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Standard Classroom Capacity: Effective of Learning Activities in Malaysian Primary School Buildings

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ABSTRACT

The teaching and learning process needs to be carried out formally in the classroom, which is the main learning space in the school system. This should be implemented effectively to achieve a level of comfort for students. The capacity of a classroom can affect the way the teacher teaches and the level of student understanding. Classroom capacity needs to be emphasized to encourage and maintain student motivation for continuous learning, especially at the primary school level. This study aims to analyse the classroom capacity in order to improve student comfort in the primary school building and thus enhance the effectiveness of learning. The qualitative method used for conducting the study in this research was to measure the predicted findings. The present area of 15 randomly chosen classrooms were measured (Width x length) using a qualitative method that also included semi-structured interviews. The findings of the study showed that 50 % of classroom capacity in primary school buildings comply with existing guidelines, established design rules and classroom area requirements. The current classroom size is 2.25 m^2 per student with a significant increase in student satisfaction during the teaching and learning process. However, the findings from the semi-structured interviews highlighted interesting points in relation to the appropriateness of classroom capacity. Teachers think that classroom capacity affects students' level of comfort. Respondents agreed that the capacity of a classroom is effective with a maximum of 26 students. This research paper emphasizes the importance of compliance with classroom physical performance standards in primary school buildings to increase the comfort level of students in the classroom. The research presented here provided current information, knowledge and findings regarding actual classroom capacity in primary school buildings that could have an impact on students' comfort. During the formative learning phase, very little meaningful attention was paid to the areas where students spend the majority of their weekdays. As a result, this can support experts in the fields of school building management, building facilities and other related fields in determining and implementing the right classroom capacity in schools generally.

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1. Introduction

Primary school education takes 6 years. Children usually start primary school education when they are 7 years' old. Primary school education is a continuation of preschool education. Apart from reading and counting, they will be exposed to other subjects. The education system not only provides formal schooling to students but also has a great impact on the overall learning of students and encourages students to gain valuable knowledge [1]. Primary education in Malaysia is an education programme offered to children starting at the age of seven years, and levels continue until they reach the age of 12 [2]. This is the first formal education that children in Malaysia will go through, although some of them have achieved success in pre-school education before that. Primary education is a compulsory education that must be given to children in Malaysia when they reach the required age [3]. Child registration process: Children's primary education begins when they reach the age of six on the first day of January.

School buildings are one of the main and most important facilities for students because they are the backbone of the future of a country. Schools should have a positive learning environment, especially in the classroom, as a method to influence communication paths and better achievement at their level [4]. The right level of comfort and efficiency in educational buildings may promote the productivity and focus of users during the teaching and learning process [5]. A conducive classroom may be able to provide suitable conditions for students to learn because the classroom environment as a whole can effect student learning [6]. According to Shernoff [7], classroom physicality can affect student achievement and improve student performance.

The purpose of this study was to determine the current classroom area and capacity whether it complies with the Building Design Guidelines and Regulations (2015). This study was to ascertain the problem of overcrowding in the classroom which contributes to the negative impact on the teaching staff which will cause them to be unable to identify and help students who have learning problems. In addition, the dense capacity of students in a classroom will have a great impact on student understanding. There are many factors that will affect the conducive learning conditions of a classroom. Among them is classroom capacity. Therefore, the classroom capacity must be appropriate to the number of students in the classroom. The significance of this study was to return to the basic needs of each student in the classroom to create a more effective teaching and learning process in primary schools.

2. Purpose of study

This study was conducted by considering the research gap in previous studies to ensure that it contributes ideally to the research interest. Previously, there were several studies focused on classrooms, including comparisons of classroom types such as flipped classrooms and conventional classrooms. Also studies were done related to different types of classrooms at the school level that can affect students' skills and success [8,9]. There are also studies related to identifying classroom weaknesses in terms of facility management that may have a negative impact on student achievement, therefore classrooms should be conducive to create a comfortable learning environment [10,11].

Based on the discussion above, the research gap can be concluded that there is still a lack of research conducted in considering the capacity of the classroom to achieve the comfort level of students from a physical perspective. Therefore, the classroom capacity usually based on the standard guidelines provided to allocate the number of students in the classroom, is only a general guideline that can be adapted to the school building. This study aims to analyze classroom capacity

in order to improve student comfort in the primary school building and thus enhance the effectiveness of learning. Other aims include the determination of the ideal student-teacher ratio for primary school classrooms in order to maximize the effectiveness of the learning activities implemented with students.

