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Residential student housing mobility and supportive design: a cross-sectional assessment of off-campus all-inclusive university student hostels in Ghana

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Abstract

Purpose – This study aims to examine the relationship between supportive design (SD) and residential mobility of students with disabilities (SWD) in off-campus student hostels in Ghana.

Design/methodology/approach – Quantitative research techniques were adopted. A sample of 243 SWD living in 190 University Student Housing were selected. Based on the SD indicators, the partial least square structural equation model was used to explore its effects on residential mobility in SWD living in university housing.

Findings – Findings indicate that a sense of control and positive distraction significantly influence residential mobility to a greater extent than social support design. While the sense of control emerged as a primary predictor of residential mobility, no direct relationships were observed between the sense of control, positive distraction and social support. Although social support did not exhibit significant direct effects, its potential relevance to residential mobility cannot be dismissed.

Practical implications – The enhancement and compliance of a sense of control and positive distraction SD in the common areas in student housing will reduce SWD residential mobility and increase investors' profitability. Positive social support designs are critical to predicting percentage change in residential mobility in off-campus student housing in Ghana.

Originality/value – SD is a theory largely used in health-care buildings. The observation of no relationship between a sense of control and positive distraction, and social support aspects of SD in university housing in

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this study significantly differs from the inverse relationship that exists between SD in hospitals, especially in the developing world, is a theoretical contribution.

Keywords Residential mobility, Facilities management, Off-campus student housing, Disabilities, Supportive design, Ghana

Paper type Research paper

1. Introduction

Student housing continues to be a critical area that has gotten little attention, despite mounting evidence of the significant role university campuses play in fostering all-inclusiveness and supporting the health and well-being of students with disabilities (SWD). Student housing is not just one of the most important amenities on campus, but it also fosters an inclusive community that improves academic performance, comfort and social care. The Nordic normalization principle, which is defined as “making accessible to those with physical and learning complications conditions of daily life as relevant to the patterns and norms of the mainstream of life,” is where the idea of inclusivity historically originated (Gjertsen *et al.*, 2021).

In the context of housing and facilities management, “physical accessibility” is frequently used to define inclusivity or supportive design. According to Kristl *et al.* (2020), inclusive design or supportive design in buildings has essentially become a requirement and a significant problem facing planners, facilities managers and investors since it was accepted as a legal right in architecture and facilities management. Students are classified as disable when they experience, mild-hearing, mild-visual impairment and physical disability (Appau *et al.*, 2024).

Research has shown that when buildings fail to make use of the enormous opportunities that people with disabilities provide, their noninclusive designs render them economically unsustainable (Hazlan *et al.*, 2023).

Empirical studies have shown that a lack of inclusiveness can impede full participation among students in various universities in the UK and Ireland (Edwards *et al.*, 2022; Shuayb and Shuayb, 2020). The documented consequences of limited participation include restricted access to campus facilities. In the USA, challenges such as navigation and wheelchair accessibility continue to affect visually impaired students at several universities (Johnstone and Edwards, 2020).

In developing regions like Africa, university campuses face significant hurdles in achieving comprehensive inclusiveness due to resource constraints, lack of technical expertise and inadequate enforcement of building regulations (Appau *et al.*, 2024; Amoah *et al.*, 2023). The repercussions of these challenges manifest as discomfort, physical and mental health issues and stigmatization (Attakora-Amaniampong *et al.*, 2024).

Despite these adverse effects, some studies have also identified that the minor deficiencies such as indoor environmental quality in student housing can influence residential mobility among SWD (Attakora-Amaniampong *et al.*, 2024; Attakora-Amaniampong *et al.*, 2022). These studies have reported stress and decreased occupancy as outcomes of the deficiencies of student housing on residential mobility among students living with disabilities. However, there remains an empirical gap in research regarding the impact of supportive design in student housing and its correlation with residential mobility. This gap is relevant as it affects SWD physical well-being, rental cashflows of student housing investment and all-inclusiveness in university campuses.

In Ghana, physical accessibility poses challenges across various building types (Appau *et al.*, 2024). The Disability Act (715) of 2006 mandates stakeholders to ensure building accessibility for individuals with disabilities, yet it lacks a clear definition of "accessibility" and has received minimal emphasis in the Ghana Building Regulation and Ghana Building Standards of 2018. This disconnect complicates the enforcement of supportive design principles typically among off-campus university housing in Ghana (Attakora-Amaniampong *et al.*, 2022). Nevertheless, universities in Ghana have seen an increase in enrollment among SWD (Amoah *et al.*, 2023). However, the real challenge lies in creating inclusive spaces for all, where only a few campus facilities demonstrate compliance regarding accessibility in residence halls, canteens, restrooms, places of worship and sports facilities (Amoah *et al.*, 2023). Despite that, studies have not focused on the impact of supportive design on student housing and its correlation with residential mobility, highlighting an empirical gap with implications for student housing policy, design and the health and well-being of SWD. This study aims to investigate the effects of supportive design on residential mobility among SWD living in university housing in Ghana, contributing to sustainable development goals 10 and 11, which advocate for reducing inequality and promoting social inclusion of persons with disabilities, as well as ensuring access to essential building services and adequate, affordable housing for all.

2. Theory of supportive design

Supportive design theory, as articulated by Ulrich and Lake (1991), emerges from an understanding of the needs of visitors, staff and patients in relation to the physical environments of health-care facilities. This theoretical framework emphasizes the enhancement of wellness through stress minimization and the establishment of design guidelines aimed at managing stress effectively. Ulrich and Lake (1991) posits that factors such as a sense of control, social support, and positive distractions are instrumental in fostering patient well-being and alleviating stress. Patients often experience anxiety due to illness, which is compounded by uncertainty, diminished physical capabilities, lack of privacy, invasive medical procedures and environmental noise (Ulrich and Lake, 1991). The significance of supportive design theory has been corroborated by various studies (Edwards, 2020; Bae and Asojo, 2020), which illustrate its utility in interpreting the needs of staff, patients and visitors while providing strategic guidelines for implementing supportive design principles in health-care settings (Edwards, 2020). Despite the widespread acceptance of Ulrich's theory within the health-care domain, empirical research applying this framework to the student housing sector, particularly concerning disabilities, remains limited (Johnstone *et al.*, 2015; Pirhonen and Pietilä, 2016). The few studies that have used this theory predominantly focus on mental health care for the elderly in care homes, social housing, community well-being and issues related to homelessness (Johnstone *et al.*, 2015; Parsell *et al.*, 2020). Nevertheless, findings indicate that when individuals with disabilities are provided with social support, a sense of control and elements of positive distraction, their quality of life within residential settings can be significantly enhanced (Edwards, 2020; Durbin *et al.*, 2019; Andrade *et al.*, 2017).

2.1 Relationship between social support, sense of control and positive distraction in housing management

2.1.1 Social support, physical environment and disability well-being. Social support is widely acknowledged as a crucial psychosocial factor influencing health outcomes (Farzan *et al.*, 2023). The supportive design theory encompasses various aspects of social support, which includes the provision of positive interactions and friendly conduct from staff toward individuals with disabilities, aimed at mitigating stress (Farzan *et al.*, 2023). Bae and Asojo (2020) argue that fostering positive relationships can alleviate anxiety and discomfort. The application of social support within health-care settings suggests that encouraging family visits can significantly reduce patient stress, necessitating the design of environments that facilitate such interactions.

