

Students, Sanitary Facilities and Regulations: An Overview of Public Schools in Malaysia

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ABSTRACT

Sanitary facilities in public schools should provide a safe and secure environment for students to enter and utilise any sanitary fixtures. The reason for this is that public coeducational schools encompass a diverse range of students in terms of gender, age, behaviour, culture, religion, ethnicity, and belief. The government has implemented enhancements to design and arrangement of sanitary facilities and fixtures in order to minimise the impact on school buildings. However, inadequate information from students has resulted in less provision of sanitary fixtures in sanitary facilities. This research focuses on an overview of sanitary facilities or also known as toilets based on perceptions from students in selected public coeducational schools. Design and arrangement of existing gender-specific toilets are inappropriate for females due to the fact that females spend twice as much time in sanitary facilities as males. The overview includes relevant information of students' perceptions, and sanitary facilities and fixtures in public coeducational schools.

Keywords: Sanitary facilities; Sanitary fixtures; Gender-specific toilets; Students' perspectives; Public coeducational schools.

INTRODUCTION

Sanitary facilities are significant spaces in all public buildings. Designers frequently disregard and fail to prioritise sanitary facilities in comparison to other spaces (Greed, 2014, 2016; Robert & Greed, 2014; Ramster et al., 2018). For public buildings in Malaysia, strict regulations need to be applied when designing and constructing the buildings by following guidelines produced by the government (Prime Minister's Department, 2015). In addition, design of public buildings needs to be presented and get approval not just with city hall or council, but also other government departments (Malaysian Public Works Department, 2022). These processes must be applied and followed by building and construction professionals because of limited cost provided by the government to build public buildings.

There are more than 800 public schools in Malaysia which considered as '*sekolah daif*' or impoverished schools in 2023 (Ruzki, 2023a, 2023b). It is categorised as impoverished schools as the schools are unsafe and old for students and staff at scale six and seven based on the assessment done by the Malaysian Public Works Department. By November 2023, 689 impoverished schools were already refurbished, renovated or rebuilt depending on conditions of school buildings by the government (Bernama, 2023). Plus, inappropriate design and location of sanitary facilities, and arrangement and provision of sanitary fixtures have led to privacy, security and usage to users (Rosli and Zulhumadi, 2019).

Starting from 2022, all design of public schools is using the ‘PAP fleksi Sekolah Module’ or the Pre-Approval Plans Flexible School Module or the school module is introduced by the Malaysian Public Works Department (2022). The school module can speed up design and build of public schools with applying Building Information Modelling (IBM) and Industrialised Building System (IBS) during design and construction processes. Existing public schools have been designed with various number of classrooms and size of buildings. Added to, the school module presents five modules based on number of classrooms and land sizes that are accurate, consistent and repetitive.

The acknowledgement and awareness of the government regarding conditions of public sanitary facilities has granted RM 150 million to maintain and repair from Budget 2024 (Ministry of Finance, 2023). The allocation not only for public toilets at 150 local authorities, but also 8354 public schools are included and need to be repaired before the end of 2024. This is because public areas and spaces offer variety of business, education, entertainment and retails to attract the public to stay longer which lead to increase need for sanitary facilities. ‘*Tandas Sejahtera*’ or well-being toilets are public sanitary facilities provided by the government that are for outdoors and managed by local authorities with an application My WC to locate sanitary facilities (Hasnan, 2017; Ministry of Housing and Local Governance, 2024).

Gender-specific toilets (female and male toilets) designs are often inappropriate for females (Greed, 2014; Beebeejaun, 2017). For example, the regulations show differences in minimum dimensions, as well as different numbers of sanitary facilities and fixtures between female and male toilets. In addition, females are known for spending more time in sanitary facilities, number of sanitary fixtures in female toilets is supposed to be double or triple (Goldsmith, 2000; Greed, 2016). Minimum or equal number of sanitary fixtures in female toilets compared to male toilets has led to queues especially during peak hours and hectic days Bovens & Marcoci, 2017; van Hautegeem & Rogiest, 2017).

