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" Expedition of Fundamental and Meta Cognitive Modules in English Punjab Textbook Board, Pakistan"

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Abstract

The present study aims to examine the modules (exercises and activities) within compulsory English textbooks (grades 6-10) in order to elucidate the balance between fundamental cognitive (lower-order thinking skills) and metacognitive abilities (higher-order thinking skills). The objective of this study is to explore the balance between fundamental cognitive abilities and higher-order critical thinking skills-based modules. Compulsory English textbooks were selected as the focus of evaluation to assess the levels of criticality, with the modules within these textbooks (grades 6-10) serving as a representative sample for examining the aforementioned balance between fundamental cognitive and metacognitive abilities. To present the findings in a quantitative manner, a data analysis approach was employed, yielding numeric results. The research design adopted for this study was expository, which facilitated the analysis of the modules within compulsory English textbooks (grades 6-10). The Critical Thinking Evaluation Model was utilized to highlight the modules that focused on fundamental cognitive and metacognitive abilities. The overall results demonstrate that compulsory English textbooks (grades 6-10) do not equally enhance learning in accordance with both fundamental cognitive and metacognitive abilities. There is a greater emphasis on modules that target fundamental cognitive abilities compared to those that foster metacognitive skills. This study holds significant importance for the development of the education system as a whole, benefiting curriculum designers, syllabus designers, examination paper setters, lesson planners, and individuals involved in crafting course outlines for specific subjects. Its findings contribute to maintaining a balanced approach to learning that encompasses both fundamental cognitive and metacognitive abilities. The findings indicate that there is a need for further training among syllabus designers to effectively manage the balance between fundamental cognitive abilities and modules that promote metacognitive abilities in compulsory English textbooks.

Keywords: Critical Thinking Evaluation Model (CTEM), English Textbooks, Modules, Fundamental Cognitive Abilities, Metacognitive Abilities.

Introduction

The Punjab Textbook Board in Pakistan has undertaken an exciting expedition to explore and enhance the Fundamental and Met Cognitive modules in the English curriculum. This endeavor aims to delve deeper into the foundational aspects of English language learning while also focusing on the development of fundamental cognitive (lower order thinking skills) and metacognitive (higher order thinking skills) abilities. The ability to retain and comprehend knowledge is what's known as lower-order thinking skills, (Jansen & Möller, 2022; Kwangmuang et al., 2021). In the meantime, a framework for how students' critical thinking abilities develop over the course of their schooling is provided by higher-order thinking skills, or HOTS (Mubarok & Anggraini, 2020; Mustika & Susanti, 2020; Suherman et al., 2020).

By integrating the modules into the textbooks, the Punjab Textbook Board seeks to provide students with a comprehensive and holistic approach to English language education, fostering their language proficiency and cognitive abilities. Graves (2000) asserted that textbooks serve as the primary instructional tool for teaching and learning in specific subjects. With the aim of examining the foundational cognitive abilities and higher-order critical thinking skills fostered by textbooks, this study seeks to explore the presence of modules dedicated to these skills within compulsory English textbooks for grades 6-10. The study pursues two objectives: firstly, to determine the frequency and percentage of modules focused on fundamental cognitive abilities and higher-order critical thinking skills in these textbooks; secondly, to assess the balance between these two types of modules.

While previous research has evaluated textbooks in various subjects from different angles (e.g., Fayyaz et al., 2021; Zamani & Yousofi, 2016; Ebadi & Mozafari, 2016; Zamani & Rezvani, 2015; Zareian et al., 2015; Assaly & Igharia, 2014; Askaripour, 2014; Riazi & Mosalanejad, 2010), there has yet to be a specific evaluation of modules within compulsory English textbooks. There are several other concerns that contribute to the issue, such as the teacher's teaching materials and approach. Unfortunately, they are not effective in preparing students to tackle higher-order thinking skills (HOTS) questions in reading. As a result, students become more comfortable with addressing lower-order thinking skills (LOTS) questions during reading activities. The main issue here is that Indonesian students don't get enough practice in answering contextual questions that require concrete action, reasoning, and innovation.