Empirical evidence indicates that a lack of social support adversely affects the well-being and comfort of individuals with disabilities. For example, Durbin *et al.* (2019) found that enhanced social support enables individuals with disabilities to better cope with stressors, particularly during transitions to different housing situations amid homelessness. Johnson (2004) highlights the connection between social support and positive distraction, noting that challenges in assisted living arrangements can provide beneficial distractions for individuals with disabilities. Furthermore, research by Johnstone *et al.* (2015) reveals that housing control variables, such as security of tenure and rental arrangements, have both direct and indirect effects on social support and the sense of control experienced by individuals with disabilities. Other studies have explored the impact of supportive design on the residential mobility of individuals with disabilities. Shaw *et al.* (2011) identified a positive correlation between the proximity of individuals with disabilities to their friends and their visitation rates. Consequently, many individuals with disabilities have expressed dissatisfaction with their living conditions and a desire for improved accommodation (Shaw *et al.*, 2011). Similarly, Pirhonen and Pietilä (2016) affirm that social relationships outside the housing context facilitate easier access to resources, contributing to a sense of belonging and reducing the inclination to relocate:

H1. Social support supportive designs of student housing influence residential mobility.

2.1.2 Sense of control of physical environment and disability well-being. The physical environment plays a crucial role in shaping the sense of control and well-being of individuals with disabilities. Studies have established an inverse relationship between a sense of social support and positive distraction, which influences the sense of control of persons with disabilities (Andrade *et al.*, 2017; Tutuncu and Lieberman, 2016). Freeman *et al.* (2020) demonstrated that disabled people experience a loss of control associated with every aspect of their daily lives, including control over their physical surroundings when they are socially disconnected. In the context of housing, Freeman *et al.* (2020) indicated that self-supporting systems in rooms, such as the level of natural lighting, positioning of the bed, choices of services and amenities and the acoustical environment, influence the sense of control. Other studies (Huisman *et al.*, 2012; Chaudhury *et al.*, 2005) found that salon services, control over light, concierge services, nature of furniture, on-demand room service, patient self-service kitchenette and adjustable window blinds affect the sense of control:

H2. Sense of control supportive designs of student housing influence residential mobility.

2.1.3 Positive distraction features and disability facilities. Positive distraction features and disability facilities can be described as the ability to allow individuals with disabilities to shift their concentration from negative foci within the health-care facility to the more restorative aspects of the nonmedical environment (Weber *et al.*, 2022). These include photographs, reading material, paintings of nature and representational posters. Ulrich and Lake (1991) found that viewing a nature video positively affects physiological measures. Positive distraction has been established by researchers to have an indirect relationship with a sense of control and social support (Suess and Mody (2018). According to Martín López and Fernández Díaz (2022), the nature of color of walls (COW), ceilings, floors, furniture and the effective arrangement of space positively affect disability positive distraction.

Andrade *et al.* (2017) are of the view that noise affects positive distractions such as cleanliness, temperature and lack of space detracting from the quality of the experience for people with disabilities.

The environmental design perspective of housing accessibility for disabled people includes common areas linked to information accessibility and physical accessibility (Sahoo and Choudhury, 2023). Specific environmental design access indicators include accessible entrances, accessible parking, tactile markings, clear signage and rational counter heights for disabled persons using wheelchairs, which positively affect disability's sense of control. However, empirical studies have provided divergent views on their applicability. Adam (2019) found that about 40% of the hotels have visibly marked entrances to their lobbies, 50.6% had handrails on ramps, 22.2% of hotels had access ramps landing at the top and 39.8% of hotels had bottom of ramps that do not distract those with disabilities. Leung *et al.* (2019) found the use of signage and security is positively related to information acquisition for persons with disabilities. Hamzat and Dada (2014) reported that the inaccessibility of wheelchair-mobile students to school libraries negatively affects sense of control. Karunasena *et al.* (2018) findings provide evidence that excessive slopes across the direction of the building entrance make control of the wheelchair difficult, and scarce provision of doorway spaces outside and within rooms makes maneuvering wheelchairs difficult. Chan *et al.* (2008) found that foot and head of ramps, access ramps and handrails did not have all directional signs raised, and notification and detection sensors negatively influenced disability sense of control such as visual impairments. Similarly, Bodaghi (2012) found the availability of ramps, exclusive space and availability of parking spaces pose the most difficulties in accessing campus housing:

H3. Positive distraction-supportive designs of student housing influence residential mobility.

2.2 Nature of student housing in Ghana and supportive design

Student housing in Ghana predominantly consists of off-campus private rented accommodations, which have become essential due to the insufficient capacity of on-campus university housing to meet the growing student population. Despite the high demand for student accommodation, student preferences are significantly influenced by factors such as the availability of building services, rental costs, finishes and location. Additionally, there is an increasing awareness of the need to incorporate disability requirements into student housing, which poses challenges for many off-campus facilities. Common issues reported include flexible regulations regarding students' social activities, inadequate maintenance and the lack of landlord adherence to tenancy agreements (Gbadegesin *et al.*, 2021). Empirical research indicates that SWD often express dissatisfaction with the design of student housing, which can lead to health risks. For instance, Attakora-Amaniampong *et al.* (2021) applied the Gap Model by Parasuraman *et al.* (1985) to evaluate the satisfaction levels of SWD residing in off-campus accommodations. Their findings highlighted deficiencies in service quality, including the absence of fire extinguishers, inadequate room finishes, insufficient spatial distancing, poor noise insulation, lack of first aid facilities, ineffective sewage management and security issues. In a follow-up study, Attakora-Amaniampong *et al.* (2022) used a survey to examine universal design standards in Ghana's student housing, revealing that only 50% of off-campus facilities had slip-resistant flooring and approximately 33% featured clear signage, both of which significantly impacted the psychological well-being of SWD. Furthermore, they reported challenges such as inaccessible entrances and limited common areas, which hinder wheelchair mobility. Recent research by Appau *et al.* (2024) explored the physical health conditions associated with student housing in Ghana through quantitative methods. Their study identified that lighting conditions, including bulb types and electric switches, along with window sizes for ventilation and visibility, contributed to positive distractions for SWD. Conversely, noise control and environmental factors negatively influenced students' sense of control, exacerbating psychological stress. Similarly, Simpeh and Shakantu (2019) found that inadequate ventilation and poor lighting systems adversely affected the comfort of SWD in Ghanaian Universities.

