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Evaluation of the Facilities and Infrastructure in UPI Kindergarten Lab School Based on the Principles of Child-friendly School Design

Dinna Nafisa[1*], Mokhamad Syaom Barliana[2], Fauzi Rahmannullah[3]
[1*]Architectural Engineering Education Study Program, Universitas Pendidikan Indonesia
[2,3]Department of Architectural Engineering Education and PUI TVET-RC, Universitas Pendidikan Indonesia
Email: dinnanafisa@upi.edu[a*], aombarli@upi.edu[b], fauzirahmanullah@upi.edu[c]

ABSTRAK

This study aims to describe the criteria for the principles of child-friendly school design in the kindergarten environment, explain the condition of the facilities and infrastructure in the UPI Kindergarten Lab School, and the suitability of the facilities and infrastructure owned by the UPI Kindergarten Lab School with the principles of child-friendly school design. This uses a quantitative approach with a descriptive-evaluative method. Data collection techniques are in the form of observation and documentation. The research results related to the criteria for the principles of child-friendly school design in the kindergarten environment are known to have five aspects: security, health, comfort, safety, and convenience. The results of evaluating the suitability between the facilities and infrastructure of the UPI Kindergarten Lab School with the principles of child-friendly school design are 72.66% with good assessment criteria. The most superior and appropriate assessment is found in the assessment of health requirements and is less suitable for safety requirements.

Keywords: *child-friendly school, facilities, infrastructure, kindergarten*

INTRODUCTION

Early childhood is a period that significantly affects the process of human life in the future. At that age, the child's personality and character are straightforward to shape, and children can quickly receive stimuli and responses from the surrounding environment. Thus, in the first seven years of life, children need positive stimulation and a supportive environment to help optimize the child's growth and development process. In the first seven years of life, a child's personality and character are straightforward to shape because, at that age range, children are susceptible to receiving stimuli and responses from their environment (Sofyan & Ariaji, 2021).

At an early age, children have a high awareness of the quality of the physical environment, especially education, which has an essential role in shaping the behavior and character of children. To create an excellent educational environment, some factors can support learning and the achievement of educational programs listed in Government Regulation No. 19 of 2005 concerning the scope of National Education Standards, which include:

(a) content standards, (b) process standards, (c) standard competence of graduates, (d) standards of educators and education personnel, (e) standards of facilities and infrastructure, (f) standards of management, (g) standards of financing, (h) standards of education assessment. Based on these standards, facilities and infrastructure are the standards that need to be met so that learning objectives can be achieved.

One of the things that include respecting children's rights is that children must get a learning environment with proper facilities and infrastructure. This is related to the opinion of Utami et al. (2017), which revealed that child-friendly schools could provide opportunities for students to carry out the learning process comfortably and not feel dangerous or threatening. In addition to the psychological aspects realized in child-friendly schools, physical aspects such as facilities or facilities and infrastructure provided by schools must meet ergonomic criteria according to the needs of children (Diyanti et al., 2014).

However, in reality, there are still many facilities and infrastructure of kindergarten units that have not been fulfilled and adequate, especially those that have not met architectural and structural physical standards. In addition to meeting physical standards, kindergarten must also create a child-friendly environment. One of the components of child-friendly schools is the existence of child-friendly school infrastructure facilities. However, there are no specific standards for child-friendly school facilities and infrastructure for early childhood schools.

The UPI Kindergarten Lab School, as a pilot school that is a place to develop various innovations and findings in the field of education, must be able to meet the standards of child-friendly facilities and infrastructure. Based on preliminary observations made by researchers, it was found that the facilities and infrastructure of the UPI Kindergarten Lab School were not entirely fulfilled. So, it is necessary to evaluate educational facilities and infrastructure to assess compliance with existing standards, both physical standards, and child-friendly school requirements.

This study aims to describe the criteria for the principles of child-friendly school design for kindergarten, describe the condition of the facilities and infrastructure of the UPI Kindergarten Lab School, and explain the suitability of the facilities and infrastructure owned by the UPI Kindergarten Lab School with the principles of child-friendly school design.

RESEARCH METHODOLOGY

The research method used is descriptive, evaluative, and research method with quantitative data. Descriptive research aims to explain or describe the results of research in the field, and researchers do not give treatment to each research variable. Meanwhile, the evaluative method is used to evaluate the research data by comparing the natural conditions in the field with the instruments that have been prepared. This evaluative research produces results in the form of an assessment of the percentage of the condition of facilities and infrastructure.

