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ORIGINAL ARTICLE

Children's Evaluation of the Physical Environment Quality in Kindergarten: A Case Study from China

Huan Chen[1,2] · Xiaoying Wang[1]

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Abstract
The quality of the physical environment is an important factor to assess in evaluating programs in early childhood education (ECE). However, children's evaluation of the quality of their physical environments in ECE has been rarely explored. Across two kindergartens, 32 children, aged 5 years, were interviewed to rate photographs of features in the outdoor, inside, and wall environments of their kindergarten. Analyses of children's qualitative explanations of their rating identified seven factors into which their explanations could be categorized. Children's perceptions about difficulty of use and functionality were the most common factors identified, while issues in layout, availability, physical attributes, maintenance, and access were also mentioned. This evidence suggests that children can offer authentic and specific suggestions about their environment that can contribute to efforts for continuous improvement in ECE settings. The research provided evidence that five-year-old children are competent to speak about the qualities of the physical environment that influence their daily life.

Keywords Children's perspectives · Kindergarten · Physical environment · Early childhood education · Program quality

Résumé
La qualité de l'environnement physique est un facteur qu'il est important d'étudier lorsque l'on évalue les programmes d'éducation à la petite enfance (EPE). Néanmoins, l'évaluation par les enfants de la qualité de leur environnement physique en EPE a rarement été explorée. Dans deux écoles maternelles, 32 enfants âgés de 5 ans, ont été interviewés pour évaluer les caractéristiques de l'environnement intérieur, extérieur et des murs de leur école maternelle. L'analyse des explications qualitatives de leur évaluation a identifié sept facteurs dans lesquels leurs explications pouvaient être classées. Les perceptions des enfants de la difficulté d'utilisation et la fonctionnalité étaient les facteurs les plus couramment identifiés, alors que les questions de disposition, de disponibilité, d'attributs physiques, d'entretien et

Extended author information available on the last page of the article

d'accès étaient aussi mentionnées. Les résultats suggèrent que les enfants peuvent faire des suggestions authentiques et spécifiques sur leur environnement, qui peuvent contribuer aux efforts d'amélioration continue des contextes préscolaires. La recherche a montré que des enfants de cinq ans ont la compétence de parler des qualités de l'environnement physique qui influe sur leur vie quotidienne.

Resumen

La calidad del ambiente físico es un factor importante cuando se evalúan programas de educación temprana. Sin embargo, la evaluación por parte de los niños sobre la calidad de su ambiente físico en jardines infantiles no ha sido lo suficientemente investigada. A 32 niños de cinco años de edad en dos jardines infantiles se les pidió que calificaran fotografías de diferentes partes externas, internas y de los murales en sus jardines infantiles. Las respuestas cualitativas de los niños sobre las calificaciones que brindaron, fueron separadas en siete factores. Los factores más comunes que se identificaron fueron las percepciones de los niños en cuanto a la dificultad de uso y funcionalidad, seguidos por problemas de diseño, disponibilidad, atributos físicos, mantenimiento y acceso. Esto sugiere que los niños son aptos para brindar sugerencias auténticas y específicas sobre su ambiente, las cuales pueden contribuir al mejoramiento continuo en las instalaciones de jardines infantiles. Esta investigación brindó evidencia de la competencia de niños de cinco años para evaluar la calidad del ambiente físico que influencia sus actividades diarias.

Introduction

The rights of children were officially recognized internationally in the 1989 UN Convention on the Rights of the Child (Hammarberg 1990). Since then, children are increasingly viewed as "being" and not just "becoming" (Qvortrup 2002). As Sommer et al. (2010) observed, recent research in early childhood education has begun to explore children's own explanations of their experiences and there is now a large body of international research that has sought to consult on children's opinions about issues that matter to them. However, in the context of China, research into children's perspectives is still missing from mainstream research approaches and there has been little attempt to involve children as stakeholders in quality assessment of early childhood programs. In this research, children's perspectives are explored about their experiences on the quality of the physical environment in two Chinese public kindergartens.

New methods for research have now emerged to explore children's ideas on their experiences in early childhood education. For example, in the "mosaic approach," Clark (2005) proposed a range of new methods to ensure that voices of children are heard. The approach begins with understanding that listening to children is an active rather than a passive process, in which children and adults can discuss meanings. In a New Zealand study, White (2015) reported conducting research with young

children by inviting them to share their perspectives on their outdoor experiences. Children were invited to take photographs on issues of significance to them during nature-based learning experiences. Children could capture and document their understandings about complex environmental concepts and discuss their experiences in interviews with their educators. Rosen (2010) also investigated how Canadian young children perceived their role in curriculum development through interviews. Children had ideas that could influence the curriculum in new ways, although capacity to do this was constrained by factors within the preschool and by broader influences outside the preschool.

