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Evaluation of The Computer Laboratory During The Covid-19 Pandemic at SMK Negeri 7 Baleendah

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Abstract - This study aims to obtain a general description of the condition and fulfillment of the facilities and infrastructure of the computer laboratory for the Modeling and Building Information Design (DPIB) program at SMK Negeri 7 Baleendah based on the standards of the Minister of Education and Culture No. 34 of 2018. The purpose of this study is also to assess the compliance of health protocol facilities at SMK Negeri 7 Baleendah and to obtain a computer laboratory layout plan that is in accordance with health protocol rules during the Covid-19 pandemic. This research is an evaluation research. Data collection techniques in this study by means of observation and documentation. The results of this study indicate the level of achievement of facilities and infrastructure at SMK Negeri 7 Baleendah based on the standards of Permendikbud No. 34 of 2018 reached 83% in computer laboratory room infrastructure, the achievement was included in the very feasible criteria and in the facilities it reached 72.91% including the feasible criteria. The results of the evaluation on health protocol facilities based on existing standards, the availability of disinfectant liquid has not been met, the sink near the computer laboratory room is not available for hand washing soap, and the layout of the computer laboratory room has not been given a distance of 1.5 meters. Design recommendations for the DPIB program computer laboratory room at SMK Negeri 7 Baleendah by changing the type of opening, the position of the sink placed next to the entrance to the computer laboratory room and the layout of the room spaced 1.5 meters apart from each seat. The results of the evaluation on health protocol facilities based on existing standards, the availability of disinfectant liquid has not been met, the sink near the computer laboratory room is not available for hand washing soap, and the layout of the computer laboratory room has not been given a distance of 1.5 meters. Design recommendations for the DPIB program computer laboratory room at SMK Negeri 7 Baleendah by changing the type of opening, the position of the sink placed next to the entrance to the computer laboratory room and the layout of the room spaced 1.5 meters apart from each seat. The results of the evaluation on health protocol facilities based on existing standards, the availability of disinfectant liquid has not been met, the sink near the computer laboratory room is not available for hand washing soap, and the layout of the computer laboratory room has not been given a distance of 1.5 meters. Design recommendations for the DPIB program computer laboratory room at SMK Negeri 7 Baleendah by changing the type of opening, the position of the sink placed next to the entrance to the computer laboratory room and the layout of the room spaced 1.5 meters apart from each seat.

Keywords - Computer Laboratory, Facilities and Infrastructure, Health protocol, Standard of Computer Laboratory Facilities and Infrastructure for SMK.

Introduction

Facilities and infrastructure is one way to achieve the improvement of an education. As stated in Law No. 20 of 2003, education is a planned effort in creating an atmosphere and learning process so that students can develop actively to have religious strength, self-control, wisdom, intelligence, noble character, and the necessary skills. for himself, society, and nation and state. Vocational High School (SMK) is a formal education at the secondary education level that conducts vocational programs to prepare graduates to be able to work in certain fields. The main objective of vocational education is to grow a workforce that can meet the needs of the labor market, and is able to utilize and be oriented by the growth of science,(Law No.20 of 2003). In addition to providing manpower, SMK also prepares graduates to become entrepreneurs and can continue their education at a higher level(Susanto & Sudira, 2016).

SMK Negeri 7 Baleendah is one of the vocational schools that conducts a learning process so that its graduates are educated, trained, and have an attitude that can adapt to industrial developments, and can compete in meeting future workforce needs, this is stated in the vision and mission of SMK State 7 Baleendah. In order to educate graduates who excel, are efficient and able to compete, it is necessary to be equipped with the provision of facilities and infrastructure that are in accordance with the needs and can affect the teaching and learning process of students. Given the importance of facilities and infrastructure, it is necessary to identify the feasibility of facilities and infrastructure, and one of them is a computer laboratory room on the competence of Building Modeling and Information Design (DPIB) skills at SMKN 7 Baleendah.

The Ministry of Education, Culture, Research and Technology (Kemendikbudristek) is currently directing the implementation of Limited Face-to-Face Learning (PTMT) during the Covid-19 pandemic. The concept of PTMT is setting the number of students in each class so that the number is less than the normal number, which is a maximum of 50% of the number of students in one classroom. This is done so that teaching and learning activities can be carried out smoothly but still prioritize in terms of prudence, health, and safety of all school members.

