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The Concern of Architects and Design Teams toward Universal Design and Its Implementation in Building Design (Case Study: “Architect ALIEN Design Consultant Firm”)

Rizky Mi'raj Furadana^{1*}, Tulus Widiarso²

^{1,2}Universitas Trisakti, Jakarta, Indonesia

*Correspondence: Email: rizkymfuradana99@gmail.com

ABSTRACT

This study aims to examine the relationship between the concern of architects and design teams toward the application of Universal Design and its implementation in Detail Engineering Design (DED) documents. The study was conducted at Alien Design Consultant (Alien DC) and focused on projects that had reached the DED stage during the 2018–2024 period. The research was motivated by the gap between accessibility regulations and Universal Design principles and their implementation in architectural design practice. This research employed a mixed-methods approach with a case study strategy. Data were collected through DED document audits using a checklist based on Universal Design principles and accessibility regulations, questionnaire surveys distributed to design team members, and semi-structured interviews with architects and design team members. The findings indicate that architects and design teams demonstrate a high level of concern regarding the importance of Universal Design in the design process. However, the implementation of Universal Design within DED documents varies across different design aspects and projects. The study identified a gap between architects' concern and the actual implementation of Universal Design in design outcomes, particularly in elements that are not considered primary design priorities. This gap is influenced by factors such as time constraints, project targets, a focus on meeting minimum regulatory requirements, and the lack of systematic integration of Universal Design within the design

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review process. The study concludes that architects' concern is an important factor in supporting the implementation of Universal Design, but it is not sufficient to ensure consistent application within DED documents. Therefore, the integration of Universal Design from the early stages of the design process, supported by design checklists, periodic design reviews, and capacity building for design teams, is necessary to promote more inclusive environments that can be used equitably by all users.

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1. INTRODUCTION

The rapid development of urban areas requires built environments that are inclusive, safe, resilient, and accessible for all users. In the Sustainable Development Goals agenda, inclusivity in cities is not limited to infrastructure provision, but also includes equal access to buildings, public facilities, and daily services for people with diverse physical, sensory, cognitive, and social needs (PBB, n.d.) (Zallio et al., 2024) (Carlsson et al., 2022). Recent studies on public building accessibility show that barriers in the built environment continue to limit participation, independence, and spatial equity, particularly for persons with disabilities, older adults, children, and users with temporary mobility limitations (Carlsson et al., 2022) (Kapsalis et al., 2024).

In architecture, accessibility has developed from a barrier-free and compliance-oriented approach into a broader Universal Design framework. Universal Design aims to create products, buildings, and environments that can be used by the widest possible range of users without the need for special adaptation. The seven principles of Universal Design consist of equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, and size and space for approach and use (Follette et al., 1998) (Bianco, 2020). This approach differs from accessible design because it does not only address specific user groups, but also places human diversity as a primary design consideration from the beginning of the design process (Linden & Dong, 2019) (Watchorn et al., 2023).

Recent literature emphasizes that inclusive and Universal Design should not be understood only as physical access. Inclusive design also involves orientation, comfort, safety, independence, dignity, and the overall experience of users when interacting with the built environment (Linden & Dong, 2019) (Ying & Bahaiddin, 2022) (Zallio & Clarkson, 2021). Therefore, the quality of Universal Design implementation must be evaluated not only from the existence of accessibility elements, but also from how these elements are integrated into spatial organization, circulation systems, information systems, service areas, and supporting facilities (Kapsalis et al., 2024) (Watchorn et al., 2023).

In the Indonesian context, accessibility in buildings is regulated through the Regulation of the Minister of Public Works and Housing Number 14 of 2017 and Government Regulation Number 16 of 2021 (IAI, 2026). These regulations establish technical requirements for circulation paths, ramps, elevators, accessible toilets, parking areas, entrances, and other supporting facilities. However, several studies in Indonesia indicate that the implementation of accessibility standards remains inconsistent. Evaluations of public facilities, office buildings, ramps, sidewalks, and service facilities show that non-compliance is still found in aspects of dimensions, slope, safety, signage, and supporting facilities (Wibawa, 2019) (Zallio & Clarkson, 2021) (Putri et al., 2024) (Muhammadiyah & Selao, 2025).

