

Teachers Asking Questions in Preschool

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Abstract

This case study examined two preschool teachers' questions during activities with children to determine the type of questions asked. The teachers were audio recorded during morning and afternoon activities during one school day. Questions asked by the teachers were coded according to cognitive levels (knowledge, comprehension, application, analysis, synthesis, and evaluation), structure (closed-ended, open-ended), and type of activity (whole group and individual activities). The findings indicate that both preschool teachers asked mostly knowledge level (82.6 % and 69.4%) and closed-ended questions (86% and 92.2%). This finding indicated that teachers need to improve their questions asking skills. Furthermore, the teachers asked more questions during whole group (1.35 and 1.06 question per minute) than during individual activities. This finding suggests that preschool teachers need to ask more questions geared toward the individual activities. The findings of this study exhibited how teachers asked questions in classroom activities and why teachers asking questions was important for children.

Keywords: Preschool education, teachers asking questions, cognitive levels, questions structure (open-ended, closed-ended)

Introduction

Questioning is an important teaching strategy for most learning experiences for young children. Also, asking questions can improve children's learning rather than control children's knowledge (MacNaughton & Williams, 2004). However, examination of the literature and research shows that research exploring the cognitive (knowledge, comprehension, application, analyses, synthesis, evaluation) and structural (open-ended, closed-ended) levels of pre-school teachers' questions is very limited, because the existing research shows that teachers tend to ask closed-ended and direct knowledge questions (Gall, 1970; Gall, 1984; Duster, 1997; Sultana & Klecker, 1999; Storey, 2004; Blatchford & Mani, 2008, Lee, 2010; Bay, 2011). The general purpose of this study was to provide awareness about the importance for children of teachers asking questions.

This study examines the types of questions used by preschool teachers. Teachers' asking questions may improve children's active participation in teacher-child interactions; and variability in the types of questions may prompt the complexity of children's responses (Massey, Pence, Justice, and Bowles, 2008). In the present research, we examined the types (cognitive levels and structures) of teachers' questions in various classroom activities. Our particular focus in this study was preschool teachers' use of asking questions in different activities (whole group or individual). Questions were used in the classroom context. We described each activity for considering the use of questions. This study was intended to understand how teachers use questions in classroom activities and in which contexts their questions appear, so that, we can better discuss teachers asking questions skills and how they can give better support to the children with different types of questions. A question is a sentence intended to get someone to provide information or think about something (MacNaughton & Williams, 2004). Teachers use questions for these purposes every day. They ask children what they know and to think about something in a particular way (Cotton, 1989).

The use of questions is so pervasive in classrooms that they are a major influence on children's learning, interactions, and thinking (Wood & Anderson, 2001). This study included descriptions of classroom activities in order to provide a deeper understanding of how teachers asked questions. First, to ask questions is important in terms of revealing the ideas of children (Gall, 1984; Morgan & Saxton, 1991; Ozden, 1999; Acikgoz, 2006; Cheminaist, 2008; Taspinar, 2009). Thinking begins to form from the moment that a question is asked about a subject (Özden, 1999). Therefore, correctly planned and asked questions can improve the effective thinking of children (Gall, 1984; Duster, 1997; MacNaughton & Williams, 2004; Daglıoglu & Cakır, 2007; Sonmez, 2007; Zucker, Justice, Piasta, and Kaderavek, 2009). In pre-school, questions like "Let's move the home furniture somewhere else in the classroom. Where should we put the furniture? Is here or there better? Let's consider the reasons why should or shouldn't we do this. Will everyone have to participate in this change? Are there easier ways of moving furniture than collecting the pieces?" are the questions that had been found to improve problem solving and thinking for children (Warner & Sower, 2005). Also, different levels of questions improve critical thinking (Sanders, 1966). King (2005) examined children's dialogue in preschool, and she identified and demonstrated that children's critical thinking skills improved when they were asked questions.

Also, in each environment that has thinking occurring, real learning emerges (Robbins, 1995). On the other hand, asking questions improves more than just learning (Cheminaist, 2008); therefore, it is important for teachers to learn to ask effective questions is important (MacNaughton & Williams, 2004; Johnston, Halocha, and Chater, 2007; Chappella, Crafta, Burnardc, and Creminb, 2008). Besides supporting children to learn by asking questions, to ask questions also is important to evaluate children's learning (Johnston et al., 2007; Massey, Pence, Justice, and Bowles, 2008). Children frequently ask questions, and their wanting to know the answers gives hints to teachers in terms of their thinking skills (Alisinanoglu, Ozbey, and Kahveci, 2007), because children bring their experiences and thinking into the classroom (Morgan & Saxton, 1994). Therefore, teachers should ask about the ideas of each child, and they should improve discussion of these ideas (Alisinanoglu et al., 2007). Questions such as "How do you..? or "Why do you think...?" produce children's theories, understandings, imagining, and feelings and provide teachers an opportunity for them to reconsider their experiences (Macnaughton & Williams, 2004). Teachers keep the speech and responses coming for ideas that children encourage (Machado, 2010).

Questioning also is important in terms of improving the language skills of children (Wasik & Bond, 2001; MacNaughton & Williams, 2004; Walsh & Blewitt, 2006; Wasik, Bond, and Hindman, 2006; Massey et al., 2008). In classrooms, questions are used for more than just clarifying their statements in terms of words used to describe children's experiences, because children use language to hypothesize, speculate, and make judgments. Therefore, in teacher-child interactions, increasing the use of questions from teachers develops the active participation of children. Furthermore, using different kinds of questions mediates more complexity in children's responses (Massey et al., 2008). In sum, asking questions in educational settings has been found to be an effective way to develop a range of skills, and thinking skills in particular. Preschool teachers understand both the types of questions and how to use which type of question, in which conditions (Alisinanoglu et al., 2007). This study emphasized which kinds of questions were used by teachers (cognitive levels and structure), and descriptions of teacher activities were developed in this study for understanding how and under which conditions they used different question types. Besides determining the kinds of questions asked by teachers, examining the content of these questions in their activities is beneficial in developing teachers' asking questions skills. Therefore, this study raises awareness about the importance of preschool classrooms' questions.