In practical subjects at SMK Negeri 7 Baleendah the teaching and learning activities have been carried out offline/face to face by applying limited face-to-face learning. One of the rooms used for learning activities is a computer laboratory room. The fulfillment of facilities and infrastructure as well as the condition of the computer laboratory for the DPIB SMKN 7 Baleendah program during the Covid-19 pandemic needs to be considered. The preparation of health protocol facilities, such as a place to wash hands with soap, the provision of hand sanitizers and seating arrangements is one of the things that is the main key so that the implementation of learning can be carried out smoothly and still avoid the transmission of the corona virus. However, the provision of health protocol facilities at SMK Negeri 7 Baleendah is currently still limited and the arrangement of the learning space has not been changed(Permana et al., 2019). The air quality in the computer laboratory room is also not good because the openings and ventilation of the room are not functioning optimally. Because of this background, the researcher intends to carry out a study entitled "Evaluation of Computer Laboratory Space During the Covid-19 Pandemic Period at SMK Negeri 7 Baleendah".

Methods

Research Methods

This research was conducted at SMK Negeri 7 Baleendah. The research is focused on the computer laboratory room for the Building Modeling and Information Design expertise program.The research was conducted using evaluation research methods. By using this research method to look for truth and factual information by comparing the real condition of room comfort, completeness of health protocol facilities, and computer laboratory facilities and infrastructure at SMK Negeri 7 Baleendah with the standards in Permendikbud No. 34 of 2018 concerning Standards for Vocational High School Facilities and Infrastructure, Guidelines for the Implementation of Learning in the Covid-19 Pandemic Period, and Standards for Room Comfort based on SNI. As for the steps-The steps taken by researchers in evaluation research are (1) The reason for conducting evaluation research on computer laboratories is to determine the suitability of existing facilities and infrastructure in the computer laboratory room with existing standards. As well as the availability of health protocol facilities at SMK Negeri 7 Baleendah. (2)

In this study, what will be evaluated are computer laboratory facilities and infrastructure and health protocol facilities at SMK Negeri 7 Baleendah. (3) Collecting data or information needed to support evaluation. Data or information collected by means of direct observation and measurement to the research location. (4) The report generated from this research is in the form of conclusions from the results of observations and measurements. And from the results of the evaluation, recommendations are given.

Research variable

In this study using a single variable or variable which does not discuss an influence or correlation. This research variable assesses the feasibility of the room area, room furniture, educational equipment and educational media in the computer laboratory room at the DPIB program at SMK Negeri 7 Baleendah. As well as the comfort of room temperature, lighting, air conditioning, and the availability of health protocol facilities.

Data collection technique

Data collection techniques are methods used to collect data that support the achievement of research objectives. In this study the data collection techniques used are:

1. Documentation

Documents used in this research include:

a. Picture of the work space of the DPIB program at SMK Negeri 7 Baleendah
b. Photos of practice room documentation
c. Lamp. Permendikbud No. 34 of 2018 regarding the standard of facilities and infrastructure
d. Guidebook for the Implementation of Learning for the Year 2020/2021 during the Covid19 Pandemic
e. Indonesian thermal comfort standard

2. Observation

Observation is a direct observation to the location to obtain factual data related to research. Data collected using tools so that the object of research can be examined clearly (Sugiyono, 2012). These observations and measurements were carried out to: (1) determine the condition of the room, measure of temperature, lighting and air velocity in the practice room of the DPIB program of SMK Negeri 7 Baleendah, (2) determine the condition of the facilities and infrastructure of the practice room. After that, it is compared with data from observations with regulatory standards and literature studies. In this study, researchers used a luxmeter to measure room lighting, a thermometer to measure room temperature, and an anemometer to measure air velocity.