These are crucial aspects of PISA-style questions. Another problem is that teachers lack the ability to create assessments specifically designed for higher-order thinking skills (HOTS), and there is a scarcity or limited access to evaluation tools that train students in HOTS (Hamdi et al., 2018; Widyaningsih et al., 2020). To address this gap, the study aimed to identify different levels of criticality (Background Knowledge, Apprehension, Conceptualization, Application, Anatomization, Critical Evaluation, Creativity, and Self-Directed Learning) and highlight the balance between fundamental cognitive abilities and higher-order critical thinking skills-based modules.

This study is significant for the entire education system, including curriculum designers, textbook designers, examination paper setters, lesson planners, and course outline designers, as

it can enhance criticality-based learning by incorporating balanced cognitive and critical thinking-based exercises, activities, examination papers, course objectives, and lesson plans. Additionally, this study can provide insights for the redesign of English language textbooks for grades 6-10. The research questions that this study aimed to answer are as follows

1. To what extent do the compulsory English textbooks (6th-10th) published by the Punjab Textbook Board effectively portray the fundamental cognitive and metacognitive abilities?
2. To what extent were the compulsory English textbooks (6th-10th) intentionally designed to maintain a balance between modules that focus on fundamental cognitive abilities and those that emphasize metacognitive abilities?

