



Supporting Professional Development of Preschool Teachers Through Transcript-based Lesson Analysis (tbla)

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Abstract. The article presents a literature review analysis of effective teacher professional development and a pilot test on teachers' questioning skills using Bloom's taxonomy to support young children's cognitive and language development. The study examines the status of effective teacher professional development and the challenges in developing and posing questions that support children's cognitive and language development. The study highlights the importance of effective teacher professional development in supporting young children's cognitive and language development. A systematic review of 304 articles resulted in the selection of 108 studies for further analysis. We used VoS Viewer to identify clusters. A pilot test was conducted among teachers from four kindergartens using the TBLA approach to examine their ability to formulate questions and support children's thinking and speaking in three phases. The result of the pilot study indicates an improvement in the teachers' ability to develop questions that support children's thinking.

Keywords: Early childhood teacher · Teacher professional development · Questioning skill · Bloom taxonomy · TBLA approach

1 Introduction

Lesson study is a way that support teacher professional advancement that includes the many types of learning mentioned above. Learning is social, communicative, and situational. Individuals learn differently by talking, examining, involving, experimenting, getting thoughts from others, imitating, and reflecting [1]. Lesson research is a methodology that supports the professional development of teachers by developing and teaching the best methods and materials for teaching the subject content with the participation of qualified professional teachers, observing and discussing the results based on the performance and involvement of students [2]. The Lesson study approach has a cycle of activities with 5 phases [3]. It takes many forms, depending on the purpose, format, and participation, and one is transcript-based lesson analysis (TBLA). Many educators and educational institutions use the Lesson study approach and study its teaching effect and result [4] [5] [6]. Bloom's taxonomy has received considerable recognition internationally within the evaluation community because it was used soon after its introduction at the United Nations Educational, Scientific, and Cultural Organization (UNESCO) and Organization for Economic Cooperation and Development (OECD) seminars [7]. The use it receives, especially with an emphasis in middle schools, is mainly in support of curriculum development and teaching strategies-that is, teacher-focused rather than learner-focused [7]. In the classroom, especially, questions are effective teaching tools. Rich, insightful questions may pique young children's innate interest and open them to a new universe of opportunity and understanding. Teachers dealing with young children will learn how to meet them at their unique developmental levels and push their thinking with this purposeful method based on Bloom's Taxonomy [8].

2 Literature Review

A study of Greek researchers, which included pre-service teachers, found that teachers' ability to collaborate and understand each other was the main factor influencing collaboration and teacher professional development [6]. One way of teacher professional development is collaboration, from which teachers get satisfied with what they are learning from their discussion, involvement, evaluation, and analyses of lesson study cycles [9]. The existing literature underscores the critical importance of ongoing educational learning for educators to continually advance their understanding, abilities, and uses, as well as stay current with evolving research, tools, methods, and student needs. The Organization for Economic Cooperation and Development [10] emphasizes that continuing professional learning is crucial for teachers to enhance their effectiveness as professionals, help their colleagues, contribute to the collective improvement of the profession, and cultivate confidence, position, and self-esteem in what they do. Through professional learning, teachers can acquire the knowledge, skills, and practices required to be successful instructors, assist colleagues, contribute to the overall advancement of the education sector, and build the confidence, rank, and self-worth required to do their jobs with a high level of competency. As such, continuing professional learning is indispensable for teachers to refresh, develop, and expand their knowledge to stay abreast of changing research, tools, practices, and student needs. In addition, teachers must be prepared to

respond to shifting learning objectives and student needs, which impact what and how they are how they are expected to teach, as highlighted by the OECD [10]. Despite the significant role that educators play in the learning and development of young children, there is a dearth of focus on the professional development of early childhood teachers. A bibliometric analyze can help bridge this knowledge gap. As educators, it is important for us to ensure that our students understand the objectives of our teaching and are able to demonstrate knowledge or skills as a result [11]. To enhance the standard of education, it is often accepted that teacher must learn to put sound questions. Good/higher-order cognitive skills (HOCS) questions are crucial to effective teaching. According to Brualdi, educators that use HOCS questions encourage communication between teachers and learners [12]. There are several that might have been used; but, Bloom's was selected because it is i) well-known and utilized by numerous researchers, ii) general and appropriate across many different disciplines, iii) basic and straightforward to be used to a range of question forms [13]. Bloom's taxonomy is a classification system of academic goals founded on the degree of student comprehension required for success or mastery. It is divided into six levels, with the concept that proficiency at a higher level implies a reasonable degree of proficiency at the lower levels. Clarification and question verb instances representing the cognitive engagement of the six levels are knowledge, comprehension, application, analysis, synthesis, and evaluation [14]. According to Bloom's Taxonomy, levels can be coupled to create three groups: (lower, intermediate, and higher), with distinctive qualitative evaluation requirements:

