Comparing Teaching Methods between Older Child Peers and Adult Teachers: A Pilot Test by Using a Case study for Preschool Children

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Abstract

The teaching of adult teachers and older child peers acting as teachers was compared in terms of the level of teaching control maintained, adjusting the teaching to the situation and scaffolding. Participatory observation was used to collect the data for this case study. An adult teacher and an older child peer separately guided a preschool child in playing a colour arrangement game. The findings demonstrate that the adult teacher tend to maintain better control and to better adjust their teaching to the situation than older child peer. Moreover, the adult teacher and older child peer can use their own unique scaffolding technique (verbal expression and non-verbal expression respectively) to achieve effective teaching. Through this research, an alternative face-to-face learning opportunity for preschool children can be arranged, apart from online learning. Preschool teachers and parents would gain insight on handling the transition from preschool education to formal primary school learning.

Keywords: Teaching control, Situational teaching, Scaffolding, Preschool education

1. Introduction

Cognitive development not only refers to the development of intelligence, but also to the development of cognitive behaviour, the individual's understanding of things, the way of thinking and various thinking abilities. It is the process of growth and gradual change that adapts to the environment (Cheng et al., 2017). One's intelligence quotient (IQ) is determined not only by learning ability, but also depends on the teaching ability of the teacher. How well children learn depends heavily on their teachers' teaching methods. Even if two children have the same performance and abilities in dealing with difficult problems, their IQs may differ greatly due to different learning processes (Greenwood et al., 2003). Children with the same level of mental development can have great differences in their learning abilities if they have different teachers (Ma, 2005). Their mental ages are then not the same, and their future learning is also likely to be different. Children often take the initiative to explore, seek knowledge and find root causes to try to understand things, as Piaget's constructivism theory explains (Piaget, 1981). Children can learn through a series of activities, interact with the real world and step by step through their own behaviour in order to establish an effective, complex, and complete cognitive system (Wood, 1988). Such behaviour does, however, strengthens a child's self-centeredness, which can limit accepting others' opinions, moral thinking and interpersonal communication ability. It can become the main factor hindering the growth of preschool children (Light & Littleton, 1994). Therefore, children can learn more effectively if the right teachers can be identified for them.

The COVID-19 pandemic had made this study even more important, as most nursery schools are either closed or conducted partially teaching online. Many children are retained at home that causes parts of the teaching role have fallen to their parents or even elder brothers and sisters. In order to better understand the most appropriate methods of instruction for the development of preschool children, this study achieves the academic contribution by exploring the differences in the roles of adult teachers and older child peer teachers. Wood's (1988) level of teaching control is used in order to determine the performance of adult teachers and older child peer teachers. The data classification method based on Tharp and Gallimore (1991) is used for making accurate quantitative analysis. Therefore, data analysis method is used to show each scaffolding activity of adult teachers and older peer teachers. There are the following research questions for investigation.

Question 1: If adults serve as teachers, will the teaching control be better implemented than if older child peers serve as teachers?

Question 2: If adults serve as teachers, will the teaching be better adjusted to the situation than if older child peers serve as teachers?

Question 3: Are there any significant differences between the scaffolding techniques adopted by adult teachers and older child peer teachers?

2. Literature Review
2.1 Learning and development of Preschool Children

Simple peer relationships usually first form when a child is one to two years old. Children only begin to have preliminary self-belief at that age. It is like the "personalized society" proposed by Schneider (1993). Each person has his own beliefs not necessarily shared by others. Children are not yet adept at communicating with others and culture provides no fixed communication mode. At three, however, children begin to understand how to use language effectively for communication. Peer-to-peer interactions then become more frequent and they can have some meaningful communication (Schaffer, 2006). Selman (1980) reminds us that between the ages of three and seven the establishment of friendship is limited to momentary peers. Since children cannot distinguish their own views from those of their friends, their peer friendships are usually short-lived and based on material values (Huang, 1995). Young and Ferguson (1979) have proposed that collective life is an important basis for identity, especially in collectivist societies like China's and Hong Kong's. However, children also have the possibility to be outliers who refuse to participate in collective life. That can be regarded as a personal right and is permitted among peers (Schneider, 1993). In any case, a preliminary peer culture has been formed at this stage, and it affects a child's behaviour. Selman (1980) believes that children are only at the stage he calls "one-way assistance" between the ages of five and nine. Therefore, not able to attend school is a serious problem in collectivist societies not only for learning, but also missing chances to socialize with peers. Previous literature has also pointed out that the values internalized by children before the age of six may have different effects at different stages in the development of group behaviour in the future (Broesch et al., 2021; Whiting and Whiting, 1975). That is because when children observe certain behaviour of others being encouraged by the community, they will internalize that and modify their own understanding of the behaviour. Therefore, children from different cultures may show very different behaviour in the different situations (Corsaro, 2017). For example, in the United States where