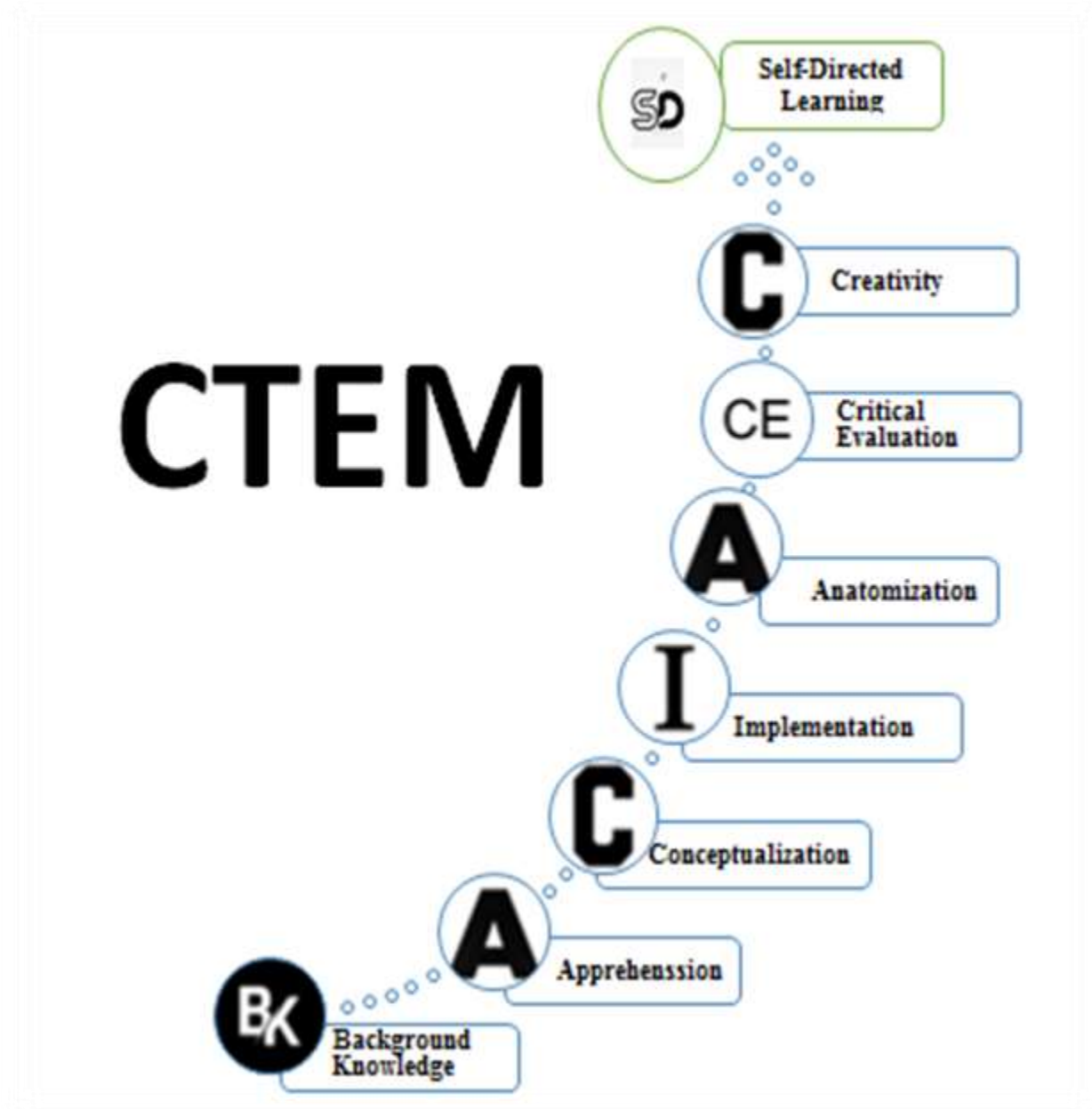
Theoretical Underpinning

Fayyaz (2019) introduced the "Critical Thinking Evaluation Model (CTEM)" as an advanced framework for assessing critical thinking skills in various educational components such as activities, exercises, learning outcomes of textbooks, lesson plans, course outlines, and examination questions. The CTEM is structured based on a hierarchy of critical thinking skills, comprising eight levels: Background Knowledge, Apprehension, Conceptualization, Application, Anatomization, Critical Evaluation, Creativity, and Self-Directed Learning/Independent Learning. A visual representation of the CTEM is provided below:

Figure 1: Critical Thinking Evaluation Model (CTEM)

Initial four levels including background knowledge, apprehension, conceptualization, and implementation are included in fundamental cognitive abilities, while on the other hand anatomization, critical evaluation, creativity and self-directed learning are classified into metacognitive skills. A number of relevant studies have been conducted so far some of them are quoted below.

In order to complete a descriptive content analysis report, Qasrawi (2020) used the Revised Taxonomy with a checklist of probable verbs from OPAR (2012) and the cognitive levels of



Bloom's Taxonomy. The results of this study showed that whereas the first edition primarily focused on Comprehension and Analysis, the bulk of the cognitive objectives in the second edition

relate to both LOTS (Comprehension) and HOTS (Analysis and Synthesis). Additionally, several objectives were reworded to better reflect the cognitive objectives in cases where they were more closely linked to the sub-skills of reading comprehension (skimming, scanning, previewing, etc.). Similarly, Armala et al. (2022) conducted a qualitative and descriptive study to examine the levels of lower-order thinking skills (LOTS) and higher-order thinking skills (HOTS) among pupils in response to reading questions. Data was gathered from eighteen students through reading tests and a questionnaire. Descriptive qualitative analysis was used for data analysis. The findings indicated that students performed well in responding to reading questions based on LOTS, but struggled with questions that required HOTS. There was significant variation in students' reading comprehension skills based on LOTS and HOTS. These results can help improve students' proficiency in responding to reading questions that incorporate both LOTS and HOTS.

