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OBSERVING INCLUSIVE PLAYGROUNDS: A CASE STUDY INVESTIGATING CRITERIA FOR CHILDREN WITH DISABILITIES

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ABSTRACT

Playgrounds play a vital role in children's development by facilitating exploration, socialization, and skill-building. However, traditional playgrounds often fall short in providing suitable environments for children with disabilities (CWD), limiting their participation and hindering their growth. In contrast, inclusive playground (IP) design presents a transformative opportunity to break down barriers and create play spaces that empower children of all abilities. The research focuses on observing various playgrounds to assess their criteria and features, with an emphasis on accommodating children of all abilities. By analyzing the criteria employed in these playgrounds, the research aims to identify best practices and potential areas for improvement in creating inclusive play spaces. The methodology employs a qualitative approach through observations of three publicly accessible playgrounds to delve into the current criteria adopted for the selected IP based on seven basic principle of Universal Design (UD). By analyzing the designated IP, this study unveils the immense potential of inclusive playgrounds in promoting equal access, fostering social interaction, and nurturing skill development for CWD. Findings reveal that the key component of an inclusive playground lies in its adherence to intuitive UD principles. However, some aspects are lacking and require continuous maintenance. This research will be inspired designers, supplier, policymakers, and communities to create dynamic and transformative play spaces that celebrate the unique abilities of all children, fostering a sense of belonging and empowerment for children with disabilities.

Keywords: Criteria, Children with disabilities, Inclusive Playground, observations, universal design

1.0 INTRODUCTION

People with disabilities (PWD) are individuals who are unable to conduct activities like normal people due to permanent physical or mental impairment. The World Health Organization (2010) described people with disabilities as having a diminution that is an issue with physical structure or function and having a constraint on engaging in life interests. This handicap has a significant impact on their lives, especially those of children who find it difficult to carry out

everyday duties and activities to meet their needs for things like health, education, and play. According to WHO and World Bank estimates from 2018, 1 billion people, or 15% of the global population, live with a disability. In Malaysia, the number of PWD registrations has been steadily rising, and by 2020, there will be around 588,378 PWDs registered nationwide.

Furthermore, according to Jabatan Kebajikan Malaysia (2022), children with disabilities account for 23% of all Malaysians with disabilities. Despite all of the laws, conventions, and legal procedures, there are still many difficulties that affect people with disabilities and have been the focus of several conversations. One such issue is the right to an accessible physical environment. The children ran across several challenges that prevented them from taking part completely in the community and playground activities. Although many local governments in Malaysia have already recognised the value of providing playgrounds for children with disabilities and should be made accessible to the general public, the number of these playgrounds is limited and not fully utilised for all of the country's disabled children (UNICEF Malaysia, 2020; Liew, 2017; & Ch'ng, 2015). Guidelines and criteria that address more specific issues regarding the children's outdoor play spaces have recently been developed in Malaysia through the Department of Standard Malaysia and SIRIM Berhad. The obligation is place on the responsibility of the Council to take appropriate measures in ensuring that children with disabilities have equal access with other children without disabilities to participation in play. Yet, the guideline is not specifically addressing the needs of children with disabilities, although the clause on accessibility has been included in the draft. As mentioned by Talay, Akpinar, and Belkayali (2010) it is crucial to provide suitable play areas and equipment in order to address the needs of children with disabilities. However, a significant fraction of practically all of Malaysia's existing playgrounds are not suitable for usage by kids with disabilities in various ways. Obstacles include the fact that the playground's layout and the playthings weren't made with children with impairments and limited mobility in mind. For instance, the size of the playhouse may make it difficult for children in wheelchairs with disabilities to enter and exit the structure.

In order to make it possible for these physically challenged kids to use the equipment and explore the playground, space must be taken into account when designing the playground. As a result, the goals of this essay are to evaluate the available information and examine the problem of inclusive playgrounds for kids with disabilities as to assist their recreational activities. It is crucial to establish a standard for inclusive playgrounds that all local state authorities may follow as a guide so that everyone, particularly children with disabilities, can take advantage of the amenities and meet societal demands. Therefore, this study aims to evaluate the existing criteria used in inclusive playground design to ensure children with disabilities can fully participate and enjoy these recreational areas.

