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Covid-19 Responsive Public Space Signage Design for Children from Physical Distancing Aspects at Lapangan Merdeka, Pematangsiantar

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Abstract. Adaptation of public space users requires COVID 19 responsive design elements to support public health, especially for children aged 7-12 years who are classified as vulnerable and still need public space to play and socialize. The Lapangan Merdeka area is a public open space where children make up about 60% of visitors. Currently, there is still negligence in the application of health protocols. This study considers design requirements in implementing physical distancing, such as signage aspects. The quantitative method is used in this research. The analysis stages consisted of identifying the child's characteristics through behavior-setting and place-setting; and formulating design element needs through signage aspects such as directional signage, informative signage, and identification signage. The research result shows three-element of signage. First is directional signage, such as a circulation regulation on the surfaces of the jogging track. It is used for the signing facility on the jogging track. It uses a board stuck in the ground and is placed in the area leading to the field, and uses an information board with 1-1.5 meters on the jogging track. Second, informative signage such as an x-banner at all facility points. Third, identification signage such as a board containing an area plan and placed near the words "Lapangan Merdeka."

Keywords: Public Space, Covid-19, Physical Distancing, Children

INTRODUCTION

During quarantine at home due to the COVID-19 pandemic, on average there was a threefold increase in the use of open spaces for recreation in all age groups of the population [1, 2, 3]. The condition of public open spaces is one of the main urban elements that must be considered, especially during the Covid-19 pandemic. The improved quality of public open space will have implications for the quality of a city populated by people who depend on their environment [4]. This is due to the fact that the more densely populated a community is, the higher the degree of virus contamination caused by uncontrolled crowds. The condition of lack of supporting facilities also causes problems in public spaces, especially in the midst of the COVID-19 pandemic [5, 6, 7]. This is as a result that all age groups of the population's utilization of open space for recreation increases by an average of threefold during home quarantine caused by the COVID-19 epidemic. [3, 8]. This condition of social distancing has encouraged the government to implement special policies on the use of public spaces [8, 9, 12]. Population with younger ages amid the covid-19 pandemic prefers to do recreation and look for place preferences to play, one of which is a public open space [10].

In children, this activity restriction greatly affects changes in their behavior. This condition causes a decrease in their activity related to behavioral changes, such as spending more time staring at screens, and a longer sleep

duration. Those changes will have an impact on both physical and mental health-related to the characteristics of children's behavior when in public spaces [11, 12]. Given that childhood lifestyle habits still have certain limits, public open space is needed to increase children's physical resilience during the COVID-19 pandemic. Children who live in or are near nature and have the possibility to regain the capacity to pay attention to people develop more favorably. [13]. Thus, it can be concluded that public open spaces in the form of parks can positively impact the growth process of children who are tough to becoming adults.

So based on the above it can be concluded that children amid the COVID-19 pandemic situation also need a place to carry out physical activities in the form of public open spaces adapted to the characteristics of children's behavior when in public spaces [11, 12]. In this case, it is important to understand that public spaces can also be dangerous due to dense interactions if not controlled, necessitating the use of signs design components responsive to the transmission of the COVID-19 virus. [14, 15].

Signage will assist limit the spread of COVID-19 in public spaces by focusing on compliance in keeping physical distance and enforcing rules, appeals, and prohibitions in the COVID-19 pandemic. **[16]**. Signage is one of the visual media used to provide information quickly and easily. The importance and effectiveness of signage to encourage the behavior of children visitors to be safe from the covid-19 virus attack are shown on the research by **[17]**. In the use of signage in public spaces, signage can be classified based on the type of information **[18]** consisting of (1) Directional Signage which is a sign that functions as a reference for users of public space in directing to an area or facility that be in a public space. (2) Informative Signage which is a sign that serves to provide comprehensive information about public space. Finally, (3) Identification Signage, which is a sign that functions to provide identification information for an area.