This condition shows that the existence of regulation does not automatically guarantee inclusive design outcomes. Many accessibility elements are still treated as technical additions or minimum compliance requirements rather than being integrated as part of the design concept. The compliance-based approach tends to focus on fulfilling mandatory standards, while Universal Design requires a more comprehensive process that considers user diversity, user experience, and long-term usability (Grangaard, 2016) (Zallio & Clarkson, 2021)

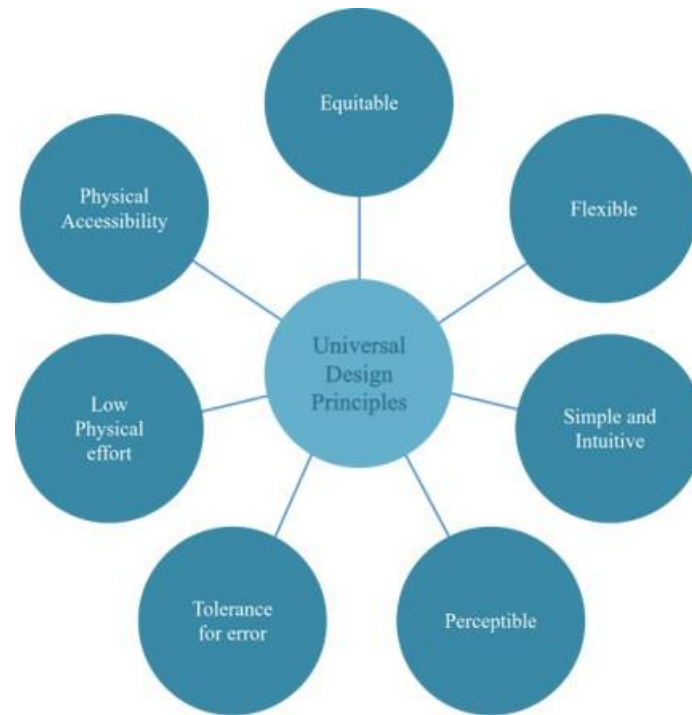


Figure 2. Universal Design Principles

Sumber : ADCET Australian Disability Clearinghouse on Education and Training, 2026

In professional architectural practice, design quality is influenced not only by regulations and technical standards, but also by the concern, awareness, and priorities of architects and design teams. Design decisions are produced through the negotiation of various factors, including user needs, building function, regulations, project targets, cost, time, coordination, and the values held by designers (Lawson, 2006). Therefore, architects' concern toward Universal Design has the potential to influence how accessibility principles are translated into spatial decisions, technical drawings, and construction documents.

Several studies show that architects and building professionals often recognize the importance of inclusive design, but its implementation is not always consistent in practice. Lack of knowledge, limited design tools, project time pressure, budget constraints, and client priorities may reduce the integration of inclusive design during the design process (Khoojine & In, 2020) (Zallio & Clarkson, 2021). Research on Universal Design education also indicates that awareness and training can improve designers' attitudes toward disability and accessibility, but this awareness still needs to be supported by practical evaluation instruments and organizational design procedures (Watchorn et al., 2023) (Bianco, 2020)

Post-occupancy and building evaluation studies further confirm that many public buildings still contain barriers despite the presence of accessibility standards. Studies on libraries, educational buildings, public facilities, and urban spaces identify recurring problems in circulation, wayfinding, ramps, toilets, service counters, and information systems (Anis Fathipour, Seyyed Mohammad Hossein Zakeri, 2024) (Harahap, 2024) (Neufert, n.d.) (Yakob et al., 2022). These findings indicate that accessibility is not only a matter of regulation, but also a matter of design interpretation, coordination, and control during planning and documentation.

Detail Engineering Design (DED) documents are important because they represent the translation of design concepts into technical information used for construction. If Universal Design principles are not clearly documented in DED drawings, the implementation of inclusive design during construction may become inconsistent or incomplete. Previous research has mostly focused on evaluating existing buildings or user experience after

occupancy, while studies that connect architects' concern with the implementation of Universal Design in DED documents are still limited (Watchorn et al., 2023) (Kurniawan et al., 2024) (Zallio & Clarkson, 2021).

This gap is particularly relevant in architectural firms that handle office and public-service buildings, because these projects involve diverse users and require careful integration of accessibility into circulation, entrances, service areas, toilets, vertical circulation, and supporting facilities.