3. Research methods

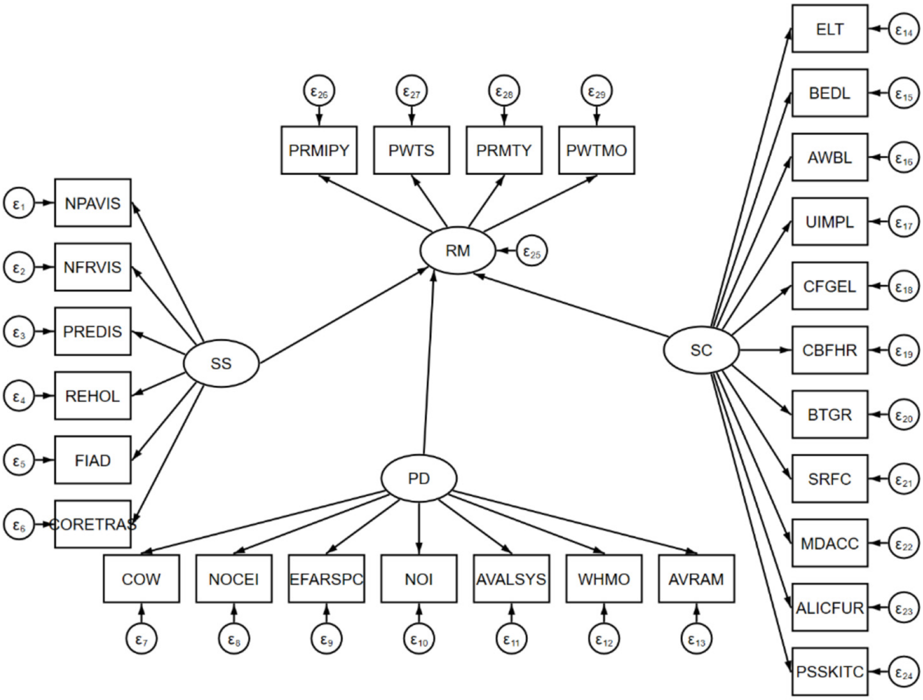
This study used a quantitative research methodology grounded in a positivist philosophical framework. Positivism was deemed appropriate as it emphasizes the discovery of measurable and observable facts, facilitating the examination of relationships among the collected data. This approach was specifically adopted to assess the satisfaction levels related to supportive design on university campuses and its impact on the residential mobility of SWD in Ghana.

3.1 Participants and instruments

The study examined the relationship between supportive design, social support, sense of control and residential mobility among 243 SWD living on university campuses. Through a convenient sampling approach, participants were recruited from a list of 289 SWD obtained from the Dean of students offices. Due to the limited number of SWD, all were invited to participate in the study. Considering their health circumstances, 35 min of informative talks at different times were organized to explain the rationale and implications of the study on their social well-being. Additionally, the approach was standardized across the locations. SWD, who voluntarily agreed to participate signed an informed consent form. A structured questionnaire survey was used to collect data, divided into three parts: availability of supportive design facilities, satisfaction with physically accessible facilities and effects of satisfaction/dissatisfaction on residential mobility. The questionnaire was pretested with five SWD to assess reliability and validity.

3.2 Definition of parameters

Based on the literature review, supportive design variables were defined as positive distraction, sense of control and social support. Following the literature (Andrade *et al.*, 2017), nine positive design indicators were defined in this study, namely, COW; nature of ceiling (NOCEI); the effective arrangement of space (EFARSPC); noise installation systems (NOI); availability of alarm systems (AVALSYS); clear and accurate visual signage (CACVSIG); wheelchair mobility (WHMO); and availability of ramps (AVRAM) (see Figure 1). Social support was defined using eight indicators from the literature (Calsyn and Winter, 2002). These include the number of parent visitations (NPAVIS); the number of friend visitations (NFRVIS); the provision of rent discounts for SWD (PREDIS); rental holidays (REHOL); first aid (FIAD); competitive reliable transport (CORETRAS); all-inclusive transport mode (AITMSYS); and all-inclusive sports facilities (AISPFAT) (Bae and Asojo, 2020; Shaw *et al.*, 2011). Sense of control was defined with 11 indicators: effective lighting (ETL); bed location (BEDL); adjustable window blinds (AWBL); unimpeded lobby (UIMPL); configured elevators (CFGEL); control buttons fitted at a reasonable height (CBFRH); baths and toilets with grab rails (BTGR); slip-resistant floor covering (SRFC); manipulated door accessibility (MDACC); all-inclusive furniture (ALICFUR); and patient self-service kitchenette (PSSKITC) (Freeman *et al.*, 2020). Further, residential mobility indicators were determined using four indicators: the percentage of



Source: Authors' construct (2024)

Figure 1. Conceptual model of the study

residential mobility in previous years (PRMIPY); the percentage of those willing to stay (PWTS); the percentage of those who moved in this year (PRMTY); and the percentage of those who are willing to move (PWTM). These parameters were measured using a five-point Likert scale ranging from 5 (definitely yes) to 1 (definitely not).

3.3 Measurement of data and analysis

The partial least squares structural equation modeling (PLS-SEM) was adopted by this study as supported by Appau *et al.* (2024). This model explains the hypothesis that supportive design influences residential mobility both positively and negatively (see Figure 1). Based on this hypothesis, the data reliability and construct validity of the model were determined. The study used the *R*-squared as a basis for determining the reliability and dependency of the data, as evident in Hair *et al.* (2017). Further, construct validity was used to determine the fit of the model. A set of fitting cut-off values was adopted as acceptable by Hair *et al.* (2017). These include the root mean square error of approximation (RMSEA < 0.05 indicating close estimated fit, $0.05 <$ RMSEA < 0.08 demonstrating reasonable error of approximation, and RMSEA above 0.10 as unacceptable). To understand the difference between the predicted and observed variables, the standardized root mean square residual (SRMR) was used with a cut-off value below 0.10, largely considered acceptable. Others include the comparative fit index (CFI), coefficient of determination (R^2) and Tucker–Lewis Index (TLI).

The analysis involved the definition of latent and observed variables. In this study, the latent variables include the supportive design variables: social support (SS), sense of control (SC), positive distraction (PD) and residential mobility (RM). Observed variables are defined in Section 3 above.

Stata 10.3 was used to estimate the coefficients of supportive design and its influence on residential mobility due to its ability to estimate higher-order models through the interaction of latent and observed variables in a simpler way (Cain, 2021). Maximum likelihood estimation was used to determine overall estimates of standardized and unstandardized coefficients. The analysis first determined the overall supportive design variables influencing residential mobility, followed by an assessment of each observed variable's contribution to the impact of supportive design on residential mobility.

3.4 Demographic information

The demographic profile of SWD was characterized by age, gender, types of disabilities and the selection of student housing, as outlined in Table 1. The findings indicated that the majority of SWD were aged between 23 and 34 years across the study area. Additionally, a significant proportion of SWD were male and predominantly exhibited physical disabilities, while other types of disabilities were not extensively documented. The prevalence of

Table 1. Demographic information of respondent

Ages	19−<22	23−<25	26−<30	31−<34	35−<38	40+	Total
SDD-UBIDS	12	18	16	2	3	1	52
KSTU	5	9	3	0	1	0	18
UDS	15	13	11	2	1	0	42
KNUST	11	12	12	8	2	0	45
UG	7	13	9	6	1	1	37
TaTU	9	7	8	4	1	0	29
AAMUSTED	6	8	4	2	0	0	20
Total	65	80	63	24	9	2	243
Off-campus hostels selected							
UG	34						
UDS	33						
SDD-UBIDS	23						
KNUST	47						
AAMUSTED	18						
KSTU	22						
TaTU	13						
Total	190						
Forms of disability	Male	Female	Total				
Mild-visual impairment	12	9	21				
Physical disability	165	42	207				
Mild-hearing impairment	8	7	15				
TOTAL	185	58	243				

Notes: UG = University of Ghana; KSTU = Kumasi Technical University; UDS = university for development studies; SDD-UBIDS = Dombo University of Business and Integrated Development Studies; KNUST = Kwame Nkrumah University of Science and Technology; AAMUSTED = Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development; TATU = Tamale Technical University
Source: Authors' construct (2024)

physical disabilities has important implications for the incorporation of supportive design features in student housing, which, in turn, affects residential mobility.