Children's perspectives can be incorporated into research that also explores the quality of early childhood programs. Katz (1993) described five perspectives from which quality in early childhood settings can be evaluated. These include the perspectives of external inspectors, children, parents, staff, and the broader community. The perspectives of children provide an "insider" look into the determinants of quality because quality is to benefit children's own long-term development. In line with such a direction for research, Papadopoulou and Gregoriadis (2017) evaluated the quality of teacher–children interaction from children's perspectives in a more quantitative-focused study and found that children's views on the quality of teacher–child relationship was associated with children's school engagement.

The aim of this study is to provide a case study about how children evaluated the qualities of the physical environment in two Chinese kindergartens and explore how children's voices could contribute to quality improvement. In this study, the physical environments that matter for children's learning and play are investigated from children's perspectives. Three aspects of the physical environment are of interest. These are the outdoor play environment, the indoor activity environment, and the wall environment that includes materials displayed on the walls.

Research Method

Pilot Study

An initial pilot study was conducted to inform the development of the main research study. The pilot study was conducted for convenience in the affiliate kindergarten of the researcher's university. The main purpose of the pilot study was to determine an appropriate interviewing method that would encourage children to explain their ideas, as well as to check the viability and efficiency of the proposed interview questions to use in the main research. A total of eight children of different genders were interviewed in the pilot study.

Previous studies (Blades and Kumari 2011) have encouraged children to share their perspectives by offering them a camera to take photographs or inviting them to draw. Both of these methods were trialed. Both methods had some drawbacks in their efficiency. The photographic method was time-consuming and did not elicit any useful material beyond what was gained from observation and interviewing. When drawings were used in the interview, children tended to talk imaginatively

about their drawings without constraint but they provided much less talk about any pragmatic problems within the physical environment. After testing these two methods, the researcher decided to personally photograph the physical environment and interview children using these photographs in the main study.

Procedure for Main Study

The main research was conducted in two public kindergartens which were selected by purposive sampling. The public kindergartens were believed to have more enriched physical environments than the private kindergartens in the same city in which the research was conducted. Across the two public kindergartens, four classes with children aged from 5 to 6 years were selected by random sampling. Ten children from each class were then identified to participate through a pre-interview with the purpose of evaluating their language ability and willingness to participate. A group of 16 boys and 16 girls were identified as research participants and interviewed in pairs.

Both kindergartens had a structured curriculum and pedagogy. The usual routine at each kindergarten was for children to arrive between 7.30 and 8.30 am and have morning free play and breakfast. This was followed by two group activities and then 30–60 min of outdoor play. Another group activity was conducted before lunch and then there was naptime. Afternoon activities began at 2.30 pm, and normally included free play in learning centers or other activities in small groups. The kindergarten day ended at 4.30 pm. All the classrooms were designed with several different activity areas that provided different materials designed to support development and learning.

Data Collection

The researcher took photographs of the range of materials, equipment, facilities, play areas inside the classroom and outside in the play areas. This resulted in a total of 299 photographs across the two kindergartens of the outdoor play environment, the indoor activity environment, and the wall environment that included materials displayed on the walls. All the photographs were coded according to features listed in the *Guiding List for the Kindergarten Physical Environment* which was published by the Ministry of Education (1992) in China.

Before beginning the interview, the researcher gave the children three different "face cards" with a smiling face, a neutral facial expression and a crying face, respectively; as well as three types of stickers. In the interview, the researcher asked the children for each photograph, "Which face would you like to give this photo?" and invited the children to stick the relevant sticker beside the photograph and explain the reason for this choice. The stickers were used to enhance children's sense of participation and to benefit their narrative. Each interview took around 25 min and was audio-recorded with the permission of the children. On the spot written records related to different photographs were made when necessary. The children were interviewed up to five times across 1 week to review all the photographs for his or her classroom and the outside play area. Participants were

thanked for their participation with a small toy. A representation of the data collection notebook used in the interviews is presented in Fig. 1.

After the first round of data collection, a return visit to the participating classrooms in the kindergartens was made to talk with teachers about children's evaluation and concerns, with a particular focus on discussing the photographs of specific places, facilities, and materials with the highest and lowest ratings to make comparisons between perspectives of children and adults.

Data Analysis

Two types of data were collected during the interview: First, children used a face card to rate each photograph on a 3-point scale. Each photograph was rated as 1 (crying face), 2 (neutral face), or 3 (smiling face). An average score on a scale of 1–3 could then be derived to describe each photograph with higher scores indicating a more positive evaluation. Second, children's provided explanations for their judgments. This information provided qualitative data about the environmental features and these data were summarized descriptively.