Data collection techniques are in the form of observation and documentation. Documentation is used for data collection by

taking photos in the field related to the condition of school facilities and infrastructure and documentation from books and internet sources. At the same time, observation is an activity that will be carried out by researchers to directly observe the conditions in the field by following the observation sheet that has been made. The observation sheet uses a comparison instrument from the Kindergarten Infrastructure Standards (Kemdikbud, 2014), the Child-Friendly School Guide (Kementerian PPPA, 2015), the Child-Friendly School Manual *(*UNICEF, 2009), and developed with several other literatures. The use of scores on the observation sheet uses a scale of 1-3, with details: (1) does not meet the criteria; (2) less meets the criteria; (3) meets the criteria. The score results obtained from observation (F) are compared with the maximum score (N) and then multiplied by 100%, and the results are compared with the following criteria:

Table 1. Observation Evaluation Criteria

Score Range		Category
80% - 100%	:	Very Good
60% - 79%	:	Good
56% - 65%	:	Pretty Good
40% - 55%	:	Bad
<40%	:	Very bad

RESULT AND DISCUSSION

Principles of Child-Friendly School Design for Kindergarten

The principle of child-friendly school design is a design approach centered on children as users of space, and the learning environment, by involving the participation of families and communities in designing schools to get the best design. According to Washor (2003), based on the results of *The US Department of Education and White House Millennium Council* in 1998, several design principles for educational facilities were produced, including the following: 1) improving the quality of learning that can accommodate all students; 2) each educational facility functions as a community center; 3) the design planning must involve all parties; 4) pay attention to the health, security and safety aspects of users; 5) make effective use of available resources; 6) have flexibility and adaptability to the environment. This is related to the concept of child-friendly schools, where schools must be able to meet the needs of children as a whole by considering security, safety, health and sustainability, child psychology, and ease of accessing all facilities or infrastructure in schools (Pada et al., 2021). The principle of child-friendly school design is a design approach centered on children as users of space and learning environments, involving the participation of families and communities in designing schools to get the best design.

Some theories explain the requirements for child-friendly schools, including the Child-Friendly School Guide (Kementerian PPPA, 2015) and the Child-Friendly School Manual (UNICEF, 2009). Based on these theories, the design criteria for child-friendly schools are produced:

Table 2. Principles of Child-Friendly School Design

Friendly Schools Principles	Definition
Security	The school environment must create a conducive learning environment, a place to play, and interactions that are not harmful.
Health	The school environment must ensure health and create a physical environment that can accommodate every child's activities in a safe location.

Comfort	A condition when the user can perform various activities.
Safety	The condition of the school environment is free from the risk of injury or injury when carrying out activities at school.
Convenience	Everyone has the same opportunity to access all school facilities and Infrastructure, and it provides safe, easy, comfortable, and inclusive accessibility.

1. Security

a. Building

Security is an environmental condition free from all dangers, including psychological and physical dangers from outsiders (Diyanti et al., 2014). In this case, security means creating a conducive educational environment and avoiding distractions so children can carry out activities peacefully. Some aspects need to be considered to create a design following security principles, including:

- Space transparency aims to create security through supervision so that users can monitor each other. Each room must be connected to the circulation so that users can monitor each other. Also, avoid designs that have the circulation that could become dead space.
- Material, all furniture used does not have sharp corners, and the surface texture is not rough.

b. Play Area

On the principle of safety, play areas must be designed and planned to create a safe and comfortable space for children. The following are some categories that need to be considered in the play area to meet the safety principles, including:

- Zoning

In the play area, the concept of supervision is essential to ensure the playing environment is free from dangerous conditions and actions such as accidents or injuries while children are playing. Thus, in the play area, an area is needed for adults to supervise children's activities by providing a resting area adjacent to the play area. The following is the zoning for the surveillance area in the design of the play area.