individualism prevails, peer relationships between children are indeed very different from those in collectivist China.

2.2 Teaching control level

Piaget's (1969) interaction theory uses some elements of biological maturity theory and environmental learning theory and points out that internal and external factors are equally important in the development process. Unlike those other theories, the interaction theory emphasizes how active children can have a decisive influence on their own development. It asserts that children can try to adapt to the environment to create or construct their own development. Children and the environment, or individuals and society, directly affect each other. According to Skinner's environmental learning theory, the environment is regarded as an important driving force for development and change rather than a pre-existing factor transmitted by genetics (Skinner, 1953). That means the environment is the most important element that leads development, and that children can be shaped instead of relying on the innate abilities of the children themselves. This is evident when a teacher or other adult is conversing with a preschool child. In such instances the children are obviously affected by the attitudes and forms of dialogue being used. When school children talk to teachers, the scope of their conversation is specific to school matters because the teacher always needs to retain control of the conversation's content and keep it within the school's curriculum.

On the other hand, the role of older child peers functioning as teachers is possible, since children's teaching capabilities seem to increase throughout childhood (Boyette and Hewlett, 2017). Nevertheless, children spend most of their days at school with adult teachers, the most intense communication in the teaching process is between teacher and student. Good teacher-student relations are essential for maintaining a positive classroom environment and to simulate students' interest and motivation to effectively take part in class activities (Yilmaz & Sahin, 2016). The teaching control level is determined by the content of conversation between a teacher and children and how it is conducted, as teachers need to keep the students' behaviour consistent with the goals of the curriculum and to organize appropriate learning experiences (Sahin & Yilmaz, 2020). Therefore, it is hypothesized that:

H1: When adults are teachers, their teaching control is better than that of older child peer teachers.

Guided participation helps children improve their thinking skills by encouraging children to refer back to their focus, attention, memory, and problem-solving skills (Rogoff, 1993). It would involve the learner and tutor in a collaborative process whereby the learner's current level of understanding is linked to a new level (Shabani, 2016). It aims to assist students as they perform adult-like activities assisted by adult teachers. Previous literature has indicated that adult teachers are usually perceived to be the primary teachers of children (Rogoff et al., 1996). Tomasello's (1999) has echoed that 'instructed learning' as necessarily occurring from adults to children, but 'collaborative learning' may only involve older child peers in the entire teaching process. Therefore, it is hypothesized that:

H2: When adults are teaching, their teaching is better adjusted to situations than the teaching of peer children.

2.3 Scaffolding

Scaffolding is a technique applying Vygotsky's zone of proximal development (Vygotsky, 1978). It aims to provide customized support based on each child's level of knowledge or ability (Maryam et

al., 2019). It describes a teacher's supportive role in extending children's learning (Edman et al., 2007). One of the most difficult barriers for scaffolding is self-centeredness, but it can be overcome through social experience, especially when children and their peers cooperate. Based on the equal relationship between the two, even if their opinions are different, consolidation can lead to a better synthesis (Light & Littleton, 1994). Although opportunities for teachers to actively assist are relatively rare, they can help children to discover whether there are problems or implicit contradictions in their own ideas, thereby promoting the child's development (Wood, 1988). Moreover, some older peer children may be skilled at teaching other children because they are closer in development. They have privileged knowledge of another child's "Zone of Proximal Development" (Lew-Levy et al., 2020).

