90.2% of all tasks in the STBB textbook are represented.

Least representation is given to higher-order thinking (HOTS). Only 8 exercises (9.8%) were

categorized at the HOTS level, all of which are situated at L4 Analyzing. These tasks are concentrated in Unit 1, where students are requested to arrange numbers in ascending and descending order, and in Unit 5 (Patterns), where shape and number patterns are identified and continued by the students. Critically, no exercises are found at L5 Evaluating or L6 Creating.

OUP Grade 2 Mathematics Textbook

Across all 13 chapters of the OUP Grade 2 Mathematics textbook, a total of 127 exercises and activities were identified and classified according to Bloom's revised Taxonomy. The distribution is presented in Table 2.

Table 2: Cognitive Distribution of Exercises — OUP Grade 2 Mathematics

Bloom's Level	No. of Exercises	Percentage (%)
L1 — Remembering	16	12.6%
L2 — Understanding	31	24.4%
L3 — Applying	47	37.0%
L4 — Analyzing	19	15.0%
L5 — Evaluating	6	4.7%
L6 — Creating	8	6.3%
Total	**127**	**100%**

As is showed in Table 2, most of the exercises in the OUP textbook are similarly focused at L3 Applying (47 exercises, 37.0%), which is monitored by L2 Understanding (31 exercises, 24.4%) and L1 Remembering (16 exercises, 12.6%). A total of 94 exercises are made up by these three lower-order levels, by which 74.0% of all tasks are represented.

However, unlike the STBB textbook, a noticeably wider intellectual range is shown by the OUP textbook. All six levels of Bloom's Taxonomy are covered, including L5 Evaluating with 6 exercises (4.7%) and L6 Creating with 8 exercises (6.3%). Additionally, 19 exercises (15.0%) are taken up by L4 Analyzing, which are feast across numerous chapters such as Numbers, Addition and Subtraction, Multiplication, Length, and Picture Graphs. A total of 33 HOTS (Higher-Order Thinking Skills) exercises are contained in the OUP textbook; by this, 26.0% of all tasks are embodied, which means more than one out of every four activities in the book is involved in this category.

Distribution of LOTS and HOTS in Both Textbooks

A direct appraisal of the LOTS and HOTS distribution between the two textbooks is presented in Table 3.

Table 3: LOTS and HOTS Distribution — STBB vs OUP

Category	STBB (n=82)	STBB %	OUP (n=127)	OUP %
LOTS (L1 + L2 + L3)	74	90.2%	94	74.0%
HOTS (L4 + L5 + L6)	8	9.8%	33	26.0%
Total	**82**	**100%**	**127**	**100%**

A substantial difference in the LOTS/HOTS balance between the two textbooks is exposed by the findings presented in Table 3. Only 9.8% of its exercises are allocated to higher-order thinking by the STBB textbook, linked to 26.0% in the OUP textbook, by which a difference of 16.2 percentage points is shown. By this, it is meant that for every single HOTS task in the STBB textbook, about nine LOTS tasks are found. In contrast, a considerably more well-adjusted ratio is maintained in the OUP textbook, where roughly one HOTS task is provided for every three LOTS tasks.

The gap between the two textbooks becomes even more discrete at the highest cognitive levels. The STBB textbook contains no exercises at either L5 (Evaluating) or L6 (Creating). In contrast, the OUP textbook includes 6 evaluating tasks (4.7%) and 8 creating tasks (6.3%). Consequently, the OUP curriculum provides Grade 2 students with tangible opportunities to validate their mathematical thinking, assess the validity of solutions, and build original mathematical concepts, learning

opportunities that are completely mislaid from the STBB textbook.

Promotion of Critical Thinking and Cognitive Development

To answer RQ3, a qualitative analysis was conducted to examine the type, variety, and placement of exercises across various cognitive levels. This helped evaluate how efficiently both textbooks encourage critical thinking and cognitive growth in Grade 2 learners.