Data analysis technique

The results of observations and measurements in this study will be analyzed using descriptive statistical analysis techniques, which are statistics used to analyze data by describing the data that has been collected as is without intending to make general conclusions or generalizations. In this data analysis using a percentage scale with the following formula:

$$\text{Pencapaian} = \frac{skor\ riil}{skor\ ideal}\ x\ 100\%$$

The achievement criteria are as follows:

Very Worthy	= 76% - 100%	No Kite	= 26% - 50%
Worthy	= 51% - 75%	Very Inappropriate	= 0% - 25%

Results and Discussion

1.1 Computer Laboratory Room Analysis

The computer laboratory room for the DPIB program at SMK Negeri 7 Baleendah has a total room area of 96m², with a length of 12 meters and a width of 8 meters and a height of approximately 4 meters. This room faces Northwest. The type of door used in the computer laboratory room uses a double swing door. The window used is a top hung casement type window that opens upwards. This window is combined with a stationary window that cannot be opened or closed and is placed between the top hung

casement windows. In the computer laboratory room, inlet and outlet rules have been applied, but different elevation rules have not been applied. The elevation in the computer laboratory room is still parallel.

Figure 1. Pieces of Computer Laboratory Room

Users of the computer laboratory room are teachers and students. The number of students in one class is 31 students. Due to the Covid-19 pandemic, limited face-to-face learning (PTMT) is applied so that the number of students who enter the class during the Covid-19 pandemic is only 50% of the total number of classes, which is 15-16 students. Activities carried out by teachers and students before entering the room must wash their hands or use a hand sanitizer first because learning activities are carried out during the Covid-19 pandemic. On the 2nd floor right next to the computer laboratory room there is a sink to wash hands before entering the classroom. However, the placement of the sink is still not optimal, apart from being far from the entrance to the computer laboratory room,

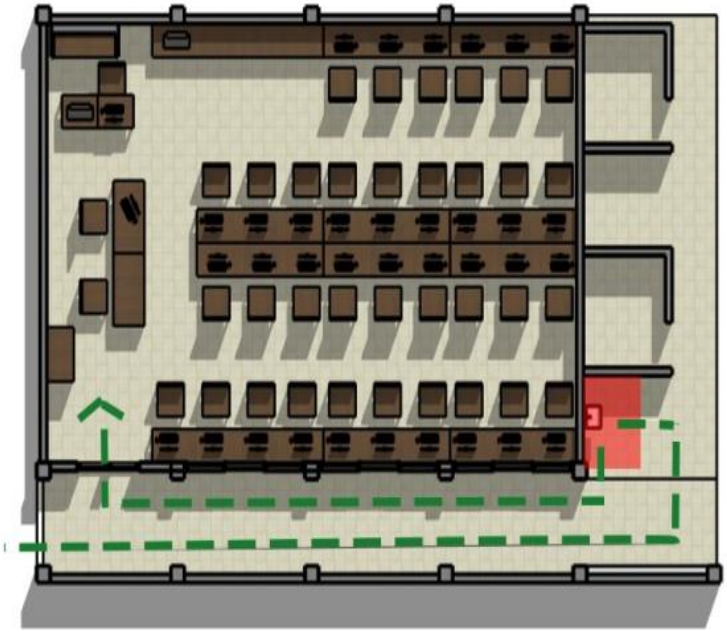


Figure 2. Top View Sink Position and Circulation Line

When learning begins, the teacher goes around the class several times to see the results of the students' work. Circulation when the teacher was going around to see student work when he met the end of the road made the teacher have to go back to see the work of students who were on the other side of the table. Then the computer desk in the computer laboratory room has not been spaced according to

health protocols and is still face to face. Layouts that make students face to face are not appropriate during this Covid-19 pandemic