Knowledge and Comprehension. The two lowest levels of the taxonomy are frequently misunderstood in informal descriptions of the taxonomy. A student can recite a fact when asked, even at the lowest "knowledge" level, without necessarily comprehending its significance. Because a learner who adequate at the comprehension level comprehends the importance of a scene, they move up to the following level, "comprehension." A student demonstrates this understanding by responding to questions distinct from how the material was initially taught. The term "Lower Order Cognitive Questions" (LOCQ) will be used to describe this group [13].

Application and Analysis. Students are expected to be able to create and analyze artifacts within a clearly defined context at these intermediate levels of the taxonomy. IOCQ (Intermediate Order Cognitive Questions) will be the name of this group [13].

Synthesis and Evaluation. At this top stage, learners should be able to demonstrate critical skills in evaluating artifacts and important ability in creating and accomplishing what they want with little help from instructor. This gathering will be called HOCQ (Higher Order Cognitive Questions) [13]. Practical questions should encourage students to consider and provide feedback on the problem. Informational or problem-solving questions and significantly more complex thinking questions that stimulate a student's mental activities are examples of compelling questions. The nature of these questions can't be ambiguous or unclear, and they shouldn't have a problematic vocabulary, complicated syntax, or unintentional clues. Engaging students in higher-order thinking through skillful questioning is essential to productive discussion [13]. Educators who put HOCS questions encourage communication between themselves and their learners. Bloom's taxonomy is convenient to adapt to variety of inquiry forms. The taxonomy can be used for cognitive goals and thinking levels [14]. The second objective of this paper is to investigate teachers' ability to formulate questions to support children's thinking and speaking through TBLA (Transcript-based Lesson Analyze).

3 Methodology and procedures

The Bibliometric analyze was used to find problems in the existing literature. The three specific steps for scoping a literature review are as follows: 1) identification and 2) examination, 3) eligibility, and 4) inclusion [15]. Academic and peer-reviewed papers were the only items included in the current reviews.

Step 1: Identification - The papers were searched in the Dimension database. The query consists of relevant keywords ("teacher professional development" AND "early childhood educator" AND "Bloom's taxonomy") included in the title or abstract. This initial search yielded a total of 88 articles (Dimension n=88).

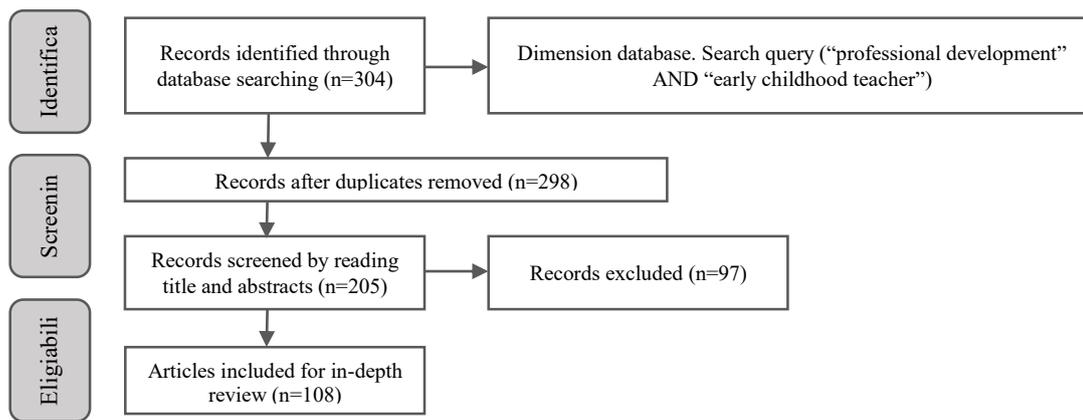


Fig 1. The flow of the study

Step 2: Screening: Numerous duplicate papers were removed during this phase. The results were reduced to 298 after six identical papers were removed. Then, the titles and abstracts were looked at to see how they related to the scope of the research. Additionally, 97 articles were excluded from further analysis after the title and abstract screening.

Step 3: Eligibility: The papers that did not meet the inclusion and exclusion criteria were effectively excluded by reading their titles and abstracts. The review's inclusion and exclusion criteria are presented in Table 1.