Table I. Different cubicle sizes by the regulations in Malaysia

Standards/Design Guidance	Code	Cubicle Size (Length x Wide) (mm)
Malaysia Standard	MS 2015: Part 1: 2017	2200 x 1200
Uniform Building By-Laws 1984	No. 43	1500 x 750 (water closet)
Uniform Building By-Laws 1984	No. 43	1250 x 750 (squat toilet)

Current regulations for sanitary facilities need to be revised and synchronised. This is due to data differences between the regulations have led to hinder between authorities, designers and other building professionals as Table 1. Travel distance between users and sanitary facilities need to be included in the Malaysian regulations. As for now, there are no regulation regarding travel distance to sanitary facilities except for travel distance to exits during emergency (Department of Malaysia Standards, 2017). Right location of sanitary facilities with travel distance between 100 and 150 metres can reduce users’ stresses (British Standards Institution, 2006). Long travel distance to sanitary facilities can impact pregnant women, elderly and disabled people, children and ethnic minority (British Standards Institution, 2010). Such impact can lead to abdominal and intestine diseases to users.

There are many studies of female toilets that show disadvantages to women and girls (Greed, 2014, 2016; Ramster et al., 2018; Bovens & Marcoci, 2017; van Hautegeem & Rogiest, 2017). Two studies show females have to endure long waiting times due to design and provision of sanitary facilities and fixtures (Bovens & Marcoci, 2017; van Hautegeem & Rogiest, 2017). A waiting time for more than two minutes is intolerable

that can cause discomfort and diseases (British Standards Institution, 2010). These happened to women and girls because of clothing, menstruation, and more. Besides that, males can choose either to use urinals or water closets and females only have water closets.

PURPOSE OF THE RESEARCH

This research aims to determine the perspectives of existing and new model design of gender-specific toilets among students in public primary and secondary schools. It also aims to investigate opinions of the public and experts on this topic. The results will indicate the degree to which this change may impact new model design of gender-specific toilets for public coeducational primary and secondary schools in Malaysia.

Research Questions

1. What are problems in existing gender-specific toilets in public primary and secondary schools with perspectives from students?
2. What are components and criteria in existing gender-specific toilet that lead to good model design for students' needs?
3. What are perceptions of existing gender-specific toilets and acceptance of new model design of gender-specific toilets?
4. How to develop new model design of sanitary facilities in public primary and secondary schools that is suitable for students?

Research Scope

This research employs mixed research methods to identify problems, determine components and criteria in existing gender-specific toilets in public primary and secondary schools. Additionally, to establish perception and acceptance of existing and new model design of gender-specific toilets. The research focuses on two main areas of interest, the built environment and human behaviours as its two focal points. The built environment emphasises problems, components and criteria of gender-specific toilets in public primary and secondary schools. Meanwhile, human behaviour refers to perception and acceptance of the public and experts towards existing and new model design of gender-specific toilets in public schools.

This research will adhere to certain scope outlines as follows:

1. The students in year five to six, and form one to five or six if available in daily national public primary and secondary schools.
2. Selected coeducational public primary and secondary schools located in Kuala Lumpur.
3. The public in community centres in Kuala Lumpur.
4. Experts from relevant bodies and institutions who involved in construction of sanitary facilities in public schools.

The research will identify students' perceptions of existing gender-specific toilets by case studies. In this research, the opinions from teachers and staff in the selected schools are considered irrelevant and hence excluded. Plus, existing gender-specific toilets are used and experienced by students during school hours. Meanwhile, teachers and staff have they own sanitary facilities available for them. Paper questionnaires will be used to get respond from students. The questionnaire includes both multiple-choice and open-ended questions pertaining to quantitative research methods.

Qualitative research methods involve the use of semi-structures questions during the discussions and

interviews with the public and experts. It is crucial to involve the public and experts in obtaining their perspectives on existing and new model design of gender-specific toilets in public schools. New model design of gender-specific toilets in public primary and secondary schools in Malaysia combines two focal points.