2.0 OVERVIEW OF INCLUSIVE PLAYGROUND

Playgrounds that are inclusive focus on fostering possibilities for social interaction and inclusion rather than just the technical aspects of accessibility. A strategy to encourage the engagement and inclusion of children with disabilities in society might be to build inclusive playgrounds. Additionally, inclusive playgrounds encourage the "social parts of the play," including making friends, and work to increase societal acceptance of people with disabilities. This playground has the potential to serve as a space for kids to grow socially, mentally, and physically. These advantages ought to be extended to all kids, including those with disabilities. The necessary playthings that may be used and enjoyed by all kids should be placed on this playground so that no kid has any trouble using or using them. In order to build an inclusive environment for the playground, children with disabilities must be able to use it. Inclusive playground can be defined from various views. Dunn, Moore and Murray (2003), Moore and Cosco (2007) scene as creating accessible play area by enabling all children.

Additionally, they claim that removing social obstacles will make a play area inclusive while removing environmental barriers can make play areas accessible. Despite these discrepancies in meaning, there appears to be some consensus that the phrase inclusive can be understood to have three dimensions when used to describe an outdoor play area. Three things should be possible in a space: disabled children should be able to play there; disabled children and non-disabled children should be able to play there; and third, families should be able to use the area. The remaining section of the study will focus on the first two of these problems. The design of the play spaces is the only topic of this investigation; it does not address any related issues, such as their location or accessibility. Interest in the idea of an inclusive playground or the use of universal design has grown within the occupational therapy field as a means of promoting the integration of children with disabilities into society. Principally "universal design" is the practice of designing all objects and environments in a covert manner so that they are as aesthetically pleasing and usable as possible by everyone, regardless of their age, aptitude, or social standing. In order to ensure that a product or environment may be enjoyed by everyone without the need for adaption of specialist design, universal design is a principle rather than a design aesthetic.

2.1 Criteria of Inclusive Playground for Children with Disabilities

Children with disabilities often encounter challenges when using public playgrounds due to their physical limitations and other impairments. An inclusive playground seeks to address this issue by providing a play space that allows all children, regardless of their abilities, to actively participate in local play and leisure activities. The underlying premise is to create a versatile and accessible playground that caters to all populations. Achieving an inclusive playground can be realized through the application of Universal Design (UD) principles in the playground's design. UD, as defined by its pioneers Follette, James, and Ronald (1998), involves discreetly designing all products and environments to be aesthetically pleasing and highly usable by everyone, regardless of age, ability, or life circumstances, including individuals with disabilities. This concept of UD combines accessibility, versatility, inclusivity, and the removal

of barriers to accommodate individuals with varying levels of physical and intellectual functioning.

By adhering to these principles, playgrounds can become more welcoming and enjoyable for all children, fostering an environment of inclusivity and providing equal play opportunities for everyone. In the context of inclusive playgrounds, Figure 1 outlines the seven fundamental UD principles that need to be considered: universal use, convenient access, safety, ample size space, easy manipulation, convenient use of information, and flexible use.

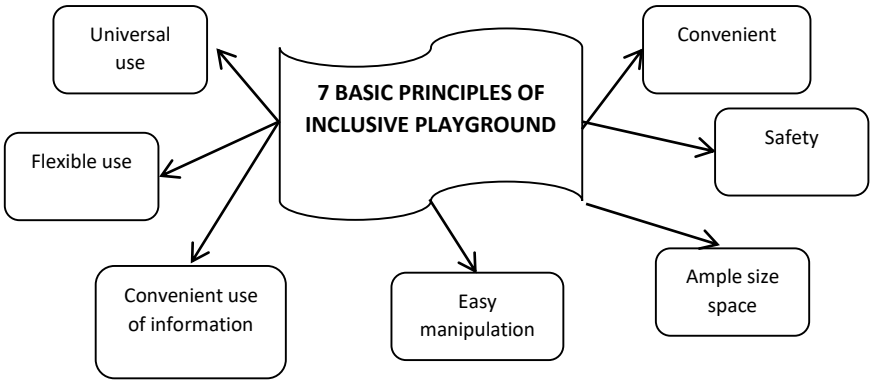


Figure 1: Seven basic principles of inclusive playground

The first principle, Universal Use, ensures that the product is beneficial and usable for people with diverse abilities, providing equal means of use for all users. The second principle, Convenience, focuses on a simple, easily understood, and intuitive design that meets user expectations. Safety is the third principle, emphasizing the minimization of hazards, with tolerance for errors, warnings, and fail-safe features to reduce accidents. The fourth principle, Ample Size Space, stresses the provision of sufficient space without judgment of body size, mobility, or posture to ensure accessibility. The fifth principle, Easy Manipulation, focuses on user comfort and efficiency, minimizing fatigue and repetitive actions.