3. Literature review

3.1 Guidelines and Regulations for Building Design

The planning and use of space is important to provide a reliable school building condition, where the main elements of space planning are function, usability and appeal to the public. According to the guidelines of the Economic Planning Unit (EPU, 2015) in the Book of Building Design Guidelines and Regulations prepared by the Standards and Cost Committee, there are the main spaces that must be present in a primary school building are administrative spaces, academic spaces and spaces for other facilities such as general store, canteen, assembly square and co-curricular movement room (Table 1).

Primary school buildings are classified under A2.0: Educational Buildings in the 2015 EPU Guidelines and Regulations Book for Building Design and can be categorized into administrative, academic, other facilities and pre-school. Spaces such as classrooms are the main spaces for the purpose of Student Enrollment in Malaysian schools which has increased up to 83 percent since 2018 [12]. This increase requires concern that the student capacity of each classroom needs to be taken seriously to facilitate positive academic development among students. This increase in students can contribute to the increase in the use of spaces that should not be used as classrooms such as general stores being made into classrooms to accommodate the capacity of many students.

3.2 Classroom Area vs Student Capacity

The main concept of the classroom, especially for the school level, refers to a comfortable and conducive learning environment provided to students. Aspects of the physical environment of the classroom, such as class size or synonymous with classroom capacity can influence student behaviour, attitudes, achievement and attendance. Class size refers to the number of students in a given course or classroom, specifically either the number of students taught by an individual teacher in a course or classroom or the average number of students taught by a teacher in a school, district or education system. Class size also refers to an educational tool that can be used to describe the average number of students per class in a school [13].

An effective classroom environment should control the number of students to avoid congestion during the teaching and learning process. Several studies have found that larger classroom capacity is often accompanied by lower student academic achievement [14]. Smaller class sizes can have a positive impact on student learning and academic achievement. Many initiatives at both the state and federal policy levels, and in schools and districts seek to lower student-teacher ratios. The underlying rationale is that if teachers have fewer students, they can devote more time and attention to each student, including more time diagnosing specific learning needs, critiquing work products, and providing students with one-on-one instruction and academic support.

Table 1
Primary school maximum floor area

JADUAL A2.2 (5): KELUASAN LANTAI MAKSIMUM SEKOLAH RENDAH																		
BIL.	PERKARA	6 BD			12 BD			18 BD			24 BD			30 BD			36 BD		
		Kap.	Unit	Luas (m.p.)	Kap.	Unit	Luas (m.p.)	Kap.	Unit	Luas (m.p.)	Kap.	Unit	Luas (m.p.)	Kap.	Unit	Luas (m.p.)	Kap.	Unit	Luas (m.p.)
1.0	PENTADBIRAN																		
1.1	Bilik Guru Besar		1	22.50		1	22.50		1	22.50		1	22.50		1	22.50		1	22.50
1.2	Bilik Penolong Kanan		1	16.00		1	16.00		1	16.00		1	16.00		1	16.00		1	16.00
1.3	Bilik Guru	11	1	67.50	25	1	150.00	30	1	180.00	42	1	247.50	48	1	292.50	58	1	348.00
1.4	Bilik Alat Bantu Mengajar (ABM)		1	22.50		1	22.50		1	33.75		1	45.00		1	45.00		1	45.00
1.5	Bilik Mesyuarat Utama	17	1	28.00	28	1	56.25	36	1	57.60	46	1	74.25	55	1	90.00	66	1	105.60
1.6	Bilik Pengurusan Peperiksaan (ruang kerja)		1	39.40		1	50.65		1	50.65		1	67.50		1	67.50		1	67.50
1.7	Pusat Sumber (ruang buku/bacaan)	50	1	80.00	108	1	170.00	160	1	247.50	210	1	315.00	250	1	337.50	320	1	495.00
1.8	Bilik Pergigian		1	11.25		1	11.25		1	11.25		1	11.25		1	11.25		1	11.25
1.9	Bilik Pemeriksaan Kesihatan		1	11.25		1	11.25		1	11.25		1	11.25		1	11.25		1	11.25
1.10	Bilik Bimbingan dan Kaunseling			0.00			40.50			40.50			40.50			51.75			51.75
1.11	Kedai Buku		1	45.00		1	67.50		1	67.50		1	67.50		1	67.50		1	67.50
1.12	Bilik Pengawas		1	22.50		1	22.50		1	22.50		1	33.75		1	33.75		1	33.75
1.13	Bilik Keselamatan		1	45.00		1	45.00		1	45.00		1	67.50		1	67.50		1	67.50
2.0	AKADEMIK																		
2.1	Bilik Darjah	30	6	405.00	30	12	810.00	30	18	1215.0	30	24	1620.0	30	30	2025.0	30	36	2430.00
2.2	Surau (ruang solat, wuduk dan j-QAF)		1	135.00		1	135.00		1	135.00		1	202.50		1	202.50		1	202.50
2.3	Bilik Kelas Pemulihan	15	1	67.50	15	1	67.50	15	1	67.50	15	1	67.50	15	1	67.50	15	1	67.50
2.4	Bilik Pendidikan Seni (ruang seni lukis)	30	1	67.50	30	1	90.00	30	1	90.00	30	1	90.00	30	1	90.00	30	1	90.00
2.5	Bilik Sains (P&P)	30	1	90.00	30	1	90.00	30	2	180.00	30	2	180.00	30	3	270.00	30	3	270.00
2.6	Bilik Kemahiran Hidup (P&P)	30	1	112.50	30	1	112.50	30	1	112.50	30	1	112.50	30	1	112.50	30	1	112.50