Research Significance

This research is important for gathering information in perspectives of students regarding existing and new design model of gender-specific toilets at public schools on a daily basis. Therefore, the results will enable the identification of problems, determination of components and criteria, and establishment of perceptions and acceptance of existing and new model design of gender-specific toilets. As a result, development of new model design of gender-specific toilets for coeducational public primary and secondary schools.

Additionally, it is crucial to consider number of students when designing sanitary facilities, as this ensures appropriate design and provision of sanitary facilities and fixtures for students (Goldsmith, 2000). It demonstrates the necessity for designers to possess a thorough understanding of the needs and characteristics of both primary and secondary students when designing sanitary facilities for daily coeducational public schools. If this research demonstrates that students' perspectives on problems, components, criteria, perception and acceptance significantly influence the effectiveness of gender-specific toilets, then the connection between the built environment and human behaviour will assist designers in making more informed decisions and effectively designing sanitary facilities in public schools.

This research aims to address the information gaps regarding facility design needs and improvement for gender-specific toilets in public primary and secondary schools. It will involve collecting and analysing data to produce new model design for gender-specific toilets. Plus, this research is valuable as its results are not only useful to students, but also to professional bodies and institutions, also, the criteria for sanitary facility design. Professionals from bodies and institutions are included to get the awareness and opinions about sanitary facilities in public schools.

METHOD

Mixed research methods will be applied to collect data from students, the public and experts (Gray, 2014; Bryman, 2016; Creswell & Clark, 2017; Cohen et al., 2018; Creswell & Creswell, 2018). The research is exerting pragmatism to find problems, components, criteria, perception and acceptance of existing and the model design of gender-specific toilets in public schools (Leavy, 2017; Hennink et al., 2020). Triangulation research design will be utilised to connect data analysis of research methods involved.

The pilot study and case studies with paper questionnaires contain multiple choices and open-ended questions are utilise in quantitative research methods. Meantime, the discussions and interviews with semi-structures questions are qualitative research methods. Data collection from all research methods are analysed separately and connected to get results. All questions will be carefully worded to allow detailed but sensitive data collection from voluntary participants to be achieved (Earlywine, 2014; Kumar, 2019).

Problems in Existing Gender-Specific Toilets in School Buildings

School buildings suffer from unaddressed and undisclosed problems in sanitary facilities. Academic research in sanitary facilities primarily emphasises females rather than males and other users (Earlywine, 2014; Greed, 2014, 2016, 2019; Roberts & Greed, 2014; Beebeejaun, 2017 Bovens & Marcoci, 2017; van

Hautegeem & Rogiests, 2017; Wendland et al., 2017; Ramster et al., 2018; Isham et al., 2022;). Here, challenges encountered by students in existing gender-specific toilets, as well as design and arrangement of sanitary facilities and fixtures. Additionally, facility design requirements are following the latest Malaysian regulations for sanitary facilities and fixtures, also, public schools.

Challenges Faced by Students in Existing Gender-Specific Toilets

The design and provision of sanitary facilities and fixtures is the primary problem with gender-specific toilets, leading to occurrence of queues at female toilets (Greed, 2014; Bovens & Marcoci, 2017; van Hautegeem & Rogiest, 2017). It occurred primarily during busy periods and peak hours, such as recess hours, breaks between classes and co-curricular days. Restriction poses by teachers during class hours that limit usage of sanitary facilities can lead to students' inconveniences.

In addition to a restricted number of cubicles, there are other factors that contribute to need for more sanitary facilities like cubicle size, menstruation, clothes and the fact that females spend twice as much time in toilets compared to males (Greed, 2016; Ramster et al., 2018). Prolonged waiting times over two minutes have a significant influence on children (British Standards Institution, 2010; Bhattacharya et al., 2019). It can lead to health problems such as urine incontinence, bladders troubles, gastrointestinal complications and other related abdominal and intestine diseases.

Narrow gap between door and water closet pose challenges due to cubicle size. It can provide challenges for students with carers, mobility assistance and overweight (Greed, 2014, 2016). The presence of gap between water closet and sanitary pad bin can lead to unhygienic circumstances if any of these sanitary fixtures or all are dirty. This can result in transmission of bacteria and viruses to students and other school areas. Off centred of water closet in female cubicles can reduce exposure between students and sanitary fixtures (Greed, 2016).