The most widely applied scheme for understanding and analyzing the cognitive complexity of questions is Bloom's taxonomy of the cognitive domain (Morgan & Saxon, 1991; Acikgoz, 2006). The six levels in his taxonomy (1956) (Morgan & Saxton, 1994; Walsh & Sattes, 2005; Cecil & Pfaifer, 2011) had a significant effect and attracted much attention with his research on the differences between less complex cognitive skills and that those are more complex (Duster, 1997; Ozden, 1999; Wood & Anderson, 2001). The levels of complexity are range from knowledge, comprehension, and application, to analysis, synthesis, and evaluation (Morgan & Saxon, 1991; Duster, 1997; Wood & Anderson, 2001; Storey, 2004; Waslh & Sattes, 2005; Acikgoz, 2006; Buyukalan Filiz, 2007; Sönmez, 2007; Cheminaist, 2008; Taspinar, 2009). When applied to the area of teacher questions, knowledge, comprehension, and application are types of questions that have been considered at lower cognitive levels than analysis, synthesis, and evaluation, which are classified as high level in Bloom's Taxonomy (Sanders, 1966; Goodwin, Sharp, Cloutier, and Diamond, 1983; Sahinel, 2002; Wilen, 1991; Storey, 2004).

For example, preschool teachers who ask low level questions of children prompt them to engage types of thinking like recall, inference. In contrast, teachers who ask more complex questions of children prompt them to engage in types of thinking that involve studying the elements and relations of something, fashioning elements into relations so that they form something, and determining the significance and value of something (Goodwin et al., 1983). There is evidence that the level or type of questions according to this taxonomy relates to the thinking processes and products of children responses although the nature and strength of this relationship is beyond the aim of this research. That is, high level questions asked by teachers improve children's thinking about their answers (Hunkins, 1972; Cotton, 1989; Brown & Wragg, 1993; Storey, 2004; Warner & Sower, 2005). This study exhibited at which levels teachers asked questions.

Another scheme for understanding and analyzing the response constraints of questions include two types of question structure: open-ended and closed-ended questions. As with cognitive complexity, there is evidence that these question structures create different effects on children (MacNaughton & Williams, 2004). Closed-ended questions have been used to determine specific facts and information, and are typically answered with a "yes" or "no" (MacKay, 1997) or only a few other words (Johnston et al., 2007; Sonmez, 2007; Taspinar, 2009; Lee, 2010). There is usually one right answer to closed ended questions (Cheminaist, 2008; Lee, 2010) and in general teachers ask closed-ended questions to identify what children know (Lee, 2010). Therefore, closed-ended questions limit the ability to develop children's ideas (MacKay, 1997; Goodwin et al., 1983; Wilen, 1991). Children can give an answer of "yes" or "no" even if they do not have ideas about what is wanted by their teacher (Duster, 1997; Paterson, Dowden, and Tobin, 1999). Open-ended questions are asked to establish relations between events for children, to elicit more information from children, and to encourage children to find their own solutions and to think on their own (MacKay, 1997). Also, open-ended questions usually require children to share with other children, or with adults, their information, dreams, and feelings (Beaty, 2000; Klein, Hamrich, Bloom, and Ragins, 2000; Wood & Anderson, 2001; MacNoughton & Williams, 2004).

Open-ended questions are particularly appropriate for cognitively complex speech (De Rivera, Girolametto, Greenberg, & Weitzman, 2005; Van Kleeck, Vander Woude, and Hammett, 2006). Open-ended questions identify many possible answers (Cheminaist, 2008; Lee, 2010; Machado, 2010) and have no single response, so these questions encourage high level thinking (Lee, 2010). Also, open-ended questions increase dialog, and they encourage discussions among children. Therefore, children's talking about and discussing their answers help to develop their vocabulary (Wasik & Bond, 2001). Open-ended questions also effectively improve children's intangible vocabulary, and they increase children's speed in using words (Van Kleeck et al., 2006; Zucker et al., 2009). Research has identified that providing more talking and increasing the vocabulary of children by teachers who ask open-ended questions produces high level results in book reading activities in preschool (Wasik & Bond, 2001; Van Kleeck et al., 2006; Wasik et al., 2006; Zucker et al., 2009). This study identified the use of questions in the whole group and in individual activities, and this finding supports understanding in which activities teachers used more questions.

In sum, children's answers to open-ended questions are more flexible and produce longer conversations for talking about content (Johnston et al., 2007; De Rivera et al., 2005). Therefore, teachers should avoid only using limiting questions (Bradtmueller & Egan, 1983; MacNaughton & Williams, 2004; Acikgoz, 2006; Taspinar, 2009). This study is an important demonstration of teachers' question structures, and this study emphasizes the importance of using open ended questions by teachers. Another important element for using questions is how questions are used in activities. Children need different activities for learning, and teachers encourage children in these activities. Teachers' awareness of classroom activities is important for developing the learning of children (Chen & McNamee, 2011). Also, it is important for children's developing language skills that teachers use challenging conversation with children, such as questions (Massey, Pence, Justice, and Bowles, 2008). This study grouped activities into whole group activities and the individual activities. In individual activities, children choose their own interest center. The teacher can observe and understand what children know, what problems they solve, and also what they do not know. The teacher helps the children with conversation for children to expose their knowledge and to emerge their ideas (Schwartz & Copeland, 2010). Participation of all children in whole group activities limits the use of questioning. Questioning is most effective in individual activities, when it is specially planned and used carefully (MacNaughton & Williams, 2004). This study is important for understanding how teachers use questions in these activities. Also, this study showed which activity included questions at which cognitive levels and structures.

Therefore, this study can help inform our understanding of teachers' asking questions generally in the profession, so that they can benefit from knowing that they are making an important contribution.

Purpose of the Study

This study was designed to identify the cognitive levels and structure of questions asked by preschool teachers, and to demonstrate with descriptions how they ask questions in learning activities. Also, teachers' questions were examined in whole group and in individual activities. Furthermore, descriptions of teachers' activities were given for a deeper understanding in this case study of the import of activities or questions. Besides determining just what kind of questions are asked by teachers, showing how questions are asked in teachers' activities is beneficial in terms of developing teachers' question asking skills.

