Journal of Architectural Research and Education

Journal homepage:
https://ejournal.upi.edu/index.php/JARE/index

Analysis of The Availability of Primary School Infrastructure Based on Geographic Data

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ABSTRACT

The purpose of the study is to analyze the availability of elementary school infrastructure based on geographic data. This research will use qualitative methods; apart from distributing questionnaires, it will also explore more information from literature studies sourced from various books, scientific journals and articles that will contribute and be relevant to this research. The results show that the availability of educational infrastructure in 5 (five) primary and remote class schools shows different types of infrastructure. The availability of this infrastructure, as a whole, this school has not been able to meet the needs of educational facilities in the learning and teaching process. So, the role of infrastructure in several schools' teaching and learning processes falls into the category of less effective or not yet practical. Analysis of the affordability of school infrastructure based on optimal distance shows that based on spatial modeling using ArcMap it is known that the availability of infrastructure at the school is affordable.

ARTICLE INFO

Article History:
Submitted/Received 6 June 2024
First Revised 21 July 2024
Accepted 5 September 2024
First Available online 1 Nov 2024
Publication Date 1 Nov 2024

Keyword:
Availability,
Infrastructure,
Schools,
Geographical Location,

1. INTRODUCTION

The progress of a country is strongly supported by an education system that will produce superior human resources, the better the education system will make the country more advanced and developed. Bone Regency, which is one of a series of regencies in South Sulawesi Province within the framework of the unitary state of the Republic of Indonesia, has a strategic geographic location; it has tropical natural wealth which is greatly admired and ogled by national and international tourists. The vast sea with long rivers, tropical forests stretching between mountains, and cliffs add to the beauty of the archipelago's wealth. However, on the other hand, the beauty of the natural panorama gives rise to a problem in education. Even though Indonesia's independence passed seventy-eight years ago, the distribution of education in this area has not yet been fully felt by the community, especially those in remote areas with geographic conditions that are difficult to reach using transportation (Pramono, 2022). People in remote areas believe that education is the same as a luxury item because the costs they pay are identical. Sometimes, they must spend more money to prepare facilities for their children because the lack of facilities and infrastructure indicates unequal education in remote areas (Rohiyatun, 2019). Schools that are far from home with unsupportive road infrastructure and means of transportation, inadequate facilities and infrastructure at schools cause a wide range in the quality of education between cities and remote areas (Ulfa, 2023). The lack of facilities and infrastructure in schools will result in a minimum level of education because facilities and infrastructure greatly influence teachers' interest in teaching and students' interest in learning (Angelly et al., 2022).

Five factors influence schools' teaching and learning process: educators, students, goals, tools, and environment (Sardiman, 2020). To achieve an increase in the quality of education, one must be supported by adequate learning facilities and an effective learning environment (Sitirahayu & Purnomo, 2021). If the facilities and infrastructure provided are lacking, it can affect students' interest in participating in the teaching and learning process. This factor can improve student learning achievement if students are interested in participating in the teaching and learning process (Kartika et al., 2019). School facilities and infrastructure have a significant influence on the learning process. If the availability of facilities and infrastructure in schools is not optimal, this will hinder the learning process (Herawati et al., n.d.). Achieving educational goals in creating quality human resources requires the support of adequate human resources, funds, management, educational facilities, and infrastructure so that it is hoped that the process of providing education can run effectively to achieve academic goals in general and institutional goals in particular (Kristiawan et al., 2019). Strong coordination between the central and regional governments is needed to overcome the limitations on facilities and infrastructure in schools in remote areas (Rismayani et al., 2021). Factors that influence national education standards in areas with remote geographic locations are community leaders, parents, students who experience learning difficulties, teaching staff, and minimal infrastructure (Sarbandi et al., 2023). With current technology, various alternative educational methods have emerged that can expand each student's reach and learning opportunities. The availability of facilities and infrastructure supported by adequate technology can be an alternative to equalizing education between urban and remote areas. Technological developments enable people to access education in various ways without being limited by study space, study time, and study place (Patandung & Panggua, 2022).

