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A STUDY OF THE IMPLEMENTATION OF ACCESSIBILITY FACILITIES FOR DISABILITIES BASED ON UNIVERSAL DESIGN THEORY

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Abstract

Accessibility has an important role in creating an inclusive higher education environment for disabilities. Universitas X has provided various accessibility facilities; however, their implementation has not fully complied with the principles of Universal Design. This research aims to identify the implementation of accessibility facilities for disabilities based on the principles of Flexibility In Use, Simple and Intuitive Use, and Low Tolerance Error at Universitas X. This study employed a descriptive qualitative approach and was conducted at the four buildings. Data were collected through observations, documentation, interviews, and questionnaires. The data were analyzed using the Miles and Huberman about qualitative model, while data trustworthiness was ensured through technique triangulation. The research indicate that the implementation of accessibility facilities has not yet been optimal. Based on the principle Flexibility In Use, limitations were found in the availability of guiding blocks, accessibility features in elevators, and accessible toilet doors. Based on the principle of Simple and Intuitive Use, ramps, automatic doors, corridors, and accessible parking areas have not fully met the required standards. Regarding the principle of Tolerance for Error, stairways and evacuation routes also require further improvement. This research concludes that accessibility facilities at Universitas X have been provided; however, they do not yet fully comply with the principles of Universal Design. Therefore, improving the quality and equitable provision of accessibility facilities is necessary to support the development of a more inclusive campus

Keywords: *Facility Accessibility, Universal Design, Disabilitie, Inclusive Campus*

INTRODUCTION

As an inclusive educational service, the resources available in the educational environment must be accessible to all segments of society, including individuals with disabilities, in accordance with the provisions of Regulation of the Minister of Education, Culture, Research, and Technology No. 48 of 2023 Regarding Appropriate Accommodations for Students with Disabilities in Formal Early Childhood Education, Elementary Education, Secondary Education, and Higher Education. This has had a significant impact on higher education institutions in Indonesia, which are becoming increasingly aware of and understanding their responsibility to ensure the right to education for all, particularly for people with disabilities(Andreyanto et al., 2025). This regulation encourages a commitment to transitioning toward inclusive campuses by providing physical facilities such as accessible pathways for people with disabilities (Mulyani et al., 2022). Thus, a higher education environment equipped with inclusive facilities will create a fair academic atmosphere and optimize the potential of every student (Ramli et al., 2025).

The presence of facilities is crucial because they serve as supporting elements that enable core activities or operations to function more effectively and efficiently (Puspitosari et al., 2022). Facilities play a vital role in ensuring that a building functions in accordance with its intended purpose (Karnawati & Cemara, 2023). Furthermore, facilities also serve as a means of ensuring equal access for all users, regardless of their background, thereby creating equal opportunities for everyone to enjoy the available facilities (Ramli et al., 2025). Providing facilities is not merely about complying with established accessibility standards but also about ensuring that every individual can fully participate in various activities in public spaces without barriers, thereby strengthening the use of public spaces by providing fair and equitable facilities for all (Diop et al., 2021). This was articulated by Ronald Mace through his concept of Universal Design. Since the 1970s, the concept of Universal Design has been extensively developed up to the present as a framework for establishing standards or guidelines in designing environments, products, and technologies to be more inclusive, so that they can be accessed, understood, and used to the fullest extent possible by every individual (Verma, 2021).

The standards in question are accessibility requirements that emphasize the need to create and provide accessibility features for people with disabilities in order to ensure equal opportunities in usage (Maldonado-Garcés et al., 2025). Based on a review of previous studies, such as the identification of accessibility measures for people with disabilities at Lancang Kuning University according to Universal Design (Ravelino et al., 2023), the Evaluation of University Campuses in Ecuador for Sustainable Inclusion:Evaluation of Physical Accessibility in Higher Education(Maldonado-Garcés et al., 2025), as well as an Evaluation of Universities in Turkey for Physical Accessibility (Ünal, 2025), the availability of physical facilities is crucial in creating a standardized campus.