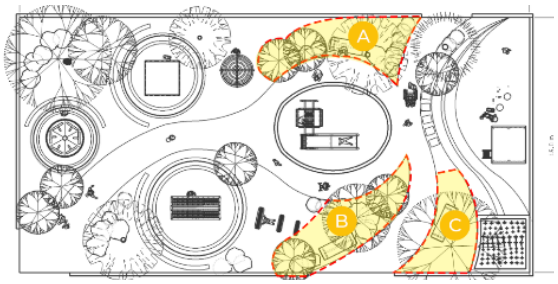

Figure 1. Rest Area Layout as Surveillance Area

Figure 2. Perspective. Rest Areas and Surveillance Areas

- Material

Materials used must be considered in the play area, and all materials must meet child-friendly criteria. The play area is also dominated by curved or circular patterns that can minimize sharp corners. In addition, the surface of the play area is not allowed to use a complex and rough surface such as soil without being coated with other materials on it, especially in regions with APE on it, because this can endanger the child if the child falls.

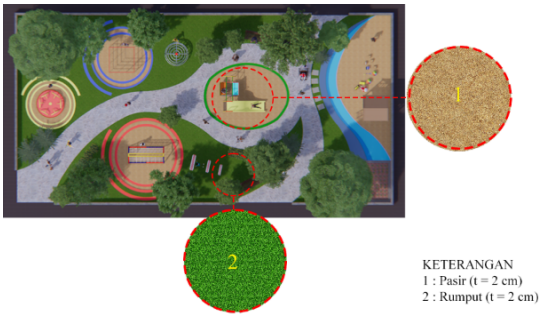

Figure 3. Materials on the Playground

- Educational Game Tool (APE)

  The use of Educational Game Equipment (APE) outside the room must pay attention to the safety of children. Among them are that every Educational Game Tool (APE) does not have sharp corners, and there are no splinters on wood or iron parts that can injure children.

2. Health

a. Building

Environmental health means the school environment is free from everything that can interfere with the child's physical health. Therefore, schools must avoid materials that harm children's health, whether in buildings or furniture. Some aspects need to be considered to create designs according to health principles, including:

- The materials used do not contain hazardous materials for children and are not harmful to the environment (Kementerian PPPA, 2015). Hazardous materials contain formaldehyde, VOCs, asbestos, radon, and lead (Diyanti et al., 2014).
- Air conditioning and ventilation, every room requires good air circulation to reduce heat and humidity (UNICEF, 2009). Use of natural ventilation is needed to regulate temperature and cleanliness and distribute air from going outside or vice versa.

b. Play Area

On the principle of health, the play area must be designed and planned so as not to endanger the health of children, such as not being placed in an area with the potential for high air pollution and not being placed close to the final waste disposal site. To support the principles of health, the following aspects can be considered:

- Vegetation

  Schools must take advantage of the surrounding environment in designing a play area for children by utilizing the available vegetation or planting various kinds of vegetation. The presence of vegetation can help to reduce air pollution it can be beneficial for children's health. The vegetation used in the play area also needs to be adjusted to child-friendly criteria, namely, vegetation that is not dangerous, such as selecting plants that are not thorny, not gummy, and non-toxic (Hutapea et al., 2015).

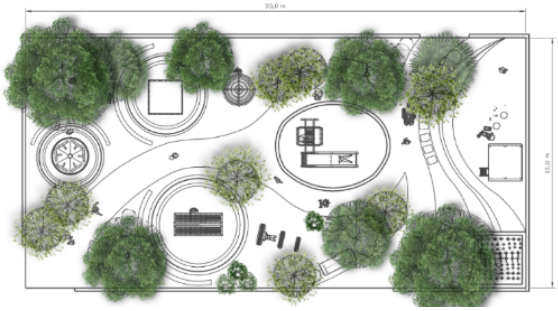

Figure 4. Vegetation Layout

- Sanitation

  Availability of hidden trash cans, but still accessible to children. Trash cans must consist of organic waste bins (green color),

inorganic waste bins (yellow color), and B3 trash cans (red color).

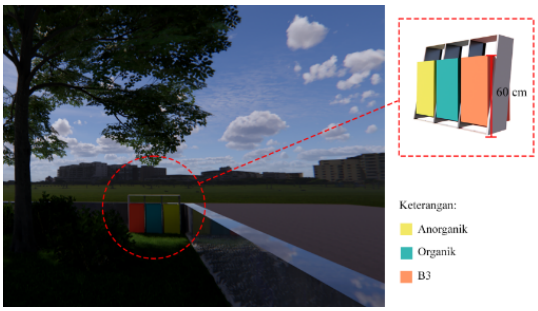

Figure 5. Garbage Disposal Site

- Educational Game Tool

  Educational Game Equipment (APE) use outside the room must pay attention to children's health; namely, there are no rusty and moldy Educational Game Tools.