3.3 Effectiveness of Classroom to Enhance Learning Activities

The effectiveness of key spaces within a school building is critical to the overall educational experience and success of both students and staff. The main space in a school building usually refers to areas such as classrooms, libraries, auditoriums and common areas, such as cafeterias or porches. Through research, there are several factors that can contribute to the effectiveness of these spaces. Classroom design can affect learning outcomes. The selection of relevant classroom capacity is to ensure an easier way to manage and carry out learning activities in the classroom. Uhrain [15] reported the findings of a survey related to classroom capacity from the perspective of parents and teachers, where a smaller classroom capacity is generally preferred, which is more practical for students at either the primary or secondary school level. In another study, a small classroom capacity of 13-17 students showed more significant achievement and continued success compared to a large classroom capacity of 22-25 students.

Next, a well-designed library will provide students with easy access to a variety of educational resources, including books, digital materials and research tools related to their learning. It should offer quiet study spaces, collaborative work areas and easy computer access. According to Mutalib [16] the purpose of the school library is to meet the information needs of the community in the school environment, especially the teachers and students.

Effective classroom management may enhance students' motivation to continue successful in their studies, making it one of the most crucial components of teaching and learning. Ngware [17] described classroom management as an orchestra that plays in the classroom and that requires the development of a curriculum, upkeep of policies and instructional materials. In addition, he emphasized the significance of keeping an eye on student development, teaching responsibilities and setting up the classroom to maximize effectiveness. In contrast to the school's curriculum policy and evaluation of collaboration between instructors and the community, Marzano [18] claims that a teacher's activity in the classroom can have a double effect on the success of students.

4. Methodology

To analyze the existing area, the length and width of each classroom were measured manually for the purpose of this research using a tape measure, ruler, pencil and a notebook. The relationship between classroom capacity and students' comfort levels in the classroom was also established using a qualitative method that considered semi-structured interviews, published reports, building regulations and teacher experiences. To evaluate the condition, six teachers from different classrooms were interviewed.

The researchers employed a qualitative approach to accomplish the first objective of this study, measuring the classroom's length and width with a measuring tape to assess the classroom's capacity. This approach of gathering data makes use of semi-structured interviews and observational methods. The process of observation involves looking at the classroom space to determine whether there is a high student capacity, which influences how comfortable the students are during learning activities. The researcher also physically evaluated the classroom's size to determine whether it meets the established guidelines.

Subsequently, semi-structured interviews were performed to gather data from those involved regarding the level of comfort that students received in the classroom. Teachers from specific classrooms were chosen as responders to evaluate the conditions. Six teachers in all were chosen as respondents to questions about students and the classroom because they are qualified teachers in the classroom.

5. Results and Discussion

Table 2 shows the area and student capacity allocated in 15 selected classrooms where the classroom area, length (L) x width (W), was physically measured to analyze the current area equivalent to the classroom with student capacity. According to the Building Design Guidelines and Regulations (2015), the standard area of classroom space is 67.5m^2 per classroom or 2.25m^2 per student, and classrooms in primary school buildings should have a maximum of 26 students (Economic Planning Unit, 2015).