The sixth principle, Convenient Use of Information, involves effective communication using different modes such as pictorial, verbal, and tactile to accommodate users with sensory limitations. Finally, the seventh principle, Flexible Use, allows for diverse individual capabilities, preferences, and methods, accommodating both right and left-handed users and offering adaptability to user pace. Applying these Universal Design principles to the current Inclusive Playground (IP) will make it more user-friendly and promote accessibility and inclusiveness for children with disabilities. An Inclusive Playground based on these principles welcomes children with and without disabilities, fostering integration physically, developmentally, emotionally, and socially.

3.0 METHODOLOGY

The research employed a qualitative descriptive design to observe and analyze the criteria for an inclusive playground. Qualitative content analysis was chosen to analyze the data, aiming to identify similarities, differences, and patterns. The study selected three publicly accessible playgrounds in Malaysia, all constructed according to inclusive playground guidelines, catering to children with and without disabilities. These playgrounds were situated adjacent to public park areas.

Data collection involved conducting an observation survey on the selected playgrounds, which are specifically designed and equipped to be accessible and exciting for all children. Referred to as 'inclusive playgrounds,' they boast features and equipment manufactured with accessibility in mind. The audit focused on examining the physical characteristics of the playgrounds, including the accessibility of pathways, play equipment design, surfacing, and signage. To structure the observations, researchers developed an observational checklist based on a review of inclusive playground guidelines worldwide. The checklist served as a structured observation tool to assess the playground's design characteristics in terms of accessibility, usability, and layout of the equipment. During the observations, researchers diligently documented all relevant information using detailed field notes. They then summarized, analyzed, and added their reflections about the observed situations.

4.0 RESULTS AND DISCUSSION

4.1 Inclusive Playground background

4.1.1 Location: Site A

This location covers a 1,000 sqm playground and has facilities specially built for wheel-bound children. This playground started construction in July 2013 and was completed in November 2013 by taking consideration complying with the Universal Design Principle. The playground is suitable for children with disabilities and also for toddlers. There are several types of equipment that can be played by all children such as slides, playhouses, trampolines, mazes, wall board games, horizontal climbers, and others. This model of the playground has become the first model that has been established and opened for all children including children with disabilities.

4.1.2 Location: Site B

Furthermore, the second location of the selected observation site which is one of the parks that is open to the public. This park has become the first fully disabled-friendly park that is complete with tactile, ramps and other barrier-free facilities by applying the Universal Design Concept to the design and equipment of the park. The slides are also fitted with ramps and rails which provide easy access for wheelchair-bound users. Besides that, these slides are complete with braille ties for ease of use for the visually impaired children that play at the playground.

4.1.3 Location: Site C

The next study area is located in the north of Kuala Lumpur city centre. This 46.14 ha district park was also the first urban park to be established on ex-mining land and was designed in compliance with the amended Town and Country Planning Act 1976 (Act 172) to provide sports facilities and as a leisure park. This playground has become one of the most accessible scenic public play spaces in Kuala Lumpur and was later a popular recreational destination for high-class residents and others.

4.2 Observation's Results on Criteria for Inclusive Playground

Table 1 presents the results derived from observations made at three publicly inclusive playgrounds: Site A, Site B, and Site C. The analysis is based on seven themes, which reference the universal design standard as the criteria for assessment. These themes are as follows: (1) universal use, (2) convenient access, (3) safety, (4) ample size space, (5) easy manipulation, (6) convenient use of information, and (7) flexible use.

Regarding the first criterion, universal use, it was observed that the play equipment at Sites A, B, and C is well-connected, allowing all children, both with and without disabilities, to enjoy the playground. However, there is limited availability of sliding activities, as only single open slide types are provided at Site A. Similarly, Site A lacks equipment for climbing activities, although it adequately offers facilities for swinging and interactive activity panels, including braille play panels. In contrast, Site C presents a more diverse range of play equipment, including swings, slides, rockers, spinning wheels, elevated structures, and climbing activities. The playground at Site C accommodates both older children (ages 5 to 12) and toddlers (ages 2 to 5) for swinging. However, the design of the spinning wheel lacks transfers systems, backrests, foot supports, and accessible handgrip support, which could enhance play for children of all sizes and abilities.