The need to address problem of varying restriction regarding width and length of cubicles to ensure that an appropriate cubicle size can adequately accommodate all students. The discrepancy in cubicle size dimensions arises from the fact that the Uniform Buildings By-Laws 1984 (International Law Book Services, 2022) specify sizes of 1.5 by 0.75 metres and 1.25 by 0.75 for water closet and squat toilet, but the Malaysian Standard (Department of Malaysia Standards, 2017) specifies a size of 2.2 by 1.2 metres.

In addition, there are options to consider, such as choosing between a water closet and a squat toilet, deciding between a tap with a hand bidet or roll paper, selecting the style of taps at hand wash basins and others among other possibilities. The designers must consider the design and location of sanitary facilities, and arrangement and provision of sanitary fixtures to ensure that it meet users' needs and expectations.

Design and Arrangement of Sanitary Facilities and Fixtures

Carefully assess the overall design and provision of sanitary facilities and fixtures to determine whether adequately meet student demands or only meet the minimum requirements outlines in the regulations (Department of Malaysia Standards, 2017). Optimal design and provision of sanitary facilities and fixtures in public schools and other public buildings should prioritise inclusivity for all students and users (van Hautegeem & Rogiest, 2017; Greed, 2019; Isham et al., 2022). The inclusion for suitable and sufficient sanitary facilities and fixtures in public school buildings allows students to spend more time comfortably and conveniently, without concerns about the availability of such facilities and fixtures when needed.

Adhering to the design and provision of sanitary facilities and fixtures in public school buildings may

reduce usage and waiting times by meeting students' demands (Greed, 2014, 2016; Beebeejaun, 2017 van Hautegeem & Rogiest, 2017). Given that females spend twice as much time in sanitary facilities as males, it is anticipating double or triple number of sanitary fixtures in female toilets (Goldsmith, 2000). The proper design and arrangement of sanitary facilities and fixtures will attract students to spend more time at schools without worrying about sanitary facilities.

CRITERIA OF EXISTING GENDER-SPECIFIC TOILETS BY THE MALAYSIAN REGULATIONS

The Uniform Building By-Laws 1984 (International Law Book Services, 2022), the Malaysian Standard (Department of Malaysia Standards, 2017, the Economic Planning Unit (Prime Minister's Department, 2015), and the school module (Malaysia Public Works Department, 2022) provide the criteria for gender-specific toilets. These criteria are utilised to regulate public buildings and sanitary facilities. During design, construction, and completion of public buildings, the primary objective is to guarantee the needs, health, and safety of all users. It also enables users to enter, utilise, and exit sanitary facilities in a comfortable and secure manner. Here, each criterion in detail, following the presentation order especially for public schools.

Criteria of Sanitary Facilities for Public Schools by the Uniform Building By-Laws 1984

The Uniform Building By-Laws 1984, published by the International Law Book Services (2022), is commonly used across all levels. For example, the government, experts in the building and construction industry, tertiary students, and other relevant bodies and institutions use this data or reference purposes. Most people cite the by-law because it compiles data into a single book, updates regularly, and is more affordable than other regulations. This by-law consolidates all the criteria pertaining to minimum criteria for sanitary facilities in public schools.

According to by-law number 40(2)(a), sanitary facilities on two and four levels must have a minimum size of three and a half, and four-square metres, respectively, and must be equipped with natural ventilation, or "air well". If a space is enclosed with walls and lacks windows for natural ventilation and lighting, it is required to have fixed mechanical ventilation or air conditioning according to by-law number 41. Meanwhile, water closets and squat toilets in public buildings must have a minimum size of 1.25 by 0.75 metres and 1.5 by 0.75 metres, respectively, as by-law number 43 and 44(4).