Table 2
Area of the classroom and the respective capacity of students

Area of the classroom (L X W)					Capacity of classroom with current area		Space Capacity Compliance
Item	Name of classroom	Length (m)	Width (m)	Total area (m^2)	No. of students	Current area (m^2/students)	Comply / not comply
A. Sekolah Kebangsaan A							
1.	Alif	8.809	7.163	63.099	31	2.04	Not comply
2.	Adab	8.809	7.132	62.826	33	1.90	Not comply
3.	Azam	8.869	7.102	62.988	27	2.33	Comply
4.	Aktif	8.809	7.132	62.826	31	2.03	Not comply
5.	Amanah	8.869	7.163	63.529	27	2.35	Comply
B. Sekolah Kebangsaan B							
6.	Anggerik	9.401	7.315	68.768	30	2.29	Comply
7.	Cempaka	9.053	6.831	61.841	24	2.58	Comply
8.	Kenanga	9.250	7.315	67.664	22	3.08	Comply
9.	Mawar	8.832	7.841	69.252	30	2.31	Comply
10.	Seroja	9.053	7.314	66.214	21	3.15	Comply
C. Sekolah Kebangsaan C							
11.	Angklung	10.972	6.932	76.058	34	2.24	Not comply
12.	Rebana	8.250	7.091	58.500	35	1.67	Not comply
13.	Nafiri	8.315	7.315	60.824	34	1.79	Not comply
14.	Canang	8.809	7.163	63.099	31	2.04	Not comply
15.	Gamelan	8.919	7.215	64.350	37	1.74	Not comply

Only seven example classrooms Azam, Amanah, Anggerik, Cempaka, Kenanga, Mawar and Seroja which had classroom areas of 62.988m², 63.529m², 68.768m², 61.841m^2, 67,664 m^2, 69.252m² and 66.214m^2 comply with the criteria, according to the study's conclusions. To meet the student capacity, the remaining classes are categorized as tiny classrooms with a large number of students. Classrooms in Alif, Adab, Azam, Aktif, Amanah, Cempaka and Seroja follow a two-shift schedule, morning and afternoon. This system is meant to address the problem of having too many pupils. The two-shift teaching method is appropriate for dense schools, particularly in metropolitan settings, claim [19]. Nonetheless, although there are enough classrooms to hold teaching and learning sessions concurrently in rural regions, there is still only one shift school session [20].

According to Table 2, 75 to 100 % of classroom spaces demonstrate compliance with the space standard established by the Economic Planning Unit (EPU 2015), while 0 to 59 % of spaces exceed 100 % in non-compliance. Because a classroom has more students than the maximum allowed by the Economic Planning Unit (EPU 2015), it does not meet space capacity requirements in a primary school building. Additionally, because of the school's limited space, which requires too many students—up to forty individuals per classroom—the classroom arrangement does not conform. This may affect how comfortable the students are in the classroom while they are learning. This may result in a decline in the comfort level of the students during instruction during class.

The majority of classrooms do not meet the standards provided by the Economic Planning Unit, 2015 according to Table 2's data analysis results regarding compliance with classroom capacity standards in primary school buildings. Based on percentages, the majority of classrooms appear to be larger, denser, busier and noisier than those defined by the Space Capacity Compliance Index, which makes challenging for students to learn in those surroundings.

Analysis of recommendations from interviews regarding classroom layout in primary school buildings that comply with standards. In order to get information about the suggested classroom arrangement that would raise students comfort levels, the researcher interviewed with a total of six teachers from that particular classroom. Based on the conducted interviews, the researcher discovered that four teachers recommended limiting the number of students in each classroom to just 28. This is to avoid having too many students in a classroom that is uncomfortable for them.

Furthermore, arranging all of the classroom's tables and chairs with their backs to the chalkboard would help students concentrate better when the teacher is teaching. In order to keep students comfortable while the teacher is teaching, two other teachers recommended maintaining the standard of the classroom's facilities, such as fans and lights. In the event that the classroom's infrastructure sustains damage, the instructor recommends prompt maintenance.

Students become uncomfortable and restless in poorly managed classrooms with plenty of disorganized tables and chairs, minimal heat, light and electricity supplies that are either unavailable or malfunctioning. As a result, students are unable to focus entirely on their studies, which raises the possibility of disruptions in the classroom environment.

6. Conclusion

Compliance with space standards in primary school buildings is important to create a conducive and effective learning environment for young children. These standards are usually set by education authorities and are based on consideration of safety and health requirements. Classrooms in primary school buildings must have a satisfactory level of comfort to achieve the main purpose of the teaching and learning process [21] in addition to being a medium to produce quality in children's personality and discipline. In conclusion, compliance with the Building Design Guidelines and Regulations (2015) still requires adjustments to consider the classroom capacity for students' comfort. This is to ensure that the classroom has relevant capacity. After considering several aspects from measurement and interview methods, the new proposal of 26 students is relevant for the capacity of students in a classroom.

References

[1] Ing, Marsha. "Using informal classroom observations to improve instruction." *Journal of Educational Administration* 48, no. 3 (2010): 337-358. https://doi.org/10.1108/09578231011041053

[2] *MyGOV - the government of Malaysia's official portal*.(n.d.). https://www.malaysia.gov. my/portal/index.