3. Comfort

a. Building

Comfort is the feeling of users when they are in a room and can carry out activities in that room. Several aspects affect the principle of comfort, including:

- Visual is the user's comfort in seeing an object in space. Visual comfort in a room is related to the quality and quantity of incoming light. Factors affecting visual comfort are the number of openings with the ideal light entering 20% of the floor area (Kementrian Kesehatan RI, 2006)
- Thermal is the feeling that users are satisfied with their thermal environment (Gunawan & Ananda, 2017). Some factors that can affect the thermal room are the use of materials, the placement of vegetation, the arrangement of the mass, the openings' location, and the openings' size.
- Acoustic comfort seeks to reduce the potential for noise that can interfere with children's activities while studying at school. Factors affecting acoustic comfort are the availability of guardrails in the form of walls and vegetation and the placement of masses buildings.
- Privacy, schools need to provide private or semi-private areas for children to be alone. Children need an environment to develop their self-concept and personal identity (Quirk, 2013).
- Ergonomics is the harmony between the facilities following human limitations and abilities (Afandi et al., 2021). So, body size and range of early childhood affect the size of the ideal furniture for activities.

b. Play Area

On the principle of comfort, the play area needs to be designed and planned to be a comfortable place for children so they can dare to explore their environment. To create the principle of convenience, one can pay attention to the following aspects:

- Zoning

  Several aspects need to be considered in the play area for children, namely, paying attention to the division of zones in the play area, which provides a comfortable space for children (Hutapea et al., 2015).

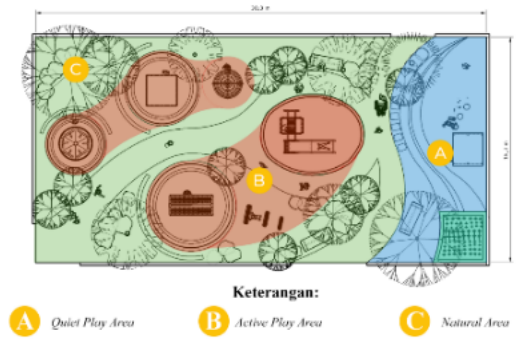

Figure 6. Zoning of the Kindergarten Play Area

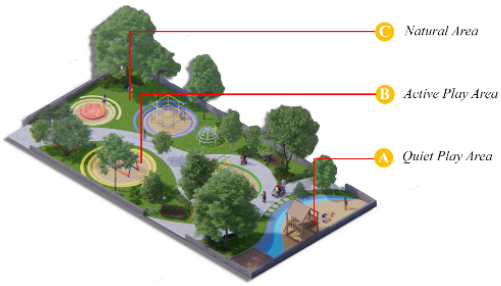

Figure 7. Kindergarten Play Area Zoning Perspective

1) *A quiet play area* is a play area that demands concentration and perseverance for children, for example, a sand play area. Playing sand is one of the Educational Game Tools (APE) that can help train children's fine motor skills and can stimulate children's creativity. In addition, the *quiet area* can be used as an area or place for children to be alone.
2) *An active play area* is a play area that trains children's physical, balance, and coordination. Games can be provided in this area, such as slides, swings, compound stairs, and others. The minimum safe zone distance between APE and other types of APE is 2 meters.
3) *Natural Area* is a play area filled with natural elements such as grass, trees, and gardens. So that children can have more opportunities to explore their environment. In addition, a gardening area can be used as a place for children to explore the surrounding environment by learning to grow crops, take care of plants, and get to know plants.

- Educational Game Tool (APE)

  To create comfort in the play area, the selection and use of the type of Educational Game Tool (APE) needs to consider ergonomic aspects for children, especially for the kindergarten level, in the age range of 4-6 years. In addition, the selection of APE also needs to be considered based on the type of game that can stimulate children. Using bright colors in educational game tools can train the sense of sight and stimulate children's psychology.