Piaget (1981) views development as from the inside out. Development is a stage-like process of biological evolution progressing towards socialization. He eschews generalization in explaining development because generalization is purely descriptive and not explanatory. He insists that children respond to conflicting stimuli from their own perceptions and the environment and will actively respond by integrating them to expand their original experience and learn. There is an asymmetry in the learning from interaction of stronger and weaker children. Children can learn from adults incessantly because most adults already understand what a child needs to learn (Vygotsky, 1978). This process is co-construction of a shared understanding (Light & Littleton, 1994). Such co-construction can happen with other children too, which is how older child peers can serve as younger children's teachers.

Rogoff's (1993) theoretical model can also be used to produce scaffolding and analyse the entire teaching process qualitatively through observation. As for coding method the scaffolding, Tharp and Gallimore's (1991) quantitative data classification method is the most appropriate. It shows the number of occurrences and examples of each scaffolding teaching activity. Adults' and others' support for students is classified as either verbal or non-verbal. If children can move from conflict to collaboration, interaction and mutual assistance can play a constructive role (Buđevac et al., 2017). However, the learning content should not be too difficult, outside a child's current phase of development. Otherwise, no matter how many times the child is taught it, he or she will not be able to comprehend the knowledge. Vygotsky (1978) terms this "the general law of cultural development". All the functions in a child's acculturation have a social aspect and a psychological aspect. This principle is equally applicable to casual attention, logical memory, the formation of concepts, and the development of will power. Children can achieve higher levels of performance more easily when they are guided by adult teachers or older peer teachers with better-developed abilities. That guidance allows them to practice and gradually internalize new knowledge until finally they can independently show higher-level thinking and development (Essa & Burnham, 2020). Therefore, it is hypothesized that:

H3: Both adults and older child peers can perform scaffolding serving as teachers.

3. Method

3.1 The subject of the study and participants

This study is designed to be a pilot test by using a case study for preschool children. It was conducted to compare the two teaching processes between 1) an adult teacher with a six years old preschool child, and 2) eleven years old peer teacher with a six years old preschool child. In both teaching environments, their tasks are to arrange colour balls by using an instruction chart in two different orders (Table 1). The study used a set of coloured round balls, which were set as tasks to be completed in the teaching situation. Although the task may seem simple, and preschool children have never been exposed to these plays, it might be difficult for six-year-olds to complete it independently in two minutes. Based on the fact that the preschool child had not played the game

before, the activity is intermediate difficulty. Similar colour ball arrangement game is popular that in other related research studies can be found; for instance, Rouadi and Anouti's study (2020) is an example. Colour ball arrangement game is a simple but effective activity that many previous studies have adopt it. The whole teaching process was conducted in the recent development area of preschool children, and the participants had never been exposed to the game before.

3.2 Research tools and related material
The research used a set of toys and set them as teaching tasks that must be completed. The coloured toys were round balls. This activity had an instruction chart. The entire activity process were divided into two sections and each lasted two minutes. The entire process had been written by the researcher.

3.3 Research Steps
This study employed qualitative research methods (Creswell, 2014). In order to reduce any pressure on the preschool children, the experiments were carried out in an informal setting in Hong Kong rather than in a nursery school. First, the adult teacher worked with the six-year-old child explaining the task; then the eleven-year-old teacher worked with the same child, each for about two minutes. Both instructors guided the child in understanding the instruction chart and arranging the balls to complete the task correctly. The process was recorded from selecting the first colour ball to placing the last.

Table 1: Colour sequences in the ball arrangement activity

Order one (Older child peer teacher and six-year-old child)	1) Pink 2) Blue 3) Red 4) Yellow 5) Orange 6) Blue 7) Green 8) Pink 9) Orange 10) Red
Order two (Adult teacher and six-year-old child)	1) Red 2) Orange 3) Pink 4) Green 5) Blue 6) Orange 7) Yellow 8) Blue 9) Pink 10) Red

4. Results
4.1 The level of teaching control
Teaching control level was coded is terms of the number of times each instructor used each of the teaching modes shown in Table 2) (Wood, 1986). The table provides examples for each level of control, but when an instructor's language was difficult to categorise, that instance was not coded. The differences between adult teacher and the older peer in making situational adjustments was then analysed. Adult teachers tended to use "General Verbal Instruction (GVI)" and "Special Verbal Instruction (SVI)" in the teaching process, while older peer uses "General Verbal Instruction (GVI)" and "Specific Verbal Instruction (SVI)" less than adult teacher in the teaching process, and clearly use "Indicates Materials (IM)" and "Demonstration (DEM)" methods much more.