Unlike previous studies that mainly evaluate the physical condition of built facilities or compliance with accessibility standards, this study connects two dimensions: the concern of architects and design teams toward Universal Design and the implementation of Universal Design in DED documents. This approach enables the identification of gaps between conceptual concern, design priorities, and technical documentation. The novelty of this study lies in positioning DED drawings as evidence of design decision-making while simultaneously examining the concern of architects and design teams who produce those documents.

Based on these conditions, this study aims to identify the level of concern of architects and design teams toward Universal Design, evaluate its implementation in Detail Engineering Design (DED) documents, and analyze the gap between concern and design implementation. The study was conducted at Alien Design Consultant (Alien DC) as a case study to understand how Universal Design is considered and translated into professional architectural practice. The findings are expected to contribute to the development of more systematic design strategies, internal checklists, and review mechanisms to improve the consistency of Universal Design implementation in architectural design practice.

2. RESEARCH METHOD

This study employs a mixed-methods case study approach at Alien Design Consultant (Alien DC). The method was selected to analyze the relationship between architects' and design teams' concern toward Universal Design and its implementation in Detail Engineering Design (DED) documents. Quantitative data were obtained from questionnaire results and DED audit scores, while qualitative data were obtained through semi-structured interviews with architects and design team members involved in the design process.

The research objects consist of selected building projects designed by Alien Design Consultant during the 2018-2024 period and already developed into DED documents. The projects were selected purposively based on the availability of DED drawings, completeness of design information, and relevance to Universal Design evaluation. This scope is consistent with the thesis limitation, which focuses on planning documents and does not evaluate post-occupancy performance or user experience.

Data collection was conducted through three main techniques. First, DED document audits were carried out using a checklist developed from Universal Design principles, Indonesian accessibility regulations, and accessibility audit references. The audit covered site and building aspects, including access points, pedestrian pathways, parking, drop-off zones, entrances, horizontal and vertical circulation, toilets, reception areas, service counters, signage, pathway surfaces, and supporting facilities.

Second, questionnaires were distributed to design team members to measure their level of concern toward Universal Design in the design process. The questionnaire used a 1-10 rating scale to assess concern toward general Universal Design principles, site accessibility aspects, and building accessibility aspects.

Third, semi-structured interviews were conducted with architects and design team members to explore their understanding of Universal Design, design considerations,

implementation experiences, obstacles, and expectations for more inclusive design practice. The interview results were analyzed thematically to identify patterns of concern and factors affecting implementation.

Quantitative data from the questionnaire and DED audit were analyzed using descriptive statistics, including mean values and percentages. Qualitative interview data were analyzed through thematic coding. The final analysis was conducted through triangulation by comparing questionnaire results, interview findings, and DED audit results to identify the relationship and gap between concern and implementation.

The research stages are summarized in Figure 3, showing the flow from literature review, case selection, data collection, data analysis, triangulation, gap identification, and formulation of Universal Design integration strategies.



Figure 3. Research Method and Data Triangulation Flow
(Source: Author, 2026)

3. RESULTS AND DISCUSSION

3.1 Level of Design Team Concern toward Universal Design (Questionnaire)

The analysis of the design team's level of concern toward Universal Design was conducted based on the results of questionnaires distributed to respondents involved in the building design process. The questionnaire was designed to identify respondents' level of concern toward various aspects of Universal Design, including the general Universal Design approach, site-related aspects, and building-related aspects.

Each aspect was assessed using a 1–10 rating scale, in which a higher score indicates a greater level of concern toward the assessed aspect. The assessment results were then processed using the mean value to determine the tendency of respondents' level of concern for each Universal Design variable.

Table 1. General Aspects

NO	ASPECT	VARIABLE	MEAN
1	GENERAL	Implementation of Universal Design principles	7,83
2		Universal Design principles considered from the early design stage	7,67
3		Regulations in the design process	8,17

(Source: Author, 2026)

Table 2. Site Aspects

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1	SITE	Access Point	5,67
2		Parking Area	7,83
3		Drop-Off and Pick-Up Zone	7,83
4		Pedestrian Pathway	8
5		Site Vertical Circulation	8,33
6		Supporting Facilities	8,5
7		Pathway Surface	8,83
8		Public Toilet on Site	7,5