4. Safety

a. Building

Safety is closely related to human life, so schools need to be designed to reduce the risk opportunities caused by the building themselves (Diyanti et al., 2014). The following aspects can meet safety criteria, including:

- Circulation, school buildings should be safely located from heavy traffic because there is a risk of endangering children's safety (Kemdikbud, 2014).
- In disaster protection, schools need facilities to cope with incoming disasters from external factors other than building conditions. Such as providing fire protection and disaster evacuation routes (Kementerian PPPA, 2015).

b. Play Area

The play area is not placed under trees that fall quickly, which can threaten the safety of children. In addition, the location of the play area should not be close to traffic.

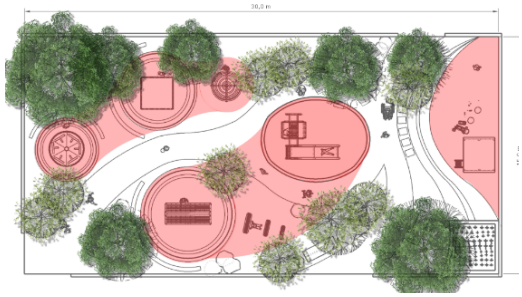

Figure 8. Educational Game Tools Layout

5. Convenience

On the principle of convenience, children should be able to access all games easily, including children with physical limitations. The existence of pedestrians aims to make it easier for users to enter the play area, especially for children with physical limitations. This alternative design has a pedestrian area with a width of 2 meters. The existence of a pedestrian can also be used as a means to play APE, such as playing on a bicycle.

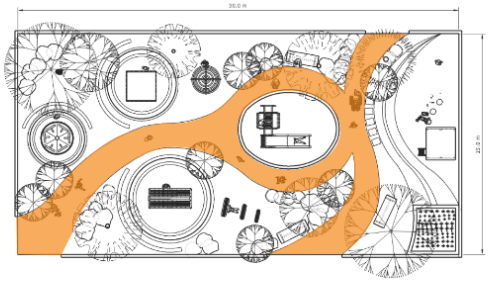

Figure 9. Pedestrians

From the explanation of the principles of child-friendly school design, it can be concluded that the relationship between the criteria, aspects, and elements is as follows.

Table 3. Relationship Criteria, Aspects, and Design Elements

Indicators	Aspect	Elements				
		Mass Building	Furniture	Zoning and Circulation	Game Equipment	Landscaping/ Outdoor
Security	Transparency	√	-	√	-	√
	Material	-	√	-	√	-
Health	Air conditioning and ventilation	√	-	-	-	-
	Material	√	√	-	√	√
Comfort	Visual	√	-	√	-	√
	Thermal	√	-	-	-	√
	Acoustic	√	-	-	-	√
	Privacy	√	-	-	-	√
	Ergonomic	√	√	-	√	√
Safety	Disaster Protection	√	-	-	-	-
Convenience	Flexibility	√	√	√	√	√
	Inclusive	√	√	√	√	√

Condition of Facilities and Infrastructure for UPI Kindergarten Lab School

Educational facilities are any school equipment that reflects the curriculum and educational programs at the school (Rohiyatun & Najwa, 2021). So the available educational facilities must follow the curriculum foundation and educational programs that have been

established so that any available equipment can support the learning process in schools. Meanwhile, infrastructure is one all the main tools that can support the achievement of the learning process in schools. There is a list of facilities and Infrastructure that must be available in schools, including:

Table 4. Kindergarten Facilities and Infrastructure in UPI Kindergarten Labschool

Facilities and Infrastructure	Availability	Description
Main		
Indoor and outdoor play area	√	Indoor play area in the form of a playground with a size of 3 m x 4 m x 3 m and outside the available play area 27.5 m x 11.5 m equipped with educational games
Teacher's room	√	There is a teacher's room with an area of 70 m^2 with seven teachers.
Administration Room/Principal's Room	-	The principal's office is in the same room as the teacher's.
School health unit room	√	Area = 2.4 m x 3.4 m = 21.12 m^2
Teacher's toilet	√	There are two bathrooms for male and female teachers with an area of 8.16 m^2
Kids toilet	√	There are bathrooms for female and male students as well as one toilet training.
Furniture	√	Available
Multipurpose		
Kitchen	√	There is a special kitchen for the school.
Praying room	√	Has an area of 5 m x 5 m = 25 m^2
Counseling Room	-	Not available
Parking area	√	Has an area 11.2 x 50 = 560 m^2
Hall	√	Has an area 14.5 x 7.8 = 113.1 m^2
Wash Area	√	Available
Warehouse	√	Available