The essence of learning is a process of grouping in a conducive and ideal environment around students, which can revitalize, elevate, and encourage students to carry out

DOI: https://doi.org/10.17509/jare.v6i2.70782
p- ISSN 2776-9909 e- ISSN 2580-1279

learning. Learning is providing guidance and assistance to students in the educational process. Based on the Republic of Indonesia Law Number 20 of 2003 concerning the National Education System, learning is a process of interaction of 3 (three) elements between teachers, students, and learning resources that occur in the learning environment. The learning process is a system that includes related components that interact to obtain desired results in harmony with predetermined goals (Dasopang & Pane, 2017).

2. RESEARCH METHODS

More interaction is needed with competent parties such as school principals, teachers, committees, parents, and students through surveys, questionnaires, and architectural documentation to sharpen information about the availability of infrastructure in elementary schools. This research will use qualitative methods; apart from distributing questionnaires, it will also explore more information from literature studies sourced from various books, scientific journals and articles that will contribute and be relevant to this research.

This research will identify the availability of infrastructure in elementary schools (primary schools) with branch schools (distant classes) based on geographical location in the Bone Regency education office area, South Sulawesi province. Researchers will conduct direct interviews with the principal of the primary school and teachers who teach in remote class schools. In contrast, the principal and teachers fill out the questionnaire that has been provided. The results of this research will later be able to provide input and recommendations to the district education office and other parties. Parties who are sympathetic to the world of education.

3. RESULTS AND DISCUSSION

Advanced and quality human resources will greatly determine and support the success of development in a region. One way to advance and improve the quality of human resources is through education. Efforts to improve the quality of education for the country's population are by opening the doors of education wide for them so that they can receive a broader education, which, of course, must be supported by quality educators and equipped with adequate facilities and infrastructure.

The Department of Education, under the auspices of Bone Regency, there are 24 (twenty-four) primary schools (SD) that have remote classes. Remote classes are allocated to students living far away from the primary school. Remote classes are not independent schools with their names, but classes from the primary school, and the school's name is also from the primary school. Among the total number of schools, 1 (one) primary school has 2 (two) distant class schools. The total number of leading primary schools plus remote classes is 49 schools. Considering the minimal time, this research only focuses on 5 (five) leading primary schools and 5 (five) remote primary schools, as seen in the following table (table 1.1):

Table 1.1 School Data and Number of Students

No	Name of Parent School	Address	The number of students	Remote Class School Name	Address	The number of students
1	SD Negeri 198 Cinennung	Cinennung Village	132	SD Negeri 198 Cinennung	Abbumpungeng Village	77
2	SD Negeri 239 Tellongeng	Tellongeng Village	83	SD Negeri 239 Tellongeng	Tellongeng Village	10
3	SD Instruction 7/83	Malimongeng	137	SD Instruction 7/83	Mappatoba	100

DOI: https://doi.org/10.17509/jare.v6i2.70782
p- ISSN 2776-9909 e- ISSN 2580-1279

No	Name of Parent School	Address	The number of students	Remote Class School Name	Address	The number of students
	Malimoneng	village		Malimoneng	Village	
4	SD Instruction 12/79 Ulubalang	Ulubalang Village	87	SD Instruction 12/79 Ulubalang	Ulubalang Village	105
5	SD Inpres 3/77 New Style	New Style Village	86	SD Inpres 3/77 New Style	New Style Village	94

The data obtained from survey results and based on filling out questionnaires for 5 (five) leading class schools along with 5 (five) remote class schools, respectively, are presented as follows.

