Questioning during Story-telling Activities in Singapore Pre-schools

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Abstract

Children attending pre-schools should acquire the necessary knowledge, skills, and dispositions to develop holistically. Therefore, promoting thinking skills in children is important. One of the ways to develop and promote thinking skills in children is through "dialogue such as questioning and challenging" (Higham et al., 2010, p. 393). This study looks into pre-school teachers' conversations with children during story-telling activities. Six Kindergarten 1 (K1) and Kindergarten 2 (K2) teachers' story-telling activities with children were audio recorded. These recordings were then analyzed with regard to the number and type of questions asked by the teachers. Teachers also participated in qualitative interviews about their views on story-telling activities. Results have shown that teachers mostly asked factual and procedural questions. The questions asked also belonged to the lowest cognitive level of Bloom's Taxonomy of learning domains. While most teachers agree questions could help to facilitate children's thinking, some of them think that questions of the higher cognitive levels may be too demanding for children of this age. These results have future implications for various stakeholders.

Keywords: questioning, story-telling activities, pre-school, Singapore

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Introduction

Pre-school education is not compulsory in Singapore but about 99 percent of children attend a pre-school (kindergarten or childcare centre) at least one year before entering primary school (MOE, 2016). It is believed that a quality pre-school education will provide every child with a good foundation in literacy and numeracy. Children attending pre-schools should acquire the necessary knowledge, skills, and dispositions to develop holistically and prepare them for future school, work, and life (MOE, 2016). In formal primary education, thinking skills are an important aspect and one of the 21st Century Competencies. In order to cultivate thinking skills in children, many resources such as teacher guides, parent handbooks, children's storybooks, games, puzzles, and educational toys have been used to teach them thinking skills (Higham et al., 2010). Alternatively, teachers can also develop and promote thinking skills in children through "dialogue such as questioning and challenging" (Higham et al., 2010, p. 393). These "language-rich interactions" can arise from storybook reading activities and can be used to teach children thinking skills.

One common way teachers use to promote children's learning and thinking during storybook reading is by asking them questions. Asking questions is a common practice in pre-schools (Resnick, 1972), and is shown to be associated with positive learning outcomes including academic achievement and the ability to think critically and logically (Wise & Okey, 1983). However, not all questions are created equal. Bloom's Taxonomy of learning domains, for example, differentiates between questions focusing on low-level cognitive functions such as naming and recalling information, and questions focusing on high-level cognitive functions such as evaluating and inventing (Viswanathan, 2014). Therefore, it is important to scrutinize the type of questions asked by teachers.

Higham et al. (2010) and Vaish (2012) conducted studies to investigate teachers' dialogues, specifically questioning at the primary level in schools in Singapore. The teachers mostly used a lower cognitive level of utterances during storybook reading, and most of their questions were also close ended. Based on the results from these two studies, the current study aims to gather data on teachers' interactions (specifically, type and cognitive level of teachers' questions) during story-telling activities from pre-schools

(kindergarten or childcare) and compare them against the Bloom's Taxonomy of learning domains (specifically, cognitive domain).

This study has important implications for various groups of people. Firstly, it can provide stakeholders such as teachers and parents with the status and importance of thinking skills for children's language and cognitive development. Secondly, this study can inform teachers and teacher-training institutes on the knowledge, skills, and dispositions required to promote thinking skills among pre-school children. Lastly, it can give information to pre-schools and Early Childhood Development Agency (ECDA) or Ministry of Education's Pre-school Education Branch (MOE PEB) for review of teacher-education and professional development programs for pre-school teachers.

Literature Review

Thinking is generally presumed to be a cognitive process by which knowledge is attained (Presseisen, 1984). Thinking processes are related to various behaviors and require the thinker's active involvement. Some products of thinking are thoughts, knowledge, reasons, and judging. To encourage thinking skills in young learners and to get them to display their abilities, educators would have to choose and integrate these skills into their curricula and school programs. One of the skills which is often referred to in education is Bloom's Taxonomy of learning.

Bloom's Taxonomy was created by psychologist Benjamin Bloom and his colleagues in 1948. This taxonomy focuses on three main domains of learning: cognitive, affective, and psychomotor (Coffey, 2008). As mentioned earlier, the cognitive domain of Bloom's Taxonomy will be the focus in this study (see Figure 1).