Then, the study investigated the distribution of HOTS in tests created by English teachers, the test's applicability to the abilities covered in the English simplified curriculum, and the cause of HOTS's lower frequency in tests created by English teachers (Syahdanis et al., 2021). In a study conducted by Fayyaz, Hassan, and Parveen (2021), the learning outcomes of compulsory English textbooks were assessed using the Critical Thinking Evaluation Model. The results indicated that the textbooks focused more on Lower Order Thinking Skills (LOTS) rather than Higher Order Thinking Skills (HOTS). Other researchers, such as Riazi and Mosalanejad (2010), have also used Bloom's taxonomy to evaluate textbook contents. They evaluated four textbooks, three from senior high school and one Pre-University textbook, to determine the level of critical thinking skills. The textbooks were analyzed and categorized based on the coding scheme representing Bloom's taxonomy. The Chi-square test was used to identify significant patterns of criticality-based learning levels in different textbooks. The results showed that the senior high school textbooks primarily emphasized fundamental cognitive abilities, with Application and Comprehension levels of Bloom's taxonomy being dominant.

The Pre-University textbook, on the other hand, focused more on Knowledge and Comprehension levels of criticality. Another study conducted by Zareian et al. (2015) examined Iranian Universities' textbooks titled "English for the Students of Science" and "English for the Students of Engineering" to assess the levels of criticality. The questions in the selected textbooks were analyzed using the coding of Revised Bloom's taxonomy. The findings indicated that the syllabus designers of "English for the Students of Science" and "English for the Students of Engineering" prioritized fundamental cognitive abilities when designing the questions. The lower levels of Bloom's Revised Taxonomy (Remembering, Understanding, and Applying) were more prevalent compared to the higher-order thinking skills levels (Analyzing, Evaluating, and Synthesis).

Additionally, other researchers, such as Zamani and Rezvani (2015), employed Bloom's Revised Taxonomy in coding form to assess the levels of criticality in exercises and activities of university textbooks. Their findings showed that the designers of "An Introduction to Methodology for TEFL/TESL" and "Linguistics & Language" textbooks emphasized tasks based on fundamental cognitive abilities. Conversely, the textbook "Testing Language Skills from Theory to Practice" featured a dominance of exercises and modules that focused on higher-order critical thinking skills. Assaly and Igbaria (2014) analyzed the reading and listening activities in the Master Class textbook used for teaching 10th grade in Arab. They aimed to identify the levels of critical thinking skills using Bloom's taxonomy. The findings showed that the activities, such

as multiple-choice questions, wh-questions, yes/no questions, completing sentences and statements, and research questions, were designed to enhance fundamental cognitive abilities in reading and listening skills.

Out of a total of 173 activities, 114 were relevant to fundamental cognitive abilities, while 59 were intended to develop metacognitive reading and listening skills. Zamani and Yousofi (2016) examined the contents of the B.A State curriculum for Teaching English as a Foreign Language (TEFL) and English Translation (ET) using Bloom's Revised Taxonomy. the results of the study showed that fundamental cognitive abilities were more common in the contents of "Teaching Persian to Speakers of other Languages." The English translation standards focused on critical skills, especially in evaluation and creation. Ebadi and Mozafari (2016) used a coding scheme based on Bloom's Revised Taxonomy to investigate the contents of two series of "Teaching Persian to Speakers of other Languages."

The results also indicated that the selected textbooks lacked criticality in the levels of synthesis, evaluation, and analysis. Askaripour (2014) used Bloom's Revised Taxonomy to identify the contents of the new version of the "Top Notch Series (2009)" in terms of fundamental cognitive abilities and higher-order critical thinking skills. The findings revealed that the new version of the series did not prioritize making students critical thinkers, as the content focused more on fundamental cognitive abilities than higher-order critical thinking skills. The study followed the Critical Thinking Evaluation Model to analyze the levels of critical thinking skills, and a reliable and valid research methodology was adopted.

Methodology

To enhance the comprehensibility of the results, a quantitative data analysis approach was employed to ascertain the frequencies of modules based on critical thinking skills in English textbooks for grades 6-10. The research design adopted was expository, facilitating an examination of the content of modules in compulsory English textbooks for grades 6th-10th. This analysis aimed to elucidate the equilibrium between fundamental cognitive abilities and metacognitive abilities.