University X is one of the leading educational institutions in Bandung that has demonstrated tangible support for creating equal access to education for all members of the community, including individuals with disabilities, through its transition to becoming an inclusive campus. University X is committed to fostering inclusivity, a commitment that was warmly welcomed by the Chair of the National Commission on Disabilities, who officially designated it as a Disability-Friendly Campus in Bandung in 2022. As a university that is welcoming to all individuals, the educational institution must provide clear facilities and support as tangible signs of its inclusivity. Educational institutions need to foster a campus atmosphere that physically and operationally supports people with disabilities (Prasetyo, 2025). This includes providing facilities that can be used by all such individuals (Ravelino et al., 2023). Unfortunately, however, the recognition as a Disability-Friendly Campus by the National Commission on Disability in 2022 has not yet fully

aligned with the on-the-ground conditions at University X, which still faces many challenges in implementing inclusive physical facilities. This situation contradicts the provisions of Ministry of Education, Culture, Research, and Technology Regulation No. 48 of 2023, which requires educational institutions to provide infrastructure that supports all individuals, including those with disabilities.

Based on the current conditions, some of these facilities have issues. For example, tactile paving is only available at a few points along the sidewalk, and it is either damaged or obstructed by goods stored by street vendors in the campus area. Furthermore, the entrances to the buildings are still manual doors that require pushing or pulling by hand, resulting in the need for additional physical effort. Regarding accessibility from the sidewalk to the lecture buildings, there are no ramps to facilitate access for wheelchair users; and the ramps available in various locations have steep slopes and are not equipped with handrails on the right side.

Under the conditions described above, the use of ramps requires assistance from others for wheelchair users and runs counter to the principle of barrier-free access. The lack of these facilities not only undermines the effectiveness of the campus's commitment to being disability-friendly, but also poses safety risks and can lead to social exclusion for vulnerable groups on campus (Ravelino et al., 2023). The discrepancy between the current state of accessibility facilities and Ministry of Public Works and Public Housing Regulation No. 17 of 2014, which serves as the minimum technical standard but does not yet guarantee the rights of all individuals when using physical facilities, indicates a discrepancy between established policies and their implementation on the ground. To address this issue, this study was conducted at four locations on the University X campus, including Building A, Building B, Building C, and Building D. Consequently, this study was compiled into a final thesis report titled **"A STUDY OF THE IMPLEMENTATION OF ACCESSIBILITY FACILITIES FOR PEOPLE WITH DISABILITIES BASED ON UNIVERSAL DESIGN THEORY"** which aims to analyze the extent to which University X has implemented accessibility facilities that reflect a disability-friendly campus based on the following principles: 1) Flexibility In Use; 2) Simple and Intuitive Use; and 3) Low Tolerance of Error.

METHOD

This research method uses a checklist table developed based on Regulation of the Minister of Public Works and People's Housing (PUPR) No. 14 of 2017 concerning Building Accessibility Requirements as an instrument to assess the adequacy of accessibility facilities for people with disabilities. Data collection was conducted through field observations, interviews, questionnaires, and a review of documentation. The study focused on four buildings at University X: Building A,

Building B, Building C, and Building D. Observation data were recorded in the checklist table by comparing the existing conditions of each facility against the established indicators and technical requirements. Subsequently, an analysis was conducted by calculating the percentage of indicator compliance, that is, comparing the number of indicators that met the requirements to the total number of indicators assessed, then multiplying by 100%. These results were used to describe the level of compliance of accessibility facilities in each building based on PUPR regulations, which served as the reference for this study.

RESULT AND DISCUSSION

Research Result

This study examined the availability and compliance with accessibility standards for people with disabilities at four locations at University X: the lecture buildings of Faculty A, Faculty B, and Faculty C, as well as Building D. The primary data sources for this study were obtained through field observations at these four research sites. To validate the validity of the data, questionnaires and interviews were conducted with students with disabilities, fellow students from Faculties A, B, and C, students who had previously visited Building D, and general administrative staff at each building. The questionnaire respondents' data were grouped based on profile categories and the buildings the respondents intended to visit, as presented in Table 1. Based on Table 1, data was collected from 25 individuals to validate the availability of facilities in lecture buildings A, B, C, and D. To validate the observational data, a questionnaire was distributed regarding the availability of facilities and supplementary features related to accessibility.