FIGURE 1. There is no COVID-19 Responsive Signage at Merdeka Square

This study was conducted in the Pematangsiantar Merdeka Square Area, which is one of the sites where 60% of visitors are groups of youngsters who are encouraged to play rather extensively by the facilities. However, in this area, there are still violations of health protocols such as not wearing masks, staying at a safe distance, and there are still crowds. The Pematangsiantar Merdeka Square area is surrounded by activity centers such as offices, tourist attractions, shopping centers, elementary schools, and accommodation places making this area easily accessible to anyone, especially for school-aged children (7-12 years) to play. Therefore, elements of the need for a responsive COVID-19 signage design are needed that focus on providing signage by implementing physical distancing aspects.

In the Pematangsiantar Merdeka Square Area, more attention should be paid to children. This is due to the region being a Pematangsiantar City Park with a very strategic location and easy public access. The Pematangsiantar Merdeka Square area is also frequently occupied with street vendors selling refreshments to schoolchildren in the afternoon, namely along Jalan W.R Supratman, causing this area to be crowded with youngsters.

Based on the related literature, the researchers carried out a synthesis of the literature. Synthesis activities were carried out to determine the variables in the research by selecting the variables and sub-variables related to the research theme. The group of variables and sub-variables that have been taken represents information related to aspects of supporting physical distancing in public spaces in the form of signage with aspects: Directional Signage, Informative Signage, and Identification Signage. These variables are used as a reference in the implementation of the research. In the Pematangsiantar Merdeka Square area, there is no informative signage, especially in supporting social distancing in public spaces.

This study aims to formulate a signage design that is responsive to the prevention of COVID-19 from the aspect of physical distancing for children in the Merdeka Square Area, Pematangsiantar City. The results of this study are expected to provide direction and recommendations for signage design in the application of aspects of physical

distancing in the Pematangsiantar Merdeka Square area that is responsive to the spread of COVID-19. The application is expected to influence the behavior of visitors in the Pematangsiantar Merdeka Square Area.

DESCRIPTION OF STUDY AREA

The scope of this research covers the study area, namely the Pematangsiantar Merdeka Square located in Siantar Barat District. This field area has an area of ± 3,600 square meters with a length of ± 80 meters and a width of ± 45 meters.

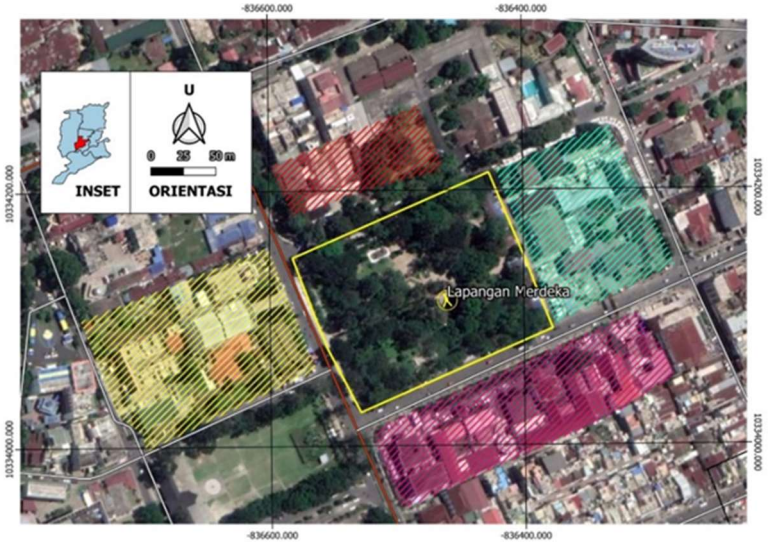


FIGURE 2. Location Map of Pematangsiantar Merdeka Area

The Merdeka Square area is surrounded by several activity spaces, including the government center in the south, the culinary tourism center along Jalan W.R. Supratman, a shopping center, and there is an elementary school located ± 1 km from the area. This area also has good accessibility, supported by adequate public transportation around the area. Therefore, the Pematangsiantar Merdeka Square Area has a fairly high number of visitors, especially children because it has complete playing facilities and is close to elementary schools. The Merdeka Square area is a public space that is actively used, especially for children.