Table 2: Teaching techniques

	Adult teacher		Older child peer teacher	
	Number of appearances	%	Number of appearances	%
General Verbal Instruction Example: Which colour ball is then put into the transparent box?	4	34	2	14
Special Verbal Instruction Example: What is the next colour ball?	7	58	2	14
Indicates Materials Example: It's this colour ball!	0	0	5	36
Prepares for ball arrangement Example: The rest of the colour balls are here.	1	8	1	7
Demonstration Example: Put the red colour ball in the transparent box.	0	0	4	29

4.2 Adjusting to the situation

Rogoff's (1993) theoretical model of participation under guidance is a qualitative way to analyse the entire teaching process. In the experiments the adult teachers and the older child peer teachers made different degrees of adjustment to their teaching in response to the situation. If the child was successfully completing the task, the adult teachers tended to reduce their assistance immediately. If the child was having trouble, the adult teachers tended to step up their assistance. This was case-by-case adjustment. Table 3 presents the data on adjustment. The adult teachers clearly adjusted more readily.

Table 3: Adjusting teaching to the situation

	Adult teacher		Older child peer teacher	
	Number of appearances	%	Number of appearances	%
Adjusted to the situation	7	88	2	25
Did not adjust to the situation	1	12	6	75

4.3 Scaffolding

Table 4 shows the coding of scaffolding using Tharp and Gallimore's (1991) classification system. It shows the number and percentage use of each scaffolding measure by the two types of instructor. The scaffolding measures are divided into verbal and non-verbal assistance. As Table 4 shows, the adult teachers relied more on verbal techniques and preferred to use questioning, encouraging and giving instructions in their scaffolding. The older child peers preferred to non-verbally "Indicates Materials (IM)" and "Modelling (MOD)"the correct response.

Table 4: Scaffolding incidence

	Adult teacher		Older child peer teacher	
	Number of appearances	%	Number of appearances	%
Verbal assistance				
Questioning, Q Example: Which colour ball do you put into the transparent box now?	17	53	2	13
Feedback, FB Example: Yes! Put the coloured ball into the transparent box.	2	6	2	13
Encouragement, ENC Example: Excellent!	3	9	0	0

Gives Instructions, GI Example: Put the ball into the transparent box like this	9	29	2	13
Non-verbal assistance				
Modelling, MOD Example: Instructor puts the blue ball in the transparent box	0	0	4	27
Prepares Materials, PM For example, instructor takes the coloured balls out of the toy cabinet	1	3	1	7
Indicates Materials, IM Example: (Indicates) That colour ball.	0	0	4	27

5. Thematic Discussion

5.1 The level of Teaching Control (Hypothesis 1)

The results also confirm Vygotsky's (1978) view that older peer teachers with higher levels of ability can help preschool children learn and develop in the same way adults can, but there are significant differences in the way they teach. The adult teachers functioned like guides or counsellors, providing appropriate advice and adjusting the control level as necessary, helping the children to gradually take the initiative in solving the problem. The most obvious example is when a child could not put the correct ball in the box, the adult teachers let the child find their own way to put the ball back. That is self-solving. In contrast, the older peer teachers did not often adjust the teaching level. Their goal was simply to assist the child to complete the task as quickly as possible. When a child did not know which colour ball to use next, most of the time the older peer teacher immediately indicated which colour was correct, or even personally demonstrated the correct arrangement. They gave children less opportunity to use the instruction chart to self-study. That undoubtedly reduced the children's learning. It also shows that the older child peers did not try to systemize their teaching. To sum up, the adult teachers had better teaching level control than older child peers, as Hypothesis 1 predicts.