4. Findings and discussions

4.1 Model validity and fit results

The theoretically expected results show that a sense of control, social support and positive distraction are critical supportive design elements aimed at managing the well-being and stress of patients (Ulrich and Lake, 1991). As part of the processes to test the implications of supportive designs on student residential mobility, the validity of the data and model fit were determined. Convergent validity was based on the average variance extracted. Aside, the discriminant validity based on significant estimates greater than squared inter-construct correlations. The model displayed a significant RMSEA, acceptable to determine data consistency (see Table 2). Size of residuals, SRMR and CD also recorded accepted levels of model fit higher than acceptable levels in Hu and Bentler (1999). Measurements for baseline consideration and information criteria of the model produced a satisfactory fit and were above the threshold. The overall measurements of CFI and TLI were 0.95 and 0.93 levels, respectively, higher than acceptable levels in Hu and Bentler (1999).

Regarding reliability, the model yielded a substantial *R*-squared value of 72%, explaining a considerable proportion of the variance (Table 3). This finding contradicts the theoretical expectation that supportive design would positively influence residential mobility among SWD. This discrepancy may be attributed to divergent perspectives on the relationship between supportive design and residential mobility within the SWD community. Internal consistency reliability, as measured by Cronbach's alpha, was satisfactory at 0.692.

4.2 Residential mobility and supportive design

This section investigates the path coefficients and significance of supportive design elements within student housing on the residential mobility of SWDs (see Figure 2). While previous research has established a positive correlation between social support, sense of control and positive distraction in designed environments and enhanced quality of life for individuals with disabilities (Nesse *et al.*, 2022; Durbin *et al.*, 2019), our findings present a counterintuitive trend. Residential mobility among SWDs exhibited a significant positive relationship with supportive design, suggesting underlying challenges within supportive design in student housing in Ghana. This can be witnessed in Figure 2, where SC and PD recorded positive contributions to SD than SS. Even though SS showed a negative standardize coefficient for overall estimates, its indicators that have a positive coefficient are

Table 2. Model fit statistics and value description of data

Description	Construct	Fit statistics	Criteria	Decision
Population error				
Root mean squared error of approximation	RMSEA	0.086	≤0.08	Accepted
Size of residuals				
Standardized root mean squared residual	SRMR	0.066	≤0.08	Accepted
Coefficient of determination	CD	0.724	≥0.9	Satisfactory
Baseline comparison				
Comparative fit index	CFI	0.962	≤0.95	Accepted
Tucker–Lewis index	TLI	0.931	≥0.95	Accepted

Source: Authors' construct (2024)

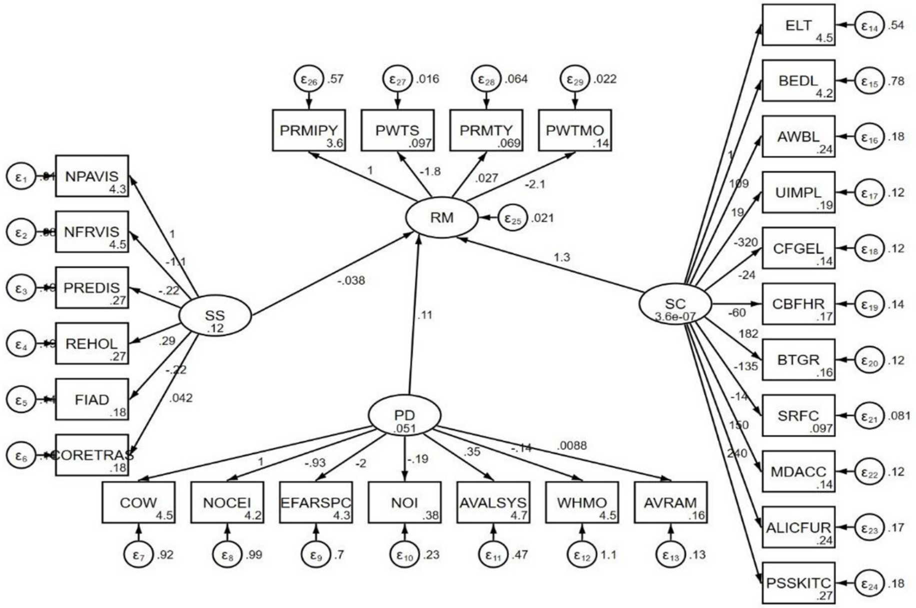
Table 3. Equation level goodness of fit test results

Observed	Variance	Fitted predicted	Residual	*R*-squared	mc	mc2
NPAVIS	0.931	0.118	0.812	0.127	0.357	0.127
NFRVIS	0.829	0.147	0.682	0.178	0.421	0.178
PREDIS	0.198	0.005	0.192	0.027	0.167	0.028
REHO	0.196	0.009	0.186	0.049	0.222	0.049
FIAD	0.150	0.005	0.145	0.036	0.191	0.037
CORETRAS	0.144	0.000	0.144	0.001	0.039	0.001
ELT	0.545	3.490	0.545	6.400	0.001	6.400
BEDL	0.786	0.004	0.782	0.005	0.075	0.005
AWBL	0.179	0.000	0.179	0.000	0.027	0.000
UIMPL	0.153	0.037	0.116	0.242	0.491	0.242
CFGEL	0.119	0.000	0.119	0.001	0.041	0.002
CBFHR	0.138	0.001	0.137	0.009	0.097	0.009
BTGR	0.135	0.012	0.123	0.088	0.297	0.088
SRFC	0.087	0.006	0.080	0.074	0.273	0.074
MDACC	0.122	0.000	0.122	0.000	0.024	0.000
ALICFUR	0.182	0.008	0.174	0.044	0.210	0.044
PSSKITC	0.195	0.020	0.175	0.105	0.325	0.105
COW	0.966	0.051	0.915	0.052	0.229	0.052
NOCEI	1.039	0.044	0.992	0.042	0.206	0.042
EFARSPC	0.905	0.204	0.700	0.225	0.475	0.225
NOI	0.236	0.001	0.234	0.008	0.089	0.008
AVALSYS	0.473	0.006	0.467	0.013	0.115	0.013
WHMO	1.060	0.001	1.059	0.000	0.031	0.000
AVRAM	0.132	3.966	0.132	0.000	0.005	0.000
PRMIPY	0.594	0.021	0.572	0.036	0.192	0.036
PWTS	0.087	0.071	0.015	0.819	0.905	0.819
PRMTY	0.064	0.000	0.064	0.000	0.016	0.000
PWTMO	0.119	0.096	0.022	0.814	0.902	0.814
RM	0.021	0.000	0.021	0.038	0.195	0.038
Overall				0.723		
Cronbach’s alpha				0.692		

Notes: mc = Correlation between depvar and its prediction, and mc2 = mc^2 is the Bentler–Raykov squared multiple correlation coefficient
Source: Authors’ construct (2024)

critical indicators that can cause residential mobility when not checked. This correspond with Shaw *et al.* (2011), who found that where people with disabilities found their living conditions undesirable, they express a wish for change accommodation.