While, second design criterion is convenient access. According to the observations, all three sites (playgrounds) offer easy accessibility and adhere to the standard. The entrances to the playgrounds are connected through accessible routes, including ramps and pathways that are designed to accommodate all users. These pathways extend throughout the ground-level play equipment. However, at Site B, only entrances near the main road are made accessible to disabled users, while entrances from the residential area are obstructed by bollards, making them inaccessible to disabled users who require mobility aids.

Moving on to the third design criterion, which is safety, ensuring safety in playground design is of utmost importance. Based on the observations, all three sites have implemented rubber surfacing, particularly in fall zones, to mitigate the risk of injuries during falls. However, during the field observation at Site B, it was noted that the playground surface appeared slippery, dirty, and worn out due to constant use and inadequate maintenance. Additionally, the surface of the

slide was found to be poorly maintained, leading to slippery conditions. This could increase the potential for injuries, especially as rubber mats are only placed at the slide's exit.

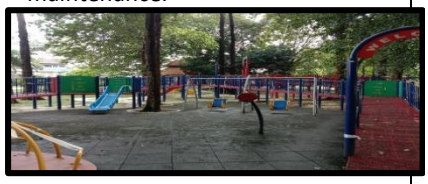
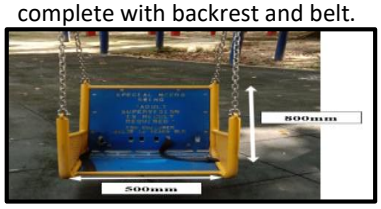
Table 1: Analysis of results from site observations

Item	Theme	Site A	Site B	Site C
	Universal Use	▪ The playground offers various play equipment such as slides, rocking, climbing and playhouse. ▪ ▪The slide is placed near the transfer deck with accessible hand grips that assist wheelchair users. ▪ ▪The play equipment incorporates various types of sensory stimulators including touch, visual, and sound. ▪ ▪The playground is an allocated playhouse with an access opening for wheelchair users to encourage dramatic play among children of all types of abilities. ▪ ▪However, there are limited options for sliding activities as there are only single open slide types on the playground.     	▪ The playground offers opportunities for swinging to both ordinary people and children with disabilities. There are also have adaptive swing seat, braille plays, slides and spinning wheels. ▪ The adaptive swing seats are accessible and flexible for all children with all types of abilities and sizes. ▪ The playground offers several interactive activity panels that benefit the sensory development of all children such as braille letters. ▪ There are also musical play panels enhancing the fun environment of the playground. ▪ However, the playground does not provide any equipment/facilities for climbing activities.     	▪ The playground provides various types of play equipment such as swing, slide, rocking, spinning wheel, elevated structure and climbing activity. ▪ The playground offers opportunities for swinging in both children (age 5 – 12 years old) and toddler (2-5 years old). ▪ ▪Support structure in both types of swings is designed to discourage climbing. Besides, the reach height of the swings is also suitable for the intended user and age group. ▪ ▪Children with physical disabilities or children who use mobility devices may face some difficulties in getting access to the spinning wheel. It is recommended to allocate accessible spinning components that support users in a variety of positions such as sitting, standing, lying etc.    

Table 1: Cont'd

Item	Theme	Site A	Site B	Site C
2.	Convenient Access	▪ The design of the playground is simple with practical accessibility. All entrances are connected with accessible routes including ramps, accessible pathways are continuing and connect all the ground and elevated levels of play equipment. 	. ▪ The playground has four main entrances, however, only one main for disabled users. ▪ All the pathways are connected to play equipment and inclusive accessibility. The width of pathways on both ground level and the elevated structure is appropriate to the required standard. ▪ Only entrances near the main road are made accessible to disabled users, while entrances from the residential area are blocked by bollards which make them inaccessible to disabled users with mobility aids.  	▪ The design of the playground is circular, and every entrance is connected with an accessible route and ramp. The accessible pathways are continuing and connect all the ground-level play equipment. The cycleway is separated from the walkway, and it was painted with a bright red color. ▪ The spinning wheel is located on the accessible route. ▪ The width of the pathway is compliant to the specification stated in MS 1884; 2014 and MS996; 2017, and is capable of allowing two-way traffic for wheelchair users.  