By-law number 165 mandates the provision of "measurement of travel distance to exits" for the protection of users in case of emergencies. There are four types of measures in metres that have a "limit when an alternative exit is available" condition, "one-way, two-way insprinklered, two-way sprinklered, and corridor." The

Seventh Schedule specifies that the "maximum travel distance" for public schools is 15, 45, 60, and 15 metres for four categories. By-law number 257 allows for the use of regulation from other countries when data is not available in the Malaysian regulations.

Although the by-law provides a reference for building and construction, it is necessary to include extra data. For instance, travel distance to sanitary facilities, location of sanitary facilities, provision of sanitary fixtures, and ratio of females to males based on type of buildings. It is significant because schools serve as environments where students not only engage in academic pursuits but also interact socially.

Criteria of Public Sanitary Facilities by the Malaysian Standards

The document MS 2015-1:2017, titled "Public Toilets: Part 1: Design Criteria (First Revision)", published

by the Department of Standards Malaysia (2017), outlines five specific criteria for sanitary facilities. The list has the following items, “1. Performance requirements, 2. Design of public toilets, 3. Location, 4. Number of toilet units, and 5. Expectation of users”. The standard specifies the essential design requirements for public sanitary facilities, both indoor and outdoor, excluding water supply and storage systems. The standard includes two formulae for number of cubicles based on initial and thorough calculations for gender-specific toilets.

For design and arrangement of cubicles with water closet, the standard provides plans and sections with dimensions for full brick, and half brick and half partition cubicles as Fig. 1. The standard has addressed the problems of door swing, placement of sanitary fixtures, and even positioning of sanitary pad bin and other sanitary fixtures. Buildings and constructions professionals should adhere to these prescribed designs and layouts for sanitary facilities and fixtures in female toilets, ensuring that cubicles are pleasant for use. The reason for this is the spatial separation between water closet, sanitary pad bin, paper roll dispenser, door and other sanitary fixtures.

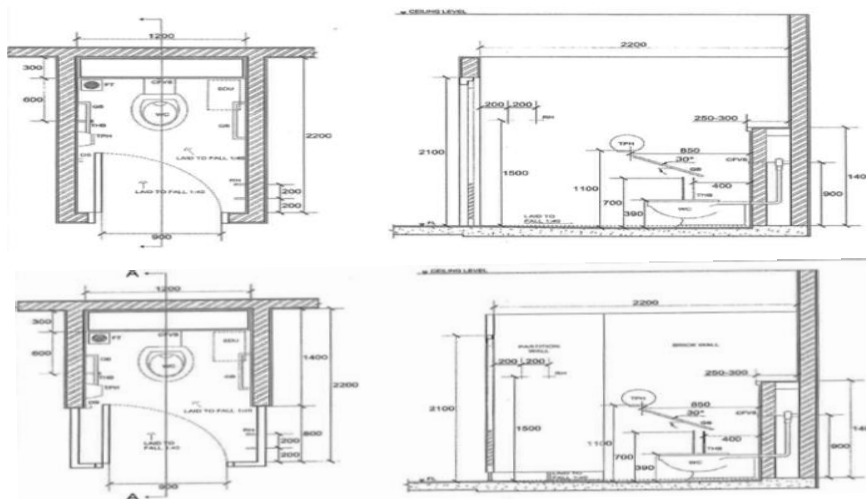


Fig. 1 Full brick wall (top) and half brick wall and half partition cubicles plans (left) and sections (right)

(Source: MS 2015: Part 1: 2017 – Public Toilets: Part 1: Design Criteria (First Revision), 2017).

According to the Malaysian Standard for standards of public sanitary facilities, these facilities can be constructed either indoors or outdoors and must meet the requirements of the public. However, there is a lack of data regarding the presence and usage of hand drying agents, such as hand dryers and paper towel dispensers, as well as the number and provision of sanitary facilities and fixtures in public buildings. The issues encountered by users in existing gender-specific toilets indicate that Malaysian building and construction professionals are not adhering to the regulations (Nazir et al., 2018; Rosli and Zulhumadi, 2019; Yacob et al., 2019).