Table 4 and Figure 2 reveal a startling 3.6 standardized coefficient increase in residential mobility over the past years, despite a concurrent rise in supportive design facilities. Furthermore, a reduction in supportive design elements was linked to a 0.096 standardized coefficient decrease in SWDs willing to remain in their housing. Conversely, the availability of supportive design facilities positively impacted SWD occupancy rates by 0.69 standardize coefficient annually, while also increasing the likelihood of SWDs moving by 0.138 standardize coefficient when these facilities were reduced. These results indicate a complex interplay between supportive design and residential mobility, with a seemingly higher propensity for SWDs to leave their housing compared to staying or maintaining occupancy.



Source: Authors' construct (2024)

Figure 2. Overall estimates of the relationship between residential mobility and supportive design

Table 4. Drivers of residential mobility

Construct	Estimates	Std. err.	Z	$p > Z$	[95% Conf)	Interval
PRMIPY	1					
Cons	3.622	0.052	69.20	0.000	3.519	3.724
PWTS	−1.807	0.743	−2.43	0.015	−3.265	−0.349
Cons	0.096	0.020	4.82	0.000	0.057	0.136
PRMTY	0.027	0.126	0.22	0.828	−0.219	0.274
Cons	0.069	0.017	4.01	0.000	0.035	0.102
PWTMO	−2.102	0.776	−2.71	0.007	−3.625	−0.580
Cons	0.138	0.023	5.90	0.000	0.092	0.184

Source: Authors' construct (2024)

To delve deeper into the drivers of supportive design influencing residential mobility, we examined three key variables: sense of control, positive distraction and social support. Table 5 highlights the significant impact of sense of control (1.301) and positive distraction (0.114) on residential mobility. Unexpectedly, social support demonstrated a negligible negative effect (−0.038) on residential mobility, although not statistically significant as compared to Bae and Asojo (2020) who found positive impact on physical well-being of patient. While this finding warrants further investigation, the standardize coefficient estimate for social support design provides a valuable foundation for future discussions.

Table 5. Factors influencing supportive design in student housing

Supportive design variables	Coef.	Std. err.	z	$p > Z$
Social support (SS)	−0.0382	0.078	−0.49	0.627
Sense of control (SC)	1.303	33.033	0.04	0.031
Positive distraction (PD)	0.114	0.1516	0.76	0.045

Source: Authors' construct (2024)

4.2.1 Social support drivers' effects on residential mobility. The theory of supportive design posits that increasing social support helps physically challenged individuals cope with stressors, particularly when transitioning to different housing during homelessness (Durbin *et al.*, 2019). In this study, social support drivers of supportive design were measured by the number of parent and friend visitations, provision of rent discounts and holidays, first aid services and reliable transportation. The findings indicate that while the number of parent visitations was not significant, other drivers showed substantial negative impacts on residential mobility. Specifically, the lack of friend visitations directly influenced the residential mobility of SWD, contradicting previous research suggesting friend and family visitation reduces patient stress (Bae and Asojo, 2020). This discrepancy may be attributed to other factors restricting visitations in the selected student housing. Reductions in rent discounts had significant social effects, increasing residential mobility by 0.271 standardize coefficient. This suggests that student housing managers must treat SWD as a minority group to maintain occupancy levels.

Interestingly, increased rent holidays did not impact SWD's willingness to stay, potentially due to other housing factors hindering mobility, contradicting research linking perceived financial support to reduced stress (Johnstone *et al.*, 2015). Consistent with studies showing a positive relationship between health support and recovery rates for physically challenged individuals (Nesse *et al.*, 2022; Nesse *et al.*, 2021), reduced first aid services increased residential mobility by 0.184 standardize coefficient of SWD expect student housing to provide health systems, reducing anxiety and stress (Attakora-Amaniampong *et al.*, 2021). However, increased transportation services marginally affected residential mobility, with a 0.0441 standardize coefficient increase resulting in a 0.175 standardize coefficient mobility rise, indicating ongoing transportation challenges as a key determinant.

In summary, even though the overall social supportive design shows negative, the lack of friend visitations, reduced rent discounts and inadequate first aid are critical social support drivers significantly influencing residential mobility. Transportation service estimates predict future high residential mobility, supporting the hypothesis that social support drivers limitedly impact student housing mobility. These findings highlight the importance of targeted social support interventions to promote housing stability for physically challenged individuals experiencing homelessness.

4.2.2 Factors influencing sense of control supportive design in residential mobility. The study presented in Table 6 indicates a significant positive correlation between the drivers of sense of control and residential mobility among students in university housing. All identified drivers exhibited both negative and positive influences on residential mobility. Notably, features such as bed control, effective lighting, adjustable windows, bathrooms and toilets equipped with grab rails, all-inclusive furniture and self-service kitchenettes were acknowledged as positive indicators of sense of control, aligning with findings from previous research (Attakora-Amaniampong *et al.*, 2021; Tutuncu and Lieberman, 2016; Huisman

Table 6. Drivers of social support and its effects on residential mobility

Construct	Estimates	Std. err.	Z	$p > Z$	[95% Conf)	Interval
NPAVIS	1					
Cons	4.263	0.066	65.08	0.000	4.134	4.391
NFRVIS	−1.115	1.054	−1.06	0.290	−3.182	0.951
cons	4.461	0.062	72.17	0.000	4.340	4.582
PREDIS	−0.216	0.193	−1.12	0.262	−0.593	0.162
Cons	0.272	0.030	9.00	0.000	0.213	0.331
REHOL	0.286	0.244	1.17	0.243	−0.193	0.765
Cons	0.267	0.030	8.90	0.000	0.208	0.326
FIAD	−0.215	0.173	−1.25	0.212	−0.554	0.123
Cons	0.184	0.026	7.00	0.000	0.133	0.236
CORETRAS	0.042	0.135	0.31	0.758	−0.224	0.307
Cons	0.175	0.026	6.79	0.000	0.125	0.226

Source: Authors' construct (2024)

et al., 2012). This suggests that the presence of these facilities may lead to a decrease in residential mobility (Table 7).