The children's interviews were transcribed, which resulted in a total of 3731 items of qualitative description about the materials across all interviews. Each of these items was read with careful deliberation and was classified by one or more

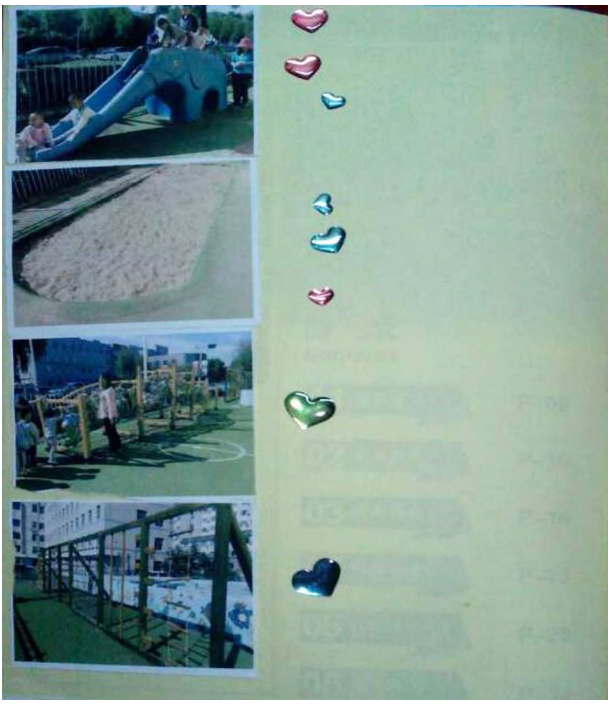

Fig. 1 Example of a data collection notebook

keywords generated. These keywords were sorted, summed up and abstracted by the researcher, and double-checked by two other researchers. Result of these analyses showed that children mainly referred to seven factors in evaluating the physical environment in their kindergartens: difficulty, functionality, physical features, availability, position, maintenance, and access. These features with definitions are presented in Table 1.

Findings

Children's Overall Assessment of the Quality of the Physical Environment

In Table 2, the average rating for features of the outdoor environment was 2.47 (rating scale of 1–3); and 2.37 for features in the indoor activity areas; 2.19 for the features of the wall environment. Overall, across the different environments, the rating of the quality of the physical environment was 2.38. This shows broad satisfaction with the physical environment. Evaluation ratings provided by girls were slightly more positive than those given by boys.

Children's Perspectives of the Quality of the Outdoor Environment

Figure 2 illustrates how often children's explanations referred to particular factors. Difficulty was the factor most frequently mentioned, accounting for 50% of the total responses; followed by functionality (19%). Other factors accounted for 31% in total, indicating that the difficulty was the most salient issue for the children.

Table 1 Factors categorized into children's qualitative evaluations of the physical environment

Factors	Implicit meanings in children's description
Difficulty	Do I know how to use it?
Functionality	Do I need it?
Physical features	Appearance, size, height, texture, etc.
Availability	Are there a sufficient number of the items?
Layout	Is it convenient to use?
Maintenance	Is it well maintained?
Access	Am I allowed to use it?

Table 2 Average rating for physical environment quality provided by children

	Outdoor environment	Indoor activity environment	Wall environment
Boys	2.45	2.29	2.14
Girls	2.49	2.45	2.24
Overall	2.47	2.37	2.19

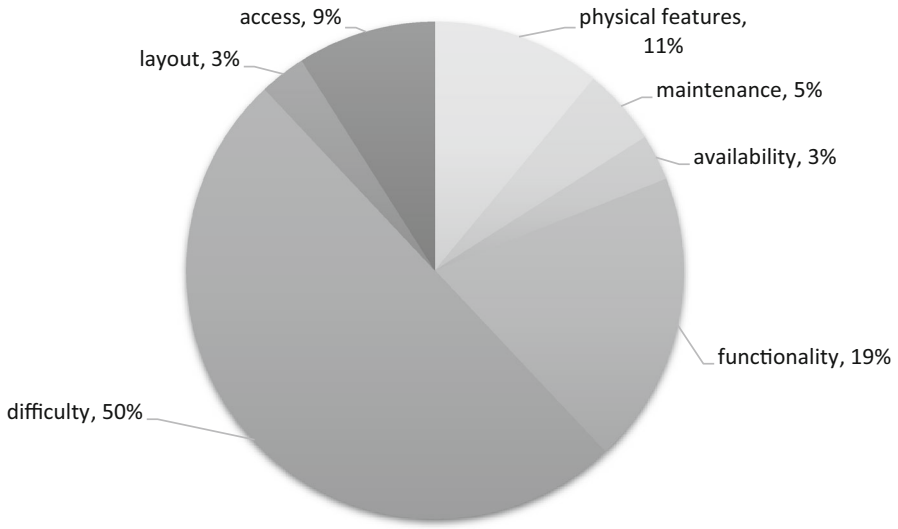

Fig. 2 Frequency of factors in children's qualitative evaluations of the outdoor environment

Difficulty: 'Why is the Basketball Stand so Tall While We are so Small?'