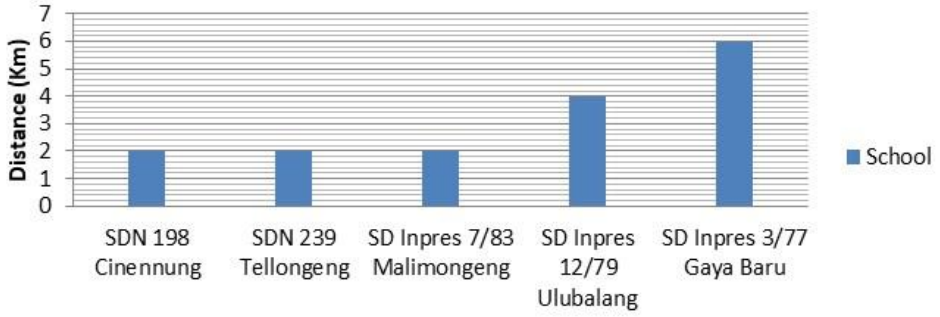


Figure 1.1 Data Processed, 2024: Distance From Primary School To Distant Class

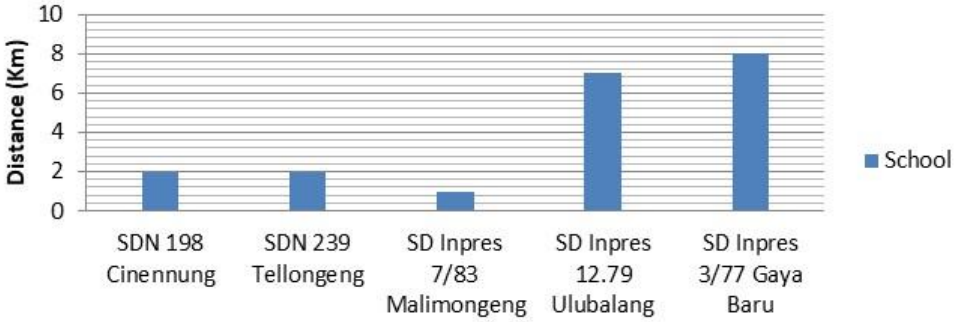


Figure 1.2 Data Processed, 2024: School Class Distance Is Far From Provincial Axis Road

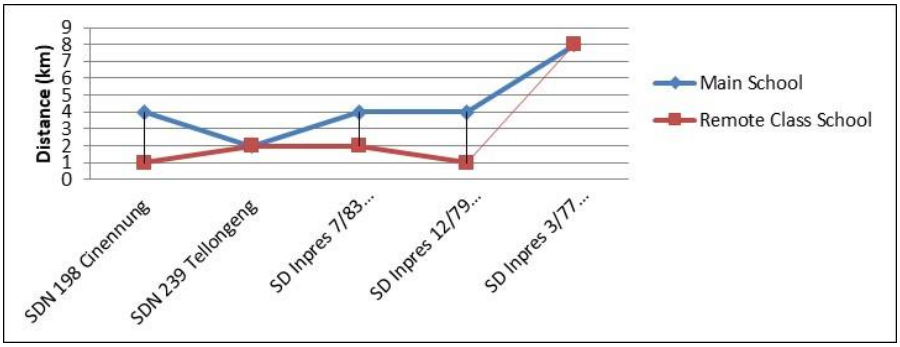


Figure 1.3 Data Processed, 2024: Students' Furthest Distance From School

DOI: https://doi.org/10.17509/jare.v6i2.70782
p- ISSN 2776-9909 e- ISSN 2580-1279

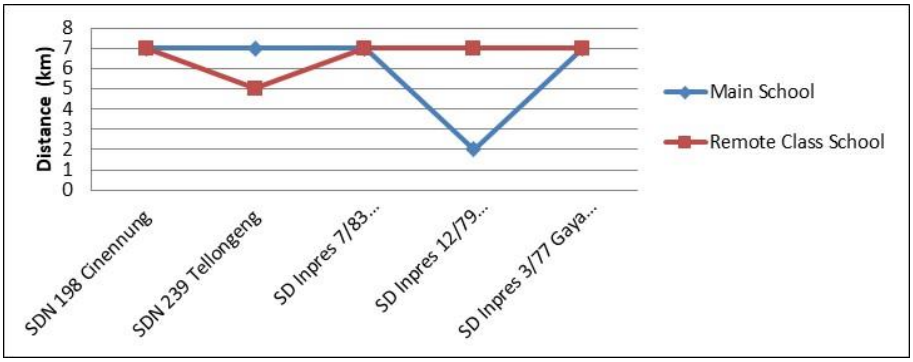


Figure 1.4 Data Processed, 2024: Teacher's Furthest Distance From School

Table 1.2 Number of Classrooms

No	Primary School Name	Main School	Remote Class School
1	SD Negeri 198 Cinennung	7	6
2	SD Negeri 239 Tellongeng	4	3
3	SD Inpres 7/83 Malimongeng	6	6
4	SD Inpres 12/79 Ulubalang	6	6
5	SD Inpres 3/77 Gaya Baru	6	3