Conversely, the study found that high residential mobility was associated with dissatisfaction regarding certain facilities: unimpeded lobbies, unconfigured elevators, slip-resistant floor coverings, control buttons positioned at reasonable heights and manipulated

Table 7. Drivers of sense of control supportive design in student housing in Ghana

Construct	Estimates	Std. err.	Z	$p > Z$	[95% Conf)	Interval
ELT	1					
Cons	4.502	0. 050	0.050	0.000	4.404	4.601
BELD	110.989	541.027	0.21	0.837	−949.410	1,171.379
Cons	4.248	0.060	70.60	0.000	4.130	4.366
AWBL	19.268	120.223	0.16	0.873	−216.365	254.902
Cons	0.235	0.028	8.17	0.000	0.178	0.291
UIMPL	−326.112	1,511.169	−0.22	0.829	−3,287.94	2,635.724
Cons	0.188	0.026	7.11	0.000	0.136	0.241
CFGEL	−24.201	130.288	−0.19	0.853	−279.560	231.158
Cons	0.138	0.023	5.90	0.000	0.092	0.184
CBFHR	−61.386	293.552	−0.21	0.834	−636.738	513.966
Cons	0.165	0.025	6.57	0.000	0.116	0.215
BTGR	185.537	861.503	0.22	0.829	−1,502.97	1,874.052
Cons	0.161	0.025	6.46	0.000	0.112	0.210
SRFC	−136.967	635.521	−0.22	0.829	−1,382.56	1,108.631
Cons	0.096	0.020	4.82	0.000	0.057	0.136
MDACC	−14.470	96.899	−0.15	0.881	−204.390	175.449
Cons	0.142	0.026	6.01	0.000	0.096	0.189
ALICFUR	152.216	708.825	0.21	0.830	−1,237.05	1,541.487
Cons	0.239	0.029	8.27	0.000	0.182	0.296
PSSKITC	243.881	1,132.409	0.22	0.829	−1,975.6	2,463.362
Cons	0.267	0.030	8.90	0.000	0.208	0.326

Source: Authors' construct (2024)

door accessibility. These findings are consistent with the research of Adam (2019), Karunasena *et al.* (2018) and Leung *et al.* (2019). Specifically, dissatisfaction with unimpeded lobbies accounted for 18.9% of residential mobility, followed by unconfigured elevators at 13.8%, slip-resistant floor coverings at 9.6%, control buttons at 16.5% and manipulated door accessibility at 14.2%. These aspects represent significant architectural shortcomings that hinder the movement and accessibility of SWD in student housing.

Framing these results within the context of supportive design theory, it becomes evident that the sense of control features that support student housing are predominantly found indoors rather than in communal areas. This highlights a technical gap with implications for the mobility of SWD within the building, as emphasized in the work of Attakora-Amaniampong *et al.* (2022). In comparison to supportive design elements, the drivers of sense of control exhibited a greater influence on residential mobility. Therefore, we accept the hypothesis that sense of control significantly impacts residential mobility among SWD residing in university student housing in Ghana.

4.2.3 Positive destruction implications on residential mobility in student housing. The theoretical foundations of positive distraction have previously identified static stimuli such as photographs, reading materials, nature paintings and representational posters as beneficial to physiological measures in individuals (Ulrich and SmallWood, 2003). This section discusses the factors contributing to supportive design for positive distraction that influence residential mobility among SWD in Ghanaian student housing.

According to the findings presented in Table 8, all identified drivers significantly impact the residential mobility of SWD. Notably, wall color is a crucial factor, as it affects the visual perception of SWD. Additionally, the condition of ceilings – specifically issues like leaks and heat generation – negatively impacts the health of SWD, influencing their decisions regarding housing changes. The arrangement of indoor spaces and furniture positioning has also been highlighted as a significant driver, correlating with a 433% increase in residential mobility among SWD.

Moreover, a 19.3% decrease in the availability of noise insulation systems is associated with a 38.2% increase in residential mobility, aligning with Andrade *et al.* (2017), who noted

Table 8. Positive destruction effects on residential mobility

Construct	Estimates	Std. Err.	Z	$p > Z$	[95% Conf)	Interval
COW	1					
Cons	4.451	0.067	66.70	0.000	4.321	4.582
NOCEI	−0.932	1.059	−0.88	0.379	−3.009	1.144
Cons	4.235	0.069	61.26	0.000	4.099	4.370
EFARSPC	−1.999	3.008	−0.66	0.506	−7.895	3.895
Cons	4.336	0.065	67.14	0.000	4.209	4.463
NOI	−0.193	0.318	−0.61	0.543	−0.817	0.430
Cons	0.382	0.033	11.59	0.000	0.318	0.447
AVALSYS	0.352	0.428	0.82	0.411	−0.488	1.191
Cons	4.658	0.047	99.73	0.000	4.567	4.751
WHMO	−0.144	0.591	−0.24	0.807	−1.301	1.013
Cons	4.484	0.069	64.13	0.000	4.347	4.621
AVRAM	0.008	0.205	0.04	0.966	−0.393	0.411
Cons	0.157	0.025	6.35	0.000	0.108	0.205

Source: Authors' construct (2024)

that noise, cleanliness and temperature are critical to the quality of experience for individuals with disabilities. The study also found that the limited availability of wheelchairs in student housing discourages SWD from remaining in their current accommodations, resulting in a 448% higher rate of residential mobility.

Conversely, while the limited availability of alarm systems had a positive impact, it only showed signs of facilitating mobility. Satisfaction with ramps in student housing was positively significant but did not substantially influence residential mobility. When comparing these findings with the research conducted by Karunasena *et al*. (2018), Leung *et al*. (2019) and Castell (2014), it becomes evident that the high residential mobility among SWD is more closely linked to indicators of indoor positive distraction than to factors associated with common areas and overall environmental design. Consequently, the study supports the hypothesis that positive distraction significantly affects residential mobility in student housing.

5. Implications of the study

5.1 Theoretical implications

This study theoretically explored the concept of supportive design within the context of student housing, drawing parallels to the health-care environment. While recognizing the distinct needs of patients, the research highlighted a significant gap in the provision of care for SWD. This gap underscores the necessity for a more comprehensive approach to student housing that prioritizes inclusivity and social care in the supportive design theory. Given the potential for increased stress, anxiety and discomfort associated with residential mobility among SWD, as previously documented, this research emphasizes the critical role of supportive design in mitigating these challenges. By focusing on enhancing sense of control, social support and positive distraction, the study posits that supportive design can effectively address the ripple effects of residential mobility. The overall negative contributions of social support premises of the supportive design theory are not well situated when assessing drivers' residential mobility in housing as compared to patients with disability in hospitals.

5.2 Practical implications

Empirically, this study used a structural equation model to examine the relationship between supportive design and residential mobility among SWD residing in university housing. Results indicated that positive distraction and sense of control were key determinants of residential mobility than social support. These resulted to increase the percentage of SWD willing to change student housing and reduce in percentage of SWD willing to stay in their present student housing. Aside, these have had dyeing effects on number of SWD looking for accommodation in the study areas. This has implication on inclusivity, quality of life of SWD, accessibility and rental cashflows on the part of the student housing owners.

Practically, the implementation of rent discounts, inclusive transportation options and improved physical infrastructure, including automated doors, elevators and slip-resistant flooring, is recommended to control positive social support and sense of control supportive designs in student housing in Ghana.