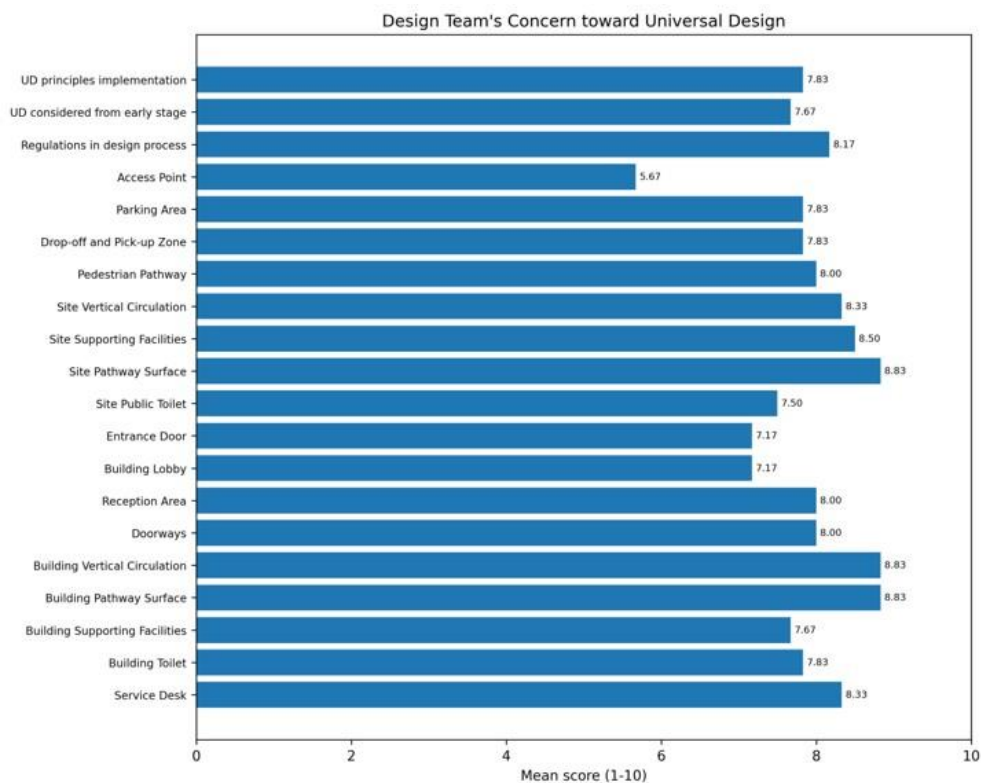
(Source: Author, 2026)

Table 3. Building Aspects

NO	ASPECT	VARIABLE	MEAN
1	BANGUNAN	Entrance Door	7,17
2		Building Lobby	7,17
3		Reception Area	8
4		Pintu Dalam Bangunan	8
5		Vertical Circulation	8,83
6		Pathway Surface	8,83
7		Supporting Facilities	7,67
8		Building Toilet	7,83
9		Service Desk	8,33

(Source: Author, 2026)

Table 4. Chart of the Design Team's Concern toward Universal Design



(Source: Author, 2026)

Based on the questionnaire results, the design team's level of concern toward site aspects is generally in the high category, with the mean value of all variables above 5.00 on a scale of 1–10. This indicates that accessibility aspects on the site have become one of the considerations in the building design process.

The variable with the highest mean value is the provision of pathway pavement or pathway surface (8.83), followed by supporting facilities (8.50) and site vertical circulation (8.33). These findings indicate that the design team gives considerable concern to the smooth movement of users and the provision of facilities that support accessibility within the site environment.

The pedestrian pathway aspect also obtained a high score (8.00), indicating that pedestrian mobility is one of the priorities in the design process. In addition, the concern toward accessible parking (7.83) and drop-off zones (7.83) shows an awareness of the

importance of access for all users, including persons with disabilities and other vulnerable groups.

Meanwhile, public toilets on the site obtained a mean value of 7.50, which remains in the high category, although it is relatively lower than several other site aspects. The variable with the lowest mean value is the access point (5.67). This finding indicates that although access points are still considered in the design process, their level of priority remains lower compared to other accessibility aspects.

Overall, these results show that the design team has a high level of concern toward site aspects, particularly elements directly related to user mobility, circulation, and ease of access within the building environment.

3.2 Architects' Level of Concern toward Universal Design (Interview)

Semi-structured interviews were conducted to understand how architects and design teams interpret Universal Design and how the concept is considered in the building design process. The interview analysis focused on identifying the forms of architects' concern toward Universal Design, the factors influencing its implementation, and the challenges faced in integrating Universal Design principles into building design.