Data Processed, 2024

Table 2.1 Main School Support Building

No	Name of Parent School	Teacher's Room	Room Library	R. Lab. Computer	UKS Room	Toilet	Islamic Prayer Room	The Store
1	SD Negeri 198 Cinennung	1	1	0	0	0	0	1
2	SD Negeri 239 Tellongeng	0	1	0	0	0	0	0
3	SD Inpres 7/83 Malimongeng	1	1	0	1	1	0	1
4	SD Inpres 12/79 Ulubalang	1	1	0	0	1	0	1
5	SD Inpres 3/77 Gaya Baru	1	1	0	0	1	1	0

Data Processed, 2024

Table 2.2 Remote Class School Support Buildings

No	Name of Parent School	Teacher's Room	Room Library	R. Lab. Computer	UKS Room	Toilet	Islamic Prayer Room	The Store
1	SD Negeri 198 Cinennung	0	0	0	0	0	0	0
2	SD Negeri 239 Tellongeng	0	0	0	0	0	0	0
3	SD Inpres 7/83 Malimongeng	0	0	0	0	1	0	0
4	SD Inpres 12/79 Ulubalang	0	0	0	0	1	0	0

DOI: https://doi.org/10.17509/jare.v6i2.70782
p- ISSN 2776-9909 e- ISSN 2580-1279

No	Name of Parent School	Teacher's Room	Room Library	R. Lab. Computer	UKS Room	Toilet	Islamic Prayer Room	The Store
5	SD Inpres 3/77 Gaya Baru	0	0	0	0	0	0	0

Data Processed, 2024

Tables 2.1 and 2.2 show the availability of supporting buildings in schools, both in primary schools and remote class schools, using a dummy scale analysis (1= Exists and 0= Absent) in 5 elementary schools that researchers have examined to distinguish differences between the available buildings. Based on the table above from the results of the dummy scale analysis, it is known that 5 (five) elementary schools in the main class have partial availability of supporting buildings. In contrast, in 5 (five) elementary schools, remote class schools have almost no availability of supporting buildings at all.

Table 3.1 Availability of Construction Locations for Main School Supporting Buildings

No	Name of Parent School	Teacher's Room	Room Library	R. Lab. Computer	UKS Room	Toilet	Islamic Prayer Room	The Store
1	SD Negeri 198 Cinennung	-	-	1	1	1	1	-
2	SD Negeri 239 Tellongeng	1	-	0	0	0	0	0
3	SD Inpres 7/83 Malimongeng	-	-	1	-	-	1	-
4	SD Inpres 12/79 Ulubalang	-	-	1	1	-	1	-
5	SD Inpres 3/77 Gaya Baru	-	-	1	1	-	-	1

Data Processed, 2024

Table 3.2 Availability of Locations for Construction of Buildings Supporting Remote Class Schools

No	Name of Parent School	Teacher's Room	Room Library	R. Lab. Computer	UKS Room	Toilet	Islamic Prayer Room	The Store
1	SD Negeri 198 Cinennung	1	1	1	1	1	1	1
2	SD Negeri 239 Tellongeng	1	1	1	1	1	1	1
3	SD Inpres 7/83 Malimongeng	1	1	1	1	-	1	1
4	SD Inpres 12/79 Ulubalang	0	0	0	1	-	0	0
5	SD Inpres 3/77 Gaya Baru	1	1	1	1	1	1	1

Data Processed, 2024

DOI: https://doi.org/10.17509/jare.v6i2.70782
p- ISSN 2776-9909 e- ISSN 2580-1279

Tables 3.1 and 3.2 also analyze the availability of supporting building locations using a dummy scale (1= Exists and 0= Absent). By looking at the availability of supporting buildings in tables 2.1 and 2.2, to optimize the availability of school-supporting buildings it is necessary to construct or procure these supporting buildings. This is explained by the researchers regarding the availability of construction sites to provide supporting buildings not owned by the elementary school, both at the primary school and remote school. Therefore, with the results of the analysis above, it is hoped that the relevant parties can procure supporting buildings to improve the quality of education in elementary schools.