Questioning is an important skill as it can check a student's understanding, help him/her connect to his prior knowledge, and motivate cognitive development (Vogler, 2005, as cited in Chafi & Elkhouzai, 2014). One of the teacher's roles is to cultivate thought and inquiry in students and this can be fulfilled through "proper questioning" (Chafi & Elkhouzai, 2014, p. 353). When questioning is done properly, teachers can enrich students' learning by strengthening their critical thinking skills, rectifying their misconceptions,

providing feedback, and encouraging class discussion. Questions also promote thinking and learning through facilitating self-explanation (Chi et al., 1994) and encouraging exploration (Yu et al., 2018). According to Myhill (2006), there are four types of questions: factual, speculative, process, and procedural. The description of question types is provided in Table 1.

BLOOM'S TAXONOMY – The Cognitive Domain

EVALUATION	o Assessing o Comparing ideas o Evaluating outcomes o Judging o Recommending		Highest cognitive level
SYNTHESIS	o Using prior concepts to create new ideas o Designing and inventing o Imagining o Inferring o Modifying o Predicting		
ANALYSIS	o Identifying and analyzing patterns o Organizing ideas o Identifying trends		
APPLICATION	o Applying knowledge o Applying problem solving methods o Manipulating o Designing o Experimenting		
COMPREHENSION	o Understanding o Translating o Summarising o Discussing		
KNOWLEDGE	o Recalling information o Discovering o Observing o Listing o Locating o Naming		Lowest cognitive level

Figure 1. Bloom's Taxonomy – The cognitive domain (Viswanathan, 2014).

Table 1. *Description of Question Types*

Form	Definition	Example
Factual Question	Questions that have fixed answers and elicit recall of information.	What is the title of the story?
Speculative Question	Questions that elicit answers which are often "opinions, hypotheses, imaginings, ideas" (Myhill, 2006, p. 26).	What do you think is going to happen next?
Procedural Question	Questions that relate to "the management of the lesson" (Myhill, 2006, p.26).	Can you continue?
Process Question	Questions that ask students to explain their learning process.	Can you explain why?

Although much research has investigated teachers' use of questions in classes, few have examined it in the context of early childhood education. Most existing studies in early childhood education have recorded teachers' questions during daily activities, and have found low frequencies of open-end questions or questions that may provoke thinking (Bateman, 2013; Bilaloğlu et al., 2016; Massey et al., 2008; Siraj-Blatchford & Manni, 2008).

The objective of this study is to capture a greater range of pre-school teachers' questioning by focusing on the context of storybook reading. Storybook reading is an excellent context to teach "oral, emergent literacy, and thinking skills" (Higham et al., 2010, p.394). Storybook reading can promote high-level thinking skills through modeling of thought patterns, accepting responses, as well as inviting children to engage in decontextualized discourse (Curenton et al., 2008; Otaiba, 2004, as cited in Higham, et al., 2010). Therefore, storybook reading provides students with not only oral input but also an opportunity to develop a range of various skills like high-level cognitive skills (Higham et al., 2010). When studying teachers' use of questions during storybook reading, it is important to investigate both the function of the questions (e.g., whether they are used to manage a class or elicit learning) and the cognitive level of the questions (e.g., whether the question was aimed at provoking recall or understanding). Therefore, we coded teachers' questions based on both Myhill's four types of questions and Bloom's taxonomy in the current study. Specifically, this study sets out to investigate the following three research questions:

1. What are the types of teachers' questions used during the story-telling activities?
2. What are the cognitive levels of teachers' questions used during the story-telling activities?
3. What are the teachers' views about promoting thinking skills among pre-school children, as well as the roles of questioning?

It should be noted that as a bilingual society, Singapore's education system emphasizes children's language development in both English and mother-tongue language, and storybook reading in pre-school classrooms are often bilingual as well (Sun et al., 2020; Sun et al., 2018). This study focuses on storybook reading in English, and storybook

reading in other languages is to be explored in future studies.

Method

A qualitative approach was adopted for this study as qualitative audio materials were recorded and qualitative interviews were conducted (Creswell, 2009).

Participants

A total of six pre-school teachers from three pre-schools (kindergarten or childcare) took part in the study. There were three K1 (for 5-year-old children) and three K2 (for 6-year-old children) teachers. The teachers who took part in the studies had different ethnicities, educational qualifications, and the number of years of teaching experience in the pre-school sector (see Table 2).

Table 2. *Background Information of Participants*

Pre-school	Teacher (K1/K2)	Ethnicity	Educational qualifications	Number of years in teaching
Pre-school X	Teacher 1 *(K1)*	Indian	University (Bachelor's Degree)	2
	Teacher 2 *(K2)*	Malay	University	3
Pre-school Y	Teacher 3 *(K1)*	Malay	Post-secondary (Diploma)	8
	Teacher 4 *(K2)*	Chinese	Post-secondary (Diploma)	5
Pre-school Z	Teacher 5 *(K1)*	Malay	Post-secondary (Diploma)	3
	Teacher 6 *(K2)*	Indian	University (Bachelor's Degree)	23

Procedure

Ethical clearance for the study was obtained from Nanyang Technological University's Internal Review Board (NTU IRB) before the study was conducted.