Participants

Compulsory English textbooks from grade 6 to grade 10 were evaluated to examine the integration of fundamental cognitive and metacognitive abilities. Modules within the textbooks served as the sample for this analysis, aiming to determine the balance between these two types of abilities. The data collection process involved several steps. First, compulsory English textbooks were collected from the online website of the Punjab Textbooks Board in PDF format. Next, the textbooks were converted into MS Word using an online converter. The data was then extracted from the modules, excluding other sections of the textbooks. The module content in MS Word format was converted into plain text for analysis using Antconc 3.4.2w. Finally, the frequency results were presented in an Excel sheet in the form of graphs and tables.

Data Collection Tools

Compulsory English textbooks were selected for evaluation purposes. To facilitate the evaluation process, an online converter was utilized to convert the textbooks from PDF to MS Word format. The data was then processed using MS Word to ensure clarity. The focus of the analysis was specifically on the modules within the compulsory English textbooks. To determine the frequency of criticality-based modules, Antconc 3.4.2w software was employed. The findings were presented using graphs and tables created in MS Excel. The assessment of criticality levels was

conducted using the Critical Thinking Evaluation Model (CTEM), and the imperative verb's list from CTEM was utilized to identify the equilibrium between fundamental cognitive and metacognitive abilities.

Data Analysis Procedure

The analysis encompassed the examination of modules found in English textbooks designed for students in grades 6 to 10. This investigation aimed to assess the presence of eight distinct levels within these modules, namely Background Knowledge, Apprehension, Conceptualization, Implementation, Anatomization, Critical Evaluation, Creativity, and Self-Directed Learning. The identification of these levels was facilitated through the utilization of a list of imperative verbs provided by Fayyaz (2019) in conjunction with the Critical Thinking Evaluation Model. To ascertain the frequencies associated with each level, Antconc 3.4.2 software was employed, while a manual review of the content was conducted to ensure the validity of the results. The findings, consisting of the critical thinking level titles, corresponding action verbs, and respective frequencies, were meticulously documented within an Excel file. For the purpose of data representation, a combination of descriptive explanations and graphical visualizations was employed, with the graphical representations being generated using MS Excel.

Findings and Discussion

Upon conducting an extensive analysis, it was exposed that the compulsory English textbooks in Punjab, Pakistan, from grades 6 to 10 were deliberately designed to enhance students' critical thinking abilities at various levels. Each textbook in this range employed a distinct approach to foster critical thinking skills. In the 6th grade English textbook, a combination of fundamental cognitive and metacognitive abilities was identified. A comprehensive examination of 223 modules revealed that approximately 56.50% of these activities focused on fundamental cognitive abilities, while the remaining 43.49% aimed to cultivate metacognitive abilities. Transitioning to the 7th grade English textbook, similarities with the 6th grade were observed. Through an analysis of 231 tasks, it was determined that roughly 52.38% were devoted to fundamental cognitive abilities, while 44.58% were designed to nurture metacognitive abilities among 7th-grade students.

The analysis of the 8th grade English textbook revealed variations among the 7th, 6th, and 8th grade English textbooks with regard to the integration of tasks that promote both fundamental cognitive abilities and metacognitive abilities. A total of 126 modules from the 8th grade English textbook were examined, and it was found that 57.93% of these activities were dedicated to cultivating fundamental cognitive abilities. Conversely, modules centered around metacognitive abilities constituted 36.50% of the entire 8th grade English textbook.

Similarly, the 9th grade English textbook was scrutinized, encompassing a total of 211 model, aiming to assess the levels of critical thinking skills emphasized. Of these, 64.92% were found to be beneficial for teaching and learning fundamental cognitive abilities, while 34.12% were specifically designed to foster metacognitive abilities.

Upon analyzing the 10th grade English textbooks, it was observed that the modules predominantly emphasized the cultivation of fundamental cognitive abilities. A total of 285 modules were examined, with approximately 57.19% dedicated to preparing students for fundamental cognitive abilities. In contrast, 25.61% of the modules in the 10th grade English textbook were centered around metacognitive abilities.