MATERIAL AND METHOD

This study used primary data. Primary data is a type of information obtained directly from sources or by going directly to the field, while secondary data were obtained indirectly through a review of documents, digital, electronic media, and documents. The data and information needed in this research are data related to the design of public open spaces that are friendly for children with the application of physical distancing in the Pematangsiantar Merdeka Square Area. The required data are arranged in tabular form, as follows:

TABLE 1. Research Data

No	Data	Aim	Source
1	Behavior setting of children in the Merdeka Square Area	Identifying the characteristics of the users of the Pematangsiantar Merdeka Square	Children aged 7-12 in Merdeka Square Kawasan
2	Place Setting of the space that children need in the Merdeka Square Area		Children aged 7-12 in Merdeka Square Kawasan

3	- Form of signage design - Signage design dimensions - Signage Placement	Analyzing directional signage, informative signage, and identification signage in the application of physical distancing	Children aged 7-12 in Merdeka Square Kawasan

METHODOLOGY

This research was carried out in the Pematangsiantar Merdeka Square, which is a Pematangsiantar City Park, which has a very strategic location and is easily accessible by the community, especially children. The research method in this study was quantitative with analytical tools in the form of behavioral mapping and quantitative descriptive methods. Questionnaires and field observations were used to collect the data. The questionnaire was in the form of closed and semi-closed questions that focus on the conditions of security, comfort, and availability of facilities for children in the Pematangsiantar Merdeka Square. Meanwhile, field observations were used to focus on certain location points and durations in the Pematangsiantar Merdeka Square Area

The proportionate stratified random sampling was used as the sampling technique. The number of respondents is children in the Merdeka Square Area from 16.00 to 18.00, the population is 100 people. Using the SLOVIN formula with a margin of error of 0.1 (10%), a sample of 50 children was obtained. The details of this research sample are as follows:

TABLE 2. Sample of Children Based on Place and Behavior Setting

Characteristics of Children Based on Place & Behavior Setting	The margin of Slovin 1%
Children playing with natural materials in the playspace	9
Children playing in the playspace	18
Children running on pedestrian ways	6
Children playing in the greenspace	5
Children chatting on playspace	8
Children chatting in greenspace	4
Total	50

RESULT AND DISCUSSION

Analysis of the Characteristics of Child Users at Merdeka Square Pematangsiantar

Based on the observations that have been made, Pematangsiantar Merdeka Field has the characteristics of children users (school-age children 7-12 years) obtained through the identification of children users seen from the behavior setting and place setting. Behavior settings in the children's group are the types of user behavior of school-age children in using Pematangsiantar Merdeka Square, while the place settings are the spaces used by the child users in Pematangsiantar Merdeka Square.

Pematangsiantar Merdeka Square as a public space is distinguished based on its function, namely playspace as a play space for children in carrying out physical activities, pedestrian ways as a space used in daily activities such as walking, and green space as a green space equipped with natural elements. or vegetative which provides opportunities for relaxation or recreation. The following is an overview of the existing conditions at Pematangsiantar Merdeka Square during the COVID-19 pandemic. The numbering Zone 1 represents the playspace area, Zone 2 represents greenspace, and Zone 3 represents pedestrian ways.