STBB Textbook: The cognitive layout of the STBB textbook shows that it mostly depend on procedural and recall-based learning for Grade 2 mathematics. Because 90.2% of its activities are concentrated within the LOTS levels—with 39.0% dedicated to L3 Applying alone—the book leans deeply toward repetitive skill practice. The total lack of L5 and L6 tasks shows that the textbook infrequently stimuli students to think critically, analyze mathematical logic, or design anything original. Additionally, the distribution of HOTS activities within the STBB book is highly unbalanced; all 8 identified HOTS exercises are confined to Unit 1 (Numbers) and Unit 5 (Patterns). This leaves seven out of the nine units entirely devoid of any advanced cognitive demands, suggesting that higher-order thinking in the STBB textbook is simply accidental and quarantined rather than purposely planned across the curriculum.

Table 4: Summary Comparison — Cognitive Profile of Both Textbooks

Bloom's Level	**STBB %**	**OUP %**	**Difference (OUP − STBB)**
L1 — Remembering	22.0%	12.6%	−9.4%
L2 — Understanding	29.3%	24.4%	−4.9%
L3 — Applying	39.0%	37.0%	−2.0%
L4 — Analyzing	9.8%	15.0%	+5.2%
L5 — Evaluating	0.0%	4.7%	+4.7%
L6 — Creating	0.0%	6.3%	+6.3%
Total LOTS	**90.2%**	**74.0%**	**−16.2%**
Total HOTS	**9.8%**	**26.0%**	**+16.2%**

In summary, a cognitively richer and more diverse learning experience is clearly presented to be delivered to Grade 2 students by the OUP textbook in comparison to the STBB textbook. Although a procedural alignment is shared at the core of both books, this baseline is meaningfully extended by the OUP textbook through the incorporation of exercises through all six cognitive levels of Bloom's Taxonomy. In addition, HOTS tasks are distributed across the full range of content themes, whereby regular opportunities are offered to Grade 2 learners to examine patterns, evaluate reasoning, and generate original mathematical products. By contrast, the STBB textbook is found to be confined to the three lower cognitive levels, with only slight Analyzing tasks and no Evaluating or Creating tasks being offered whatsoever. Important implications for the quality and equity of mathematical learning experiences accessible to Grade 2 students across Sindh's public and private school sectors are accepted by these results.

Discussion

This chapter is concerned with the clarification of the findings offered in the previous section. The results obtained from the content analysis of both textbooks are deliberated in relation to the research questions, existing literature, and the wider educational context of Sindh. Patterns of cognitive demand are observed across both textbooks, and the differences found between them are considered in terms of their possible effects on learners' thinking development. The discussion is organized around six main areas: the overall dominance of lower-order thinking in both textbooks, the cognitive gap between the two books, the distribution of tasks across content themes, the implications for educational equity, the implications for curriculum and policy, and the boundaries of the study.

The Dominance of Lower-Order Thinking in Both Textbooks

The results of this study show that both the STBB and OUP Grade 2 Mathematics textbooks are largely focused on lower-order thinking skills. In the STBB textbook, 90.2% of all exercises fall under the LOTS category, while the OUP textbook shows a LOTS proportion of 74.0%. This pattern is generally in line with the broader body of international and Pakistani research on textbook cognitive demand. Ahmed, Lashari, and Golo (2023), in their review of primary-level English textbooks under Pakistan's Single National Curriculum, similarly found that nearly 90% of textbook items were classified as lower-order, which confirms that the dominance of LOTS is not limited to mathematics or to the STBB curriculum but reflects a wider pattern in Pakistani educational materials. At the international level, like patterns have been recorded across multiple countries, where studies consistently found that textbooks in developing country settings assign the large majority of tasks to the recall and procedural categories of Bloom's Taxonomy (Huang et al., 2025; Rochmatillah, 2023).

The specific supremacy of L3 Applying in both textbooks 9.0% in the STBB and 37.0% in the OUP — deserves closer attention. Although Applying tasks do require students to use learned procedures to solve problems, which is more cognitively demanding than simple recall, the nature of these tasks in both books differs quite strikingly. In the STBB, Applying tasks are mostly mechanical computation drills long sets of addition, subtraction, multiplication, and division sums that require students to repeat algorithms without any change in problem type or context. This kind of drill-based practice, while helpful for procedural fluency, does not build the deeper mathematical reasoning that Applying tasks can ideally grow. In the OUP, on the other hand, Applying tasks more often seem as contextualised word problems reinforced by bar models, real-world measurement activities, and multi-step money calculations task types that require students to not only carry out a procedure but also decide which procedure is suitable for a given situation, which represents a noticeably higher cognitive request within the same taxonomic level. This qualitative difference within L3 is important and suggests that a purely numerical comparison of Bloom's level distributions does not fully reflect the cognitive difference between the two textbooks.