Table 1. Demographics of Questionnaire Respondents

Profile Groups	Percentages	Building Purpose	Number of Respondents	Percentages
Non-disability student	92%	Building A	7 people	28%
		Building B	6 people	24%
		Building C	5 people	20%
		Building D	5 people	20%
Disability student	8%	Building A	1 people	4%
		Building C	1 people	4%
TOTAL	100%		25 people	100%

Current Condition in Flexibility In Use

In terms of spatial accessibility, the availability of several facilities was evaluated. First, based on observations at all four locations, access to the buildings was equipped with guiding blocks, textured floor surfaces featuring lines and polka dots, particularly on the sidewalks leading

from the front yard of the building to the main entrance. However, in terms of quantity, they are still very limited, particularly on the sidewalks around the lecture buildings of Faculty A and Faculty C. In addition, the guide paths found at University X: (a) on the sidewalk near Faculty Building B have low color contrast; (b) at several points, they are damaged to the point where the surface texture is lost and covered with moss; and (c) the sidewalk near the gate leading to the parking lot is obstructed by objects, as shown in the image below.



(a) (b) (c)

Source: researcher's documentation, February 2026

Image 1. Condition of the Guide Paths at University X (a) Low contrast, (b) Damaged/covered with moss, (c) Obstructed by objects

Furthermore, elevators, the primary means of moving between floors, are available in all four buildings included in the study. However, the availability of accessibility features for students with disabilities is not consistent across all buildings or within each elevator unit. Based on observations, Braille symbols were found only in elevators designated for faculty and staff, specifically in Faculty Building A. Additionally, the audio announcements designed to provide information about the destination floor were found to be non-functional in the elevators of Faculty Building B, and were entirely absent in Faculty Building A.



(a) (b)

Source: researcher's documentation, February 2026

Image 2. A comparison of (a) the elevators reserved for faculty and staff and (b) the student elevators in Faculty Building A at University X

Last, to support activities within the buildings, accessible restrooms are now available in all four buildings at University X. In general, the accessible restrooms in all four buildings are equipped with handrails to facilitate transfers from a wheelchair to the toilet and feature non-slip flooring. However, a point of concern is the door width in the Faculty A lecture building. Based

on field data, the width of the accessible restroom door is less than optimal for wheelchair users, as the entrance and exit to the accessible restroom measure only approximately ±50cm.



(a) (b)

Source: researcher's documentation, February 2026

Image 3. Condition of Accessible Restrooms at University X

Current Condition in Simple and Intuitive Use

To ensure compliance with the principle of barrier-free access, the observations focused on doors, ramps, hallways, and parking areas. Based on the observations, the main entrances to all buildings surveyed were wide enough for wheelchair users to pass through. However, not all main entrances were equipped with automatic doors fitted with sensors. For example, at Faculty Building B and Building D, the main doors still use a manual system that requires physical force to open and close them.

Furthermore, based on the observation results, the sidewalks at University X are not yet equipped with ramps or sloped pathways connecting the sidewalk to the roadway. Ramps are generally found only in the front areas of buildings adjacent to the entrances. Although the width of the available ramps complies with applicable standards, observations show that (a) some ramps still have a fairly steep slope and (b) the ramps are not equipped with handrails or grab bars. These conditions were found on the ramp leading to Building D, as shown in the following image.



(a) (b)

Source: researcher's documentation, February 2026

Image 4. Condition of the ramps at the front and rear sections of the library building

In addition to access to the buildings, observations were conducted in the hallways as accessibility routes to rooms inside the buildings. In the four buildings studied, the observations showed that the hallways were wide enough for wheelchair users to pass through, although there

were some objects such as flower vases, banners (advertising signs), and other items in the hallway areas. However, not all hallways were equipped with guiding blocks. In (a) Faculty Building A, tactile paving was only available in the second- and third-floor corridors. Meanwhile, in (b) Faculty Building C, tactile paving was only found in the first-floor corridor. As for (c) Faculty Building B, guiding blocks are only available in the corridors leading to specific rooms. Unlike these three buildings, (d) the corridors in Building D are not equipped with guiding blocks.



(a) (b) (c) (d)

Source: researcher's documentation, February 2026

Image 5. Availability of guiding blocks in the corridors inside the building

Next, observations were made regarding the availability of designated parking spaces for people with disabilities. The results of the observation revealed a lack of parking spaces specifically designated for people with disabilities. Among the four buildings included in the study, designated parking spaces for people with disabilities, marked with road markings, were found only in the basement parking area of Faculty Building C. However, these designated parking spaces were not equipped with sufficient clear space to allow wheelchair users to maneuver when getting in and out of their vehicles.