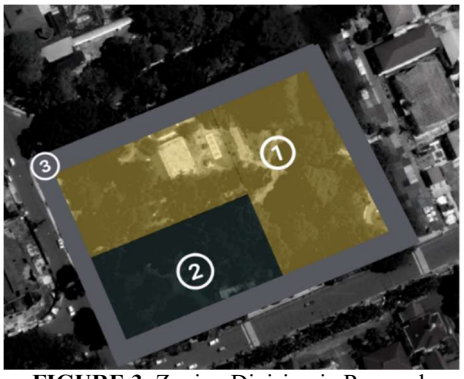


FIGURE 3. Zoning Division in Research

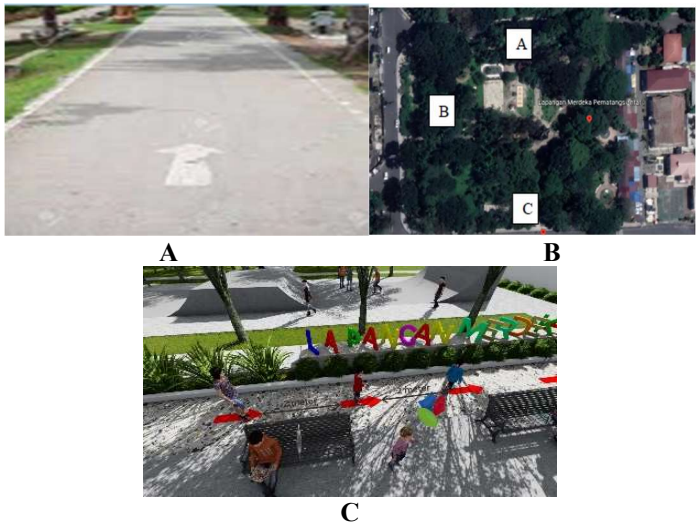
Analysis of Design Needs Elements Based on Directional Signage Aspects

The signage variable is one of the visual media used to provide information quickly and easily. The type of signage consists of three categories, namely directional, informative, and identification signage. The use of the signage amid the COVID-19 pandemic is considered important in urging and providing information on the implementation of physical distancing in the Pematangsiantar Merdeka Square Area. The following is a result of the preferences of children's users.

Directional Signage as a Circulation Directional Sign

The function of the signage as a sign for the direction of circulation for child users in the Pematangsiantar Merdeka Field Area is related to the implementation of physical distancing. This circulation direction signage aims to direct the user to follow a predetermined circulation direction.

The results of data collection indicate that the preference of children users towards the form of directional signage as a sign of the direction of circulation is by using arrow-shaped sign attached to the surface of the area. The selection of forms in the form of signs in the form of stickers is more attractive to children while in the area and does not interfere with the visual aesthetics in the area. Next is the preference for placing the signage in the Pematangsiantar Merdeka Square Area. In addition, it can also be concluded that the preference for placing signage as a sign of the direction of circulation according to child users in the Pematangsiantar Merdeka Square is in the jogging track area. The selection of placement in the jogging area aims to avoid mass accumulation and prevent collisions between fellow users.



A **B**

C

FIGURE 4 Preference for Form (A) and Placement (B, C) Directional Signage as a Circulation Directional Sign

Directional Signage as a Facility Directional Sign

The signage function, in this case, is that it can make it easier for child users to find directions to existing facilities in the area by looking at the sign. The following are the preferences of children users in using signage as directions to facilities in the Pematangsiantar Merdeka Square Area.

The results of data collection show that: (1) the preference for the form of directional signage as a sign for the direction to the facility according to child users is in the form of a pole/board that is plugged into the ground or floor. (2) Directional Signage dimension preference for facility direction markers according to child users is 1-1.5 meters high, which can help reach the point of view of child users when reading/viewing the board while in the Pematangsiantar Merdeka Square. (3) The preference for placing signs in the directional signage category as a sign for the direction of facilities according to child users is in the area leading to the field.

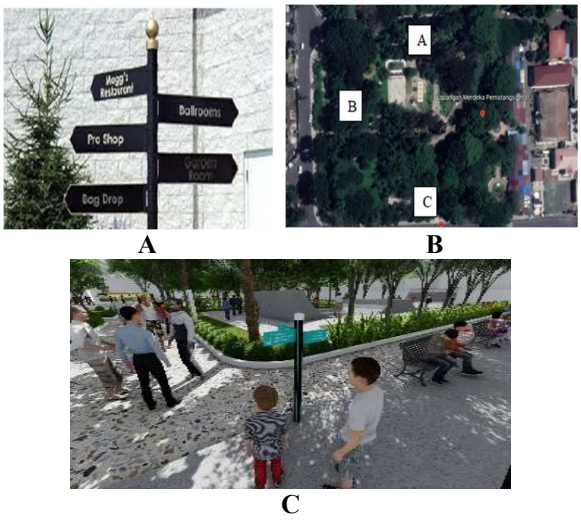


FIGURE 5 Preference for Form (A) and Placement (B, C) Directional Signage as a Facility Directional