Prior to data collection, the principals of the pre-schools were contacted through phone calls and e-mails. They were briefed on the purpose of the study and the data collection procedures. Three pre-schools agreed to participate in the study. The principals from these pre-schools identified teachers from K1 and K2 levels to participate in this study. Once the names of the six participants were confirmed, the researcher briefed them on the purpose of the study and the data collection procedures through email. Written consent was obtained from the principals and participants, acknowledging the confidentiality of their responses.

The researcher coordinated timings with the teachers in order to observe their story-telling activities. Their story-telling activities took place in the morning or afternoon. Upon arrival, the teacher selected the books that he/she wanted to read with the class. He/she was asked to conduct his/her story-telling activity like how he/she normally would do so, in order to maintain a natural setting. This meant that comments, questions, and interactions were allowed from the class as they usually were during story-telling activities. Children were seated on the floor in their groups and the teacher sat on the chair with the selected storybook in hand. During the story-telling activity, the teacher held up the book and showed children pictures from the book at intervals (Higham et al., 2010). The researcher sat behind children to observe the story-telling activity conducted by the teacher. The teacher had a microphone clipped onto his/her clothing to record his/her voice. When the teacher was ready to audio-record his/her lesson, he/she would signal to the researcher and the researcher would activate the audio-recorder and begin the recording. This procedure was repeated for all six teachers.

After the story-telling activity, a face-to-face semi-structured interview was conducted with the teachers. The interview consisted of questions to obtain background information (e.g., educational qualifications, years of teaching, etc.), teachers' views about the story-telling activity which they had conducted earlier, as well as views about thinking skills and their importance among pre-school children. During the interviews, responses were both noted down and audio recorded.

A total of 163 minutes of story-telling activities were recorded, with an average time of 27 minutes per teacher. The interviews totaled up to 50 minutes' worth of recordings (see Table 3). All audio-recorded story-telling activities and interviews were transcribed verbatim.

Table 3. *Duration of Story-telling Activities and Interviews*

Pre-school	Duration of story-telling activity (mins)	Teacher *(K1/K2)*	Duration of interview (mins)
Pre-school X	23	Teacher 1 *(K1)*	13
	25	Teacher 2 *(K2)*	15
Pre-school Y	21	Teacher 3 *(K1)*	7
	25	Teacher 4 *(K2)*	7
Pre-school Z	44	Teacher 5 *(K1)*	4
	25	Teacher 6 *(K2)*	4

Note: The duration of the story-telling activity and interview were rounded off to the nearest minute.

Organizing and Coding of Data

For the transcript data, the teacher's questions (utterances ending with question marks) during the story-telling activity were extracted so that they can be coded for further analysis. Firstly, these questions were coded using Myhill's (2006) taxonomy for question type: factual, speculative, procedural, or process. Secondly, the types of thinking skills in these questions were coded using Bloom's (1948) six developmental categories of thinking skills: knowledge, comprehension, application, analysis, synthesis, or evaluation (Coffey, 2008). Questions that do not qualify Myhill's and Bloom's taxonomies were marked as Not In List (NIL). The analyzed data provided insight into the nature of teachers' questions and which type of thinking skill was encouraged during story-telling activities.

For the interview data, thematic analysis was applied to identify and extract opinions and views that were commonly expressed by the teachers (Braun & Clarke, 2006; Nowell et al., 2017). Special attention was paid to teachers' views on questioning, as well as the role of

questioning in promoting thinking skills among pre-school children. These views were then grouped, re-grouped and refined for final analysis and reporting.

Results

The teachers' questions were the focus of the research and they were classified into two categories: (1) types of questions used and (2) cognitive level of questions used.

Types of Questions Used

The types of questions used during story-telling were coded according to the definitions given in Table 1. Table 4.1 and 4.2 show the number and proportions of the different types of questions used by all the teachers. Table 4.3 lists examples for different types of questions found in the transcripts.

Table 4.1 shows that all K1 teachers asked mainly factual questions (60%) during story-telling activities and none of them asked process questions. In Table 4.2, it shows that the K2 teachers asked mostly factual (37%) and speculative questions (38%) during story-telling activities, and process questions were least frequently used (3%).