In children's explanations which involved the factor of difficulty, 59% reported that the difficulty in using a particular environmental feature was appropriate, 30% described a feature in the outdoor environment as too difficult, and the remaining responses indicated that it was too simple to use.

Children appreciated difficulty in using particular pieces of equipment in the outdoor environment because it presented a challenge. They emphasized a sense of competence if they could use the equipment and frequently used positive words and phrases like "I've learned," "I can," "I win," "the most," and "success." For example, "I can climb up this! It is very easy. I could climb all the way to the top!", "You will succeed by walking through it. Then jump down and say 'I made it!'." They also talked about the enjoyment of climbing, running, and passing through a tunnel, and expressed strong wishes to be fast. For example, "I would be on the peak before you notice me"; "Super-fast… like the tornado." The children also made suggestions to enhance the difficulty of some pieces of equipment. For example, "It would be more challenging with obstacles."

Children gave detailed reasons why they thought a certain piece of equipment was too difficult, as well as how to improve it. One common reason mentioned was the lack of assistance. For example, "I wish to give it a smiley face, but I become nervous every time when I am near the peak. There should be a handle to assist me to climb over it"; "It is hard to climb. There should be more holes so that I can put my shoes in there." Another reason was the unsuitable height. A typical example was the basketball stands. Children complained "Why is it so tall while we are so small? To be honest, I just hold a basketball and run around it."

Functionality: "It's Very Useful!"

Functionality was about usefulness that was not related to active play. When children described a particular feature of the outdoor environment as useful in their daily experience (e.g., a music player and cabinet), they would pay close attention to its basic function. For example, "This is our national flag. It represents our country. Very useful!"; "This cabinet is to store our playthings so I will give it a smiley face." In other cases, children would judge a feature as useful if it could be used in their games: "In autumn, we can play with leaves there, you know, pretending it is raining leaves." Interestingly, children frequently mentioned the functionality of a secret space. One child said: "Sometimes we pretend that this corner is our secret home, and we play games in there. No one can find us." From the children's perspectives, places like corridors and pavilions were of low quality because there was no significant function that it served in their daily life.

However, from the teacher's perspectives in their interviews, such places were an important part of the kindergarten buildings and necessary places to take a rest.

Other Factors: "You Cannot See Them Unless You Climb up to the Top of it."

Children were also concerned about size and appearance of places. They particularly adored those spaces that would just fit their body. For example, "You can just put your head into it, and smile to your friends."; "I like the hole over there. It's just my size." The factor of access was mentioned by children when they felt restricted by parents, or inhibited by teachers in their outdoor free time. Some children commented: "My dad said I cannot play when classes were over"; "The teacher said we cannot play here. Only the security man can plant vegetables here."

From the teacher interviews, teachers noted that they restricted access to particular places for the following reasons: (1) the activity area was not listed in their curriculum plan; (2) because each kindergarten class had a certain playing area to make it easier for a teacher to look after their class of children. However, it was children's personal experiences that affected their quality assessments rather than any limitations imposed. If they used any area or equipment to have fun, they would give it a positive evaluation.

Similarly, maintenance as a factor was only mentioned when it influenced children's play or usage. It was noticeable that poorly maintained places in children's perspectives were usually ignored by teachers. For example, commenting on photograph of climbing mesh, one child said, "I dare not to play here … There are lots of ants … You cannot see them unless you climb up to the top of it." Another child reported that "It's very dirty when you climb into it." Teachers said frankly that they did not know about these problems.

Children mentioned layout as a factor mainly in relation to facilities that were in close proximity which could bring more fun: "You can play on them together for a new game!" Another reason was that they could have a wider view from the top of certain pieces of equipment. One child stated: "I enjoy staying here, watching other kids playing." And another child commented: "I can look far away over the top and say hello to my friends."

Children's Perspectives on the Quality of Indoor Activity Environment

Indoor learning corners had a large number of toys and learning materials. As evident in Fig. 3 in respect to the quality of the indoor activity environment, children discussed issues about functionality and difficulty.

Functionality: "You Need Money Everywhere."

Children were concerned about functionality of materials (Is it useful?) and adequacy (Is the function enough?). Regarding role play materials, they made very specific judgements about usefulness. For example, "It helps you to sell things. Very useful.", "You need money everywhere." Negative comments on functionality were raised for three reasons. First, some children felt that certain material was not appropriate for the context in which they were using it. One child said that medicine boxes were useless because "It is nurse's work," and he never played being a nurse. Second, some equipment was not necessary. For example, 60% of participant children in one class reported that they never used the "bus" because "It's too close from the restaurant to hospital. We just walk over there." Third, the materials could be substituted by something else. For example, children in one class said they do not like to use shopping boxes because there were already handy shopping bags available.