[3] Malaysiakini. (2023, October 17). *Ada Apa Dengan cikgu Fadli Dan Isu pendidikan Negara*. Retrieved from Malaysiakini: https://www.malaysiakini.com/news/639933.

[4] Hassanain, Mohammad A., and Ali Iftikhar. "Framework model for post-occupancy evaluation of school facilities." *Structural Survey* 33, no. 4/5 (2015): 322-336. https://doi.org/10.1108/SS-06-2015-0029

[5] Wong, Ling Tim, Kwok Wai Mui, and Tsz Wun Tsang. "An open acceptance model for indoor environmental quality (IEQ)." *Building and Environment* 142 (2018): 371-378. https://doi.org/10.1016/j.buildenv.2018.06.031

[6] Kamaruzzaman, Syahrul Nizam, Charles O. Egbu, Norhayati Mahyuddin, Emma Marinie Ahmad Zawawi, Shirley Jin Lin Chua, and Nur Farhana Azmi. "The impact of IEQ on occupants' satisfaction in Malaysian buildings." *Indoor and Built Environment* 27, no. 5 (2018): 715-725. https://doi.org/10.1177/1420326X16689493

[7] Shernoff, David J., Erik A. Ruzek, and Suparna Sinha. "The influence of the high school classroom environment on learning as mediated by student engagement." *School psychology international* 38, no. 2 (2017): 201-218. https://doi.org/10.1177/0143034316666413

[8] McLaughlin, Jacqueline E., Mary T. Roth, Dylan M. Glatt, Nastaran Gharkholonarehe, Christopher A. Davidson, LaToya M. Griffin, Denise A. Esserman, and Russell J. Mumper. "The flipped classroom: a course redesign to foster learning and engagement in a health professions school." *Academic medicine* 89, no. 2 (2014): 236-243. https://doi.org/10.1097/ACM.0000000000000086

[9] Mlambo, Victor. "An analysis of some factors affecting student academic performance in an introductory biochemistry course at the University of the West Indies." *The Caribbean Teaching Scholar* 1, no. 2 (2011).

[10] Hashim, N. O. R. H. A. S. H. I. M. A. H. "Teacher's responses to class size at the primary level in Malaysia." Educators and Education 16 (1999): 29-37.

[11] Hannah, Ryan. "The effect of classroom environment on student learning." (2013).

[12] Wikipedia contributors. (2023, October 21). *Department of Statistics Malaysia*. Wikipedia. https://en.wikipedia.org/wiki/Department_of_Statistics_Malaysia

[13] Adeyemi, T. The influencwe of class size on the quality of output In primary school, in Ekiti State in Negeria, American. *Eurasian Journal of Scientific Research*, (2018): 7-14. https://doi.org/10.4314/ijepse.v7i1.38206

[14] Norazman, Norsafiah, Adi Irfan Che-Ani, Nor Haslina Ja'afar, and Muhamad Azry Khoiry. "Standard compliance and suitability of classroom capacity in secondary school buildings." *Journal of Facilities Management* 17, no. 3 (2019): 238-248. https://doi.org/10.1108/JFM-03-2018-0017

[15] Uhrain, Christopher. "Effect of class size on student achievement in secondary school." PhD diss., Walden University, 2016.

[16] Mutalib, N.A. (2017), 21st Century Learning: Not Just Arrangement of Chairs and Tables, Malaysia National Library, Percetakan perlis, Malaysia.

[17] Ngware, Moses Waithanji, James Ciera, Peter K. Musyoka, and Moses Oketch. "The influence of classroom seating position on student learning gains in primary schools in Kenya." *Creative Education* 4, no. 11 (2013): 705. https://doi.org/10.4236/ce.2013.411100

[18] Marzano, Robert J., and Jana S. Marzano. *Classroom management that works: Research-based strategies for every teacher*. ASCD, 2003.

[19] Dignath, Charlotte, Gerhard Buettner, and Hans-Peter Langfeldt. "How can primary school students learn self-regulated learning strategies most effectively?: A meta-analysis on self-regulation training programmes." *Educational Research Review* 3, no. 2 (2008): 101-129. https://doi.org/10.1016/j.edurev.2008.02.003

[20] Rajendran, G. (2022), "School seeks aid for 24 new classrooms", New Straits Times Malaysia, p. 2, available at: www.nst.com.my/news/2015/09/school-seeks-aid-24-new-classrooms (accessed 10 June 2016).

[21] Sigurðardóttir, Anna Kristín, and Torfi Hjartarson. "The idea and reality of an innovative school: From inventive design to established practice in a new school building." *Improving schools* 19, no. 1 (2016): 62-79. https://doi.org/10.1177/1365480215612173