When comparing the different types of questions used by K1 and K2 teachers, data showed that K1 teachers asked more factual questions than speculative questions, whereas K2 teachers asked similar amount of factual and speculative questions. When comparing the proportions of the different types of questions used by the K2 teachers, Teacher 4's data stood out. Her procedural and speculative questions amounted to the same percentage of 28 percent although the general trend across all teachers is that the percentages of procedural questions asked are lower than the percentages of speculative questions asked.

Table 4.1. *Types of Questions used by K1 Teachers*

Teacher (K1)	Factual Question	Speculative Question	Procedural Question	Process Question	Total
Teacher 1	39	24	8	0	71
	54%	33%	13%	0%	100%
Teacher 3	77	43	20	0	140
	55%	31%	14%	0%	100%
Teacher 5	103	40	8	0	151
	68%	27%	5%	0%	100%
Total	219	107	36	0	362
	60%	30%	10%	0%	100%

Table 4.2. *Types of Questions used by K2 Teachers*

Teacher (K2)	Factual Question	Speculative Question	Procedural Question	Process Question	Total
Teacher 2	25	34	13	4	76
	33%	45%	17%	5%	100%
Teacher 4	32	22	22	3	79
	40%	28%	28%	4%	100%
Teacher 6	22	25	12	0	59
	37%	43%	20%	0%	100%
Total	79	81	47	7	214
	37%	38%	22%	3%	100%

Note: In Table 4.1 and 4.2, the first number in each cell shows the number of questions and the second number shows the proportional percentage of questions for each story-telling activity.

Table 4.3. *Examples for Different Types of Questions used by Teachers*

Type	Example
Factual	Is it a cheetah or a leopard?
Speculative	How do you think they feel? Sad and? And what?
Procedural	Can we start now or do you still want to make that sound?
Process	What does it mean?

Cognitive Level of Questions Used

The teachers' questions were coded for cognitive level based on the definitions of Bloom's Taxonomy of learning domains in Figure 1. There are six categories (knowledge, comprehension, application, analysis, synthesis, and evaluation) and they correspond to an increasingly higher cognitive level of questions (Higham et al., 2010). 'Knowledge' and 'evaluation' represent the lowest and highest cognitive levels respectively.

From the data, all teachers did not ask many higher cognitive level questions. They mostly asked questions that had the lowest cognitive level (knowledge) which made up 78 percent and 54 percent of their questions respectively for K1 and K2 teachers (see Tables 5.1 and 5.2). Examples for questions of different cognitive levels can be found in Table 5.3.

Table 5.1. *Cognitive Level of Questions used by K1 Teachers*

Teacher (K1)	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation	Total
Teacher 1	40	8	2	0	3	0	53
	75%	15%	4%	0%	6%	0%	100%
Teacher 3	96	13	4	2	9	0	160
	77%	10%	3%	0%	8%	0%	100%
Teacher 5	99	9	10	0	7	0	125
	79%	7%	8%	0%	6%	0%	100%
Total	235	30	16	2	19	0	500
	78%	10%	5%	1%	6%	0%	100%

Table 5.2. *Cognitive Level of Questions used by K2 Teachers*

Teacher (K2)	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation	Total
Teacher 1	39	14	6	0	7	0	66
	59%	21%	9%	0%	11%	0%	100%
Teacher 3	31	22	5	0	4	0	62
	50%	36%	8%	0%	6%	0%	100%
Teacher 5	23	15	5	0	0	0	43
	53%	35%	12%	0%	0%	0%	100%
Total	93	51	16	0	11	0	171
	54%	30%	9%	0%	7%	0%	100%

Note: In Table 5.1 and 5.2, the first number in each cell shows the number of questions and the second number shows the proportional percentage of questions for each story-telling activity.

Table 5.3. *Examples for Different Cognitive Level of Questions used by Teachers*

Type	Example
Knowledge	What is this punctuation mark?
Comprehension	What is the mouse trying to do?
Application	If he asks you, "What shall I do if my toothache comes back?" Can you give him any suggestions?
Analysis	What would you do if someone takes away your fruit?
Synthesis	Why is the crocodile so selfish?

Teachers' views on promoting thinking skills using questions

When the teachers were asked how they promoted thinking skills during story-telling activities, two common ideas stood out in all interviews. Firstly, all of them mentioned that asking questions during story-telling activities would help to facilitate children's thinking and learning. Two teachers stated specifically that they used questioning techniques, and that the types of questions asked matters in promoting thinking skills among pre-school children. Secondly, four out of six teachers mentioned that thinking skills could be promoted through other means such as discussion of current issues, encouraging children to create alternate storylines, or endings to a story using various means (i.e. dramatic play), and also the use of extrinsic rewards.