The analysis results indicate that architects' concern toward Universal Design is not only reflected in their level of understanding of the concept, but also in their professional experience, the considerations used in design decision-making, and their views on the barriers and opportunities for its implementation in practice. Through the coding process and thematic grouping, five main themes were identified to describe the concern of architects and design teams toward Universal Design: (1) understanding of Universal Design, (2) experience in implementing Universal Design, (3) consideration of Universal Design in design decision-making, (4) challenges in implementing Universal Design, and (5) expectations for the future implementation of Universal Design.

These five themes are used to explain how Universal Design is understood and positioned in design practice, as well as to identify its relationship with the implementation of Universal Design in the Detail Engineering Design (DED) documents analyzed in the subsequent stage of the research.

A. Understanding of Universal Design

The interview results show that all informants were familiar with the concept of Universal Design as a design approach aimed at creating a built environment that can be used by various user groups without requiring special adaptation. Most informants associated Universal Design with the provision of accessibility facilities, such as ramps, elevators, accessible toilets, and pedestrian pathways that are friendly to wheelchair users. However, several informants still viewed Universal Design as part of fulfilling accessibility requirements, indicating that a comprehensive understanding of Universal Design principles remains uneven.

B. Experience in Implementing Universal Design

Based on the professional experiences shared during the interviews, all informants had been involved in projects that implemented Universal Design elements. These implementations were generally found in office buildings, public facilities, and commercial buildings with high accessibility requirements. The most frequently applied elements included ramps, elevators, accessible toilets, accessible parking areas, and circulation paths that are easy to access.

C. Consideration of Universal Design in Design Decision Making

The interview results show that user needs are one of the main considerations in the design process. The informants stated that aspects of safety, comfort, and ease of access are

factors that influence design decisions, particularly in building entrance areas, horizontal and vertical circulation, and sanitation facilities.

D. Challenges in Implementing Universal Design

Although the informants demonstrated concern toward Universal Design, they identified several obstacles in its implementation. The most frequently mentioned challenges include limited site area, space efficiency, project budget, and the lack of specific requests from clients. In addition, Universal Design evaluation has not yet become a consistently implemented part of the design process.

E. Expectations for the Implementation of Universal Design

All informants expressed the expectation that Universal Design could become a more integrated part of the design process. Several suggestions emerged, including the development of more practical guidelines, increased awareness among clients, and the establishment of Universal Design evaluation standards during both the design and post-construction stages.

F. Interview Conclusion

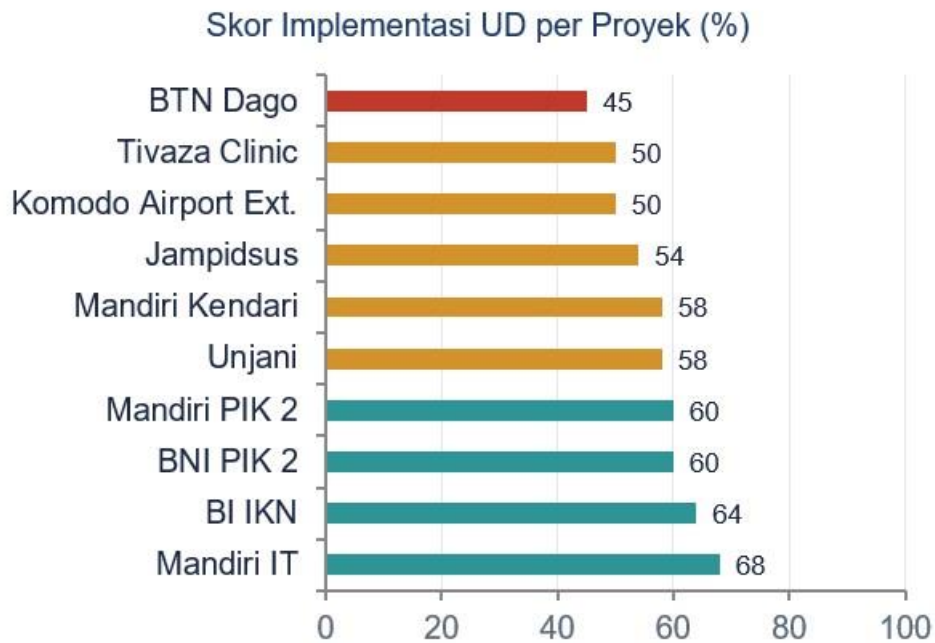
In general, the interview results indicate that architects and design teams have a good level of concern toward Universal Design. This concern is reflected in their understanding of the importance of inclusive design, their experience in implementing Universal Design elements, and their awareness of its benefits for various user groups. However, several challenges remain, causing the implementation of Universal Design to not yet be fully optimal across all projects.