Criteria of Sanitary Facilities for Public Schools by the Economic Planning Unit and School Module Prior to designing any public structures, the Malaysian Public Works Department is required to adhere to the principles outlines by the Economic Planning Unit (Prime Minister’s Department, 2015). Public primary and secondary schools are in educational facilities, with one side of the school boundary encompassing a preschool, primary and/or secondary schools, workshop, laboratory, and multipurpose hall. A typical primary school, excluding preschool facilities, usually occupies an area of six to eight acres of land and consists of six to 36 classrooms. The average space allocated per students ranges from 7.8 to 18.8 square

metres. Meanwhile, a typical secondary school has a land area ranging from eight to 12 acres. It consists of 12 to 42 classrooms, with an average of 10.5 to 21 square metres of space per student.

The architects of the Malaysian Public Works Department created the Pre-Approval Plans Flexible School Module or the School Module in 2022. The school module is a design based on number of classrooms and land size. Public schools that previously had gender-specific toilets on alternating levels now have sanitary facilities on every level. The allocation of sanitary facilities for all public schools follows a ratio of one unit per 20 students and hand wash basin are per unit range from 3.5 to 4.5 square metres.

Regarding materials and finishes, there are three classifications of high, average and utility grades, which are applicable to all public buildings. With the exception of administrative buildings and large halls, all educational buildings are constructed using utility grade materials and finishes. However, administration buildings and large halls have the option to use average grade materials and finishes. All materials and finishes for public buildings must be produced and made in Malaysia.

The school module has been implemented to expedite the design process of public schools using the Industrialised Buildings System (IBS) and Buildings Information Modelling (BIM). Prior to the implementation of the school module, public schools were constructed with different configurations of classrooms and land sizes. The school module offers five modules that contain consistent, repeatable, accurate, and detailed drawings and models. These modules can be downloaded by people involved in public school projects.

All modules are adaptable spaces capable of transforming from classrooms to multipurpose rooms, exam halls, and teachers' rooms. It is achievable with folding doors between classrooms to facilitate this flexibility. In order to accommodate the growing number of students, it is possible to construct a new school building and connect it to existing one by walkways arranged in either parallel or L configurations depending on location of school buildings as

Fig. 2. This possible due to the use of IBS and BIM approach across both existing and new school buildings.

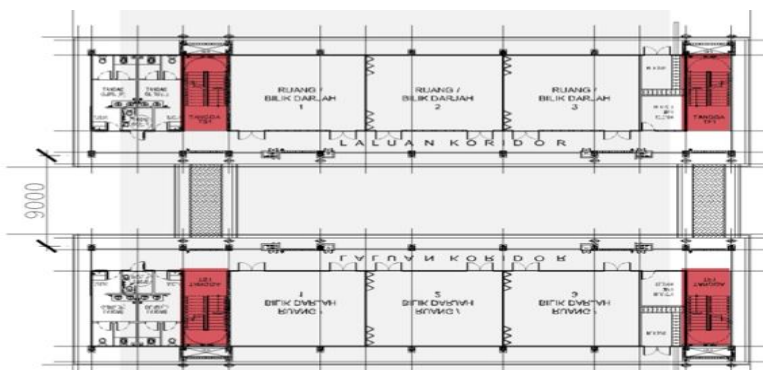


Fig. 2 Two school buildings connected with parallel walkways (Source: Pre-Approval Plans Flexible School Module, 2022).

The school building has gender-specific toilets situated at the far end, either on the right or left side, depending on the entrance of the school. The ground floor houses teacher and accessible toilets, while the first, second and third floors house student toilets. The current dimensions of gender-specific toilets are 7.5 by 6 metres.

Fig. 3 unveils in details of teacher and accessible toilets.