Table 1: Cont'd

3.	Safety	▪ There is a fixed net structure on the playground to encourage climbing activities among children.  ▪ The playground used rubber surfacing to reduce the risk of serious injuries when children fell. Besides, the surface has also been painted with interesting marking to encourage children for track activities.   ▪ Slides are provides a full pair of guiderails as the suppor and appropriate height to landing point. 	▪ The wide allocation of free surface at the exit allows children to make safe exit and landing.  ▪ The surface of the slide is not maintained.   ▪ The playground incorporates rubber mat as the playground surface. However, lacking irregular maintenance.  ▪ Swings height not suitable for toddlers aged 2 -5 years, however complete with backrest and belt. 	▪ There is a safety net provided at spinning wheel to avoid children fall during the spinning motion.   ▪ The playground used rubber surfacing to reduce the risk of serious injuries when children fell. Besides, there are also different themes of color to differentiate playground for toddlers (2 – 5 years old) and playground for primary school children (5- 12 years old).   ▪ The designed for spring rocking does not provide enough body support for disabled children.  

4.	Ample size space	The design of the slide is wide enough to accommodate various body sizes.  The rocking play equipment have wide enough and capable to act as transfer deck for wheelchair users.   The width of all accessible route are compiled to the specification stated in MS 1884; 2014 and MS996; 2017, and sufficient for wheelchair user to maneuver 	The slides comply with all required MS996;2017 standards. However, the rubber mat are only place at the exit of the slide   The size of one seat swing is 800 mm high and 500 mm wide. The seat is installed very close to the ground to provide ease for the children to sit on this swing. 	The slides comply with all required MS996;2017 standards and there is also a wide allocation of free surface to allow children to make safe exit.   The platform of the spinning wheel is wide and stable to accommodate more than one user. 

Item	Theme	Site A	Site B	Site C
5.	Easy manipulation	▪ The rocking play equipment lacking neck and body support for those children with weak muscle and trunk strength. 	▪ The spinning wheel has wide and stable platform and capable to accommodate more than one user. Each sitting position is provided with handgrips.  ▪ The distance of children's playground from the accessible entrance are quite far and this can cause fatigue to children with disabilities.	▪ The playground offers various options for climbing activities such as spider web, climbing ladders, climbing walls, and climbing bars.  ▪ The design of circular swings is not suitable for children with wheelchairs. The design of the swing could not provide adequate support for the back body structure. 
6.	Convenient Use of Information	▪ There is no sign available to direct to the playground or give information on the use of the playground equipment. ▪ There are limited tactile warning patterns on the playground surfaces for children with visual disabilities.	▪ There is no sign available to direct you to the playground or give information on the use of the playground equipment.	▪ There is signage or board of information provided on both toddler's and primary school children's playground. 

Furthermore, to enhance safety for users, Site C has incorporated a safety net for spinning wheel activities, and Site A features a fixed net structure for climbing activities. All three sites have given considerable attention to safety to ensure the well-being of children. However, it is unfortunate that Site C lacks sufficient tactile warning patterns on the playground surfaces for children with visual disabilities. Providing such tactile cues is crucial to help these children navigate the playground safely and avoid potential injuries, such as collisions with moving swings or other play equipment.

The fourth design criterion observed is ample size space. All three sites comply with the required MS996:2017 standards for the play equipment, specifically the slides. At Site A, the slide design accommodates various body sizes, while Site C's slides provide sufficient space for safe exits. In terms of accessible routes, the width of both the accessible routes and playground equipment at Site A meets the specifications in MS 1884:2014 and MS 996:2017, providing sufficient maneuverability for wheelchair users compared to Site B and Site C. Additionally, easy manipulation is the fifth criteria to be considered in playground design. Observations reveal that the rocking play equipment at Site A lacks neck and body support for children with weak muscle and trunk strength. Similarly, at Site C, there is only one type and size of rocking equipment, offering inadequate body support for children with disabilities, leading to feelings of fatigue and discomfort. Moreover, Site B has a considerable distance between the children's playground and the accessible entrance, which can lead to fatigue for children with disabilities.