3.3 Implementation of Universal Design in DED Documents

The evaluation of Universal Design (UD) implementation was conducted on ten Detail Engineering Design (DED) documents that served as the objects of this study. The assessment was carried out using an audit checklist developed based on Universal Design principles and applicable accessibility requirements, with the aim of identifying the extent to which inclusive design aspects had been integrated into the planning documents. The evaluation results were then converted into percentages to facilitate comparison of implementation levels across projects.

In general, the audit results indicate that Universal Design implementation has begun to be accommodated in most of the analyzed projects; however, the level of implementation remains varied. The differences in implementation scores indicate that concern for Universal Design aspects has not yet been translated consistently across all projects and planned design elements. Some projects demonstrate a relatively high level of implementation with more comprehensive accessibility integration, while others are still dominated by the fulfillment of basic accessibility requirements.

Table 5 presents a comparison of Universal Design implementation scores across the ten analyzed projects. The implementation scores range from 45% to 68%, with the highest score obtained by the Mandiri IT project (68%) and the lowest score by the BTN Dago project (45%). These results show that although Universal Design principles have begun to be considered in the design process, their implementation remains at a moderate level and has not yet achieved comprehensive application across all aspects of building design.

Table 5. Chart of Universal Design Implementation in DED Documents

(Source: Author, 2026)

The evaluation of the Detail Engineering Design (DED) documents shows that Universal Design has been implemented in several design elements, but not comprehensively. Several elements, such as building entrances, ramps, elevators, accessible toilets, and main circulation areas, have fulfilled most of the Universal Design criteria.

On the other hand, several elements were still found to have not fully met Universal Design principles, such as the provision of tactile paving, accessible information systems and signage, service areas that are friendly to wheelchair users, and supporting facilities for users with visual and hearing impairments. The audit checklist results indicate that the level of Universal Design implementation falls within the moderate to good category, but has not yet reached a comprehensive level of implementation.

These findings indicate that the existence of accessibility regulations does not automatically guarantee the comprehensive application of Universal Design in design documents. Implementation still tends to focus on elements that are explicitly required by regulations rather than applying Universal Design principles holistically.

3.4 The Gap between Architects' Concern and the Implementation of Universal Design

Tabel 6. Tingkat Concern Arsitek terhadap Implementasi

No	Universal Design Aspect	Level of Concern	Level of DED Implementation	Gap Level	Description
1	Access Point	High	Moderate	Sedang	Generally available, but does not always demonstrate optimal accessibility.
2	Parking Area	High	Low	High	One of the elements most frequently not documented in detail.
3	Drop-Off and Pick-Up Zone	High	Moderate	Moderate	Implemented in several projects, but not yet consistent.

No	Universal Design Aspect	Level of Concern	Level of DED Implementation	Gap Level	Description
4	Pedestrian Pathway	High	High	Low	One of the most consistently implemented aspects.
5	Site Vertical Circulation	High	Moderate	Moderate	Ramps and elevation changes do not always fully comply with Universal Design principles.
6	Supporting Facilities	Moderate	Low	Moderate to High	Not yet a main priority in several projects.
7	Pathway Surface	High	Moderate	Moderate	Material details and accessibility aspects are not always clearly explained.
8	Public Toilet on Site	Moderate	Low	High	Many projects do not provide or display detailed information.
9	Entrance Door	High	Moderate	Moderate	Considered in the design process, but its implementation varies.
10	Building Lobby	Moderate to High	Moderate	Moderate	Does not yet fully demonstrate a comprehensive Universal Design approach across all projects.
11	Reception Area	High	Low	High	Accessibility details are often not found in the DED drawings.
12	Pintu Dalam Bangunan	High	High	Low	Generally meets basic accessibility requirements.
13	Vertical Circulation	Very High	High	Low	The aspect with the highest level of concern and implementation.
14	Pathway Surface	Very High	Moderate	Moderate	Not all projects provide complete accessible specifications.
15	Supporting Facilities	High	High	Low	Relatively consistently implemented in most projects.
16	Building Toilet	High	High	Low	One of the most accommodated Universal Design elements.
17	Meja Layanan	High	Low	High	The aspect with the lowest level of implementation, despite a high level of concern.