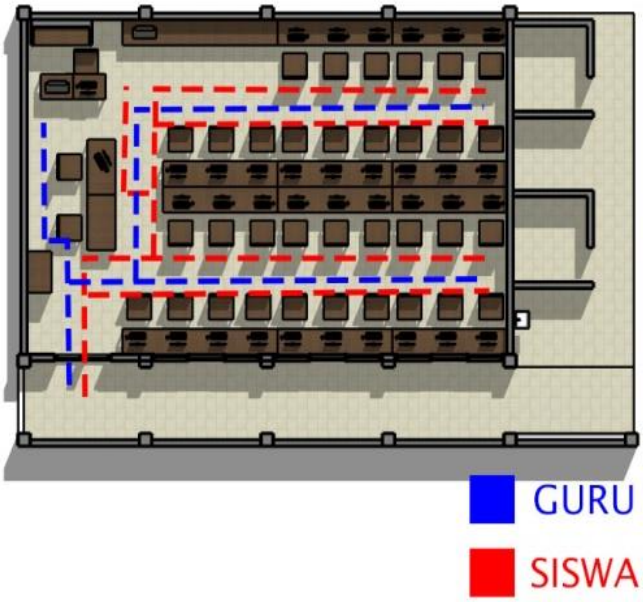


Figure 3. Teacher and Student Activity Rate

1.2 Research Result

The comfort conditions measured in this study were measuring thermal comfort which included measurements of temperature and wind speed and visually which included room lighting in the computer laboratory of the DPIB program at SMK Negeri 7 Baleendah.

Figure 4. Position of Measuring Point

Measurements are made by dividing into several points of space. The research and measurement process was also carried out at 07.00 WIB, 10.00 WIB, and 15.00 WIB.

a. Results and Discussion of Wind Speed Measurement

The instrument used to measure wind speed is an anemometer. According to MENKES No. 261/MENKES/SK/11/1998, a healthy room wind ventilation rate is 0.15 - 0.25 m/s. Based on the results of measurements in the computer laboratory room, the DPIB program at SMK Negeri 7 Baleendah has an average wind speed of 0.043 m/s. To maintain comfortable conditions, the air speed in the computer laboratory room has not met the standard. However, from the data obtained, according to the opinion of the students, the wind speed conditions in the computer laboratory room when the window was opened were quite tight and when the window was closed the condition of the room was hot.

Table 1 Results of Wind Speed Measurement

Hasil Pengukuran				Standar Kecepatan Udara Dalam Ruang (m/s)
Waktu Pengukuran	Posisi Titik Ukur Angin			
	Meja 1	Meja 2	Meja 3	
07.00	0.06 m/s	0.10 m/s	0.14 m/s	0.15 - 0.25 m/s
10.00	0 m/s	0 m/s	0.09 m/s	
15.00	0 m/s	0 m/s	0 m/s	
Rata-Rata	0.02 m/s	0.03 m/s	0.08 m/s	
Rata-Rata Total	0.043 m/s			

The measurement results are influenced by the openings in the computer laboratory room that have not applied elevation to the inlet and outlet. The size of the openings in the computer laboratory room is also not appropriate. In building physics book 1, there is a minimum area of an air inlet (inlet), which is based on the area of the facade wall of 40%-80% of the wall area and based on the area of the room by 20% of the room area. In the computer laboratory room for the DPIB program at SMK Negeri 7 Baleendah, the inlet opening area is only 13.8%. The standard hourly air change requirement (ACH) in the laboratory room is 6. Based on the results of the calculation of the air change that occurs in the computer laboratory room, the DPIB program of SMK Negeri 7 Baleendah is 2.6 which does not meet the standard.

b. Results and Discussion of Light Measurement

The measuring instrument is placed at the main measuring point, namely the measuring point with a position right in the middle. This measuring point represents all points of measurement of the strength of illumination in the work area. The measuring instrument used is the lux meter.

Table 2 Light Measurement Results

Hasil Pengukuran				Standar Pencahayaan
Waktu Pengukuran	Posisi Titik Ukur Cahaya			
	Meja 1	Meja 2	Meja 3	
07.00	60	132	155	250
10.00	224	458	447	
15.00	246	253	216	
Rata-Rata	176,67	281	272,67	
Rata-Rata Total	243,44			

From the measurement results obtained in the computer laboratory room, the average natural lighting is 234.44lux. Based on the lighting standard in Indonesia, which is 200lux. The amount of lighting in the DPIB program computer laboratory room at SMK Negeri 7 Baleendah has met the minimum requirements according to existing standards. By utilizing natural lighting in the computer laboratory room, the DPIB SMK Negeri 7 Baleendah program can save electrical energy for artificial lighting. In building physics book 1, the minimum area for light openings is 20% of the facade area (window to wall ratio/WWR). The average area of light openings in the DPIB program computer laboratory room at SMK Negeri 7 Baleendah based on the calculations in the appendix is 27.5%.

c. Results and Discussion of Temperature Measurement

The measuring instrument used to measure room temperature is a thermometer. From the results of the data obtained in the opinion of students, it was stated that the room temperature in the morning and evening was quite cool, while in the afternoon it was hot.