The Cognitive Gap between STBB and OUP

Perhaps the most important finding of this study is the size of the gap between the two textbooks in the higher-order thinking opportunities they offer. The OUP textbook gives 26.0% of its exercises to HOTS, compared to only 9.8% in the STBB — a difference of 16.2 percentage points. This gap is especially noticeable at the upper levels of Bloom's Taxonomy, where the OUP includes both L5 Evaluating (4.7%) and L6 Creating (6.3%) exercises that are totally absent from the STBB textbook. This finding directly responds to Research Question 2 and is significant both statistically and in positions of teaching practice.

The absence of L5 and L6 tasks in the STBB textbook means that Grade 2 learners in Sindh's public schools are never asked — through their main textbook — to justify a mathematical answer, assess the correctness of a peer's solution, design an original problem, or produce a mathematical outcome of their own. These are not simply abstract academic skills. As Anderson and Krathwohl (2001) point out, the ability to evaluate and create represents the highest level of cognitive engagement with a subject, and their consistent absence from a textbook that serves as the main teaching tool in many Sindh classrooms has real and lasting effects on learners' cognitive development. This finding connects with Latafat's (2024) documentation of a widespread rote memorisation culture in Pakistani mathematics classrooms, and with Amjad's (2024) finding that prospective teachers in Pakistan mostly demonstrate mastery of LOTS — a pattern that is likely both influenced by and reflected in the textbooks they are qualified with.

The OUP textbook's inclusion of L6 Creating tasks is chiefly value perceiving. Tasks such as writing one's own division story, making three different word problems from a supermarket price list, designing a 3D shape model, creating a fraction addition story, and building a picture graph from

self-collected survey data signify qualitatively different learning experiences from anything found in the STBB textbook. These tasks position students as producers of mathematical knowledge rather than passive receivers of it, encouraging the kind of mathematical confidence and creativity that research consistently links to deeper and more lasting learning (Kaitera & Harmoinen, 2022). The complete absence of such tasks in the STBB textbook represents a serious missed opportunity for the cognitive growth of Grade 2 learners in Sindh's public schools.

Distribution Patterns across Content Themes

Another aspect of the findings that deserves discussion is the uneven feast of HOTS tasks across content themes in both textbooks. In the STBB textbook, all 8 HOTS exercises are concentrated in just two of its nine units — Unit 1 (Numbers) and Unit 5 (Patterns) — leaving the remaining seven units entirely without higher-order cognitive challenge. This clustering suggests that HOTS engagement in the STBB is accidental rather than purposely built in, rising from the naturally logical character of number comparison and pattern acknowledge tasks rather than from a clear curricular intention to develop higher-order thinking across all mathematical areas.

The OUP textbook presents a clearly different pattern. HOTS exercises are spread across 11 of its 13 chapters, appearing in content areas as varied as Numbers, Addition and Subtraction, Multiplication and Division, Length, Money, 2D and 3D Shapes, Fractions, Time, Volume, and Picture Graphs. This wide spread points to a deliberate teaching philosophy of embedding higher-order thinking throughout the mathematics curriculum rather than limiting it to particular topics. This finding is consistent with Rochmatillah's (2023) analysis of Cambridge Primary Mathematics textbooks, which also found HOTS tasks distributed across all four major mathematical themes. It suggests that the OUP textbook is designed with a clear understanding of the value of cognitive variety and breadth across the curriculum — a design method that is prominently absent in the STBB textbook.

Implications for Educational Equity in Sindh

The findings of this study carry serious implications for educational equity in Sindh. Children attending public schools in Sindh depend almost entirely on the STBB textbook as their primary and in many rural and under-resourced classrooms, their only learning resource (Numajiri & Kosaka, 2025). The finding that this textbook places 90.2% of its exercises within lower-order thinking, and offers no exercises at the two highest cognitive levels, means that the formal curriculum being delivered to the majority of Grade 2 learners in Sindh's public schools reliably underestimates and underserves their cognitive prospective.