5.2 Adjusting to the situation (Hypothesis 2)

In terms of adjusting to the situation, the adult teachers again did better than the older child peers. For example, if a child has forgotten what to do next, the adult teacher would say, "Remember that the fifth ball is blue in the order on the indicator chart." This would remind the child to use their memory. The older peer teachers did not work this way, only working to complete the task as soon as possible. Most of their instructions did not guide the children to use their existing knowledge and skills to solve the problem. When a child did not know which ball to take next, the older child peers were inclined simply to tell them. For example: "The next colour is not this; it should be blue." So as Hypothesis 2 predicts, adults are better than older peer in adjusting to teaching situations.

5.3 Scaffolding (Hypothesis 3)

Table 4 shows that older peer teachers tend to give non-verbal assistance (61%), while adult teachers use non-verbal assistance much less often (3%). Older peer teachers know how to use non-

verbal techniques to provide assistance in ways that adult teachers may not. By actual showing how to execute the coloured ball task the older peer teachers demonstrated effective teaching. Modelling (27%) and indicating materials (27%) were commonly used. The data therefore suggest that Hypothesis 3 was not supported. Adult teachers are not consistently better at scaffolding. Non-verbal assistance is acceptable and sometimes better for helping preschool children learn. Not all preschool children are ready to learn from verbal instruction only, and that may indicate that the scaffolding offered by older peer teachers may promote the transition from preschool learning to elementary education. Since scaffolding can be considered a key consideration in designing and conducting teaching activities (Maryam et al., 2019), it is important for both any teacher to carefully consider the proportion of verbal and non-verbal techniques they use. Emotional scaffolding can be important in teacher - initiated interactions that support positive emotional experiences for achieving a variety of classroom goals (Yoshida, 2020).

These findings can provide some enlightenment for future research into early childhood education. In today's competitive society, adults too need to make continuous progress in learning to meet the needs of society and the workplace. Children cannot avoid being involved in such learning competition, and teachers and parents must give appropriate guidance according to each individual child's circumstances. This would help school management to make better teaching arrangements benefitting both the teachers and their students.

In today's special post COVID-19 pandemic situation, teaching approaches relying on both adult teachers and older child peers as teachers should be considered. It is important to take good care of children's development as they move from nursery school to elementary school. This study protocol might usefully be extended to see to what extent young children's moods and playtime are influential. The experiments might need to be repeated many times to do so. It should be recognized that in these experiments there may have been some misunderstanding of the objectives. Some of the older child peer teachers may have forgotten the objective. Rather than patiently teaching the children to use the instruction chart to complete the task, they may have shifted to completing the task as quickly as possible. The sample size was small due to time and cost constraints of pilot test. More qualitative observations are needed to validate these findings. A longitudinal study should be considered. Repeated observations over a longer period of time would give better reliability and validity.

6. Conclusion and Limitations

This study explored teaching and learning with preschool children in Hong Kong. Two of its three hypotheses were supported. Adults do indeed tend to be better teachers than older child peers in terms of their teaching control (accepting H1). When adults are teachers, their teaching is more situation-adjusted than that of older child peers as teachers (accepting H2). But both adult teachers and older child peers perform effective scaffolding, though in different ways (accepting H3). Therefore, the recommendations of the Older child peers Children Teacher Program should be accepted.

Teachers and parents have to be aware that a child's older peers can support them without any explicit scaffolding technique (Kulju & Mäkinen, 2021). Emotional scaffolding can be emphasized for reliable teacher - initiated interactions that support students' positive emotional experiences for achieving a variety of classroom goals (Yoshida, 2020). Moreover, this study can provide some enlightenment to other researchers of the same type, which can be helpful and breakthrough in this child educational category. In today's competitive society, not only do adults need to make continuous progress in learning to meet the needs of society and the workplace, children cannot avoid being involved in this learning competition, teachers and parents can give appropriate guidance according to the individual circumstances of children, to create a new

cognitive learning methods for children to achieve the best development. This would help the school management to have better arrangements in teaching assignments, and also achieve mutual benefits between teachers and students through reflection in the teaching process. An integrated teaching approach of adult teacher and older child peer teacher should be considered in this special post COVID-19 pandemic, where formal face-face teaching at school cannot be implemented. It is important to take great care of the children during the transition from nursery school to elementary school for their own collective development, especially in collective societies.

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