Children had several reasons to criticize the adequacy of materials. First, if "key functions" were missed. For example, one child said, "I wish I could really count how much money my customers need by using this cash register." Second, the functions of some materials were restricted. For example: "This can be only used to build a house. You cannot build other things with it." With respect to role play activity areas, children had suggestions to add more materials to make the area more

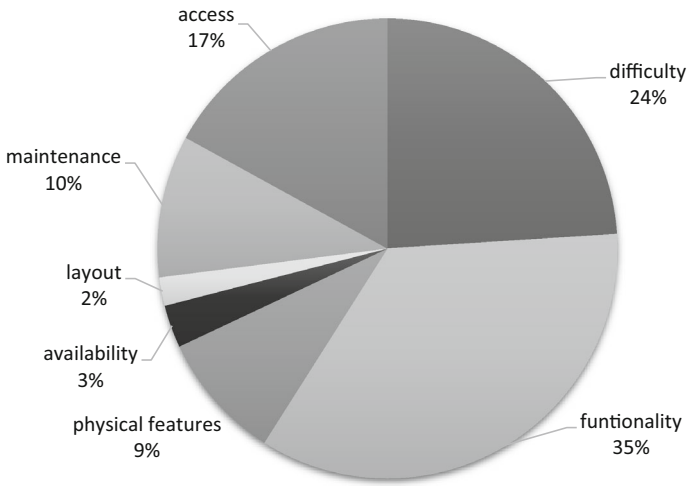

Fig. 3 Frequency of factors in children's qualitative evaluations of the indoor activity environment

authentic. For instance, one child said, "There should be a hanging hook there so that we could hook up the transfusion set on it, just like in the hospital. Currently, the doctors have to hold it. So you know it's just a game."

Difficulty: "It Looks Fun but I Don't Know What to do With it."

Difficulty was a main issue that affected children's perspectives about the quality of language learning materials. Children thought current language materials were generally too difficult, especially bilingual books and English books. For example, "I can't really recognize the characters. Little kids should read books with no characters." Teachers' responses were that all the books were purchased by the kindergarten and they had introduced most of the stories to children in language time. Bilingual books were used as teaching aids for a weekly English course.

Reasons that led children to judge some materials negatively were related to a high level of difficulty in using them. First, children thought that some materials were too challenging, such as jigsaws with more than 30 pieces, chess sets, and "add and subtract" mathematical task cards: "I do not like it; "It's just ok … if you feel bored"; "You can do some add and subtract … and then give up, because it's too difficult." Many children thought some of the art materials were too difficult: "These colored papers are too big. They are for adults. They are too difficult for us." Second, children did not understand how some materials could be used: "I don't know how to play with it. There are numbers on it. It seems fun but I don't know what to do." Finally, some materials were not suitable in size for children's use.

Other Factors: "It Takes Too Long to Give My Baby a Bath and Leaves No Time for Me to Have Dinner."

As for children's evaluation of the outdoor environment, access was mentioned when children felt restricted in their opportunities to use some materials, even though they were positive about the specific materials. For example, "This shiny box of buttons is so fun! But teacher told me don't play with them … We touch them secretly when she cannot see us. But I still want to give it a smiley face"; "I cannot use it. I'm always the chef. Teacher said it was the waiter's responsibility to buy vegetables. The chef cannot go out of the kitchen." One teacher reported that the regulations that children mentioned were for the purpose of "helping children to understand different roles in the society." On the issue of maintenance, children pointed out that some poorly maintained materials impeded their play. For example, "The wing of the butterfly is broken. It bothers me a lot." Another comment was: "They are not very easy to use. It takes a lot of effort to put two pieces together because they are just too old and have become soft." Teachers were surprised about the children's comments. One teacher said: "They pay so much attention to these tiny things, don't they?"

As for the physical features of materials, the reduced size of role play materials was noted in one class. Children complained: "This bathtub is too small. You know we have a big baby. I need to wash her legs first and then her head and body. It takes

too long to give my baby a bath and leaves no time for dinner." Children also complained about the availability of materials. Too many materials in a learning area could induce difficulty: "I know these numbers, but I cannot play with them. I feel under pressure with so many number cards. They confuse me." This was also mentioned in relation to role play activities: "Most of the time, we don't have many customers. So we don't need so many spoons at all!" Apart from that point, 60% of the children reported that their role play areas were too small.