Table 3 Temperature Measurement Results

Waktu Pengukuran	Hasil Pengukuran	Standar Kenyamanan Suhu Ruang
07.00	24℃	18℃ - 26℃
10.00	27,2℃	
15.00	29,4℃	
Rata-Rata	26,7℃	

Based on the results of temperature measurements, which can be seen in the table above, the computer laboratory room for the DPIB program at SMK Negeri 7 Baleendah has an average temperature of 26.7ºC. From these results, the temperature in the computer laboratory room does not meet the standard room temperature based on MENKES No. 261/MENKES/SK/11/1998, which is 18ºC - 26ºC. Air velocity is very influential on room temperature. The higher the velocity of the air that is spread over the space, the more air that enters and causes the temperature in a room to be low. Because the air velocity in the computer laboratory room does not meet the standard, this causes the room temperature in the computer laboratory to become hotter.

d. Feasibility Level of DPIB Program Computer Laboratory Facilities and Infrastructure

From the research results obtained, it will be converted into a scale of 1-4 which is equated with the minimum standard of facilities and infrastructure based on Permendikbud N0. 34 of 2018. After that the data is processed into a percentage scale which will result in conclusions about the level of achievement. The following are the results of observations regarding the infrastructure in the computer laboratory room of the DPIB program at SMK Negeri 7 Baleendah.

Table 4 Results of Observation of Computer Laboratory Room Infrastructure

No.	Jenis	Hasil Observasi	Standar	Skor Ideal	Skor Riil
1.	Kapasitas Peserta didik	31 orang	36 orang	4	4
2.	Luas Laboratorium Komputer	96 m²	Luas min. 150 m² meliputi ruang praktik desain masinal dan komputer, ruang instruktur dan simpan	4	3
3.	Rasio Luas Ruang per Peserta didik	3 m²	3 m²/peserta didik	4	3
Total Skor				12	10
Persentase				83%	

Based on the percentage of the feasibility of the DPIB program computer laboratory room infrastructure at SMK Negeri 7 Baleendah, the results achieved were 83%, so the level of achievement was included in the very feasible criteria. The following is data from observations regarding the facilities in the DPIB program computer laboratory at SMK Negeri 7 Baleendah:

Table 5 Observation Results of Computer Laboratory Room Facilities

Jenis	Standar	Hasil Observasi	Kesesuaian		Skor Ideal	Skor Riil
			Sesuai	Tidak		
a. Kursi peserta didik	1 buah/peserta didik	31 buah	√		4	4
b. Meja peserta didik	1 buah/peserta didik	31 buah	√		4	4
c. Kursi guru	1 buah/guru	1 buah	√		4	4
d. Meja guru	1 buah/guru	1 buah	√		4	4
e. Komputer	Minimal sejumlah peserta didik	31 buah	√		4	3
f. Koneksi Intranet dan internet	1 set/sekolah	-	-	-	4	1
g. Kotak kontak/ stopkontak	6 buah/ruang	10 buah	√	-	4	4
h. Alat kebersihan	Minimum 1 set/ruang	-	-	-	4	1
i. Alat-alat K3	Minimum 1 set/ruang	-	-	-	4	1
j. Jam dinding	1 buah/ruang	-	-	-	4	1
k. Papan Tulis	1 buah/ruang	1 buah	√		4	4
l. Proyektor	1 buah/ruang	1 buah	√		4	4
Total Skor					48	35
Persentase					72,91%	

Based on the percentage of the feasibility of the DPIB program computer laboratory facilities at SMK Negeri 7 Baleendah, the results achieved are 72.91%, so the level of achievement is included in the appropriate criteria. The results of the data in the table there are still some facilities that are not yet available in the computer laboratory room, such as wall clocks, cleaning tools, K3 tools and internet connections. The internet connection in the computer laboratory room was cut off because at the beginning of the pandemic the school was closed and the implementation of online learning at home. So when starting face-to-face learning, the internet connection is not installed yet.