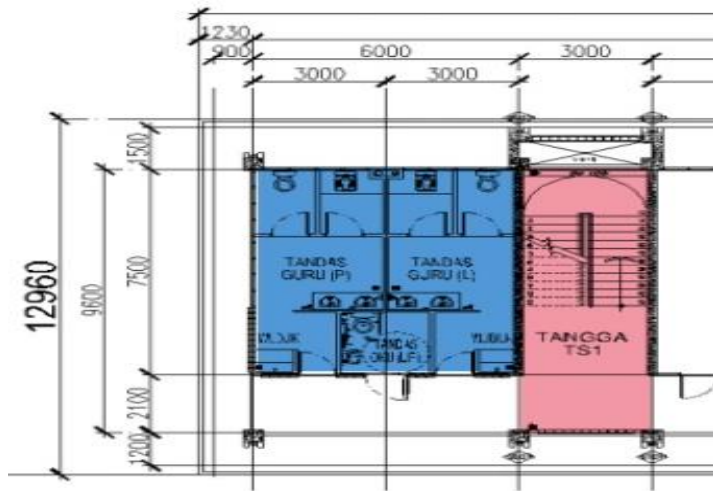


Fig. 3 Teacher (female toilet, left and male toilet, right) and accessible toilets (front) with details on ground floor) (Source: Pre-Approval Plans Flexible School Module, 2022).

Teacher and accessible toilets are located on the ground floor to ensure convenient access for disabled teachers and students. This level also houses the administration and teacher rooms. Additionally, classrooms will be located on the ground floor to accommodate students with physical disabilities and those using mobility aids. There is currently no available data on the ratio between number of teachers and sanitary fixtures, as well as ratio between teachers and students. Meantime, Student toilets are located at rear of the school building, adjacent to staircases. This placement can prevent transmission of unpleasant odours from toilets to classrooms in the event of any problems with either toilets or both. The inclusion of gender-specific toilets in the school module aims to enhance students' use of sanitary facilities during school hours.

Fig. 4 reveals in details of student toilets.

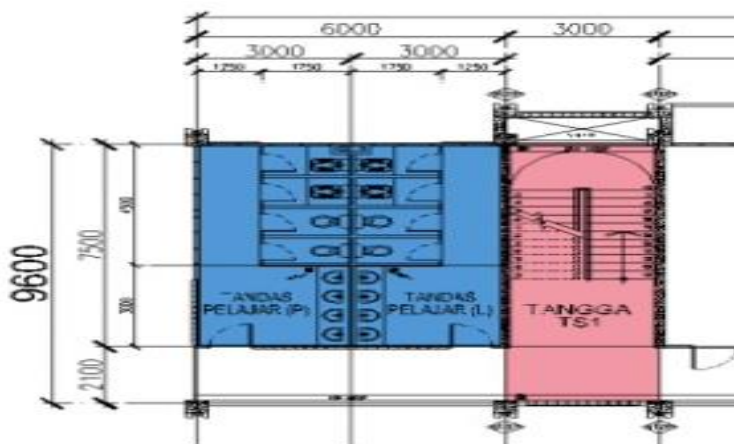


Fig. 4 Student toilets (female toilet, left and male toilet, right) with details on first, second and third floors (Source: Pre-Approval Plans Flexible School Module, 2022).

Sanitary facilities strategically place ventilation blocks and wire mesh to achieve natural ventilation and to prevent animal entry. In addition, ceiling fans are installed in gender-specific toilets to enhance air

circulation and aid in drying sanitary facilities and fixtures. The ratio of water closets to squat toilets in public schools depends on the geography, and it is mandatory to have at least one squat toilet in each gender-specific toilet.

Research Gaps

In this overview, five perceptions were identified regarding sanitary facilities in public school buildings, 1) Early and continuous sanitary facilities education; 2) Building conditions; 3) Execution of the regulations; 4) Water usage; and 5) Hygiene. Early education regarding sanitary facilities shapes individuals in terms of attitude and habit (Baird et al., 2019; Ahmadi et al., 2020; Axelrod et al., 2021; Manan et al., 2021; Nawawi & Badayai, 2021). Exposing children to sanitary facilities education during toilet trainings produce remarkable results together with parents' roles after school hours (Nawawi & Badayai, 2021). Plus, children as early as 18 months can get toilet trainings with supervision by parents and caretakers (Baird et al., 2019).

The life span of a building is presented from start to end by Talha in 2015. This sequence can be adopted by the government, also, professional bodies and institutions in providing comfortable and safe public buildings for all users. The government needs to make sure the regulations are followed to the tee by the designers and builders. It is to ensure there are no short term and high maintenance public sanitary facilities (Nair & Krishnan, 2014).