Furthermore, the creation of visually appealing and acoustically comfortable indoor environments, such as flexible spaces, coupled with outdoor accessible spaces, can significantly contribute to reduce positive distraction and the overall well-being of SWD. Collectively, these findings provide valuable insights for architects, university management and housing managers in designing and managing student accommodations that meet the specific needs of SWD. At best, university management through the Dean of student offices must regularly assess off-campus student housing to ensure quality SWD student housing selection. Finally, architects are required to ensure the implementation of design guidelines that focus largely on sense of control in emerging student housing designs, especially in off-campus university housing.

6. Conclusions

This study investigated the impact of supportive design on residential mobility among SWD in student housing using the PLS-SEM. Findings indicate that sense of control and positive distraction significantly influence residential mobility to a greater extent than social support or supportive design. While sense of control emerged as a primary predictor of residential mobility, no direct relationships were observed between sense of control, positive distraction and social support as compared to earlier studies, and therefore, reject the hypothesis. Although social support did not exhibit significant direct effects, its potential relevance to residential mobility cannot be dismissed. Specifically, dissatisfaction with sense of control in common areas was strongly associated with residential mobility. Furthermore, the impact of positive distraction on residential mobility was more closely linked to the availability of ramps than to overall indoor physical accessibility. These results suggest that prioritizing supportive design elements that enhance a sense of control, particularly in common areas, could effectively reduce high residential mobility rates among SWD in student housing.

7. Limitations of the study

This study is circumscribed by three primary limitations. First, a notable omission is the exploration of factors influencing the availability and adherence to supportive design principles from the perspective of student housing investors. Consequently, further research delving into these dynamics would significantly enrich the discourse on physical accessibility within the context of student housing. Second, to expand the application of supportive design theory, future investigations into the interplay between inverse relationship of supportive design, residential mobility and the health outcomes of SWD in on-campus student housing are warranted. This line of inquiry holds promise for advancing knowledge in both facilities management and health sciences in both on-campus and off-campus student housing. Third, a qualitative research methodology could offer profound insights into the nature of positive distraction and social support design, thereby providing a more comprehensive understanding of these critical elements.

References

Adam, I. (2019), “Drivers of physical accessibility among hotels”, *Anatolia*, Vol. 30 No. 4, pp. 560-571.

Amoah, C., Bamfo-Agyei, E. and Simpeh, F. (2023), “Disable access compliance to university infrastructure: built environment students’ perceptions”, *Property Management*.

Andrade, C.C., Devlin, A.S., Pereira, C.R. and Lima, M.L. (2017), “Do the hospital rooms make a difference for patients’ stress? A multilevel analysis of the role of perceived control, positive distraction, and social support”, *Journal of Environmental Psychology*, Vol. 53, pp. 63-72.

Appau, M.W., Attakora-Amaniampong, E. and Anugwo, I.C. (2024), “Nature of student housing in Ghana: drivers of physical health condition effects on students living with disability (SWD) in Purpose-Built university housing”, *Property Management*, Vol. 42 No. 4, pp. 523-544.

Attakora-Amaniampong, E., Anugwo, I.C. and Appau, M.W. (2024), “Relationship between indoor environmental quality and residential mobility: implications for student housing design and management in Northern Ghana”, *International Journal of Building Pathology and Adaptation*, doi: 10.1108/IJBPA-08-2023-0115.

Attakora-Amaniampong, E., Appau, M.W. and Osumanu, I.K. (2021), "Expectations of student with disability living in off-campus student housing in Ghana: a gap model approach", *PSU Research Review*, Vol. 8 No. 1.

Attakora-Amaniampong, E., Appau, M.W. and Tengan, C.I. (2022), "All-inclusiveness and end-user satisfaction in student housing nexus: cognitive dissonance perspective", *Housing, Care and Support*, Vol. 25 No. 2, pp. 107-121.

Bae, S. and Asojo, A.O. (2020), "Ambient scent as a positive distraction in Long-Term care units : theory of supportive design", *HERD: Health Environments Research and Design Journal*, Vol. 13 No. 4, pp. 158-172.

Bodaghi, N.B. (2012), "Accessibility and facilities for the disabled in public and university library buildings in Iran", *Information Development*, Vol. 29 No. 3, pp. 241-250.

Cain, M. (2021), "Structural equation modeling using Stata", *Journal of Behavioral Data Science*, Vol. 1 No. 2, pp. 156-177.

Calsyn, R.J. and Winter, J.P. (2002), "Social support, psychiatric symptoms, and housing: a casual analysis", *Journal of Community Psychology*, Vol. 30 No. 3, pp. 247-259.

Castell, L. (2014), "Building access for people with intellectual disability, dubious past, uncertain future", *Facilities*, Vol. 32 Nos 11/12, pp. 675-684.

Chan, E.H.W., Lee, G.K.L. and Chan, A.T.S. (2008), "Universal design for people with disabilities housing estates", *Property Management*, Vol. 27 No. 2, pp. 138-146.

Chaudhury, H., Mahmood, A. and Valente, M. (2005), "Advantages and disadvantages of single-versus multiple-occupancy rooms in acute care environments: a review and analysis of the literature", *Environment and Behavior*, Vol. 37 No. 6, pp. 760-786.

Durbin, A., Nisenbaum, R., Kopp, B., Campo, P.O., Hwang, S.W. and Stergiopoulos, V. (2019), "Are resilience and perceived stress related to social support and housing stability among homeless adults with mental illness?", *Health and Social Care in the Community*, Vol. 27 No. 4, pp. 1053-1062.

Edwards, H. (2020), "Making things personal : a project promoting the wellbeing of older residents and staff in sheltered housing and care homes", *Journal of Public Mental Health*, Vol. 19 No. 3, pp. 253-259.

Edwards, M., Poed, S., Al-Nawab, H. and Penna, O. (2022), "Academic accommodations for university students living with disability and the potential of universal design to address their needs", *Higher Education*, Vol. 84 No. 4, pp. 779-799.

Farzan, R., Ghorbani Vajargah, P., Mollaei, A., Karkhah, S., Samidoust, P., Takasi, P., … and Haddadi, S. (2023), "A systematic review of social support and related factors among burns patients", *International Wound Journal*, Vol. 20 No. 8, pp. 3349-3361.

Freeman, J., Gorst, T., Gunn, H. and Robens, S. (2020), "A non-person to the rest of the world": experiences of social isolation amongst severely impaired people with multiple sclerosis", *Disability and Rehabilitation*, Vol. 42 No. 16, pp. 2295-2303.

Gbadegesin, J.T., Komolafe, M.O., Gbadegesin, T.F. and Omotoso, K.O. (2021), "Off-campus student housing satisfaction indicators and the drivers: from student perspectives to policy re-awakening in governance", *Journal of Human Behavior in the Social Environment*, Vol. 31 No. 7, pp. 889-915.

Gjertsen, H.G., Hardonk. and Ineland, J. (2021), "Work inclusion for people with intellectual disabilities in three Nordic countries: the current policy and challenges", *Scandinavian Journal of Disability Research*, Vol. 23 No. 1, pp. 360-370.

Hair, J., Hollingsworth, C.L., Randolph, A.B. and Chong, A.Y.L. (2017), "An updated and expanded assessment of PLS-SEM in information systems research", *Industrial Management and Data Systems*, Vol. 117 No. 3.