e. Level of Availability of Health Protocol Facilities

Face-to-face teaching and learning activities are limited during the Covid-19 pandemic, it is mandatory to comply with the health protocol rules that have been set by the government. SMK Negeri 7 Baleendah on practical subjects has done direct learning. The following is data from observations of the availability of health protocol facilities at SMK Negeri 7 Baleendah:

1. Availability of sanitation and hygiene facilities
   a. Clean toilet
      There is a toilet next to the computer laboratory room, but the cleanliness of the toilet is still not clean because the toilet floor and toilet walls are quite dirty.
   b. Handwashing facility with soap (CTPS) with running water using soap which is near the computer laboratory room, there is no soap available for washing hands. The hand sanitizer has been fulfilled because in all rooms there are already hand sanitizers.
   c. Disinfectant
      In the guidebook for the implementation of learning during the Covid-19 pandemic, it is stated that before and after learning, disinfectant is sprayed on the infrastructure and environment of the education unit. However, the disinfectant liquid at SMK Negeri 7 Baleendah is not available.
2. Readiness to apply the mandatory mask area
   All school residents at SMK Negeri 7 Baleendah are obedient in using masks. During learning activities, students continue to wear masks until the learning activities are completed.
3. Has a thermogun (shoot body temperature gauge)
   The body temperature gauge (thermogun) at SMK Negeri 7 Baleendah does not work. Before entering the room, students are not measured their body temperature first because the thermogun is not available.
4. Dividing study groups and setting lesson plans for one class.
   To avoid crowds and reduce the spread of Covid-19, each class that conducts offline learning in the computer laboratory room of the DPIB program at SMK Negeri 7 Baleendah has been divided into study groups. In one class divided into 8 groups. For groups 1 to 4 hours of lessons starting at 07.00 to 11.00, groups of 5 to 8 hours of lessons starting at 12.00 - 16.00. So that even though teaching and learning activities are carried out offline in the laboratory room, there are still no crowds.
5. Make arrangements in the layout of the study room by taking into account:
   a. The distance between the seats is at least 1.5 meters and a distance sign is given
      During teaching and learning activities, the layout of the computer laboratory room has not changed the seating position. The student's sitting position has not yet been given a sign of keeping a distance.
   b. Sufficient open space and air ducts to ensure good air circulation.
      The air ventilation in the computer laboratory room has not been sufficiently fulfilled in the opening space. The movement of air in the room cannot be felt, so that during the day and evening the computer laboratory room is quite hot.

1.3 Design Recommendations

a. Room Layout

In the recommendation for the design of the computer laboratory room layout for the DPIB SMK Negeri 7 Baleendah program, to reduce the rate of the spread of Covid-19, there was a 50% reduction from 31 seats to 16 and the arrangement between seats with a distance of 1.5 meters according to health protocol standards. . In addition, the seating position of students is arranged so that they are not face to face with other students. The previously deadlocked teacher circulation pattern, which can be seen in Figure 3.1, has been implemented in a circular circulation so that it becomes more dynamic and

teachers can immediately go around to check on student work. With the adjustments that have been arranged, students can take turns in carrying out practice in the computer lab with a predetermined schedule, and every time students finish practicing, the seating area,

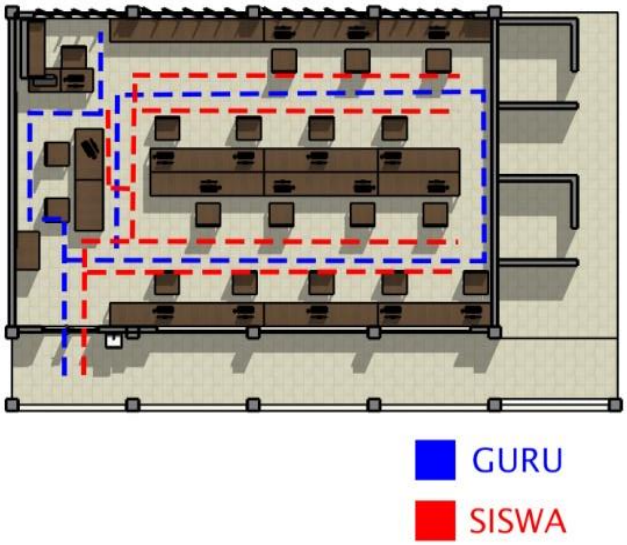


Figure 5. Recommendations for Layout Design for the DPIB Program Computer Laboratory Room at SMK Negeri 7 Baleendah