Current Condition in Low Tolerance of Error

To ensure user safety and security, the review covered the condition of staircases, handrails, and evacuation routes. Based on the observations made, in addition to elevators, staircases are also available as a means of inter-floor accessibility in every building. Each step is 18 cm high and features a textured pattern of widening lines designed to prevent slipping.

However, as a means of manual movement between floors, there is a limited number of staircases equipped with (a) warning blocks or warning tiles at the beginning and end of the stairs. Through the observations conducted, these features were only found on the stairs on the 2nd and 3rd floors of the Faculty A lecture building. Additionally, the stairs are equipped with handrails to aid balance. However, in all four buildings studied, the handrails are not equipped with Braille symbols.



(a) (b)

Source: researcher's documentation, February 2026

Image 6. Condition of warning blocks and Braille symbols on the stairs

Apart from the stairs, there are several areas equipped with handrails to ensure the balance and safety of building users, such as in the restrooms for people with disabilities and inside the elevators. However, there is a limited number of ramps located outside the front of the building to facilitate entry and exit for wheelchair users. Based on observations, ramps leading to the building that are equipped with handrails on both the right and left sides are located at (a) the Faculty A lecture building, (b) the Faculty B lecture building, and (c) the Faculty C lecture building.



(a) (b) (c)

Source: researcher's documentation, February 2026

Image 7. Condition of the handrails on the ramp of the lecture hall at X University

Meanwhile, based on the observations conducted, the ramp at the front of the library building is located only on the outermost side, and the ramp at the rear of the building is not equipped with a handrail at all. Furthermore, based on observations of the four buildings included in the study, all buildings are equipped with evacuation routes as safety measures. In the lecture buildings of Faculty A, Faculty B, and Faculty C, the evacuation routes are easily accessible on the right and left wings of the buildings. The available evacuation routes are also equipped with exit signs on the building ceilings near the route entrances. However, some of the signs are not illuminated. Meanwhile, the evacuation routes in Building D are located at the rear of the building and are out of sight of library visitors. Observations of the evacuation routes in this library building revealed that they are not equipped with exit signs or directional signage in accordance with applicable standards.

Discussion

Analysis of Flexibility in Use Implementation

After identifying the condition of each accessibility feature for people with disabilities, the data from observations, interviews, and questionnaires were analyzed based on the three principles of Universal Design. The principle of independence emphasizes that everyone, including people with disabilities, should be able to use services and areas within a building independently without always having to rely on others (Edwards et al., 2022). Tactile guide paths, elevators, and accessible restrooms are the three facilities that must be equipped with elements that assist students with disabilities in moving independently throughout the building and campus spaces (Ünal, 2025).

Table 2. Analysis the Implementation of Guide Paths

No	assessment indicators	Research Unit			
		A	B	C	D
1.	Accessibility to the building	✓	✓	✓	✓
2.	Accessibility within the building on each floor	×	×	×	×
3.	Consists of guide tiles and warning tiles	✓	✓	✓	×
4.	The guide tiles leading to the building are in good condition	✓	×	✓	✓
5.	The guide tiles inside the building are in good condition	✓	✓	✓	×
6.	The guide tiles leading to the building are a contrasting color from the regular floor	×	×	×	×
7.	The guide tiles inside the building are a contrasting color from the regular floor	✓	✓	✓	×
	Analysis	$\frac{5}{7} \times 100 = 71,43\%$	$\frac{4}{7} \times 100 = 57,14\%$	$\frac{5}{7} \times 100 = 71,43\%$	$\frac{2}{7} \times 100 = 28,57\%$
	interpretation	**GOOD**	**FAIR**	**GOOD**	**NOT GOOD**

As one of the accessibility features designed to support the mobility of people with disabilities, tactile guidance paths should be designed to help users, particularly those with low vision or who are blind—move independently and safely (Maldonado-Garcés et al., 2025). However, the limited availability of tactile guidance paths in some areas of the study site indicates that this function has not yet been fully realized. As a result, students with disabilities, especially those who are blind, still require assistance from others to reach buildings or navigate to specific rooms within them.