Table 4.1 Ceremony Field and Main School Sports Practice Field

No	Name of Parent School	0 or 1	Condition
1	SD Negeri 198 Cinennung	1	Good
2	SD Negeri 239 Tellongeng	1	Good
3	SD Inpres 7/83 Malimongeng	1	Good
4	SD Inpres 12/79 Ulubalang	1	Good
5	SD Inpres 3/77 Gaya Baru	1	Very Good

Data Processed, 2024

Table 4.2 Ceremony Field and Remote Class School Sports Practice Field

No	Name of Parent School	0 or 1	Condition
1	SD Negeri 198 Cinennung	1	Not Good
2	SD Negeri 239 Tellongeng	1	Not Good
3	SD Inpres 7/83 Malimongeng	1	Not Good
4	SD Inpres 12/79 Ulubalang	1	Not Good
5	SD Inpres 3/77 Gaya Baru	1	Not Good

Data Processed, 2024

Based on the table above, analyzed using a dummy scale (1= Exists and 0= Absent), it can be seen that school infrastructure, in this case in the form of ceremonial fields and sports practice fields in 5 (five) elementary schools, have field facilities in good condition at the school. Primary schools, while remote class schools, also have these facilities but are in poor condition. Therefore, field facilities in remote class schools at 5 (five) elementary schools require field improvement planning to support school educational facilities and infrastructure.

Table 5.1 Main School Fence

No	Name of Parent School	0 or 1	Condition
1	SD Negeri 198 Cinennung	1	Lightly damaged
2	SD Negeri 239 Tellongeng	1	Good
3	SD Inpres 7/83 Malimongeng	1	Moderately damaged
4	SD Inpres 12/79 Ulubalang	1	Moderately damaged
5	SD Inpres 3/77 Gaya Baru	1	Heavily damaged

Data Processed, 2024

Table 5.2 Remote Class School Fence

No	Remote Class School Name	0 or 1	Condition
1	SD Negeri 198 Cinennung	0	-
2	SD Negeri 239 Tellongeng	0	-
3	SD Inpres 7/83 Malimongeng	0	-
4	SD Inpres 12/79 Ulubalang	0	-
5	SD Inpres 3/77 Gaya Baru	0	-

Data Processed, 2024

DOI: https://doi.org/10.17509/jare.v6i2.70782
p- ISSN 2776-9909 e- ISSN 2580-1279

Based on the table above, analyzed using a dummy scale (1= Present and 0= Absent). The school fence infrastructure in 5 (five) leading schools with fences will remain in light, moderate, and heavy damage. Only 1 school has a school fence in good condition, namely SDN 239 Tellongeng. In this condition, the school expects special attention to be carried out to maintain school security. Meanwhile, far-class schools do not have school fence facilities; therefore, special attention is needed to provide school fences in these 5 (five) far-class schools.

Table 6.1 Number of Elementary School Teachers

No	Primary School Name	Main School		Remote Class School	
		Homeroom teacher	Subject teacher	Homeroom teacher	Subject teacher
1	SD Negeri 198 Cinennung	11	4	4	2
2	SD Negeri 239 Tellongeng	6	2	2	-
3	SD Inpres 7/83 Malimongeng	6	1	6	1
4	SD Inpres 12/79 Ulubalang	6	1	6	1
5	SD Inpres 3/77 Gaya Baru	6	2	2	-

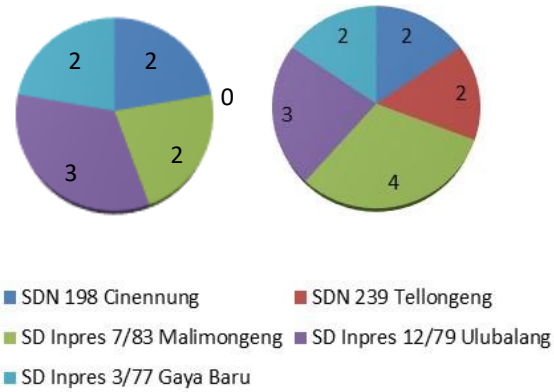
Data Processed, 2024

Diagram Pie 1 School Committee Participation in Existing Infrastructure

The Semantic Differential Scale is a scale used to measure attitudes, containing a series of bipolar (two-pole) characteristics. However, the form is not multiple choice or checklist, but is arranged in a continuum (Sugiyono, 2018). To determine the role of the school committee in existing infrastructure, look at the activeness scale: Active 7 6 5 4 3 2 1 Passive, where very positive answers are located on the right side of the line, and very negative answers are located on the left side of the line, or vice versa. In the pie diagram above, the results of respondents in 5 (five) primary schools are found at SDN 198 Cinennung with the number 7 means that the school committee's participation in the infrastructure at this school is very positive or in the active category, at SD 239 Tellongeng with the number 1 meaning participation The school's contribution to the infrastructure in this school is negative or in the passive category, SD Inpres 7/83 with the number 7 means the role of this school committee is active, SD Inpres 12/9 Ulubalang with the number 0 means there is no participation role for the committee in this school, and SD Inpres 3/77 New Style with the number 1 means that the school committee participation in this school is passive. Meanwhile, in 5 (five) remote class schools, it is known that the number for the fifth school is 1, meaning that the participation of the school committee in the five schools is passive.