The positioning of the computer equipment in the position facing the window at the inlet and outlet will not be dazzled because outside there is a roof that functions as a shade, as well as the choice of color and type of glass in the recommended design according to the needs in the field, namely by selecting clear indofloot glass which has a gray color, so that can reduce the effect of glare. The choice of laboratory room paint is also matte gray, with colors that tend not to reflect light, coupled with a rough surface that further reduces the glare effect of excess natural light.

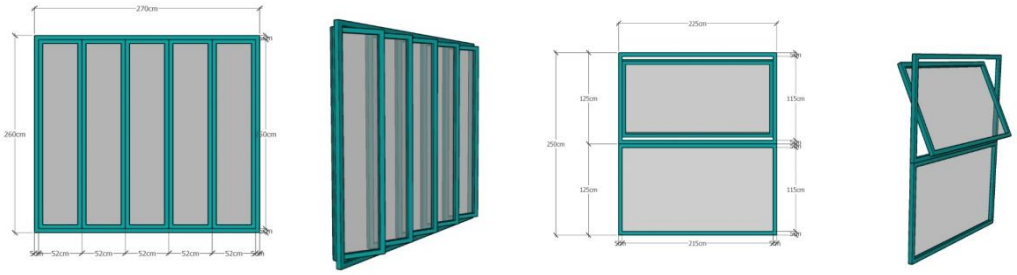
b. Place the Sink

The recommendation for placing a hand washing place/sink is next to the entrance as shown in Figure 3.2. This is done so that in addition to making it easier for space users to reach the sink, it is also expected to reduce the queues that pass each other. So it can reduce the risk of transmission.

Figure 6. Sink Laying Design Recommendations

c. Computer Laboratory Room Opening

From the results of wind speed measurements that the opening conditions in the DPIB program computer laboratory at SMK Negeri 7 Baleendah still do not meet the needs. Design recommendations for computer laboratory room openings were adjusted to the needs, inlet and outlet openings were changed. The inlet opening type uses a side hung cassement and the outlet with a horizontal pivoted type. The application of openings in the laboratory of SMK 7 Baleendah is 50%, in addition to the selection of the Cassement Side Hung opening type, the effectiveness of entering air is 90%, so that according to the formula and calculation, the Air Flow that occurs is 736.2 m3/second and the ACH that occurs is 155, This number can be adjusted by setting how many openings will be opened or closed. The selection of the type of air outlet opening in the form of Horizonta Pivoted is based on needs,



Inlet *Outlet*

Figure 3. Recommended Design of Cassement Side Hung Type Inlet and Horizontal Pivoted Type Outlet

The recommended use of Inlet and Outlet is expected to turn the air circulation into optimal. Because the air enters from the inlet which has a lower elevation than the outlet and there is air turbulence which can be seen in Figure 4.25, the air change can be more optimal.