Table 3. Analysis the Implementation of Lift

No	assessment indicators	Research Unit			
		A	B	C	D
1.	availability in the building	✓	✓	✓	✓

No	assessment indicators	Research Unit			
		A	B	C	D
2.	the door open/close buttons are equipped with sensors	×	×	×	×
3.	Minimum dimensions: 230 x 120 cm	×	×	×	×
4.	Minimum door width: 110 cm	✓	✓	✓	×
5.	Handrails are installed on the elevator walls	✓	✓	✓	×
6.	Floor buttons are equipped with Braille symbols	×	✓	✓	✓
7.	Audio floor announcements are provided	×	×	✓	×
	Analysis	$\frac{3}{7} \times 100 = 42,86\%$	$\frac{4}{7} \times 100 = 57,14\%$	$\frac{5}{7} \times 100 = 71,43\%$	$\frac{2}{7} \times 100 = 28,57\%$
	interpretation	**FAIR**	**FAIR**	**GOOD**	**NOT GOOD**

The principle of independent use of space emphasizes that every facility must be easily and independently accessible to all users, regardless of their abilities, experience, or physical condition (Ravelino et al., 2023). owever, the limitations in elevator accessibility features, as identified in the findings, indicate that this principle has not yet been fully met. This situation means that students with disabilities still require assistance from others to operate elevators, particularly when selecting their destination floor or obtaining information about floor levels.

This dependence has the potential to increase the risk of errors, such as selecting the wrong destination floor or other situations that could compromise user safety and comfort (Maldonado-Garcés et al., 2025). Therefore, providing comprehensive and properly functioning accessibility features is a critical factor in supporting the independence of people with disabilities when using elevator facilities.

Table 4. Analysis the Implementation of Accessible Restrooms

No	Assessment Indicators	Research Unit			
		A	B	C	D
1.	Equipped with a kick plate at the bottom of the door	×	×	×	×
2.	Non-slip flooring	✓	✓	✓	✓
3.	Equipped with handrails	✓	✓	✓	✓
4.	Minimum door width: 80 cm	×	×	✓	✓
5.	Minimum clear space in front of the door: 1.5 m	✓	×	✓	✓
	Analysis	$\frac{3}{5} \times 100 = 60\%$	$\frac{2}{5} \times 100 = 40\%$	$\frac{4}{5} \times 100 = 80\%$	$\frac{4}{5} \times 100 = 80\%$
	interpretation	**FAIR**	**FAIR**	**GOOD**	**GOOD**

In the principle of independent use of space, it is always emphasized that facilities must be designed to support the independent mobility of all individuals. Independent use of restrooms is determined not only by the availability of accessible restrooms but also by the user's ability to access, reach, operate, and use all facilities within them without unnecessary assistance

(Maldonado-Garcés et al., 2025). However, in reality, implementation does not align with previous research. Implementation at University X has not been optimal due to limitations regarding the ramp and the clear space required for wheelchair users to maneuver.

Analysis of Simple and Intuitive Use Implementation

In this concept of inclusive design introduced by Ronald Mace, every pathway within a building must be designed to be easily accessible to everyone, without exception. Based on this principle, buildings must have dimensions, slopes, and layouts that allow users to move comfortably and safely (Edwards et al., 2022). To facilitate movement while carrying out activities on campus, automatic doors, ramps, corridors, and designated parking spaces are provided.

Table 5. Analysis of Door Implementation

No	Assessment Indicators	Research Unit			
		A	B	C	D
1.	The building is equipped with automatic doors with sensors.	✓	×	✓	×
2.	The width of room doors must be at least 80 cm.	✓	✓	✓	✓
3.	The width of the main entrance must be at least 90 cm.	✓	✓	✓	✓
4.	The height of the door handle from the floor must not exceed 100 cm.	✓	✓	✓	✓
	Analysis	$\frac{4}{4} \times 100 = 100\%$	$\frac{3}{4} \times 100 = 75\%$	$\frac{4}{4} \times 100 = 100\%$	$\frac{3}{4} \times 100 = 75\%$
	interpretation	**GOOD**	**GOOD**	**GOOD**	**GOOD**

Doors are one of the building components that serve as entry and exit points for all building users. Based on the concept of Universal Design, doors must be designed to provide ease of use for all individuals, including people with disabilities, so that all visitors can access the building without barriers (Ramli et al., 2025). rom a Universal Design perspective, the use of automatic doors can support the independence of people with disabilities by reducing the need for physical effort and facilitating entry into the building (Ünal, 2025). Tough the analysis results were all categorized as "good," in terms of design, the doors in Building B and Building D still do not meet the established accessibility standards regarding ease of use.