Directional Signage for Directions to the Zone

Directional Signage serves to direct users to zones in the Pematangsiantar Merdeka Square Area. Child users are expected to more easily reach the zones that have been provided by looking at the signage as a sign for the direction of the zone in the Pematangsiantar Merdeka Square Area. The results of data collection show that: (1) The preferences according to children's users towards the form of Directional Signage as a direction sign is an information board containing pictures of the zones in the area. (2) Preference for placing Directional Signage as a sign towards the zone according to children's users is placed in the area leading to the field. Placed in the area toward the field, the goal is for child users to easily understand the available zones in the Pematangsiantar Merdeka Square Area.

FIGURE 6 Preference for Form (A) and Placement (B, C) Directional Signage as a Directional Sign

Setting Informative Signage

Informative signage has a function as a general information provider for child users regarding the handling of COVID-19 in the form of how to use the facilities in the Pematangsiantar Merdeka Square such as a handwashing area, the importance of keeping a safe distance, and others. The results of data collection show that (1) The preference for informative signage in the Merdeka Square Pematangsiantar area chosen by child users is by using an x-banner. (2) The preference for informative signage dimensions in the Pematangsiantar Merdeka Square area chosen by child users is 1-1.5 meters high. This dimension was chosen because child users find it easier to reach information and do not interfere with the user's point of view while in the Pematangsiantar Merdeka Square. (3) According to child users, the placement of informative signage should be placed at all points of the facility (In Figure 7 it is marked with point A). This is intended so that child users are reminded to continue to apply health protocols while in the Pematangsiantar Merdeka Square area. Furthermore, it can be seen in Figure 7 is a detail of laying informative signage in the Pematangsiantar Merdeka Square Area.

FIGURE 7 Preferences for Shape (A) and Placement (B, C) Informative

Setting Identification Signage

The following are the results of data collection on identification signage preferences in the Pematangsiantar Merdeka Square according to child users: (1) Children's user preferences in the form of identification signage in the Pematangsiantar Merdeka Square are a board containing an area plan with an attractive design for children. to read the identification signage. (2) The preference for identification signage dimensions according to child users in the Pematangsiantar Merdeka Square is 1-1.5 meters high. (3) Children's user preferences for placing identification signage in the Merdeka Square Pematangsiantar area are located near the words "Freedom Field" (can be seen in Figure 8 marked at point A). The placement of the identification signage in the Pematangsiantar Merdeka Square area in detail can be seen in Figure 8.

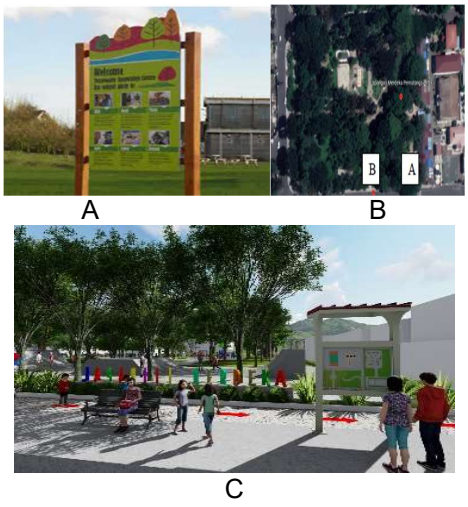


FIGURE 8 Preference for Form (A) and Placement (B, C) Identification Signage

TABLE 3. Requirements for Physical Distancing Design Elements in the Pematangsiantar Merdeka Square Area