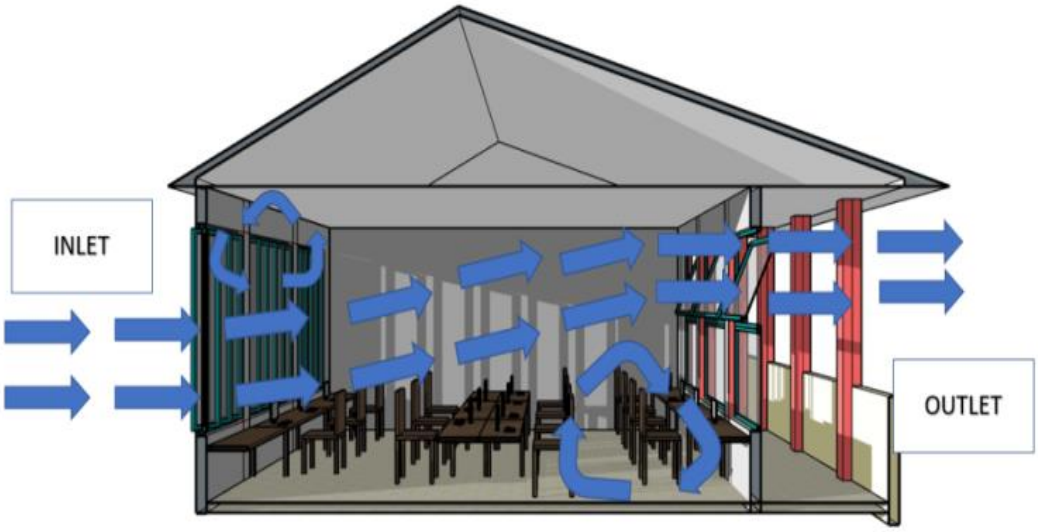


Figure 3. Airflow Section Perspective in Computer Laboratory

If the air flow is smooth, Indoor Air Quality will have good quality, this will affect the productivity of room users and is expected to minimize the spread of Covid-19 in the computer laboratory room and face-to-face learning activities (offline) will feel more secure and comfortable.

Conclusion

Conclusion

Based on the results of the research data and discussions that have been presented, the following conclusions can be drawn:

1. The DPIB program computer laboratory room infrastructure at SMK Negeri 7 Baleendah has an area of 96 m² with an area ratio per student of 3 m², and the capacity to accommodate 31 students. The facilities in the computer laboratory room have 32 computer desks in good condition, 32 student chairs in good condition, 1 teacher desk in good condition, and 1 teacher chair in good condition. The health protocol facilities at SMK Negeri 7 Baleendah have hand sanitizer, are ready to apply the mandatory mask area, and study groups have been divided.
2. Based on the minimum standards of Permendikbud No. 34 of 2018 the facilities and infrastructure of the DPIB program computer laboratory at SMK Negeri 7 Baleendah have met the minimum standard with a percentage of 72.91% (adequate) and 83% (very feasible) infrastructure.
3. The results of the evaluation on health protocol facilities based on the standards contained in the instruction manual during the COVID-19 pandemic, the availability of disinfectant liquid has not been met, the sink near the computer laboratory room is not available for hand washing soap, and the layout of the computer laboratory room has not been changed.
4. Design recommendations in the computer laboratory room for each seat are given a minimum distance of 1.5 meters and the student seating position is also not face to face with other students. Circulation in the computer laboratory room applies circular circulation. Place the washbasin/sink next to the entrance. This is done so that in addition to making it easier for space users to reach the sink, it is also expected to reduce the queues that pass each other. The inlet and outlet opening types are replaced with the inlet type using a side hung casement and the outlet with a horizontal pivoted type. The use of recommended Inlets and Outlets with this type is expected to be optimal for changing air circulation.

Suggestion

1. For SMKN 7 Baleendah
   a. It needs to be further improved in checking the availability of health protocol facilities so that the facilities that do not yet exist can be fulfilled so that the prevention of the spread of the virus can be maximized.
   b. In the computer laboratory room facilities and infrastructure that have not been fulfilled, it also needs to be improved, by calculating the need for air and light according to the standards of building physics books, then thermal comfort can be achieved optimally, which greatly affects air quality, so as to increase the productivity and health of room users. .
   c. It is hoped that there will be regular maintenance on the facilities and infrastructure of the computer laboratory room, so that the durability of the facilities and infrastructure is always maintained. In addition, during the Covid-19 pandemic, it is necessary to periodically spray disinfectants, to reduce the risk of spreading and transmitting the virus.
   d. Of the total 31 computers in the laboratory room during the Covid-19 pandemic, the capacity has been reduced by 50% so that it can only accommodate 16 students. This is based on adjustments that are expected to reduce the risk of transmission and spread of the virus.
2. For Further Researchers

There are limitations faced by researchers, because this research was carried out during the covid-19 pandemic, so that at the time of taking measurement data it could not be carried out optimally because there were limitations in borrowing measuring instruments and the function of measuring instruments was not good, and there were restrictions on community activities. PPKM) which makes schools closed and cannot be visited. So that the results of the data obtained by researchers are not optimal. For this reason, it is hoped that in further research this research needs to be developed again by exploring thermal comfort conditions, such as air humidity, thermal radiation, and activity levels for good room conditions during the Covid-19 pandemic.

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