(Source: Author, 2026)

The comparison between the level of architects' concern and the evaluation results of the DED documents indicates a gap between conceptual awareness and technical implementation. Although most respondents demonstrated a high level of concern toward Universal Design, its implementation in the design documents did not always reflect an equivalent level.

This finding indicates that concern toward Universal Design is a necessary condition, but it is not sufficient to ensure optimal implementation. A high level of concern does not always result in an equally high quality of implementation in DED documents. In other words, there remains a gap between conceptual awareness and technical application within the design process.

This gap is influenced by several factors, including limited design time, project completion demands, multidisciplinary coordination, building function priorities, and the tendency to focus on fulfilling minimum regulatory requirements. In addition, the absence of a systematic Universal Design evaluation mechanism at each stage of the design process also contributes to the occurrence of this gap.

These findings strengthen the argument that the quality of Universal Design implementation is not only determined by architects' level of understanding, but is also influenced by the work system and the design quality control process within the design organization.

3.5 Strategies for Improving the Integration of Universal Design in the Design Process

Based on the research findings, strategies are needed to bridge the gap between concern and the implementation of Universal Design. The first strategy is to integrate the Universal Design audit checklist as an internal evaluation instrument from the conceptual design stage to the preparation of DED documents. The second strategy is to develop internal design guidelines that include Universal Design elements that must be applied in every project.

The third strategy is to improve the capacity of the design team through regular training on Universal Design and accessibility regulations. The fourth strategy is to integrate Universal Design aspects into the multidisciplinary design review process so that they become part of routine project coordination. The fifth strategy is to apply a user-centered design approach by considering the needs of various user groups from the early stages of the design process.

The implementation of these strategies is expected to improve the consistency of Universal Design implementation and minimize the gap between architects' concern and the resulting design outcomes.

4. CONCLUSION

Untuk mengurangi kesenjangan tersebut, penelitian ini merekomendasikan lima strategi utama sebagai panduan penerapan Universal Design dalam proses perancangan:

Based on the analysis of the level of concern among architects and design teams, as well as the evaluation of Universal Design implementation in Detail Engineering Design (DED) documents, it can be concluded that there is a relationship between concern toward Universal Design and the quality of the resulting design implementation. In general, architects and design teams understand the importance of Universal Design and position accessibility as one of the considerations in the design process. However, the level of implementation in DED documents still varies and does not fully reflect the level of concern held by the designers.

The findings show that there remains a gap between concern and the implementation of Universal Design in the resulting design. This gap occurs because the design process is often influenced by various factors, such as time limitations, project completion targets, the complexity of multidisciplinary coordination, building function requirements, and the tendency to focus on fulfilling minimum regulatory requirements rather than applying Universal Design comprehensively.

To reduce this gap, this study recommends five main strategies as guidelines for implementing Universal Design in the design process:

- **Integrating Universal Design from the conceptual design stage.** Universal Design principles need to become part of the basis for design decision-making from the early stages of the design process, rather than merely serving as a verification process at the final stage.
- **Applying a Universal Design checklist at every stage of design.** The checklist is used as a control and evaluation tool from the concept stage, design development, and

preparation of DED documents to ensure that all Universal Design elements can be identified and applied consistently.

- **Improving the capacity of the design team through training and knowledge updates.** Regular training on Universal Design, accessibility, and related regulations is needed to improve the understanding and awareness of all members of the design team.
- **Integrating Universal Design into the multidisciplinary design review and coordination process.** Universal Design aspects should become one of the main agendas in the review process involving architectural, structural, MEP, interior, and other related teams.
- **Applying a User-Centered Design approach.** The design process needs to consider the needs of various user groups, including the elderly, children, persons with disabilities, wheelchair users, and users with temporary mobility limitations, so that the resulting design becomes more inclusive and equitable.

As an implementation tool, this study recommends the use of a Universal Design Guideline Checklist developed based on Universal Design principles, Indonesian accessibility regulations, and the findings of this study. This checklist can be used as an internal evaluation instrument for architectural firms to ensure that Universal Design principles are consistently considered and integrated into each stage of the design process.

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