The findings indicated that compulsory English textbooks for grades 6 to 10 primarily emphasized the development of fundamental cognitive abilities. There was less emphasis on incorporating modules that targeted metacognitive abilities. The textbooks placed a greater emphasis on background knowledge and the application of fundamental cognitive abilities. The figure below clearly illustrates the disparity between the number of modules focused on metacognitive and fundamental cognitive abilities in these compulsory English textbooks.

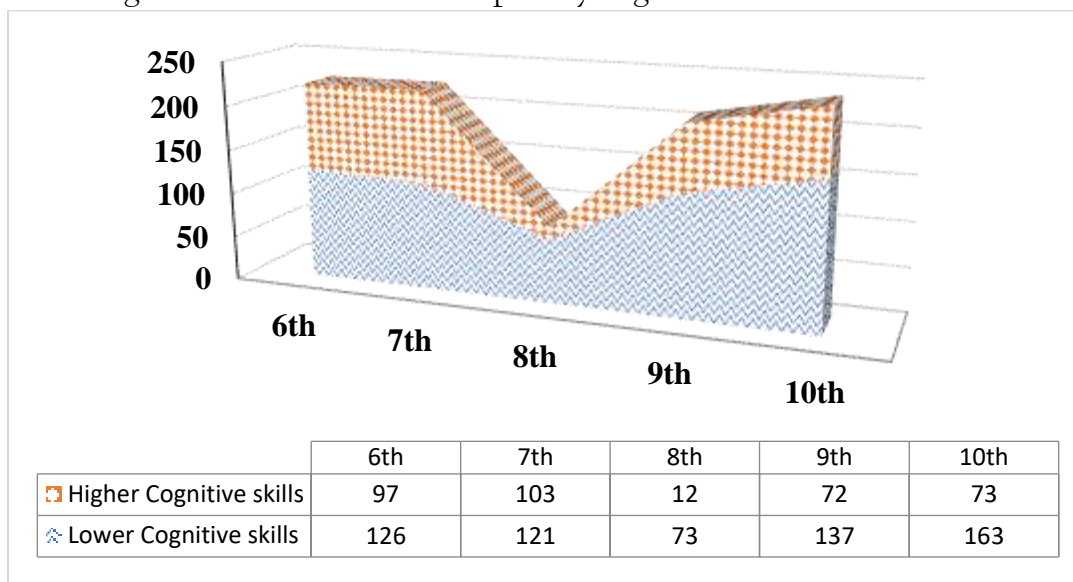


Figure 2: Balance between Fundamental and Metacognitive abilities in English textbooks (6th-10th).

Overall, the results highlight a significant difference between the quantity of modules that promote fundamental cognitive and metacognitive abilities in the compulsory English textbooks for grades 6 to 10. It is recommended that the English textbooks for grades 10, 9, and 8 should include more modules to enhance students' metacognitive abilities. In grades 7 and 6, the number of modules targeting metacognitive abilities was somewhat closer to those targeting fundamental cognitive abilities.

The frequency of metacognitive-based tasks varied across different grades in the compulsory English textbooks. In the 7th grade English textbook, there were 103 occurrences of metacognitive abilities-based modules, which was higher than the 6th grade textbook with 97 occurrences, 8th grade with 12 occurrences, 9th grade with 72 occurrences, and 10th grade with 73 occurrences. Interestingly, the 8th grade English textbook had the lowest number of HOTS-based modules, with only 12 instances, compared to the textbooks for grades 6th, 7th, 9th, and 10th.