Table 6**.** Analysis the Implementation of a Ramp

No	assessment indicators	Research Unit			
		A	B	C	D
1.	Accessibility on sidewalks around the building	×	×	×	×
2.	Accessibility to the building	✓	✓	✓	✓
3.	Minimum width of 95 cm	✓	✓	✓	✓
4.	Handrails provided	✓	✓	✓	✓
5.	Standard slope ratio of 1:12	✓	×	✓	×

No	assessment indicators	Research Unit			
		A	B	C	D
	Analysis	$\frac{4}{5} \times 100 = 80\%$	$\frac{3}{5} \times 100 = 60\%$	$\frac{4}{5} \times 100 = 80\%$	$\frac{3}{5} \times 100 = 60\%$
	interpretation	GOOD	FAIR	GOOD	FAIR

A ramp is a circulation pathway with a specific slope and width designed to facilitate access between floors for people with disabilities. This feature is a crucial component in ensuring accessibility when moving between locations. Regarding the evaluation of ramps, the findings indicate that the ramp designs in Buildings A and C of the Faculty are in compliance with the applicable slope standard of 1:12. Meanwhile, the other two buildings, Faculty Buildings B and D are do not yet meet accessibility standards, particularly regarding the slope ratio.

Based on observations, the ramp in Faculty Building B has a slope ratio of 1:7, while the ramp in Building D has a slope ratio of 1:2. These ratios do not meet the standard, which specifies a ramp slope of 1:12. This situation indicates that the ramps are still too steep, potentially creating difficulties for users, particularly people with disabilities, wheelchair users, the elderly, and those with limited mobility. As a facility designed to facilitate building access, ramps should be designed to be easily used by all users without requiring excessive physical effort. A gradient that meets the standard allows users to navigate the ramp more easily, safely, and comfortably. Conversely, ramps that are too steep such as those in Faculty Building B and Building D to reduce accessibility.

Table 7. Analysis the Implementation of a Hallway

No	assessment indicators	Research Unit			
		A	B	C	D
1.	The building has hallways.	✓	✓	✓	✓
2.	The hallways on each floor are equipped with guide paths.	×	×	×	×
3.	The hallways are 92–204 cm wide.	✓	✓	✓	✓
4.	The hallways have a minimum clear width of 92 cm, free of obstacles or barriers.	✓	✓	✓	✓
	Analysis	$\frac{3}{4} \times 100 = 75\%$	$\frac{3}{4} \times 100 = 75\%$	$\frac{3}{4} \times 100 = 75\%$	$\frac{3}{4} \times 100 = 75\%$
	interpretation	GOOD	GOOD	GOOD	GOOD

A corridor, or circulation route, is a semi-open space within a building bounded by walls on two sides. In the concept of Universal Design, corridors must be designed and laid out with consideration for the needs of every individual, including people with disabilities (Maldonado-Garcés et al., 2025). As a circulation route connecting different spaces, corridors must not only meet width requirements; Universal Design also stipulates that they must be equipped with

accessibility features that support ease of use for all users, including guiding blocks for people with visual impairments (Ramli et al., 2025). This indicates that implementation has not been consistent; the condition of the corridors at University X is not yet fully optimal for every individual because not all corridors are equipped with guiding blocks for people with visual impairments.