Hamzat, T.K. and Dada, O. (2014), "Wheelchair accessibility of public buildings in Ibadan, Nigeria", *Asia Pacific Disability Rehabilitation Journal*, Vol. 6 No. 2, pp. 123-150.

Hazlan, N.H., Yusof, L.M. and Rahman, R.A. (2023), "Universal design in housing: motivations and benefits for developers", *AIP Conference Proceedings*, Vol. 2688, No. 1, AIP Publishing.

Hu, L.T. and Bentler, P.M. (1999), "Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives", *Structural Equation Modeling: A Multidisciplinary Journal*, Vol. 6 No. 1, pp. 1-55.

Huisman, E.R., Morales, E., Van Hoof, J. and Kort, H.S. (2012), "Healing environment: a review of the impact of physical environmental factors on users", *Building and Environment*, Vol. 58, pp. 70-80.

Johnson, R. (2004), "Mental health, social inclusion and housing: mapping the issues for service providers", *Housing, Care and Support*, Vol. 7 No. 2, pp. 10-16.

Johnstone, C. and Edwards, P. (2020), "Accommodations, accessibility, and culture: increasing access to study abroad for students with disabilities", *Journal of Studies in International Education*, Vol. 24 No. 4, pp. 424-439.

Johnstone, M., Parsell, C., Jetten, J., Dingle, G. and Walter, Z. (2015), "Breaking the cycle of homelessness: housing stability and social support as predictors of long- term well-being", *Housing Studies*, Vol. 31 No. 4, doi: 10.1080/02673037.2015.1092504.

Karunasena, G., Vijerathne, D. and Muthmala, H. (2018), "Preliminary framework to manage tenant satisfaction in facilities management service encounters", *Facilities*, Vol. 36 Nos 3/4, pp. 171-194.

Kristl, Ž., Temeljotov Salaj, A. and Roumboutsos, A. (2020), "Sustainability and universal design aspects in heritage building refurbishment", *Facilities*, Vol. 38 Nos 9/10, pp. 599-623.

Leung, M.Y., Liang, Q. and Pynoos, J. (2019), "The effect of facilities management of common areas on the environment domain of quality of life or older people in private buildings", *Facilities*, Vol. 37 Nos 3/4, pp. 234-250.

Martín López, L. and Fernández Díaz, A.B. (2022), "Interior environment design method for positive mental health in lockdown times: color, textures, objects, furniture and equipment", *Designs*, Vol. 6 No. 2, p. 35.

Nesse, L., Aamodt, G., Gonzalez, M.T., Rowe, M. and Raanaas, R.K. (2021), "The role of occupational meaningfulness and citizenship as mediators between occupational status and recovery: a cross-sectional study among residents with co-occurring problems", *Advances in Dual Diagnosis*, Vol. 14 No. 3, pp. 99-118, doi: 10.1108/ADD-08-2020-0018.

Nesse, L., Gonzalez, M.T., Aamodt, G., Borg, M., Sjåfjell, T. and Raanaas, R.K. (2022), "Promoting recovery and citizenship in collaboration with residents in supported housing: a prospective comparative study", *Nordic Social Work Research*, pp. 1-18.

Parasuraman, A., Zeithaml, V.A. and Berry, L.L. (1985), "A conceptual model of service quality and its implication for future research", *Journal of Marketing*, Vol. 49 No. 4, pp. 41-50.

Parsell, C., Clarke, A., Kuskoff, E., Parsell, C., Clarke, A., Understanding, E.K., … and Kuskoff, E. (2020), "Understanding responses to homelessness during COVID-19: an examination of Australia", *Housing Studies*, Vol. 38 No. 1, pp. 1-14.

Pirhonen, J. and Pietilä, I. (2016), "Perceived resident – facility fit and sense of control in assisted living", *Journal of Aging Studies*, Vol. 38, pp. 47-56.

Sahoo, S.K. and Choudhury, B.B. (2023), "Wheelchair accessibility: bridging the gap to equality and inclusion", *Decision Making Advances*, Vol. 1 No. 1, pp. 63-85.

Shaw, K., Cartwright, C. and Craig, J. (2011), "The housing and support needs of people with an", *Journal of Intellectual Disability Research*, Vol. 55 No. 9, pp. 895-903.

Shuayb, I. and Shuayb, I. (2020), *The Impact of Legislation on University Buildings: Inclusive Design Proposals. Inclusive University Built Environments: The Impact of Approved Document M for Architects, Designers, and Engineers*, pp. 131-159.

Simpeh, F. and Shakantu, W. (2019), "On-campus university student housing facility services prioritisation framework", *Facilities*, Vol. 38 Nos 1/2, pp. 20-38, doi: 10.1108/f-10-2018-0129.

Suess, C. and Mody, M.A. (2018), "Hotel-like hospital rooms' impact on patient well-being and willingness to pay: an examination using the theory of supportive design", *International Journal of Contemporary Hospitality Management*, Vol. 30 No. 10, pp. 3006-3025.

Tutuncu, O. and Lieberman, L. (2016), "Accessibility of hotels for people with visual impairments: from research to practice", *Journal of Visual Impairment and Blindness*, Vol. 110 No. 3, pp. 163-175.

Ulrich, D. and Lake, D. (1991), "Organizational capability: creating competitive advantage", *Academy of Management Perspectives*, Vol. 5 No. 1, pp. 77-92.

Ulrich, D. and Smallwood, N. (2003), *Why the Bottom Line Isn't!: How to Build Value through People and Organization*, John Wiley and Sons.

Weber, C., Monero Flores, V., Wheele, T.P., Miedema, E. and White, E.V. (2022), "Patients' health and well-being in inpatient mental health-care facilities: a systematic review", *Frontiers in Psychiatry*, Vol. 12, p. 758039.

Further reading

Castell, L. (2008), "Building access for the intellectually disabled", *Facilities*, Vol. 26 Nos 3/4, pp. 117-130.

Keerthirathna, W.A.D., Karunasena, G. and Rodrigo, V.A.K. (2010), "Disability access in public buildings", International Research Conference on Sustainability in Built Environment, pp. 94-104.

Leung, M.Y., Yu, J.Y. and Chow, H. (2016), "Impact of indoor facilities management on the quality of life for elderly in public housing", *Facilities*, Vol. 34 Nos 9/10, pp. 564-579.

Leung, M.Y., Wang, C. and Famakin, I.O. (2021), "Integrated model for indoor built environment and cognitive functional ability of older residents with dementia in care and attention homes", *Building and Environment*, Vol. 195, p. 107734.

Nirje, B. (1969), "The normalization principle and its human management implications", in Kugel, R. and Wolfensberger, W. (Eds), *Changing Patterns in Residential Services for the Mentally Retarded*, President's Committee on Mental Retardation, Washington, DC.

Owusu, K. and Owusu-Ansah, N.B. (2011), "Design and construction of buildings in Ghana: the disability factor", in Laryea, S., Leiringer, R. and Hughes, W. (Eds), *Proceedings of the West Africa Built Environment Research*, West Africa Built Environment Research (WABER) Conference, London, Vol. 2011, pp. 305-313.

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