Method

The case study examination method used in this study is a type of qualitative research. Case studies are used to describe the details that make up a case, to develop possible explanations related to a case, and to evaluate a case (Buyukozturk, Cakmak, Akgun, Karadeniz, and Demirel, 2008). Yin (2003) claimed that case studies are the best way of exposing evidence, including documents, artifacts, interviews, and observations. In other words, case studies are qualitative research that ensure in-depth analysis by focusing on events, conditions, or individuals (Mukherji & Albon, 2010; Ekiz, 2003). In this research, the teachers working in a preschool were represented in this case study. Also, in this study an observation method was used for each teacher, because case study methods use narrative observation (Stake, 2005), and collective case study design needs to ensure the same methods are used for each case (Mukherji & Albon, 2010).

Participants

The participants in this study were two preschool teachers, because case studies allow gathering very detailed data with their focus on the case (Stake, 2005; Mukherji & Albon, 2010). The participating teachers included two four- and five-year old children's teachers who have been working in a licensed nonprofit child development center in East Lansing, Michigan, USA.

School and Curriculum

The school used in this study is a large school with a university affiliation; it has a wide garden and three floors with a basement. In the school, different programs are applied: a half-day preschool for 18+ months, a half-day preschool for 24+ months, a half-day preschool for 36+ months, a half-day preschool for 48+ months, a full-day preschool for 18+ month, 24+ month, 36+ month, and 48+ month old children, a summer program, a breakfast club program, and an after school program.

The Observed Classes and the Applied Education Programs

Both classes implement a full-day training program, with half-day training programs in the morning and in the afternoon. The school uses a university curriculum for its activities. We examined the general education program being implemented in the preschool; this program, "Program Philosophy and General Objectives in the Domains," has goals in eight fields:

1. Aesthetic Development
2. Affective Development
3. Cognitive Development
4. Language/ Communication Development
5. Physical Development
6. Social Development
7. Construction Development
8. Pretend play.

Each day, teachers repeat in the afternoon another half day of the program implemented from morning to noon, so the number of children can change in the class depending on the numbers of half day children in the morning compared to the afternoon.

The daily schedule of the class of four-year old children is:

08:30 9:15 Outdoor
9:15 9:25 Transition to Classroom
9:25 9:45 Literacy Time
9:45 10:00 Large Group
10:00 10:10 Small Group
10:10 10:50 Free Choice
10:50 10:55 Clean up
10:55 11:10 Large Group
11:10 11:20 Getting Ready to go Home
11:20 11:30 Transition, Lunch and Rest

The daily schedule of the class of five year old children is:

8:15 8:35 Free Choice
8:35 8:45 Book Look
8:45 9:00 Morning Greeting
9:00 10:10 Free Choice
10:10 10:15 Clean up
10:15 10:30 Large Group
10:30 10:40 Small Group
10:40 10:45 Transition
10:45 11:15 Large Motor
11:15 11:30 Transition, Lunch and Rest.

After the half day schedule, teachers start the afternoon schedule at 13:00.

Teachers plan a weekly program with identified weekly themes, and they carry out different activities each week. Themes of the observed week were animals in the class of four-year old children and domestic animals in the class of five-year old children.

Teacher A. Teacher A teaches the four and five year old's classroom at the preschool. She has an undergraduate degree in Family and Community Services, with an emphasis on Early Childhood Education. She also has a master's degree in Child Development. She did not take any classes about questioning skills. She said the following about the kind of questions she asks the children: "I try to ask open ended questions and based on the child's response I may take it down to close ended questions. I make the child thinking about reasoning behind event or idea." She believes it is important to ask questions. For investigating children's answers to why, she said, "I try to ask leading questions to guide."

She has been a teacher for 12 years and she has been teaching for four years in this school. She thinks this school is great. She said about the school: "They support teacher education. The students approach to being in the classroom. Variety of experiences, supportive environment, best practice opportunity." Furthermore, she has two daughters. She likes reading in her leisure time.

Teacher B. Teacher B teaches the three and four year old's classroom at preschool. She has an undergraduate degree in Family and Community Services with an emphasis on Nursing. She has a master's degree in Child Development. She took a class about questioning skills in a class an interaction with Children in Groups, in the Human Development and Family Studies department. She said about the kinds of questions to ask children: "I try to ask open-ended questions and not necessarily close-ended questions. For instance, tell me about.... . Try to get more information. Try to get the answer of why and the ideas." She believes asking questions is very important.

Before, she worked as a nurse in Taiwan. She has been teaching for six years and she has been teaching for four years in this school. She said about the school "I like it. Child care settings, teacher training institution, children and family teaching, interact with students and professors, chance to find out new research, care and train, parenting education, teach how to create activities at home."

Procedures

The researchers applied online to the Institutional Review Board for approval of the present's plan for human subject protection. After getting permission, the teachers were observed on the same regular school day by the same observer. Each teacher was observed all day in her regularly scheduled activities. The data collected consists of recorded classroom observations.

Measures

The measures were performed according to Creswell (2003). After this study was organized, the data were identified. This data was described, commented, and exhibited the findings as the case.

Descriptive: Descriptive measures include participants' behaviors and beliefs (Maxwell, 2005), so descriptive analysis is used in case studies. Descriptive analysis is the summarization and interpretation of the obtained data during the observation period by taking into consideration the dimensions of the data (Yıldırım & Şimşek, 2008). In this research, from watching video tapes shot during the observation, each teacher's behaviors during the activity process were depicted in detail.

Coding: Qualitative research uses coding which involves organizing data into themes and issues. In this study we used teachers' questions for coding, so these research categories are substantive. After defining the questions that the teachers wrote in my question finding form about the questions they asked during the observations, the cognitive levels (from the knowledge step to the evaluation level) and structure (open-ended, close-ended) of these questions were coded for each teacher in a table after identifying them.

In the analysis of the cognitive levels of teachers' questions, keywords that Bloom (1956) determined for each cognitive level were used, and we used the following definitions of cognitive levels.

Code	Definition
Evaluation	requires judging or determining using specific standards of children.
Synthesis	requires creating whole new pieces of knowledge about children.
Analyses	requires understanding the coming together of these parts as a whole and as complex parts of something.
Application	requires transfer or application of a new situation to their knowledge about children.
Comprehension	is the ability to translate or to predict, including explanation of other words, transformation, re-expression of materials on the basis of previous learnings of children.
Knowledge	requires remembering or showing their previous learning about children.