Table 1. Inclusion and Exclusion criteria of the review

Inclusion	Exclusion
Must report the implementation of teacher professional development	Pre-service teachers training
Must target ECE teachers	Not to mention teacher professional development and early childhood teacher
Must be open access to the full abstract	Book chapter
Must be considered in English	Articles in other languages

One hundred eight articles were eligible for in-depth analysis following the eligibility phase. The process of searching and screening articles, the number of reports we have found, and the reasons for including and excluding them are depicted in Figure 1. To identify the primary themes within the literature, a CSV file containing the abstracts of all 108 articles was generated. Subsequently, this file was uploaded to VOSviewer software to conduct an analysis of the abstracts.

Transcript-based lesson analysis (TBLA) approach was used in the pilot test to support teachers' collaborative professional development through which teachers' ability to develop questions supporting children's cognitive and language development. The study involved 78 teachers from 7 different kindergartens across five districts of Ulaanbaatar, Mongolia. The study used various methods to collect and analyze data, including questionnaires, interviews, observations, experiments, and mathematical processing methods. The following phases organized the pilot test:

1. During the first phase of the pilot study, we used the questionnaire method to gather kindergarten teachers' questions they ask children during their daily routines. The researchers organized training on the contents of the TBLA, and the experimental methodology for testing them in the second phase was presented.
2. In the second phase, teachers worked by the following:
 - a. divided into groups (n=6)
 - b. developed a pilot test plan, including a lesson plan with questions by Bloom's taxonomy.
 - c. Organized activities, conducted observations, and made notes.
 - d. Organized group discussion by the TBLA approach and noted the discussions.
3. Finally, the third phase of the pilot study involved a combination of quantitative and qualitative research methods in processing the results.

Ethics

Before administering the survey, an explanation of the details of the study and ethical considerations (protection of personal information and correct to refuse participation) was given to all kindergarten teachers and assistant teachers, and consent to complete the survey was obtained in writing.

4 Results

Systematic Literature Review

The findings illustrated in Figure 2 reveal three primary clusters of studies that examine effective teacher professional development in early childhood education. The red cluster is centered around “students,” while the brown cluster focuses on the keyword “self-regulation,” which has the highest centrality in this cluster. The pink cluster is led by “metacognition” as the central node. These clusters can be broadly categorized into three themes: 1) student-centered professional development in early childhood education, 2) teacher-centered professional development in early childhood education, and 3) subject-centered professional development. The clusters and themes suggest that effective professional development in early childhood education can take different approaches depending on the focus on the development, whether it’s centered around the needs of the students, teachers, or specific subjects.

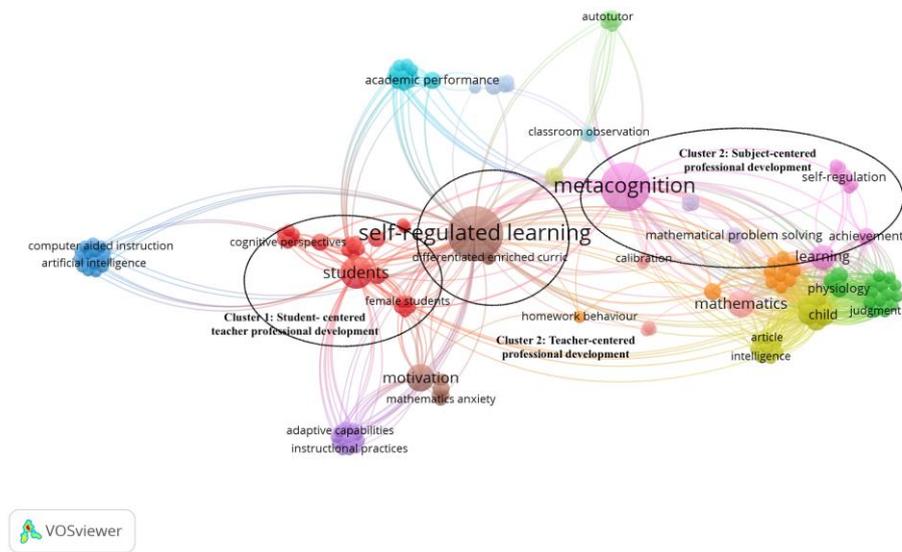


Fig 2. Keywords co-occurrence network (108 articles)

Pilot Test

As part of the investigation into the quality of the questions posed by the teacher to the child, a total of 138 questions were examined in the pre-pilot test survey (without repeated questions), and 102 questions were analyzed in the post-pilot test survey (also without repeated questions).