In contrast, children in private schools in Sindh who use the OUP textbook are regularly exposed to a broader and more cognitively challenging set of tasks, including opportunities to analyse, evaluate, and create. This difference is not simply a matter of textbook design — it represents an inequality in the cognitive opportunities available to children based on whether their families can afford private schooling. Shaikh and Benedetti (2024) have disputed that the structural inequalities in Pakistan's education system are not sufficiently addressed by curriculum reform alone, and the findings of this study offer direct empirical support for that argument at the level of primary mathematics textbooks in Sindh. The cognitive gap documented here is, in effect, a form of educational inequality that begins as early as Grade 2 and that the textbook — as the main negotiator of instruction actively strengthens. These findings are further supported by Bhutto et al. (2022), whose comparative study of secondary-level textbooks in Sindh also found meaningful differences in content quality and cognitive demand between public and private sector materials, suggesting that the pattern found in this study is not an isolated case but part of a wider and enduring structural reality in Sindh's educational setting.

Implications for Curriculum Development and Educational Policy

The findings of this study have clear and practical suggestions for curriculum development and educational policy in Sindh. If the STBB Grade 2 Mathematics textbook is to offer learners with experiences that sincerely support their cognitive growth, a meaningful revision of the book's exercise

design is required. Specifically, this revision should focus on the systematic inclusion of L4 Analysing, L5 Evaluating, and L6 Creating tasks across all nine units of the textbook, not only in units where such tasks arise naturally from the content. Tasks such as identifying errors in a peer's calculation and explaining the mistake (Evaluating), writing an original word problem using numbers from a given context (Creating), or explaining which of two methods for solving a subtraction problem is more efficient and why (Evaluating) are completely suitable for Grade 2 learners and would bring the STBB textbook significantly closer to the cognitive standard demonstrated by the OUP textbook.

Furthermore, the findings recommend that teacher training in Sindh's public schools should clearly address the difference between LOTS and HOTS tasks, giving teachers the practical skills to supplement lower-order textbook exercises with higher-order questioning and classroom activities. Since the textbook functions as the main instructional guide in many classrooms, teachers who understand its cognitive limitations are better placed to make up for them in practice. This point is consistent with Amjad's (2024) recommendation that teacher preparation programmes in Pakistan include explicit training in Bloom's Taxonomy and higher-order instructional design.

Finally, the findings call for transformed attention to the role of the Sindh Textbook Board in setting and maintaining cognitive quality standards for the textbooks it produces and distributes. The complete absence of L5 and L6 tasks in the STBB Grade 2 Mathematics textbook is not unavoidable — it is a design decision, and one that can and should be reassessed in future editions of the textbook.

Limitations of the Study in Context of Findings

While the findings of this study provide a clear and meaningful empirical picture of the cognitive differences between the STBB and OUP Grade 2 Mathematics textbooks, several limitations must be acknowledged when interpreting them. First, only the textbooks themselves were analysed in this study, and no classroom observations were conducted. It is possible that some teachers in public schools supplement the STBB textbook with higher-order questions and activities that are not present in the book itself, just as some private school teachers may use the OUP textbook in a purely procedural way. Second, the study is limited to a single grade level and subject, and the patterns observed may not fully represent the cognitive profile of the STBB and OUP curricula at other grade levels. Third, the qualitative coding of exercises involves a degree of interpretive judgement, and despite the use of a structured rubric and peer debriefing, some borderline cases may have been classified differently by another researcher. These limitations are discussed more fully in the Limitations section of this paper.

Conclusion

The primary aim of this study was to carry out a comparative qualitative content analysis of the Grade 2 Mathematics textbooks produced by the Sindh Textbook Board (STBB) and Oxford University Press (OUP), with particular attention given to the types, nature, and cognitive levels of the exercises and activities limited in each textbook, as classified according to Bloom's Revised Taxonomy (Anderson & Krathwohl, 2001). Three research questions and three specific objectives were used to guide the study, through which all exercises and activities in both textbooks were systematically identified, listed, and coded. A detailed cognitive profile was produced for each textbook, and a detailed empirical comparison between the two was made possible as a result.

Summary of Key Findings

The findings of this study can be organised and summarised along three key dimensions.