Evaluation of Facilities and Infrastructure for UPI Kindergarten Lab School with Child-Friendly School Design Principles

Evaluation of facilities and infrastructure in the UPI Kindergarten Lab School is limited to facilities and infrastructure directly related to children. Facilities and infrastructure are evaluated based on five child-friendly school design principles: security, health, comfort, safety, and convenience. The following is an evaluation score of the facilities and infrastructure of the UPI Kindergarten Lab School based on the principles of child-friendly school design.

Table 5. Results of the Evaluation of Facilities and Infrastructure based on the Principles of Child-Friendly School Design

Indicator	Score obtained	Maximum Score
Security	117	166
Health	100	129
Convenience	224	312
Safety	36	51
Convenience	60	81
Total Score	537	739

Based on the data obtained, it produces the following percentage assessments:

$$P = \frac{\mathrm{F}}{\mathrm{N}}\ x\ 100\%$$

$$P = \frac{537}{739}\ x\ 100\%$$

= 72.66%

The data shows that the evaluation results of fulfilling the requirements for child-friendly schools on the standard facilities and infrastructure of the UPI Kindergarten Lab School produce a percentage of 72.66%, which indicates that the UPI Kindergarten Lab School facilities and infrastructure are in the excellent category. Based on the observations, researchers get results if the facilities and infrastructure available in the UPI Kindergarten Lab School, physically and architecturally, agree with the existing conditions and the standards of the research instrument. However, there are still shortcomings in meeting the requirements of child-friendly schools. The following are the findings of non-compliance with the principles of child-friendly schools, including:

1. Safety Criteria

   In the part of the building structure and furniture used, there are still sharp corners, which is contrary to the principles of child-friendly schools, namely, the corners of the building do not have sharp and rough corners, and there are educational game tools (APE) that are damaged marked by rust, breakage, and damage.
2. Health criteria, overall air conditioning, and ventilation in each room do not meet the standards of the Decree of the Minister of Health of the Republic of Indonesia Number 1429/MENKES/SK/XII/2006.
3. Comfort criteria
   a. The school has not provided a private space for children, and toilet training is used simultaneously; this is contrary to the principle of child-friendly school design, where toilets between boys and girls must be separated.
   b. Availability of educational game tools that are less diverse, so children cannot explore.
   c. There are no private facilities/areas for children both in the classroom and in the school environment as a whole.
4. Safety criteria, schools, do not have disaster protection, especially fire. There are no sprinklers or other fire protection in each classroom, and the school does not have fire extinguishers or hydrants.
5. Convenience Criteria
   a. The absence of the concept of flexibility on the exterior and interior of the school to adapt to changes in school programs and school facilities cannot be used by the community outside the school. This is contrary to the concept of a child-friendly school, where there must be transparency between the school and the community.
   b. Schools have not provided facilities for special-needs children, so not all groups can access schools.

CONCLUSION

The principle of child-friendly school design generally has five requirements that must be met, including security, health, comfort, safety, and convenience. The difference in the design principles of child-friendly schools for an early age lies in the use of the concept of "play" in the school

environment, so it is necessary to provide a play area for children. The available play area needs to pay attention to the five requirements of a child-friendly school: security, health, comfort, safety, and convenience.

The availability of facilities and infrastructure for the Kindergarten of the UPI Kindergarten Lab School has not been entirely fulfilled, including the central infrastructure does not have a particular room for school principals and administrative staff, and the school supporting infrastructure does not have a consultation room. The condition of facilities and infrastructure, especially in the play area, has not fully met early child-friendly school design principles. In the existing condition, the play area only has an *active and natural area* consisting of various Educational Game Tools (APE) that train children's gross motor skills. In addition, the *classroom layout* in the existing condition only fulfills two area zones, namely the drama play zone and the acceptable motor zone.

Overall, observations on fulfilling security, health, comfort, safety, and convenience requirements at the UPI Kindergarten Lab School resulted in a **good rating category.** Based on the evaluation results, the UPI Kindergarten Lab School excels in assessing health requirements and is less superior in safety requirements.

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