As for the sixth criterion, it pertains to the convenient use of information through signage. Observations reveal that both Site A and Site B lack signage to guide visitors to the playground and offer instructions on how to properly use the play equipment. This absence of signage can create difficulties for users in finding the playground and comprehending its correct usage. On the other hand, at Site C, signage is available, but it is presented solely in text, which may present challenges in understanding the information. Additionally, the signage at Site C primarily emphasizes safety precautions rather than providing guidance on how to use the play equipment effectively.

Finally, flexible use is another crucial criterion in playground design. Observations indicate that Site A offers limited options for sliding activities, with only a single open slide type on the playground. The slide height does not vary significantly, limiting appropriate developmental challenges for children with or without disabilities. In contrast, Site C provides a variety of play equipment, including slides, circular swings, and rocking play. The slides at Site C have different heights, allowing children of different ages to explore according to their abilities. Additionally, Site C features a double slide, enabling caregivers to accompany their child while using it. In contrast, Site A is missing equipment for spinning or rolling activities, which play a significant role in developing the sense of movement among children. This sense of movement relies on the vestibular system, which provides essential information to the brain about motion, head position, and spatial orientation.

Overall, from the analysis, it can be concluded that, Site A's play equipment is thoughtfully designed and adheres to established standards. Notably, the swings are meticulously crafted, providing excellent back and neck support for children with muscle and trunk disorders. Moreover, the playground includes a variety of slides strategically positioned on accessible routes. The presence of a double slide enables caregivers to accompany their children, and the slides come in different heights, offering multiple levels with both straight and curved designs that encourage users to explore various directions based on their abilities. However, there is room for improvement when it comes to the spinning wheels. The design of the spinning wheels should incorporate transfer systems, backrests, foot supports, and accessible handgrip support to foster inclusive play among children of all sizes and abilities.

To create an inclusive playground that caters to all children, it is essential to incorporate accessible features during its development. This includes wheelchair ramps, accessible swing seats, spring riders, and see-saws, as well as swings designed specifically for wheelchair users. By incorporating these features, children with disabilities will be able to use all the equipment without facing any difficulties. The right height of the equipment is also crucial for ensuring inclusivity. Some equipment heights may not be suitable for children with disabilities, so adjustments should be made to allow all kids to play safely and enjoyably at different levels. Sufficient space should be provided to allow children to move around, turn, and transfer from a wheelchair to the play equipment, reducing the risk of collisions with other children. By considering accessibility and safety in the playground's design, children of all abilities can play together, fostering a sense of inclusion and allowing for a more enjoyable and enriching play experience for everyone.

Regarding safety elements, each piece of playground equipment must meet and exceed certain standards. The surface floor should be made of synthetic rubber to cushion the impact of falling objects, and placing rubber mats around the entire playground can further prevent accidents and injuries. Additionally, some equipment should feature elements like transfer systems, parking areas, backrests, hand rests, and guide rails to assist impaired kids in moving and playing, enhancing their interest and promoting their development.

5.0 CONCLUSION

In conclusion, this research has identified five key criteria elements that enhance inclusivity in playground design. These criteria encompass accessible pathways and surfacing for mobility devices, inclusive play equipment catering to various sensory and physical needs, signage and communication methods supporting all children, availability of supportive seating and shaded areas, and social interaction opportunities that promote inclusive play. By implementing these elements, inclusive playgrounds can effectively accommodate the needs of all children, fostering social inclusion and encouraging physical activity for children with disabilities.

The overarching aim of inclusive playgrounds is to provide opportunities for children with physical disabilities to access and enjoy playground equipment. Additionally, these playgrounds promote social integration by encouraging able-bodied children to interact and play with their peers with disabilities. By fulfilling the requirements of both children with disabilities and society as a whole, inclusive playgrounds create spaces where all children can play together. By incorporating inclusive design based on the identified criteria, playgrounds become highly accessible and welcoming to all children, irrespective of their abilities. This approach ensures that recreational activities are readily available to every child. Consequently, these criteria serve as best practices for local authorities and playground providers to develop play spaces that enable children with physical disabilities to access equipment easily and safely.