The first dimension apprehensions the overall cognitive distribution of exercises in both textbooks (RQ1 and SO1). It was found that both textbooks are largely lower-order in their cognitive orientation. The STBB textbook was found to contain a total of 82 exercises and activities, out of

which 90.2% were placed within the LOTS category — more specifically at L1 Remembering (22.0%), L2 Understanding (29.3%), and L3 Applying (39.0%). The OUP textbook, on the other hand, was found to contain 127 exercises and activities, out of which 74.0% were placed within the LOTS category — at L1 Remembering (12.6%), L2 Understanding (24.4%), and L3 Applying (37.0%). Although both textbooks were found to share a procedural orientation at their essential, the OUP textbook was observed to demonstrate a considerably broader and more varied cognitive range in comparison to the STBB textbook. It was also noted that while both books emphasise Applying tasks most heavily, the nature of these tasks differs meaningfully between the two. In the STBB, Applying tasks were found to consist largely of repetitive computation drills, whereas in the OUP, such tasks more frequently appeared as contextualised, real-world problem-solving activities — a distinction that carries significant implications for the depth of mathematical understanding being developed in learners.

The second dimension concerns the distribution of LOTS and HOTS tasks across both textbooks (RQ2 and SO2). A substantial and educationally significant gap was found to exist between the two textbooks in this regard. It was found that the STBB textbook assigns only 9.8% of its exercises to higher-order thinking, and that all of these exercises fall at the L4 Analysing level, with no exercises found at either L5 Evaluating or L6 Creating. The OUP textbook, by contrast, was found to allocate 26.0% of its exercises to higher-order thinking, with tasks distributed across all three HOTS levels — L4 Analysing (15.0%), L5 Evaluating (4.7%), and L6 Creating (6.3%). It was observed that the OUP textbook is the only one of the two that involves Grade 2 learners at the highest cognitive levels of Bloom's Taxonomy, offering tasks through which students are required to justify their mathematical reasoning, assess the precision of given solutions, and produce original mathematical outcomes of their own. This gap of 16.2 percentage points in HOTS provision between the two textbooks is not a minor statistical difference it represents a fundamental difference in the cognitive experiences being presented to learners in public and private schools correspondingly.

The third dimension concerns the extent to which each textbook indorses critical thinking and cognitive development among learners (RQ3 and SO3). On the basis of the findings, it was clearly specified that the OUP textbook provides a significantly richer and more inspiring cognitive learning environment than the STBB textbook. It was found that the HOTS exercises in the OUP textbook are systematically discrete across 11 of its 13 chapters, which was taken as a reflection of a deliberate and conscious educational philosophy of embedding higher-order thinking throughout the mathematics curriculum as a whole. In the STBB textbook, however, HOTS exercises were found to be limited to only 2 of its 9 units, and were originate to be completely absent from content areas including Number Operations, Money, Measurement, Time, Geometry, and Statistics which are surely the areas that make up the popular of the textbook's content. It was therefore concluded that the STBB textbook does not encourage critical thinking or cognitive development at the higher levels of Bloom's Taxonomy through its exercises and activities, whereas the OUP textbook does so in a meaningful, varied, and systematically distributed manner. This difference is important. When children are never asked to reason critically about mathematics in the very textbook that forms the backbone of their daily learning, the consequences for their long-term cognitive growth are important and far-reaching.

Contribution to the Literature

This study is considered to make several meaningful contributions to the existing body of scholarship on textbook analysis, mathematics education, and educational equity in Pakistan. To the best of the researcher's knowledge, this is the first published study in which Bloom's Revised Taxonomy has been applied to a systematic comparative analysis of the STBB and OUP Grade 2 Mathematics textbooks in Sindh. Through this, the tradition of comparative textbook research in Pakistan as

represented by studies such as Bhutto et al. (2022), Afzal et al. (2024), and Ahmed et al. (2023) has been extended to the domain of primary mathematics education in Sindh, a context that has received limited scholarly attention despite its considerable significance for the lives of a large number of young learners. A contribution has also been made to the international literature on the cognitive quality of primary mathematics textbooks by providing empirical data from a developing country context, thereby adding to the growing body of sign that the supremacy of lower-order thinking in textbook design is a wide and determined challenge that needs thoughtful and continued curricular involvement.