Open-ended questions mostly investigate the child's thinking process, and they require the child's assumptions, knowledge, imagination, and shared feelings with adults or other children (Klein et al., 2000). In other words, they are the questions that lead the child to explain (Sonmez, 2007). Therefore, preschool educators accept open-ended questions as the questions that provide a lot of different answers (Morgan and Saxton, 1991; Carin, Bass, Contant, 2005). According to Bloom's Taxonomy, high level questions (analysis, synthesis, evaluation) and the questions having more than one answer are accepted as open-ended questions. Close-ended questions are remembering questions that generally are replied to as yes-no, and are asked in order to detect specific facts and information (Storey, 2004, MacKay, 1997). For this reason, close-ended questions' answers consist of a single word (Sonmez, 2007).

Code	Definition
Open-ended question	An open-ended question is acceptable for many different answers and no single answer is expected from the children.
Closed-ended question	A closed-ended question is acceptable for one answer, like yes-no, or a few words, and a known answer is expected from children.

The reliability of coding was evaluated by double coding. A recording was listened to two times, and then each question was coded independently as a cognitive level and a structure by two coders. The coding of the questions was compared for reliability. Any differences in coding were sorted out by the two coders prior to the analyses.

Findings

In this study the teachers' activities and questions were described and were defined according to cognitive level and structure.

Descriptions of Teachers' Activities

The two teachers' activities were described from the beginning to the end of their activities. The descriptions are provided to understand the case study focus on the teachers' questions more deeply.

Teacher A's activities

Morning greeting. Before the activity, Teacher A sat in the block area, and she sang a song for the children, who were all sitting.

In the Morning Greeting activity, Teacher A showed the daily schedule to the children, and they all said the daily schedule together. Sometimes Teacher A asked a few questions about the schedule, such as "And next we have?" After repeating the daily schedule, Teacher A then said, "Today we have a painting project that's meant to be cooperative. What does cooperative mean?" After she listened to a few answers, she explained its meaning. Then Teacher A put pictures of the classroom's areas on the board. She showed the materials used in each area, and she explained how they could use the materials. Teacher A asked, "What month is it?" The "responsible" child stood next to Teacher A and spelled the month with the letters on the board. At the end of the activity, Teacher A sang a song, and when finishing the song she said the children's names and their destination areas in the classroom for the next activity.

Free choice and clean up. Before this activity, all children went to different areas in the classroom, as directed by Teacher A.

In the activity, Teacher A turned up the music, and the children played with the materials. Teacher A asked questions such as "What do you want to absorb today?" in the block area. Then she went to the science area. In this area, children who were in the block area played with magnetic blocks on the light table. Teacher A asked a few questions, such as "What's this shape called?" One child asked Teacher A about the aquarium. Teacher A explained things in the aquarium for the child. Then she went to the sensory table, where she talked about what the child there was doing. During this activity, every child played in a different area, and Teacher A talked and asked questions. At the end of the activity, Teacher A showed a paper which had "five minutes" written for the playing children. After five minutes, Teacher A put a bell in the responsible child's hand; she sang a song about "clean up" with the children, and the children collected materials from the areas. Then they went to the restroom to wash their hands.

Large group. Before this activity, the children washed their hands and sat on the floor while they sang in the block area for the activity.

In the activity, the teacher held a puppet in her hand, and she said her own name. She then gave it to another child, and the children said their names, singing "Hikitypikity bumble bee won't you say your name for me" in order. Then the teacher explained the activity to the children, and she gave a small cloth pouch to each child. The children and the teacher listened to a song from a CD. The lyrics said a body part, and they put their pouches by their body parts: head, arm, shoulder. After the song finished, the teacher said that the children should stay on the ground, and she collected their pouches. She did deep breathing work with the sitting children. She said that breathing needed to go in from the nose, and she showed the children how to do this. After breathing work, she showed writing number flower cards, remembering what they had done last year in this activity, and she asked, "What are these cards?" Teacher A wanted to close the children's eyes. Then she put these cards in different areas in the classroom, and she sang, "Flower, flower where could you be. Flower, flower you can't hide from me." The children opened their eyes, and the teacher explained what they would do. She said six children's names, and each child found one flower card. Teacher A asked a few questions, such as "Who has the first number zero? What comes after zero?" The children lined up with their number cards, and they counted with the teacher while they showed their cards. All children played in the activity. The teacher often asked questions about the numbers. At the end of the activity, the teacher showed the daily schedule on the wall and asked about the activity: "Did we have choice time today? Did we have large group?" She declared done for now the activity's pictures from the schedule. She said that the children had the small group activity now.

Small group and transition. Before this activity, Teacher A put the small group activity's picture on the next board. After she sang, the children lay down. Teacher A said three color names, and the children got into groups divided by three. In the activity, the children represented the winter season with cotton, fund cardboard, glue, brushes, and crayons on the tables. Teacher A asked questions about what the children made, such as "What are you making?" At the end of the activity, the children went to the restroom to wash their hands. After work, they lined up at the front of the door for going to the large motor activity room. Teacher A sang, "Everybody do this do this. Everybody do this just like me." While lining the children up, the children showed different acts. After they came together, all the children went to the gym.

Large motor, transition, lunch, and rest. Before this activity, every child dispersed in the room that had the large motor materials for children. In the activity, the children played a long time with the materials. Teacher A only talked to the children on the walking board. At the end of the activity, Teacher A brought to the garden gate the children who needed to go home. The other children went to the lunch room. Looking at Teacher A's activities, she asked more questions in the whole group activities. When we evaluated her questions before the activity, during it, and at the end of it, she turned out usually to ask questions during the middle of the activities. Furthermore, she often asked questions to the children for better understanding of activities.

Teacher B's Activities

Transition to classroom and literacy time. Before this activity, the children played with the materials in their areas of interest. In the block area they did group activities, such as putting books in a circle on the ground for the children to scan. In the activity, Teacher B sat on the chair in the area and the audiobook began working. She showed the story book's pages to the children following the CD. She asked about the pictures, such as "Where is the mouse?" At the end of the story, the teacher sang a song about putting out a basket of books for the children to look at.