DOI: https://doi.org/10.17509/jare.v6i2.70782
p- ISSN 2776-9909 e- ISSN 2580-1279

Diagram Pie 2 The Role Of Existing Infrastructure In The Teaching And Learning Process



Based on diagram 2: The role of existing infrastructure in the teaching and learning process as measured by the effectiveness ratio classification using a Likert scale (1= Not Effective, 2= Less Effective, 3= Moderately Effective, 4= Effective, and 5= Very Effective). Based on the results of questionnaires at 5 (five) leading schools: SD Negeri 198 Cinennung is in the less effective category, SD Negeri 239 Tellongeng is in the less effective category, SD Inpres 7/83 Malimongeng is in the practical category, SD Inpres 12/79 Ulubalang is in the quite effective category and SD Inpres 3/77 New Style is in the less effective category.

In remote class schools, SD Negeri 198 Cinennung is in the less effective category, SD Negeri 239 Tellongeng is in the ineffective category, SD Inpres 7/83 Malimoneng is in the category, SD Inpres 12/79 Ulubalang is in the moderately effective category and SD Inpres 3/77 Gaya New is included in the less effective category.

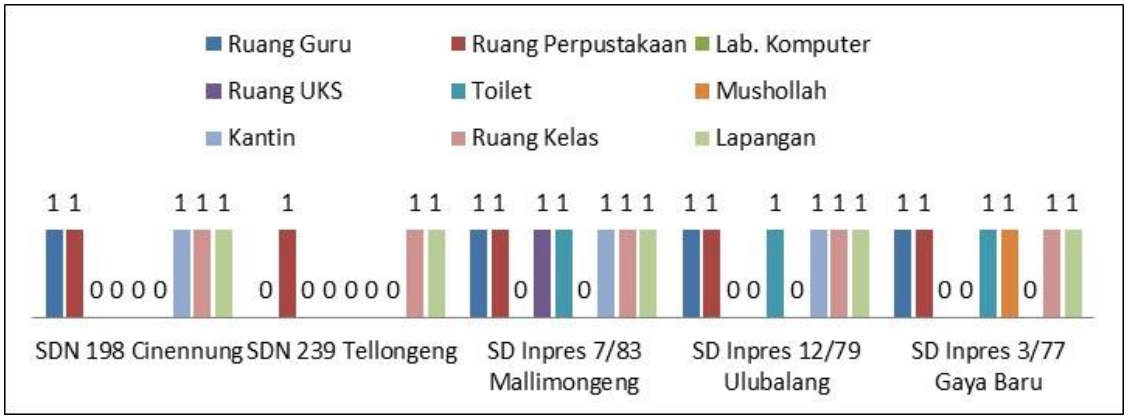


Figure 1.5 Results of Analysis of Main Primary School Infrastructure Availability
Data diolah, 2024

Based on Figure 1.5, using dummy scale analysis (1=Present, 0=Not Existant). So, the results of the study of the availability of central school infrastructure can be described as follows:

The primary school at SD Negeri 198 Cinennung has a total of 132 students with a total of 15 teaching staff (teachers). The furthest distance between students from the school is 4km with the support of 7 (seven) classroom infrastructure, a ceremonial field, a good sports practice field, and supporting buildings in the form of a teacher's room, library, and canteen. This school does not yet have supporting structures such as labs. Computers, UKS room, toilet, and prayer room; however, this school has available construction sites for these supporting buildings. By looking at active participation by the school committee in existing infrastructure, it is hoped that it will be able to increase the role of this infrastructure in a more effective student learning process.

DOI: https://doi.org/10.17509/jare.v6i2.70782
p- ISSN 2776-9909 e- ISSN 2580-1279

Then, the SD Negeri 239 Tellongeng school has a total of 87 students with a total of 8 teaching staff (teachers). The distance between students from the school is 2km, with the availability of 4 (four) classrooms, an excellent ceremonial field, a sports practice field, and supporting buildings in the form of a library room. This school does not have supporting buildings such as a lab teacher's room. Computers, UKS room, toilet, prayer room, and canteen, this school only has the availability of a supporting building construction site for the teacher's room. This is also due to passive participation by the school committee in existing infrastructure. So, the role of infrastructure in this school's teaching and learning process is in the less effective category.