On the other hand, the 10th grade English textbook had a higher frequency of fundamental cognitive abilities-based modules compared to the other grades. It contained 163 instances of fundamental abilities-based tasks, while the 6th grade textbook had 126 occurrences, the 7th grade textbook had 121 occurrences, the 8th grade textbook had 73 occurrences, and the 9th grade textbook had 137 occurrences. It is worth noting that the 8th grade English textbook had the least number of LOTS-centered modules compared to the textbooks for grades 6th, 7th, 9th, and 10th. The findings indicate that the 8th grade English textbook had the lowest emphasis on probing critical thinking skills. Out of a total of 126 tasks in the textbook, only 85 supported critical

thinking skills. Additionally, there were 12 tasks that were relevant to metacognitive abilities, while 72 fell into the category of fundamental cognitive. This suggests that the 8th grade English textbook may have provided limited opportunities for students to develop and apply critical thinking skills.

Based on the overall results, the syllabus designers of compulsory English textbooks for grades 6th to 10th should consider revising the modules to maintain a balance between fundamental cognitive and metacognitive abilities' learning. fundamental cognitive abilities involve acquiring background knowledge, understanding, conceptualizing, and implementing specific theories, processes, educational approaches, and methods. On the other hand, metacognitive abilities are valuable for analyzing, critically evaluating, creating, and engaging in self-directed learning. It is important for students to be trained in both fundamental cognitive and metacognitive abilities because gradual development of these skills helps them become effective decision-makers, problem solvers, and self-directed learners. The compulsory English textbooks for grades 6th to 10th seem to have a greater emphasis on fundamental cognitive abilities while having fewer modules focused on metacognitive abilities. However, research by Yee (2011) suggests that HOTS can enhance students' performance and help address their weaknesses. Additionally, Pogrow (2005) highlights that HOTS enable students to be better prepared for challenges in both academic and daily life. Considering these findings, students who are learning through the compulsory English textbooks for grades 6th to 10th should also receive training in metacognitive abilities. This is because there is currently an imbalance between the number of fundamental cognitive and metacognitive abilities-based modules in these textbooks.

Conclusion

The findings from the analysis indicate that there is a notable emphasis on modules centered around fundamental cognitive abilities in the compulsory English textbooks for grades 6th to 10th. In contrast, the inclusion of modules that promote metacognitive abilities is comparatively limited. Upon examining the various compulsory English textbooks across different grade levels, it was observed that the 8th grade textbook exhibited the fewest number of modules based on higher-order intellectual skills. Conversely, the textbooks for grades 6th and 7th demonstrated the highest frequency of modules that foster metacognitive abilities, surpassing those found in the 8th, 9th, and 10th grade textbooks. While the textbooks for grades 9th and 10th exhibited a similar number of modules focused on metacognitive abilities, it is worth noting that these numbers were still lower compared to the textbooks for grades 6th and 7th. Furthermore, the occurrence of modules targeting metacognitive abilities in the 6th and 7th grade textbooks surpassed those in the textbooks for grades 8th, 9th, and 10th. Based on the final findings of this study, it is recommended that revisions be made to the compulsory English textbooks for grades 6th to 10th in order to establish a more balanced integration of both fundamental cognitive and metacognitive abilities. This adjustment would facilitate a more comprehensive and holistic approach to English language learning and development.

Implication of the Study

Studying the fundamental and meta cognitive modules in the English Punjab textbook board in Pakistan has some authentic implications. First, it helps refine the English language curriculum to match students' cognitive processes, boosting language acquisition. Second, teachers can adapt their strategies to meet individual needs, optimizing learning outcomes. Third, it informs professional development programs for English teachers, enhancing their skills. Fourth, it enables

personalized learning, allowing students to progress at their own pace. Finally, it influences educational policies for English language teaching.

Limitation and Recommendations

Researching the fundamental and meta cognitive modules in the English Punjab textbook board in Pakistan, there were a few limitations. First, the findings are specific to Punjab and not easily applicable elsewhere. Second, the sample size was relatively small, and external factors like socioeconomic backgrounds were also factors. To improve future research, it's recommended to increase the sample size, conduct longitudinal studies, consider diverse contexts, and encourage collaborative research.

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