Large group and small group. Before the activity, Teacher B sang a short song for the children to be ready to sit in the corner. In the activity, after the children were ready, Teacher B sang "friends" with the children. Teacher B said every child's name and posted each child's name on a clipboard as she greeted them, and she said "hello" at the end of the song. Teacher B said that the absent children were not coming and that they were ill. Teacher B chose children's pictures from a box. Teacher B called up eight children and asked them to complete a task. After that, Teacher B gave the first sound of a child's name, and the children said their friend's name. After Teacher B asked, "How do you spell your name?" the child said her/his name's letters, and he/she put his/her pictures on the Job Chart. One of the children responsible counted her friends in the classroom and put a number on the Job Chart. Another responsible child looked outside the window at the weather and chose from the weather chart (cloudy). After identifying the responsible children, Teacher B asked, "What are we talking about this week?" The children gave the answer "animal," and then Teacher B asked, "Any know an animal tell me?" Every child said different animals' names. Teacher B showed materials, such as a pen, and she asked, "Is this an animal?" They talked about why it was not an animal. Then Teacher B explained the materials identified for the small group. At the end of the activity, Teacher B sang a song. The children lay on the ground during the song. When it finished, the children stood up, and Teacher B put her hand on their heads, and they went to different areas.

Small group. Before this activity, Teacher B prepared five different areas with tables for small groups: the snack table, the art table, the science table, the cognitive table, and the writing table. All the children went to a small group activity in the classroom. In the activity, Teacher B sat at the snack table's chair, after she put mousse on the children's tray. The children spread the mousse on their tray and shaped it with their finger. Teacher B spoke with the children and sometimes asked questions, such as "Are you making a cake for your cat?" Then Teacher B played with the children with magnetic blocks at the cognitive table. After that, Teacher B put the snack on the snack table. Teacher B went to the other tables and interacted with the children. At the end of the activity, the children continued their play in different areas, and they started the free choice activity.

Free choice and clean up. Before this activity, the children played in different areas and tables. In the activity, Teacher B helped the children go to the restroom for a long time. Then she talked about what the children were doing in the different areas, and she sometimes asked questions, such as "Do you want to try it this way?" The children played during the free choice time at the tables, the drama area, and the blocks area. At the end of the activity, Teacher B sang a song about cleaning, and the children started to collect the materials in classroom.

Large group. Before this activity, Teacher B went to the blocks area and put on a CD. Hearing the song, the children came to this area. In the activity, Teacher B and the children started to scratch their body parts in rhythm with the song. After gathering all the children together, Teacher B put the basket beside the board. Teacher B began to say to the large group the activity that she connected to the topic of the week. Teacher B chose the children’s name chart in the basket and asked, “Who is this?” Then she showed the same animal picture and asked questions about these pictures. She put the picture on the board. After she put the seven animals’ pictures on the board, she asked, “What does favorite mean? What does favorite animal mean?” Each child then said a favorite animal’s name. Teacher B put the child’s name chart under the animal picture on the board. Every child chose a favorite animal. The Teacher counted with the children how many children’s names were under the animals’ pictures, and she put the number on the board for the favorite animals they identified. They determined the most favorite animal, and then Teacher B removed the board. At the end of the activity, Teacher B called the responsible child, and she brought the Daily Schedule Chart from the wall. Teacher B reminded them, “Yes”, said in the Russian Language last week, and she said, “Yes,” in the Chinese Language together with their friends. The responsible child, who is Chinese said, “Daily schedule,” looking to the Daily Schedule Chart, and the other child said the Chinese word for “yes.” Teacher B said, “The large motor activity,” and the children came in front of the classroom door to go to the gym.

Large motor, transition, lunch, and rest. Before the activity, all the children dispersed to the gym. In the activity, the children played a long time with the large motor material in the gym. After Teacher B played with the children playing in the house model, she rolled over on the mat with the other children. Then she rode on the wood horse. During the activity, Teacher B was interested in the children who did not attend. At the end of the activity, Teacher B sang a song, and the children gathered in front of the door. She brought to the garden door the same children who had to go home. At this time, the other children went to the lunch room. Looking at Teacher B’s activities, she asked more questions in whole group activities, and she asked questions during the middle of the activities, like teacher A. Her questions also were related to better understanding and application of activities by children.

The Types of the Teachers’ Questions

The teachers in this study were found to ask a similar number of questions. The teacher of the five-year old children asked 178 questions, while the teacher of the four-year old children asked 193 questions. According to the teachers’ questions that I examined, the results below are presented in three sections: a) the cognitive levels of the questions, b) the structure of the questions, and c) comparisons of the questions to groups versus individuals.

Cognitive levels of questions

Looking at the cognitive level of the questions asked by the teachers, the questions show a high level of knowledge. Table 1 shows the cognitive levels of the questions asked by the 5 year old class teacher (Teacher A).

Table 1: Cognitive Levels of Teacher A’s Questions

Level	Number
Knowledge	147
Compr.	22
Application	2
Analyses	1
Synthesis	2
Evaluation	4
Total	178

Cognitive Level	Percentage
Knowledge	82.6%
Comprehension	12.4%
Application	1.1%
Analyses	0.6%
Synthesis	1.1%
Evaluation	2.2%

Teacher A asked questions at all levels of cognition, but her questions were mostly at the knowledge level, with 82.6% For example, she asked, “Do you see any zeros here?” Furthermore, she showed the lowest number of questions at the analyses level, with 0.6%. Similarly, the teacher of the four-year old children (Teacher B) used more knowledge-level questions.

Another important result about teacher B is that she asked application-level questions the second-most frequently. For instance, she asked, “Which is smaller?” Table 2 shows the cognitive levels of Teacher B’s questions.

Table 2: Cognitive Levels of Teacher B’s Questions

Level	Number
Knowledge	134
Compr.	13
Application	38
Analyses	5
Synthesis	0
Evaluation	3
Total	193

Cognitive Level	Percentage
Knowledge	69.4%
Comprehension	6.7%
Application	19.7%
Analyses	2.6%
Synthesis	0%
Evaluation	1.6%

Teacher B asked about 69.4% knowledge questions. Furthermore, she did not ask synthesis-level questions, and she asked evaluation-level questions the least often (1.6%). In sum, this analysis of the cognitive level of the teachers' questions produced two results. First, the vast majority of questions by the four- and five-year old children’s teachers were at the knowledge-level. Second, Teacher B asked application-level questions the second most frequently, and Teacher A asked comprehension questions the second most frequently.

Structure of questions

The questions asked by the teachers were examined according to being open-ended or closed-ended. Table 3 shows the structure of Teacher A’s questions.