SD Inpres 7/83 Malimoneng has a total of 137 students with 7 (seven) teaching staff (teachers), and the furthest distance between students from the school is 4km. With the availability of 6 (six) classrooms, an excellent ceremonial field, and a sports practice field, as well as supporting buildings in the form of a teacher's room, library room, UKS room, toilets, and canteen. This school does not yet have supporting buildings such as a computer lab and prayer room, but this school has available locations for building a computer lab and prayer room. Of the 5 (five) primary schools, this school has almost complete and adequate infrastructure, so the role of infrastructure in the teaching and learning process at this school is in the practical category.

SD Inpres 12/79 Ulubalang has a total of 87 students with a total of 7 (seven) teaching staff (teachers). The distance between students from the school is 4km, with 6 (six) classrooms, an excellent ceremonial field, a sports practice field, and supporting buildings in the form of a teacher's room, library room, toilets, and canteen. This school does not yet have supporting buildings such as a computer lab, UKS room, and prayer room, but this school has the availability of locations to construct supporting buildings that do not yet exist. So, the role of infrastructure in this school's teaching and learning process is categorized as quite effective.

Inpres 3/77 Gaya Baru Elementary School has 86 students with 8 (eight) teaching staff (teachers), and the furthest distance between students from the school is 8km. With the availability of 6 (six) classrooms, an excellent ceremonial field, and a sports practice field, as well as supporting buildings in the form of a teacher's room, library room, toilets, and prayer room. This school does not yet have supporting buildings such as a computer lab, UKS room and canteen, but this school has available locations for building a computer lab and prayer room. So, the role of infrastructure in this school's teaching and learning process is in the less effective category.

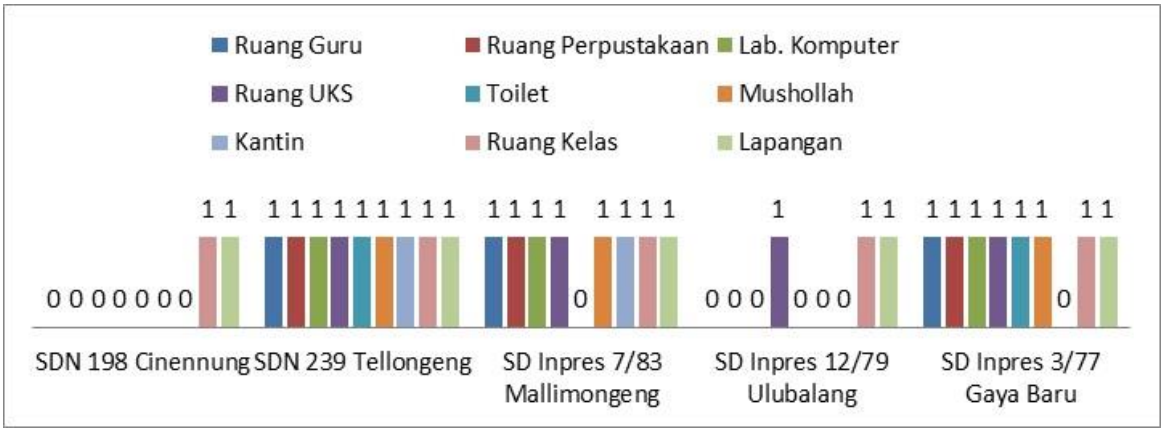


Figure 1.6 Results of Analysis of the Availability of Primary School Infrastructure for Remote Classes
Data processed, 2024

DOI: https://doi.org/10.17509/jare.v6i2.70782
p- ISSN 2776-9909 e- ISSN 2580-1279

Based on Figure 1.6, using dummy scale analysis (1=Present, 0=Not Existant). So, the results of the study of infrastructure availability in remote classroom schools can be described as follows:

The primary school at SD Negeri 198 Cinennung has a total of 77 students with a total of 6 (six) teaching staff (teachers). It has the furthest distance between students from the school of 1km, with the support of 6 (six) classroom infrastructure. The ceremonial grounds and sports practice fields are not reasonable. There are supporting buildings in the form of a teacher's room, library, computer lab, UKS room, toilet, prayer room, and canteen. However, this school has available construction sites for supporting buildings, such as computer labs, restrooms, UKS rooms, and prayer rooms. So, the role of infrastructure in this school's teaching and learning process is in the less effective category.