Some interesting points were highlighted in two of the teachers' interviews. Teacher 1 said that she did not ask questions that required children to make predictions as she perceived that they might be unable to make good and logical predictions. Teacher 3 mentioned that through questioning, thinking skills might have been encouraged in children's minds but some of them might have difficulty articulating their thinking processes and would require teacher's prompts for assistance.

Discussion

With regard to the three research questions, we have found that 1) all teachers used mostly factual questions, 2) most questions were on lower cognitive levels (knowledge and

comprehension) based on Bloom's taxonomy, and 3) although most teachers agree questions could help to facilitate children's thinking, some of them think that questions of the higher cognitive levels may be too demanding for children of this age, especially in K1 classes.

The result that all teachers used mostly factual and lower cognitive level questions is in line with previous findings which suggest that story-telling activities are mostly teacher-directed (Dangel & Durden, 2010) and that the questions being asked are mostly close-ended and lower-level (Bilaloğlu et al., 2016; Siraj-Blatchford & Manni, 2008). When this learning routine is established during story-telling activities, children will adopt this pattern of learning (Salmon, 2008) and tend to model these types of questions asked by their teachers (Vaish, 2012).

It is noted that K1 teachers asked more factual questions than speculative questions, whereas K2 teachers asked a similar amount of factual and speculative questions. One of the possible reasons is that the K2 children had more prior knowledge and experiences which enabled them to use information from storybooks to take part in decontextualized oral language (DOL). DOL is the language used "to convey novel information to audiences who are at a distance from the speaker and who may share only limited amounts of background knowledge with the speaker" (Snow, 1991, as cited in Goh & Silver, 2006). As K2 children are able to use DOL, they will be able to answer speculative questions which required them to share their opinions, hypotheses, imaginings, and ideas (Myhill, 2006).

To account for the K2 teacher's data where her procedural questions and speculative questions were of the same percentages, the researcher observed that the teacher focused a lot on classroom management during the story-telling activity. There were some children who were not so cooperative and did not behave appropriately in the class and hence, the story-telling activity was interrupted intermittently.

Regarding teachers' views on promoting thinking skills among pre-school children, it is surprising that one of the K1 teachers stated that she did not ask a lot of prediction questions as she assumed that most children in her class did not have a good prior knowledge which would enable them to make good and logical predictions. She felt that children were unable to participate in decontextualized contexts if they do not have the relevant prior knowledge which is related to the story-telling activity. However, she

mentioned that most children in her class did not have strong prior knowledge as most of them have parents who are either not highly educated or are often busy at work and spend little time with them. Therefore, these children's life experiences were lacking.

Another K1 teacher mentioned that some children might face difficulty articulating their thinking processes, as they are unable to form complex and integrated language structures (Scull et al., 2013). "Children's thinking, like talking, may go unnoticed" (Hubbard, 1998, as cited in Dangel & Durden, 2010), and it is important for a teacher to give questioning prompts to a child to facilitate his/her thinking process. Through questioning prompts, the teacher will be able to understand a child's thinking process and provide him/her with the words to form the sentences for his/her speech.

In sum, in line with previous findings from other countries (e.g., Bilaloğlu et al., 2016; Dangel & Durden, 2010; Siraj-Blatchford & Manni, 2008), we found that the 6 pre-school teachers we observed used mostly factual and the lower cognitive level questions during their interaction with children. This may be partially due to the belief that questions that require high-level thinking may be too complex for children, especially for those who are younger and from families of a lower socioeconomic status. It should be noted that although questions need to be age-appropriate, children's ability to think and properly answer high-level questions can be improved with better questioning techniques such as encouragement, breaking down large questions into smaller ones, and the wait-time strategy (Bilaloğlu et al., 2016). These techniques could be especially important for preschoolers at risk of language- and literacy-related difficulties (Massey et al., 2008).

Limitations

The key limitation of this study is that it has a small and varied sample which makes generalizations difficult. However, the sample size had been deliberately kept small as the data collected is rich and descriptive, and the research method is qualitative (Bogdan & Biklen, 2003; Creswell, 2009).

Conclusion

The results from the study showed that the questions used in story-telling activities in these six classes were mostly factual and belonged to the lower cognitive levels. In order to create a more student-centered learning environment and also promote thinking skills in children during story-telling activities, the teachers can create child-oriented activities which involve more higher cognitive level questions that could help children relate to real-life experiences (Dangel & Durden, 2010).

As thinking skills can be promoted through story-telling activities, teacher-training institutes can equip future and current pre-school educators with the knowledge, skills, and dispositions needed to facilitate thinking skills among pre-school children. Teachers may need to learn or re-learn that different types of questions used will influence a classroom's learning culture and a student's developing cognition.

Authors' Note

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