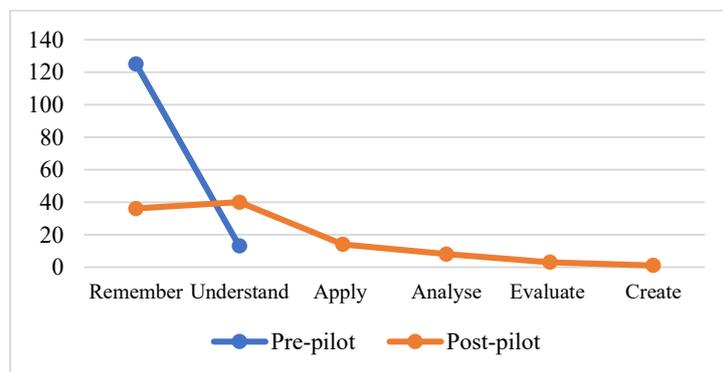


Fig 3. Comparison of teachers' questions formulated by teachers

Before the pilot study, the teacher questions were limited to "remembering" and "understanding." However, following the TBLA, teachers could develop questions at six levels, as shown in Table 2.

Table 2. Teacher's questions' frequency by cognitive functions and Bloom's taxonomy level

LeVELS OF BLOOM'S TAXONOMY	Cognitive functions	RA (N=108)	
		Frequency	
		Pre-Pilot test n	Post-Pilot test n
Remembering	Recognizing	18	3
	Naming	33	13
	Counting	1	7
	Repeating	44	
Understanding	Remembering	29	13
	Depicting	1	2
	Discussing	2	2
	Explaining	7	25
	Evaluating	3	11
Applying	Explaining why		9
	Explaining relevance		5
Analyzing	Finding out		1
	Testing		1
	Evaluating		2
	Comparing		4
Evaluating	Pronouncing		3
Creating	Inventing		1
Total		138	102

The study also found that the questions posed by teachers transformed in terms of the mental action they stimulated in the child. Specifically, questions initially focused on remembering and understanding were broadened to include applying, analyzing, and evaluating. As a result, the range and depth of questions asked by the teachers were significantly enriched, providing young children with more opportunities to engage in higher-order thinking and deeper learning.

5 Conclusion

In conclusion, the three clusters of teacher professional development identified in this study also shape the direction of teacher professional development. By understanding which areas of professional development are most relevant and impactful for teachers in early childhood education, educators and administrators can provide targeted support and resources to help teachers enhance their skills and expertise in specific areas. These skills can lead to more effective teaching practices and improved outcomes for young children. The investigation into the quality of the questions posed by the teacher to the child revealed that the implementation of the TBLA resulted in a significant improvement in the range and depth of questions asked by teachers. Before the pilot study, expanding question levels allowed young children to engage in higher-order thinking and deeper learning. Therefore, the study highlights the importance of using effective teaching strategies, such as TBLA, to improve the quality of education and promote a more comprehensive and stimulating learning environment for young children.

6 Discussion

The ability of teachers to formulate practical questions is crucial for the success of their students. As such, continuous training and work to improve this skill are necessary. Integrating question types into all learning activities has become a pressing issue in today's educational landscape. Teachers must get into the habit of using various types of questions to enhance their students' learning experiences. Without proper questioning techniques, a teacher's questions may fail to stimulate a child's interest, leading to short responses and lacking engagement in the thinking process. Furthermore, there is an apparent lack of experience and understanding of team development in many workplaces, including educational institutions. There are also limited opportunities for teachers to exchange valuable advice with each other freely. This can create a siloed environment that may hinder their ability to improve their skills and develop their teaching methods. To address these issues, it is important to establish regular training programs for teachers to improve their questioning skills and to provide a platform for teachers to collaborate and share knowledge. This can help to create a supportive and collaborative environment that fosters growth and development. In conclusion, the ability of teachers to formulate effective questions is essential for the success of their students. Teachers must improve their questioning skills continuously, and institutions must provide them with the necessary resources and support. Doing this can create a more engaging and effective learning environment for our students.

Limitation

One limitation of the study is that the absence of level 6 questions does not necessarily indicate that kindergarten teachers do not engage children in creation-level activities. While the study did not find level 6 questions in the sample of teachers surveyed, these teachers may still engage young children in creative thinking and problem-solving activities through other means. Therefore, the study's focus on the absence of level 6 questions may not provide a complete picture of the extent to which kindergarten teachers foster creative thinking in their students.

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