Any buildings experience deterioration as part of the life span of buildings (Talha, 2015; Nazir et al., 2018; Yacob et al., 2019; Sun et al., 2021; Zhu et al., 2021). Studies of sanitary facilities at public buildings such as mosques, schools and a university in Malaysia unveiled that the buildings did not execute the regulations (Nazir et al., 2018; Rosli & Zulhumadi, 2019; Yacob et al., 2019). Results showed improvement of sanitary

facilities need to be made in mosques to accommodate all users, 65 and one out of 300 schools are in serious and very serious conditions, and a short number of disabilities facilities in the campus.

Average water usage is high in Malaysia with an individual used 201 litres per capita per day in 2021 rather than 165 litres per person per day (United Nations, 2020; Air Selangor, 2021). Water usage which includes behaviours, habits and saving attempts in Southern Malaysia exhibits on high water consumption and less awareness of water conservation by participants (Muhammad et al., 2021). This happened due to low water price charged by the government as well as use of underground water from borings and wells. More tasks need to be made by the government to reduce water usage by Malaysians by advertisements and signages (Sun et al., 2021).

The "Knowledge Attitude and Practice (KAP) theory" is used in the study to find sanitary facilities hygiene among university students (Manan et al., 2021). Results revealed a high level of sanitary facilities hygiene among students with knowledge, attitude, practice and learning of 87%, 88%, 81% and 79%. Currently, sanitary facilities hygiene in Malaysia is at a low level as majority of public sanitary facilities are in dirty and poor conditions, and far from the government's standard which known as BMW, "*bersih, menawan, wangi*" or clean, attractive and pleasant smell (Ganesan, 2022; Morden, 2023; Rosli, 2023).

CONCLUSION

This paper presents a thorough overview of important perceptions from students, the public and experts regarding existing and new model design of gender-specific toilets in public schools with relevant information from gathered existing references. It is essential to gather data from students, the public and

experts as they are end users, awareness of sanitary facilities in schools and people who are erudite in these fields. By evading problems of gender-specific toilets, the governments are resolving it with shared sanitary facilities without approval from end users (Patey, 2022; Shreve, 2022).

Academic studies are focus on problems at female and accessible toilets (Earlywine, 2014; Greed, 2014, 2016; Jeffreys, 2014; Beebeejaun, 2017; Isham et al., 2022), and usage and waiting times based on design, arrangement and provision of sanitary facilities and fixtures (Bovens & Marcoci, 2017; van Haute gem & Rogiest, 2017). Plus, many studies focus on design and provision but are mostly unable to fill the gaps between the selected topics.

Regardless of growing literature on sanitary facilities, few, if any academic articles and journals discuss problems, components, criteria, perceptions and acceptance of existing and the new model design of gender-specific toilets in public schools. This research can also identify problems of gender-specific toilets by genders, ages, behaviours, cultures and more from students, the public and experts. Sanitary facilities in public schools are utilised in this research because of consistent in building size and voluntary participants (Manan et al., 2021; Isham et al., 2022).

A good sanitary facility plays an essential in maintaining any public buildings since water involve in it (Sun et al., 2021). Added to, sanitary facilities must be at the right locations, design, arrangement and provision of sanitary fixtures, proper management and users' attitudes for long periods of operations (Nair & Krishnan, 2014). Early and continuous sanitary facilities education can overcome problems like broken sanitary fixtures and negative behaviours to sanitary facilities in public buildings (Baird et al., 2019; Ahmadi et al., 2020; Axelrod et al., 2021; Manan et al., 2021; Nawawi & Badayai, 2021).

In conclusion, this research is precious because of students, the public and experts as voluntary participants included in the research in identifying problems, determining components and criteria, and establishing perception and acceptance of existing and the new model design of gender-specific toilets in public primary and secondary schools. There is, hence, an opportunity for this research to develop model design of gender-specific toilets in public schools based on the methods applied with voluntary participants, but not limited to perception and acceptance.

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