Table 3: Structure of Teacher A’s Questions

Structure	Number
Closed	153
Open	25
Total	178

Structure	Percentage
Closed	86%
Open	14%

Teacher A asked closed ended questions 6 times more often than open-ended questions. For example, she asked, “Do you still want to talk about the calendar?”Teacher B also asked more closed-ended questions. Table 4 shows the structure of Teachers B’s questions.

Table 4: Structure of Teacher B’s Questions

Structure	Number
Closed	178
Open	15
Total	193

Structure	Percentage
Closed	92.2%
Open	7.8%

Table 4 shows very few open-ended questions asked by Teacher B. Usually she asked closed-ended questions. For example, she asked, “Did you raise your hand?” In summary, then the structural analysis of the teachers’ questions shows that they asked more closed-ended questions than open-ended questions.

Comparisons of questions as a whole group and individually

One analytic issue is whether each teacher used different questions depending on whether she was teaching the whole group or individuals. The teachers’ questions were examined for whether the whole group activities and the individual activities differed in their use of questions. Table 5 displays the statistics for the cognitive questions of Teacher A.

Table 5: Cognitive Taxonomy of Group and Individual Questions of Teacher A

	W.Gr.	Ind.	Whole Group	Individual
Know.	75	72		
Comp.	6	16		
Appl.	0	2		
Analy.	0	1		
Synt.	0	2		
Eval.	0	4		
Total	81	97		
Time(min.)	60	220		
Per Min.	1.35	0.4		

Cognitive Level	Percentage
Knowledge	92.6%
Comprehension	74.2%
Application	16.5%
Analyses	7.4%
Synthesis	2.1%
Evaluation	2.1%

Table 5 shows the cognitive taxonomy of questions asked of the whole group and of the individuals by Teacher A. Also, Table 5 shows the number of questions asked per minute. Looking at the questions asked per minute, Teacher A asked more questions (1.35) in one minute when the children were in a whole group. Almost 93% of those questions were about knowledge, and she did not ask application, analyses, synthesis, and evaluation questions. For example, she asked questions such as “Whose name is this?” When children were working individually, Teacher A asked more (2 times more) comprehension questions than when children were in a whole group. For instance, she asked, “Tell me about your picture?” Furthermore, she asked questions at all cognitive levels when children were working as individuals. Furthermore, Teacher A’s questions were examined according to structure. Table 5 displays the structure of questions from Teacher A.

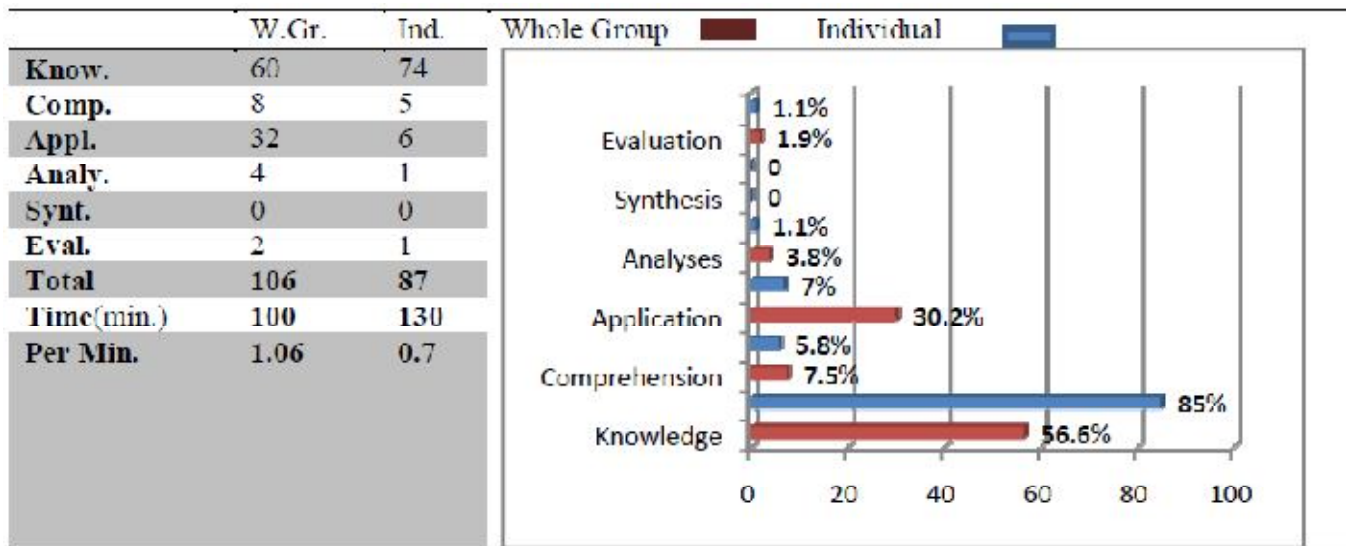
Table 6: Structure of Group and Individual Activity Questions of Teacher

	W. Gr.	Ind.	Whole Group	Individual
Closed	76	77		
Open	5	20		
Total	81	97		

Question Type	Percentage
Closed	93.8%
Open	79.4%

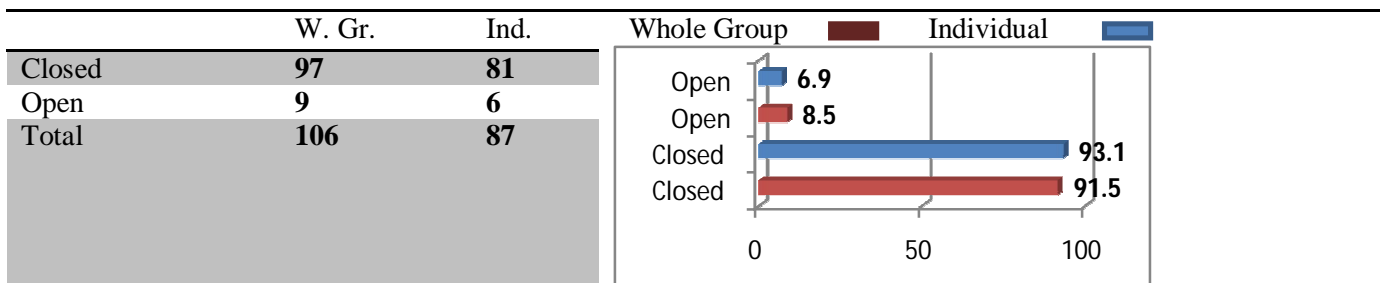
Table 6 shows that 93.8 % of the questions were closed-ended when children were in a whole group. For example, she asked, “Is this an answer?” Also, when children were working as individuals, Teacher A asked more (4 times more) open questions than when children were in a whole group. For instance, she asked, “What do you think of this game?” Teacher B, who is a four year old children’s teacher, asked questions at different rates, based on the cognitive level, and in the whole group and the individual activities. Table 7 shows the cognitive levels of Teacher B’s questions.