Then, the SD Negeri 239 Tellongeng school has a total of 10 students with a total of 2 (two) teaching staff (teachers), and the furthest distance between students from the school is 2km. With the availability of 3 (three) classrooms, the ceremonial field and sports practice field are not good, and there is no support for supporting buildings in the form of a teacher's room, library room, computer lab, toilet, prayer room, and canteen. However, this school has an available construction site for these supporting buildings. This is also due to passive participation by the school committee in existing infrastructure. So, the role of infrastructure in this school's teaching and learning process is in the less effective category.

SD Inpres 7/83 Malimoneng has 100 students with 7 (seven) teaching staff (teachers), and the furthest distance between students from the school is 2km. With the availability of 6 (six) classrooms, the ceremonial grounds and sports practice fields are not good and support for supporting buildings in the form of toilets but do not have supporting structures such as teachers' rooms, library rooms, computer labs, restrooms, prayer rooms, and canteens. However, this school has an available construction site for these supporting buildings. This is also due to passive participation by the school committee in existing infrastructure. So, the role of infrastructure in this school's teaching and learning process is in the less effective category.

SD Inpres 12/79 Ulubalang has a total of 105 students with a total of 7 (seven) teaching staff (teachers), and the furthest distance between students from the school is 1km. With the availability of 6 (six) classrooms, the ceremonial grounds and sports practice fields are not good and support for supporting buildings in the form of toilets but do not have supporting structures such as teachers' rooms, library rooms, computer labs, restrooms, prayer rooms, and canteens. However, this school has an available construction site for these supporting buildings. This is also due to passive participation by the school committee in existing infrastructure. So, the role of infrastructure in this school's teaching and learning process is in the less effective category.

Inpres 3/77 Gaya Baru Elementary School has 94 students with 2 (two) teaching staff (teachers), and the furthest distance between students from the school is 8km. With the availability of 3 (three) classrooms, the ceremonial field and sports practice field are not good, and there is no support for supporting buildings in the form of a teacher's room, library room, computer lab, toilet, prayer room, and canteen. However, this school has an available construction site for these supporting buildings. This is also due to passive participation by the school committee in existing infrastructure. So, the role of infrastructure in this school's teaching and learning process is in the less effective category.

DOI: https://doi.org/10.17509/jare.v6i2.70782
p- ISSN 2776-9909 e- ISSN 2580-1279

Documentation Picture

School name	Photo of Main School	Remote Class School Photo
SD Negeri 198 Cinennung		
SD Negeri 239 Tellongeng		
SD Inpres 7/83 Malimongeng		
SD Inpres 12/79 Ulubalang		
SD Inpres 3/77 Gaya Baru		

DOI: https://doi.org/10.17509/jare.v6i2.70782
p- ISSN 2776-9909 e- ISSN 2580-1279

4. CONCLUSION

From the results of the analysis and discussion above, it can be concluded that:

a) The availability of educational infrastructure in 5 (five) elementary schools, both primary schools and remote class schools, can be seen in different types of infrastructure. The availability of this infrastructure, as a whole, this school has not been able to meet the needs of educational facilities in the learning and teaching process. So, the role of infrastructure in several schools' teaching and learning processes falls into the less effective or ineffective category. Therefore, educational facilities and infrastructure in elementary schools, both primary schools and remote class schools, require further development planning to provide adequate educational services. So, it is hoped that special attention will be paid by the parties involved, both policymakers and policy implementers, to pay attention to the findings that researchers have made.
b) Analysis of the affordability of school infrastructure based on optimal distance shows that based on spatial modeling using ArcMap it is known that the availability of infrastructure in the school is affordable.

ACKNOWLEDGMENT

Collaboration is needed from various parties, from academic practitioners to local school students, to meet the availability of facilities and infrastructure in 5 (five) elementary schools to support the teaching and learning process both from the primary school and remote class schools.

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DOI: https://doi.org/10.17509/jare.v6i2.70782
p- ISSN 2776-9909 e- ISSN 2580-1279