Children's Perspectives on the Quality of the Wall Environment

Display and decorative materials on the walls could be grouped by five categories: decorations, signs for general guidance, interactive materials, curriculum materials, and support materials for different activities. Generally, wall displays for decoration were rated more negatively by the children (1.98 on the 3-point scale), while curriculum-support materials were rated most highly (2.51 on the 3-point scale). Details of children's explanations are presented in Fig. 4. As can be seen, functionality was the most important factor.

Functionality: "The Board Could Not Say Hi to You Anyway."

Children were quite positive about the functions of non-decorative materials, but less positive about decorations on the wall. Interestingly, most of the negative evaluation comments about decorative functions were raised by children in kindergarten A where the overall indoor space was smaller than in the other kindergarten but there were more materials displayed on the walls. For example, children complained: "It gets in my way. I want to move it."; "Too crowded there …You don't really need to make a floor more beautiful." However, children in

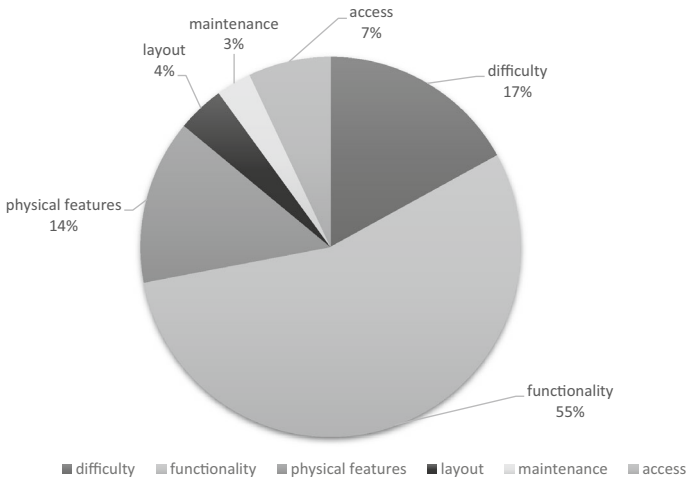

Fig. 4 Frequency of factors in children's qualitative evaluations of the wall environment

kindergarten B consistently praised the wall decorations: "These paintings are by big brothers and sisters in our kindergarten. They just want to make our kindergarten look more beautiful." As can be seen, children were less appreciative of displays in a crowded space.

Most of the functional materials were approved of by children, depending on whether they were used regularly in children's daily activities and whether children had first-hand experience of using it. For example, children reported: "Teachers hang up these paintings to encourage us to learn from each other. We always talk about each other's work when queueing."; "I like it. It warns me to be careful when I push the door."

There were three reasons that led to more negative evaluations of displayed materials on the walls. First, children had never used it or did not currently use it: "This list is used to record our performance and encourage us. But we don't use it anymore. So I would give it a sad face." Second, children did not understand how to use it or what its function was: "This is a thematic board … They just stick pictures there … I don't know why they stick them there." Third, the materials did not have a clear role in children's daily activities: "You don't need this welcome board actually. The board could not say hi to you anyway. I prefer to see my teacher smiling to me. That is the way how I feel welcomed."

Teachers explained that materials that children reported as 'never been used' were from previous classes, while the welcome board and other wall slogans were to create a warm environment. However, it was a concern that the curriculum "Thematic Board" which was designed to record children's learning was considered useless by children.

Difficulty: "There are Too Many Characters."

The difficulty factor only accounted for 17% of the explanations. There were 29% of comments that were positive in relating to an appropriate degree of difficulty. Children used phrases like "I can," "I know" to show their knowledge and competence. For example, "I know! This is for the weather. Kids can tell what the weather is today." The rest of the children's remarks (71%) related to difficulties in understanding what the wall materials were about. One of the main reasons was that Chinese characters written on the materials were beyond children's literacy abilities: "There are too many characters and I can't read them." However, some wall materials that were displayed to provide guidance could also be too difficult to children: "It shows us how to make a butterfly. But I just can't follow these directions." From teachers' perspectives, children were exposed to this language learning environment to prepare for primary school.

Other Factors: "I Could Not See What is Exactly on it."

Comments on the physical attributes of materials (e.g., appearance, size, texture) only accounted for 12% of the responses, and most were positive. For example, "I can't recognize the characters on it, but it looks beautiful so I would also give it a smiley face"; "I don't know what is written on there, but the chef looks good."

For the factor of access, 66% of explanations indicated that children had no experience in using many materials. For example, "I don't know why just hang the swim ring up there. You are not allowed to move it. But I really want to bring it down and play with it with my friends"; "This is a display to record our learning. However, I haven't play with it. I talked with my friends in class the other day… so the teacher does not allow me to play there anymore."