Table 7: Cognitive Taxonomy of Group and Individual Questions of Teacher B



Teacher B asked more questions (1.06) in one minute when the children were in a whole group. Almost 56.6% of her questions were at the knowledge-level. For example, she asked, “Anybody see a star here?” When the children were in a whole group, Teacher B asked more (approximately 4 times more) application questions than when children were working as individuals. For instance, she asked, “Which one is the biggest number and the lowest number?” Moreover, she did not ask synthesis questions either in the whole group or to individuals. Looking at the structure of Teacher B’s questions in the whole group and in the individual activities, she asked more closed-ended questions. For example, she asked, “Do you want to count with me?” Table 7 shows the structure of Teacher B’s questions.

Table 8: Structure of Group and Individual Activity Questions of Teacher B



Teacher B asked more closed-ended questions in both cases. When children were working as individuals, Teacher B asked a few more open questions (1, 6% more) than when children were in a whole group. For instance, she asked, “What do you think of this game?” In summary, analyses of whole group and individual activity questions showed three results. First, both teachers asked a lot of questions at the knowledge-level. Second, Teacher A, with five-year old children, asked comprehension level question second-most after the knowledge-level, and Teacher B, with four-year old children, asked application level questions second-most after the knowledge level. Third, both teachers asked too many closed-ended questions.

Discussion

This study is important for understanding asked of how and which questions teachers ask in the classroom context. We investigated teachers’ questions in three ways: their cognitive level and structure, cognitive level and structure of questioning during whole group and individual activities; and the importance of teachers’ activities for deeply understanding how they create questions. According to our descriptions of activities, teachers usually asked questions inside activities and for better understanding activities about materials or themes like “What are these cards?”

Therefore, they asked more knowledge questions, and they explained activities with questions.

This finding indicated why they asked more knowledge questions. Both teachers' questions were knowledge-level questions most of the time, and they were analyzed according to the cognitive levels of their questions to four- and five-year-old children.

Table 9: Comparison Findings Both of Teachers

Teacher A's Cognitive Levels and Number of Questions		Teacher B's Cognitive Levels and Number of Questions		Teacher A's Structure of Questions		Teacher B's Structure of Questions		Teacher A's Questions as a Whole Gr. and Individually		Teacher B's Questions as a Whole Gr. and Individually	
Know.	147	Know.	134	Cl.	153	Cl.	178	W. Gr	81	W. Gr	106
Compr.	22	Compr.	13	O.	25	O.	15	Ind.	97	Ind.	87
Appli.	2	Appli.	38								
Analyses	1	Analyses	5								
Synthesis	2	Synthesis	0								
Evaluation	4	Evaluation	3								
Tot.	178	Tot.	193	Tot.	178	Tot.	193	Tot.	178	Tot.	193

Teacher A, who teaches five-year-olds, asked 82.6% knowledge-level questions, and Teacher B, who teaches four-year-olds, asked 69.4% knowledge-level questions. Knowledge-level questions usually call for children to identify, memorize, and remember knowledge (Duster, 1997; Storey, 2004). The goal of asking knowledge questions is to test the child's knowledge, not to increase the opportunity of thinking (BuyukalanFiliz, 2007), whereas to ask high-level questions is important in developing thinking skills for children (Turner & Durrett, 1975; Frager, 1979; Samson, Sirkowsky, Weinstein, 1987, King, 2005; Walsh & Blewitt, 2006; Chappella et al., 2008). In this study, we saw that asking children questions did little for their cognitive development. This study indicates that teachers need to develop their asking questions skills. In other studies, there are similar results showing more asking of knowledge-level questions and lower levels of teacher involvement (Gall, 1970; Gall, 1984; Cotton, 1989; Duster, 1997; Sultana & Klecker, 1999; Akbulut, 1999; Storey, 2004; Blatchford & Mani, 2008; Massey et al., 2008; Bay, 2011). Teachers asking questions is important in terms of uncovering curiosity, activating thinking, and uncovering the ideas of children (Buyukalan Filiz, 2007). Therefore, teachers should ask questions to encourage higher-level thinking by children (Warner & Sower, 2005; DeVries, Zan, Hildebrant, Edmiaston, Sales, 2002). This study's findings showed that teachers asked a significant number of knowledge questions, to support and understanding that teachers need to improve their asking question asking skills. First, looking at the cognitive level of the questions asked second-most frequently, the teachers also asked questions at a lower level, but they asked questions at different levels. Teacher A asked comprehension-level questions (12.4%) second-most. At this level, children show what they know and use this knowledge in new ways easily (Storey, 2004). Teacher B asked application-level questions (19.7%) second-most. Application questions offer problems encountered in the daily life of children (Sanders, 1966; Duster, 1997). The purpose of this level's questions is to give the opportunity to recognize the appropriate time for them to transfer to their life what they have learned. Each cognitive level covers the previous level (Storey, 2004), and by asking questions at different cognitive levels after the knowledge-level, teachers see the development of children's cognitive skills.

Second, both teachers asked closed-ended questions at a high rate, as shown by the analysis performed on the structure of the questions they asked. In similar studies, teachers were shown mostly to ask closed-ended questions (Gall, 1970; Gall, 1984; Duster, 1997; Sultana & Klecker, 1999; Storey, 2004; Blatchford & Mani, 2008; Lee, 2010; Bay, 2011). Closed-ended questions are usually answered by yes or no, and they are used to identify specific facts and details (MacKay, 1997). The answer to the closed-ended question consists of one or a few words (Johnston et al., 2007; Sonmez, 2007; Taspinar, 2009). In addition, there is only one correct answer to these questions (Cheminaist, 2008). Therefore, closed-ended questions limit the development of a child's thinking (MacKay, 1997; Goodwin et al., 1983; Wilen, 1991). Children respond in the form of "yes" or "no," even without their necessarily understanding what is required in the question (Duster, 1997; Paterson et al., 1999). In addition, answers given to closed-ended questions asked in this way help the teacher to remember and evaluate the observation skills of children and to provide a determination of teaching according to this evaluation (Carin et al., 2005), whereas open-ended questions encourage a high level of thinking skills and also support the development of a child's problem-solving skills (Duster, 1997; Johnston et al., 2007; Klein et al., 2000). In this study, we observed that teachers asked more closed-ended questions. The teachers had a master's degree, and they studied as a professional in this field.