Table 8. Analysis the Implementation of an accessibible parking space

No	assessment indicators	Research Unit			
		A	B	C	D
1.	There is a designated parking area around the building.	×	✓	✓	×
2.	It is equipped with clear parking boundary markings.	×	×	✓	×
3.	It is located on level ground.	×	✓	✓	×
4.	The minimum clearance between vehicles is 160 cm.	×	×	×	×
5.	The maximum distance from the parking area to the building entrance is 60 m.	×	✓	✓	×
	Analysis	$\frac{0}{5} \times 100 = 0\%$	$\frac{3}{5} \times 100 = 60\%$	$\frac{4}{5} \times 100 = 80\%$	$\frac{0}{5} \times 100 = 0\%$
	interpretation	**NOT GOOD**	**FAIR**	**GOOD**	**NOT GOOD**

Designated parking spaces for people with disabilities serve to provide parking closer to building entrances for people with disabilities. This is intended to make it easier for people with disabilities to access buildings (Maldonado-Garcés et al., 2025). Unfortunately, however, the implementation at University X does not align with this theory. The compliance levels for designated parking spaces for people with disabilities vary. Some buildings do not yet provide designated parking spaces for people with disabilities, while others have provided such facilities, although they do not yet fully meet all required indicators. This situation indicates that the provision of designated parking spaces for people with disabilities has not been implemented uniformly or optimally across all buildings, and thus does not fully support users' ease of access to the campus environment in accordance with the principle of independent use of space. Based on the principle of ease of use, designated parking areas for people with disabilities must be designed to be easily identifiable, easily accessible, and provide adequate space for wheelchair users and other people with disabilities to get in and out of their vehicles with ease. The limited availability of parking facilities and the failure to meet design standards in some buildings indicate that the principle of ease of use has not yet been fully realized.

Analysis of Low Tolerance of Error Implementation

Based on this principle, designs must be crafted in such a way as to minimize the likelihood of accidents and provide a sense of safety for all users, without exception, including individuals with disabilities who have limited mobility (Ünal, 2025). Measures to minimize the likelihood of accidents can be achieved through staircase design, such as adjusting the height of each step, installing handrails in high-risk areas, and providing evacuation routes.

Table 9. Analysis the Implementation of a Stair

No	assessment indicators	Research Unit			
		A	B	C	D
1.	There is a staircase inside the building.	✓	✓	✓	✓
2.	The stair treads are made of slip-resistant material.	✓	✓	✓	✓
3.	The ends of the stair handrails are marked with Braille symbols.	×	×	×	×
4.	There are warning blocks before and after each step.	✓	×	×	×
5.	The maximum step height is 18 cm.	✓	✓	✓	✓
6.	The minimum step width is 30 cm.	✓	✓	✓	✓
	Analysis	$\frac{5}{6} \times 100 =$ **83,33%**	$\frac{4}{6} \times 100 =$ **66,67%**	$\frac{4}{6} \times 100 =$ **66,67%**	$\frac{4}{6} \times 100 =$ **66.67%**
	interpretation	**GOOD**	**FAIR**	**FAIR**	**FAIR**

As a means of vertical movement between floors in a building, used manually by occupants to move from one level to another, stairs serve as a safe vertical exit route from the building in unexpected situations. Therefore, based on safety and security principles, every facility must be designed to minimize the risk of misuse and potential accidents (Ünal, 2025). The inclusion of Braille symbols at the ends of handrails serves to provide information about the current position or floor being accessed, thereby helping people with visual impairments navigate more safely and independently. Therefore, even though the staircase dimensions meet standards, the absence of these supportive features indicates that safety and security principles have not been fully implemented in the staircase design.

Table 10. Analysis the Implementation of a Handrail

No	Assesment Indicators	Research Unit			
		A	B	C	D
1.	Availability of handrails in areas with potential hazards	✓	✓	✓	✓
2.	Handrails are securely installed	✓	✓	✓	✓
3.	Handrail surfaces are smooth, with no sharp edges or cracks	✓	✓	✓	✓
4.	In good condition	✓	✓	✓	✓
5.	Handrail ends are safely finished (rounded and flush with the wall)	✓	✓	✓	✓

No	Assesment Indicators	Research Unit			
		A	B	C	D
	Analysis	$\frac{5}{5} \times 100 = 100\%$	$\frac{5}{5} \times 100 = 100\%$	$\frac{5}{55} \times 100 = 100\%$	$\frac{}{5} \times 100 = 100\%$
	interpretation	GOOD	GOOD	GOOD	GOOD