Typology of Requirements	Characteristics of Signage Design Elements	Conditions Before Design	After Implementation
Children playing with natural materials in the playspace	• The form of directional signage as a circulation regulation using signs with a distance of 2 meters on the surface in the jogging track groove		
	• Directional form as a sign for the direction of the facility using a 1-1.5-meter-high board that is stuck in the ground and placed in the area leading to the field.		
	• Form directional signage as a sign for the direction to the zone using an information board as high as 1-1.5 meters in the jogging track area.		
	• Informative signage is in the form of an x-banner and is placed at all points of the facility.		
	• The form of identification signage is in the form of a board containing an area plan and placed near the words "Independence Field"		

Children playing in the playspace	• The form of directional signage as a circulation regulation using signs with a distance of 1.5 meters on the surface in the jogging track groove		
	• Directional form as a sign for the direction of the facility using a 1-1.5-meter-high board that is stuck in the ground and placed in the area leading to the field.		
	• Form directional signage as a sign for the direction to the zone using an information board as high as 1-1.5 meters in the jogging track area.		
	• Informative signage is in the form of an x-banner and is placed at all points of the facility		
	• The form of identification signage is in the form of a board containing an area plan and placed near the words "Independence Field"		

Children running on pedestrian ways	• The form of directional signage as a circulation regulation using signs with a distance of 2 meters on the surface in the jogging track groove		
	• Directional form as a sign for the direction of the facility using a 1-1.5-meter-high board that is stuck in the ground and placed in the area leading to the field.		
	• Form directional signage as a sign for the direction to the zone using an information board as high as 1-1.5 meters in the jogging track area.		
	• Informative signage is in the form of an x-banner and is placed at all points of the facility		
Children playing in the greenspace	• The form of directional signage as a circulation regulation using signs with a distance of 2 meters on the surface in the jogging track groove		
	• Directional form as a sign for the direction of the facility using a 1-1.5 meter high board that is stuck in the ground and placed in the area leading to the field.		
	• Form directional signage as a sign for the direction to the zone		

	using an information board as high as 1-1.5 meters in the jogging track area.		
	• Informative signage is in the form of an x-banner and is placed at all points of the facility		
	• The form of identification signage is in the form of a board containing an area plan and placed near the words "Independence Field"		
Kids chatting on playspace	• The form of directional signage as a circulation regulation using signs with a distance of 2 meters on the surface in the jogging track groove		
	• Directional form as a sign for the direction of the facility using a 1-1.5 meter high board that is stuck in the ground and placed in the area leading to the field.		

	• Form directional signage as a sign for the direction to the zone using an information board as high as 1-1.5 meters in the jogging track area.		
	• Informative signage is in the form of an x-banner and is placed at all points of the facility		
	• The form of identification signage is in the form of a board containing an area plan and placed near the words "Independence Field"		
Children chatting in greenspace	• The form of directional signage as a circulation regulation using signs with a distance of 2 meters on the surface in the jogging track groove		
	• Directional form as a sign for the direction of the facility using a 1-1.5 meter high board that is stuck in the ground and placed in the area leading to the field.		

• Form directional signage as a sign for the direction to the zone using an information board as high as 1-1.5 meters in the jogging track area.		
• Informative signage is in the form of an x-banner and is placed at all points of the facility		
• The form of identification signage is in the form of a board containing an area plan and placed near the words "Independence Field"		

CONCLUSION

The use of signage for the COVID-19 pandemic is considered important in urging and providing information on the implementation of physical distancing in the Pematangsiantar Merdeka Square Area. The results of this study resulted in the following signage design: The form of directional signage as a circulation regulation using signs with a distance of 2 meters on the surface in the jogging track groove. The directional form as a sign for the direction of the facility uses a board that is stuck in the ground and is placed in the area leading to the field and uses an information board as high as 1-15 meters and is placed on the jogging track. Informative signage forms in the form of x-banners as high as 1-1.5 meters are placed at all points of the facility. The form of identification signage is in the form of a board containing an area plan of 1-1.5 meters high and placed near the words "Independence Field".

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