Furthermore, the finding that the STBB Grade 2 Mathematics textbook includes no L5 or L6 exercises is considered a specific, evidence-based, and directly actionable finding that holds instant relevance for curriculum developers, textbook authors, and educational policymakers at the Sindh Textbook Board. Unlike wider and more general critiques of curriculum quality, which are frequently difficult to translate into real action, this finding identifies a precise and measurable gap namely, the complete absence of Evaluating and Creating tasks from the textbook that can be practically spoken through targeted and focused revision of the textbook's exercise design in future editions. This makes the study not only analytically valuable but also practically beneficial for those involved in determining the educational experiences of children in Sindh.

Recommendations

On the basis of the findings and discussion presented throughout this study, the following recommendations are existing to relevant stakeholders:

- For the Sindh Textbook Board: It is suggested that future changes of the STBB Grade 2 Mathematics textbook order the systematic and deliberate incorporation of L4 Analysing, L5 Evaluating, and L6 Creating tasks across all units of the textbook. It is important to note that this does not require a complete reshape of the curriculum. Somewhat, what is called for is the careful and deliberate incorporation of a small number of higher-order tasks within each unit tasks such as inquiring students to explain which method of solving a problem is more effective and why, asking them to check and correct a peer's calculation, inviting them to write an original word problem using numbers from a conversant context, or stirring them to classify patterns across a set of number operations. The OUP textbook is considered to provide a practical, reachable, and already-tested model for how such tasks can be successfully embedded within a primary mathematics textbook without upsetting or discouragement its procedural core.
- For mathematics teachers in Sindh's public schools: It is suggested that teachers be made aware of the cognitive limitations of the STBB textbook and be actively encouraged to supplement textbook exercises with higher-order classroom activities, open-ended questioning strategies, and peer discussion tasks that go beyond what the textbook itself provides. Professional development programmes should be designed to explicitly address Bloom's Taxonomy, the distinction between LOTS and HOTS tasks, and practical approaches for generating higher-order mathematical challenges that are appropriate for the Grade 2 level and accessible to learners from a range of ability levels.
- For teacher educators and curriculum specialists: It is recommended that both pre-service and in-service teacher training programmes in Sindh incorporate clear and structured instruction in Bloom's Revised Taxonomy and its practical application to primary mathematics pedagogy. By being fortified with the abstract tools needed to classify the cognitive limitations of their textbooks, teachers will be better placed to

compensate for these limitations through their own classroom practice and to create learning environments in which higher-order thinking is vigorously encouraged and valued.

- For educational policymakers: The significant intellectual gap that has been recognised between the STBB and OUP Grade 2 Mathematics textbooks is understood to represent a form of educational unfairness that affects a very large number of Grade 2 learners across Sindh's public school system on a daily basis. It is suggested that policymakers treat the cognitive quality of publicly distributed textbooks as a serious matter of educational equity, and that minimum standards be established for the distribution of Bloom's cognitive levels in textbooks that are produced, approved, and distributed by the Sindh Textbook Board. Without such standards, the cognitive gap between public and private sector textbooks is likely to persevere and to continue spreading.
- For future researchers: This study was focused on Grade 2 Mathematics at the level of individual exercises and activities. It is suggested that future research spread this kind of analysis to other grade levels, other subjects, and other provinces of Pakistan, so that a more comprehensive and nationally representative picture of the cognitive quality of public sector textbooks can be built over time. It is further recommended that future studies incorporate classroom observation data, so that the relationship between the cognitive demand of a textbook and the actual instructional practices of teachers can be examined more closely, thereby addressing the limitation acknowledged in this study regarding the gap between what a textbook contains and what actually takes place in the classroom.

Ethical Considerations

- The textbooks are copyrighted. In line with principles of academic work, only descriptive and analytical references are made to their content; no large part of the textbooks has been copied. • The coding process is well documented and clearly reported, maintaining academic rigor and a true reflection of the content of both textbooks.
- The researcher recognizes the potential for researcher bias because of background knowledge of either system. This is counteracted by using a pre-determined theoretical coding scheme and peer debriefing sessions.
- The study's results are described and compared but not judged to be definitive assessments of the quality of either publisher.
- No human participants are involved in the study; there are no concerns regarding informed consent, confidentiality or anonymity.

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