Comments on the layout and convenience to use the informational material on the walls were generally negative. Children from kindergarten A which was smaller, mainly complained that materials should not be hung up at crowded places like hallways: "I never stand in front and look at it. There are too many people there all the time." Children from kindergarten B mainly complained that materials should not be hung too high: "I could not see what is exactly on it. They are too high, and I could not recognize the characters." All the explanations related to maintenance of the materials were negative. Children occasionally complained about how the wall materials were maintained, for example: "This folder on the wall is not handy. We need to open it with one hand and put our painting into it with the other hand, and it's always broken…" (Researcher: "What do you mean by broken?") "I mean there are holes now and then. No one like the folders with holes."

Discussion

High-quality kindergarten physical environments can improve the relationships between teacher and children, as well as among children themselves in significant ways. It is necessary to understand children's views about quality of the physical environment and to make improvements accordingly. In the present research, children generally had more positive than negative evaluations about the physical environment and, while there was generally a positive outlook, children also made many negative comments. While prior research has pointed out that children have an "innately positive, bright and cheerful outlook on the world" (Wiltz and Klein 2001; p. 230), Children's more negative comments in this research were insightful and indicated quality drawbacks from children's perspectives that were valuable in order to contribute to quality improvement of the ECE program.

Difficulties with the Physical Environment

Outdoor playgrounds were the most favored places for children and this research showed that children were not fully supported in the present environment. Barbour (1999) described children's preferences for adventure and suggested building playgrounds that can accommodate activities for children with different levels of physical competence. Ball (2002) investigated playground environments in the UK and recommended the need to balance risk and safety in planning. However, although research has raised people's awareness on this issue, it is difficult to achieve this goal if children's perspectives are not taken into account. In the present study, the children pointed out clearly what they found disappointing in the outdoor environment and what exceeded their competence, as well as proposing many ways

to enhance the challenges or assist them in their play. The children had the competence to provide useful comments and feedback about their daily kindergarten environments and that equipment and materials need to cater for different levels of ability. Similar results were found in the research by Zamani (2016).

Children did not have as many suggestions for improvements for the indoor activity or the wall environment but were still able to clearly report what they found difficult. For example, more than half of children's comments about the books provided in the indoor environment and about some wall displays showed that they had difficulty in understanding the written Chinese characters. It seems that in choosing books and in wall displays, teachers could find a balance with respect to the levels of difficulty and providing more support to learn new Chinese characters. Similarly, for math materials, children reported difficulty in understanding the learning materials and the need for more guidance to use the materials provided. Most of the problems raised by the children had not been realized by the teachers. Teachers cannot observe every child's learning actions in every activity area, particularly in Chinese kindergartens where the teacher-child ratio can be as high as 1:15. However, by listening to children, teachers could find out what children know and support individual learning.

Functionality in the Physical Environment

Children judged the functionality of materials and facilities for the purposes of play. An elaborate outdoor environment can significantly encourage engagement in play. In the case of kindergarten A, the building had a long indoor corridor and extensive lawn, so many children reported this environment as boring. In contrast, kindergarten B had a rich outdoor natural environment, with a complex layout, which gave children more possibilities and ways to play there. These children constantly referred to opportunities in small, less openly exposed areas as "secret places," which also reflect the findings of Corson et al. (2014) who talked about the secret places that benefit children's social and emotional development.

It was impressive how children were able to comment on the functionality of role play materials. They were capable, responsible and observant, as if they were living in the play world. For instance, children complained that there was no chocolate or toys at the doctor office to comfort a crying sick baby after an injection; and that there was no hook around the sickbed so that the nurse needed to hold the drip all the time. Children had the spirit of "just like it was true," which is something that teachers need to bear in mind when they design areas for role play. Teachers needed to take it seriously as if they were planning their own rooms and working areas. Additionally, teachers could invite children's opinions and ideas about making changes, and add the materials that children suggest would be useful in their play. Many children complained about the functionality of highly structured toys like a toy phone, and cash machine, saying that some key functions were not evident in these play materials.

Wall materials can also have unique educational functions. Wohlwill and Heft (1987) highlighted the need to regard the wall and display environments as important parts of the learning environment which should invite multi-sense

involvement by children. However, there has been a long-term misunderstanding in China that materials on the wall are mainly for the purpose of decoration. The present research found that children attached more importance to the functions of keeping records, playing and learning from the wall materials rather than just decoration. Reasons for functional ineffectiveness from children's perspectives included that materials were for display only or contained many Chinese characters that they could not yet understand. Children held a more practical perspective about the materials on the wall. Teachers could design materials that are more easily understandable and for actual use by the children in their daily activities.