Handrails are supportive facilities designed to provide additional safety and security and to make it easier for users to navigate to a destination (Ünal, 2025). n the handrail evaluation, the results of the assessment indicated that the installation of handrails met all the indicators used in the study. This is supported by the appropriate placement of handrails in areas with higher potential risks, such as the perimeter walls of each floor, accessible restrooms, staircases, and elevators. Furthermore, the physical condition of the handrails also meets functional requirements: they are sturdy when in use, have no sharp edges, and are free of rust. Based on the Universal Design principle of safety and security for all, the provision of handrails in areas with potential risks is an effort to minimize the likelihood of accidents or misuse. The presence of handrails provides a stable point of support, helping users maintain their balance while moving around or using building facilities. Therefore, the installation of handrails in the study units reflects the application of safety and security principles in Universal Design, as it reduces the potential risk of injury and enhances a sense of safety for every individual, particularly students with disabilities.

Table 11. Analysis the Implementation of an Evacuation Route

No	assessment indicators	Research Unit			
		A	B	C	D
1.	Evacuation routes lead to assembly points	✓	✓	✓	✓
2.	located in easily accessible/visible/reachable areas	✓	✓	✓	×
3.	equipped with directional signs pointing to the assembly points	✓	✓	✓	×
4.	equipped with illuminated signs above the doors	×	×	✓	×
	Analysis	$\frac{3}{4} \times 100 = 75\%$	$\frac{3}{4} \times 100 = 75\%$	$\frac{4}{4} \times 100 = 100\%$	$\frac{1}{4} \times 100 = 25\%$
	interpretation	GOOD	GOOD	GOOD	Tidak GOOD

An evacuation route is a corridor-like space designated to facilitate the movement of building occupants out of the building during an emergency toward an assembly point, such as an open field. Based on observations, the evacuation route is located at the rear end of the building, accessed through a door that is generally kept closed and rarely used by building visitors. Furthermore, the route is not yet equipped with directional signs pointing toward the evacuation

route or the assembly point. These conditions could potentially make it difficult for library visitors to identify the location of the evacuation route and determine the direction to take to ensure their safety in the event of an emergency.

This situation is corroborated by a statement from the Head of Building D, who, based on an interview, explained that during emergencies, such as the 2022 earthquake, building visitors tend to evacuate en masse on their own through the building's main entrance. This occurs because most visitors are unaware of the evacuation routes located at the rear of the building. Consequently, the evacuation routes that have been provided are not utilized optimally during the self-rescue process in an emergency.

This indicates that, in accordance with safety and security principles, evacuation routes must be designed to minimize the risk of user errors, confusion, and delays during the evacuation process. Glowing "EXIT" signs and directional signs pointing toward assembly points play a crucial role in providing easily recognizable information so that users can make quick and accurate decisions in emergency situations(Ravelino et al., 2023). However, in practice, University X has yet to optimally provide the necessary equipment for these evacuation routes.

Although this study has provided an overview of the implementation of accessibility facilities in the buildings under study, there are several limitations that must be considered when interpreting the research findings. These limitations relate to the scope of the study's location and the timeframe of the research, which should be taken into account when formulating the direction of future research.

CONCLUSIONS AND RECOMMENDATIONS

The results of the identification and analysis show that accessibility facilities for people with disabilities at X University do not yet fully comply with the principles of Universal Design, particularly in the following three aspects: (1) Flexibility In Use: The availability and equitable distribution of accessibility facilities are not yet optimal in supporting the independence of people with disabilities when accessing campus facilities, particularly regarding guide paths that are still interrupted and elevators that are not equipped with disability-friendly features. (2) Simple and Intuitive Use: There are still accessibility features that do not optimally support users' mobility in a barrier-free manner. These include the slope of ramps, automatic doors, and the availability of designated parking spaces for people with disabilities. (3) Low Tolerance of Error: Some facilities do not yet provide adequate protection and safety for all users. Examples include handrails on stairs and disability-friendly evacuation routes.

Based on these findings, University X is advised to (1) install and ensure the uniform distribution of accessibility features in buildings that do not yet meet the requirements; (2) improve circulation routes, ramps, and access between rooms to ensure barrier-free use; and (3) install and repair safety features, such as handrails on stairs, non-slip surfaces, and hazard markers in high-risk areas. The implementation of these improvements must adhere to the technical requirements outlined in Ministry of Public Works and Public Housing Regulation No. 14 of 2017 on Building Accessibility Requirements, prioritizing facilities that do not yet meet the assessment criteria.

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