However, this finding shows that they did not ask questions for improving children's thinking skills. This study provides awareness for understanding the importance of teachers improving their question asking skills. When questions asked by the teachers were examined in terms of group activities and individual activities, Teacher A asked questions at all the cognitive levels in the individual activities, but she asked questions only at the comprehension and the knowledge levels in the whole group activities. In Bloom's Taxonomy (1956), the cognitive requirements are included at each level. For example, the analysis level also covers the application, comprehension, and knowledge levels (Storey, 2004). Therefore, learning is intended to develop the evaluation, synthesis, analysis, application, comprehension, and knowledge skills of children (Gall, 1984; Samson et al., 1987; Ozden, 1999). Looking in terms of the structure of the teachers' questions, in the individual activities they asked questions three times more often than during the whole group activities for a one minute. Open-ended questions provide large partitions in the schemas of children. Children are assumed most likely to have a different way of thinking (Carin et al., 2005). In Storey's (2004) research it was similarly observed in different activities that teachers asked open-ended questions at a higher rate during individual activities. However, this study indicated a different finding in terms of activities, and we provided activities descriptions to understand how teachers asked questions in their activities.

Teacher B asked four times more application-level questions during individual activities than whole group activities (see Table 2). Application level questions are asked for children to use and be able to transfer that knowledge of children. In the whole group activities, teacher-directed questions to all of the children are used for transferring and selecting knowledge. Looking at the structure of the questions asked, the closed-ended questions were asked at a high rate by Teacher B in both cases (see Table 8). De Rivera, Girolametto, Greenberg, and Weitzman (2005) in their study showed that teachers asked more closed-ended questions, but children were more responsive to open-ended questions. Also, research has shown that more vocabulary development and the development of children's language skills result from open-ended questions (Wasik & Bond, 2001; Van Kleeck et al., 2006; Wasik et al., 2006; Zucker et al., 2009). Therefore, teachers need to know the effects of question structure on the cognitive development of children.

Table 10: Per Minute Questions in Whole Group and Individual Activities

Teachers	Time (min.)		Per minute (min.)	
	Whl Gr.	Ind.	Whl Gr.	Ind.
Teacher A	60 min	220 min	1.35	0.4
Teacher B	100 min	130 min	1.06	0.7

Furthermore, this study indicated how many questions teachers asked per minute in whole group activities and in individual activities. Both teachers asked more questions during the whole group activities (see Table 5 and 7). Per minute, Teacher A asked 1.35 questions and Teacher B asked 1.06 questions. Gest and his friends (2006) claimed teachers asked three questions per minute. Sultana and Klecker (1999) claimed 2.89 questions were asked per minute. Storey (2004) also found that teachers ask 2.89 questions per minute. Even though teachers generally asked more questions in whole group activities, they asked fewer questions according to the other research. This finding showed that teachers need to improve on how many questions they can ask in the activities. Looking at the teachers' activities description, they usually asked questions about related materials and themes. The preschool teachers in this study used a similar frequency of questions with both four- and five-year-old children and they used more knowledge questions. In addition, they did not differ in terms of their use of open-ended and closed-ended questions with the four- and five-year-old children. These findings are surprising in light of the perceived importance of open-ended and high level questions. Finally, this study investigated whether the teachers' types of question (from knowledge to evaluation, open and closed ended, and whole group and individual activities) had any effect on cognitive development and how many questions teachers asked per minute.

Conclusion

In this study there were three areas identified for teachers questions: cognitive level, structure, and comparison of questions asked of the whole group and individually. Based on the study's findings, teachers asked more knowledge-level questions and closed-ended questions, and they asked more questions to the whole group than individually in a minute. Asking questions is a skill that helps children's learning, thinking, and interaction to emerge.

Also, the success of teachers in asking questions relates to reinforcement of this ability (Wood & Anderson, 2001). Effective teaching depends primarily upon a teacher's ability to ask questions (Morgan & Saxton, 1994). Therefore, preschool teachers need plan how to ask questions for the suitable development of children (Storey, 2004), so the structure and distribution of questions should be considered beforehand (Goodwin et al., 1983; Morgan & Saxton, 1991). Pre-planning allows closer inspection and replacement of teacher asked types of questions and their teaching potential. For determining what kinds of questions teachers can ask, they need to know the general terms of each level of Bloom's Taxonomy (Hunkins, 1972). In this way, it will be easier for teachers' to provide suitable questions at each level of the taxonomy (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956). Improved use of suitable questions has a connection with activities in the daily schedule (Storey, 2004). Also, teachers should avoid asking questions requiring the answers "yes" or "no" only (Bradtmueller & Egan, 1983; MacNaughton and Williams, 2004; Acıkgöz, 2006; Taspınar, 2009). When children receive closed-ended questions, they do not learn as much because they can answer with a simple "yes" or "no" (MacNaughton and Williams, 2004). Therefore, teachers can consider the question, "what can I ask of children?" Teachers should be required to write questions for developing ideas about what they can ask (Dillon, 1988; Brown & Wragg, 1993), and teachers should ask open-ended questions most often to encourage children to think deeply and to improve language (Kostelnik, Soderman, Whiren, 2011). According to the comparison of questions to the whole group and individually, teachers asked more questions in the whole group activities in a minute (see Table 5 and 7). Focusing on the individual child's activity and commenting accordingly can be difficult for teachers. Teachers have lots of opportunities for questioning to detect children's creative responses about books, events, and what happens in the classroom. Teachers can create questions for children by close listening and observation (Machado, 2010). Also, by using Bloom's Taxonomy in their questions, teachers can identify the range of thinking within children's activities (Cecil & Pfeifer, 2011). This study's findings can shed light on other research in the future. Because teachers head to ask more high-level questions and open-ended questions, how they can be supported and how they can ask more such questions per minute need to be researched.

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