Gender Comparisons of the Physical Environments

From the data, girls generally held more positive attitudes toward the kindergarten physical environment quality than boys on the rating scale evaluating children's perspectives. However, from more detailed analyses, it was found that the patterns of children's interview responses about different factors were similar. Girls and boys had similar perspectives on the importance of different factors. Hence, while this was a small sample of children, it could be hypothesized that gender does not have a significant impact on the way that children think about the quality of physical environment, but the overall ratings indicated that the current kindergarten physical environments were serving girls more positively. One possible reason could be the lack of male staff, who only account for 1% of the whole workforce of kindergarten. Hence, the physical environment of kindergartens may have more feminine characteristics that better serve the needs of girls rather than boys.

Can Young Children Contribute to Early Education Quality Improvement?

The present research is positioned within a particular context of early childhood practice in China where children's voice has not been traditionally addressed in daily education practice. By empowering children on their right to comment on the features of physical environments that matter to them, they raised many issues that implied drawbacks in ECE practice which have not been recognized by Chinese researchers. Not just about the quality of the physical environment but about the overall experiences of the learning environment per se. The present research has shown that children are competent to contribute to quality assessment and so to improve physical environments in the following ways.

1. *Children could propose improvement suggestions, especially for the outdoor environment and role play materials.* Children talked about pragmatic issues and most of the suggestions proposed were realistic and could be achieved. It could also be helpful if more flexible equipment were provided in the outdoor environment so that children could independently decide and achieve what they wished from the environment. This suggestion reflects the research of Clark and Moss (2005) about outdoor environment improvements through cooperation with children.

2. *Children's negative evaluations offered ideas about quality weaknesses.* More investigation needs to be done and taking cues from children's negative comments could be one effective way to take children's perspectives seriously. For example, children's ideas provide a window about teachers' sensitivity to children's world as well as to the quality of teacher-children relationships in the classroom. Teacher who observe children's play constantly and empathically and holds a close and supportive relationship with children would have fewer problems in taking account of children's perspectives.
3. *Children's interpretations help to identify how teachers' intentions may not always be understood by children*. The present research offered many examples where it was evident that children did not understand the value of learning materials and the guidance that the teacher was presenting to them through the environmental features of the classroom. Sommer et al. (2010) explained this phenomenon by pointing out that many teachers have a "taken-for-granted perspective" about the objectives for learning, and it is thus necessary to create more dialogue with children, "a dialogue that is necessary for young children's creation of meaning" (p. 473).
4. *Children's views contribute to the identification of those aspects of quality that are not for the benefit of children*. As Katz(1993) pointed out, the quality of child education and care is an issue involving multiple stakeholders. It happens that the quality emphasis of some stakeholders may not be in the interest of children. This may be a more serious problem in China where kindergarten regulation is implemented by local government staff who may not have an ECE background, resulting in a bureaucratic quality inspection system. Private ECE settings are faced with similar situations, though their pressures come from parents who pay for their service while not actually understanding the developmental and learning needs of children. In both of these situations, ECE settings can devote time to sophisticated decorating and performances in relation to the physical environments, which unfortunately may not provide the "quality" experiences that children want.

Conclusions

The aim of this study was to investigate children's perspectives about the kindergarten physical environment. A total of 32 five-year-old children in two kindergartens were interviewed. The results of the study indicated that children's concerns regarding the physical environment could be described by seven important aspects, namely difficulty in usage, functionality, physical features, availability, layout, maintenance and access. Difficulty and functionality were the most common concerns of children. The research provided evidence that five-year-old children were competent to speak about the quality of the physical environment that influenced their daily life, and their comments revealed quality issues for the whole ECE setting. This qualitative research will serve as a base for future studies to investigate how children's perspectives can contribute to ECE quality assessment more comprehensively.

The findings suggest several courses of action for Chinese kindergartens. Firstly, more attention should be paid to the breadth of children's capabilities to give opinions. More ingeniously designed facilities and materials that suit children with different levels of ability can be provided. Children should be entitled to the right to inform decisions about the materials they need as well as about the way that they can be used. Durable materials should be chosen and be well maintained. Finally, children's comments on the quality of environment should be valued so that improvements can be made.

This study has certain limitations including that the research was only conducted in two Chinese public kindergartens and the participants only included competent oral language users. The study did not investigate how children's perspectives might change if improvements were implemented. More focused qualitative research is needed to gain better insights into the relationship between the quality perspectives of children and that of other stakeholders.

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Affiliations

Huan Chen[1,2] · Xiaoying Wang[1]

✉ Huan Chen
chenh090@nenu.edu.cn; huan.chen.17@ucl.ac.uk

Xiaoying Wang
wangxy@nenu.edu.cn

[1] Northeast Normal University, 5268 Renmin Street, Changchun City, Jilin Province, China

[2] Present Address: UCL Institute of Education, University College London, 20 Bedford Way, London WC1H 0AL, UK