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7.0 REFERENCES

Ch'ng, B. (2015), Taman Aman now fully disabled-friendly. The Star Online, Retrieved from https://www.thestar.com.my/metro/community/2015/02/17/taman-aman-now-fully-disabledfriendly-major-changes-in-pj-park-include-ramps-and-widened-walkways

Dunn, K., Moore, M., & Murray, P. (2003), Best Practice in Inclusive Out of School Provision. London, Kidsactive

Heseltine and Holborn (1987), Play and Playground encyclopedia. https://www.pgpedia.com/p/playgrounds-planning-design-and-construction-play-environments. Retrieved on 10 mac 2022

Ja'afar, N. H., Abdul Rahim, A., Abd. Samad N. A., & Che Rahim, C. R. (2017), Sidewalk Accessibility at Melaka's Traditional Streets for People With Disabilities (PwDs) . Journal of the Malaysian Institute of Planners, 15(1), 389 – 396. DOI: https://doi.org/10.21837/pmjournal.v15.i6.255

Jabatan Kebajikan Masyarakat Malaysia (2020). https://www.jkm.gov.my/jkm/index.php?r=portal/articles&id=U0dpTUVpRXlyYUlFVFFLUmVnUVJUdz09

Jabatan Kebajikan Masyarakat. (2016). Laporan Statistik Jabatan Kebajikan Masyarakat. Online: http://www.jkm.gov.my/. Accessed 10 May 2022.

Liew (2017), Playground Suitable For Young Children At Penang Youth Park. Penang Local Stuff. Retrieved from http://www.penanglocalstuff.com/playground-suitable-for-young-children-at-penang-youth-park/

Luk C.W. & Au K. C. K. (2015), Inclusive playground for children of special needs - July 2015. 11th World Congress Design & Health, International Academy of Design & Health. At: Hong Kong Affiliation: Association of Universal Accessibility Hong Kong

MacArthur, J. Sharp, S., Gaffney, M., & Berni, K. (2007), Does It Matter That My Body Is Different? Journal of the Children's Issues Centre,11(2), 25-30.

Michael Siu, K. W., Wong, Y. L. & Lam, M. S. (2017), Inclusive Play in Urban Cities: A Pilot Study of the Inclusive Playgrounds in Hong Kong. Procedia Engineering, 198, 169-175. DOI: https://doi.org/10.1016/j.proeng.2017.07.080

Mohd Radzi1.N.A, IsmailK & Ab Wahab. L (2021), Ergonomics Concept in Inclusive Public Playground Targeting on Children with Disabilities. AMEABRA International Virtual Conference on Environment-BahaviourStudies, 2ndSeries.E-BPJ, 5(15), Dec 2020 (pp.3-9)

Moore. A & Lynch. H (2015), Accessibility and usability of playground environments for children under 12: A scoping review.Scandinavian Journal of Occupational Therapy 22(5):331-344

National Disability Authority (2014), https://nda.ie/NDA/nda-files/NDA-Annual-Report-2014-pdf.pdf. Retrieved on 10 Mac 2022

Olsen. H. M & Dieser. R.B (2012), a case study of a community which lacked social policy toward playground accessibility.World Leisure Journal 54(3):269-279

Prellwitz. M & Skar. L (2007)., Usability of playgrounds for children with different abilities. Occupational Therapy International 14(3):144-55

Soltani, S. H. K., Abbas, M. Y., & Awang, M. (2012), Disabled children in public playgrounds: A pilot study, Asian Journal of Environment Behaviour Studies, 3(8), 15-26.

Talay, L., Akpinar, N. & Belkayali, N. (2010), Barriers to playground use for children with disabilities: A case from Ankara-Turkey. African Journal of Agricultural Research. 5(9), 848-855.

UNICEF (2020), Goal 11: Sustainable cities and communities. United Nations Development Programme.

Wazani, I. A., Mohamad, D. & Jaafar, M. (2021), Accessibility for Persons with Disabilities in Built Environment of Urban Area: Case Study of George Town, Penang. Journal of the Malaysian Institute of Planners, 19 (5), 53 – 65. DOI: https://doi.org/10.21837/pm.v19i19.1059

Wenger. I, Schulze. C, Lundström. U & Prellwitz. M (2021), Children's perceptions of playing on inclusivE playgrounds: A qualitative study.Scandinavian Journal of Occupational Therapy.VOL. 28, NO. 2, 136–146

WHO. (2018) World report on disability. Online http://www.who.int/disabilities/world_report. Accessed: 2 February 2022.

