

COMPARATIVE ASSESSMENT OF USER-SATISFACTION WITH ON-CAMPUS RESIDENTIAL ACCOMMODATION AT TAKORADI TECHNICAL UNIVERSITY, GHANA

Gloria Osei - Poku ^{1*}, Anita Braimah¹ and Rebecca Clegg²

¹ Department of Building Technology, Takoradi Technical University, Ghana

² Faculty of Built and Natural Environment, Takoradi Technical University, Ghana

*Corresponding author: gloseipoku@yahoo.co.uk

Abstract

The satisfaction levels of residents in two types of on-campus accommodation at Takoradi Technical University were measured and compared in this study. Attributes used to assess the levels of satisfaction were grouped under physical features, social amenities and management factors. Using a cross-sectional research design, the study utilised a structured questionnaire to obtain the views of residents in one purpose-built hostel and three halls of residence that were converted from dormitory blocks. Cluster sampling was employed to group the population according to their respective halls while a total sample of 650 students were selected by the simple random sampling method out of 1,020 residents in the 2017/ 2018 academic year. Data analysis was done with SPSS v 21 and presented as frequency tabulation, mean score rankings and Relative Satisfaction Index (RSI). The results revealed a disparity in the satisfaction levels with residents in the purpose-built hall showing a higher value (54.8 %) than their counterparts in the converted halls (44.6 %). Although the overall scores for both halls indicate a neutral stance, the individual RSI values evince that students in the purpose-built hall are more satisfied with their accommodation. Some recommendations for the improvement of residential satisfaction in the existing halls of residence include the provision of internet access (Wi-Fi) and improved water supply. The study further suggested that new halls should be built; incorporating barrier-free systems to make them accessible for all manner of persons.

Keywords: Halls of residence, On-campus, Post occupancy evaluation, User-satisfaction, Technical University.

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INTRODUCTION

Residential accommodation in tertiary institutions is provided to offer students the prospect for communal living, to promote social communication and enhance their level of comfort while on campus. In view of this, numerous scholars have described the provision of on-campus student housing facilities as central to the achievement of the goals of every tertiary institution. Yet, many universities are grappling with the challenge of providing conducive and suitable residential facilities for students on campus because of the continuous increase in student population in recent years. Subsequently, a lot of pressure has been placed on the existing halls and hostels in institutions of higher learning resulting in problems such as overcrowding as room occupancy is increased and inadequate social amenities (Adebisi *et al.*, 2017; Osei - Poku, 2016; Akinluyi, 2013; Oladiran, 2013). In the opinion of Botha *et al.*, (2015), the residence halls should afford the best settings for enhanced social interaction leading to improved performance in all areas of life including academics. Furthermore, Hassanain (2008) has revealed that students perform better in their schoolwork if they are comfortable with their student housing. Other authors have corroborated this by establishing positive correlations between students' residential satisfaction and their academic performance (Singh, 2006; Thornton, 2006; Botha *et al.*, 2015). When satisfied, Khozaei *et al.* (2010) assert that occupants tend to have an enhanced feeling of attachment to their residences. Consequently, residents' satisfaction must be evaluated as often as possible in order to address the accommodation needs of tertiary students.

In the year 2016, some polytechnics in Ghana were upgraded into technical university status; a move by the then-government to ensure improved skills training to curb the unemployment situation in the country. This upgrading necessitated the expansion of existing infrastructure of the institutions to accommodate the anticipated rise in student enrolment and to boost the growth of the Technical

Universities (TUs). As such, in Takoradi Technical University (TTU) new construction projects involving classrooms, students' accommodation and other structures are being undertaken. In view of this, providing feedback on the performance of the existing on-campus halls of residence is of essence to guide the design and construction of the new accommodation which, in effect, would enhance the satisfaction of residents. Presently, the institution has a total of five halls of residence – four on its main campus and the fifth on its first satellite campus. However, as observed by Osei - Poku (2016), three of them were converted into halls of residence from dormitory blocks which were used in the era when the school was a second cycle institution and not purpose-built. In this research, a purpose-built student hall of residence refers to that lodging specially designed to house students at the tertiary level such as live-in residential college, containing student units with other ancillary facilities (The Adelaide City Council (ACC, 2005) cited in Attakora - Amaniampong *et al.* (2017)).

This study therefore measures the satisfaction levels of residential students on the campuses of TTU and compares the values for those living in the purpose-built residence with that of occupants in the converted halls using the Post Occupancy Evaluation (POE) approach. The following objectives guided the study:

1. to establish suitable parameters for measuring the satisfaction of students in on-campus residential accommodation
2. to compare the satisfaction levels of residents in purpose-built halls with those in converted halls

The findings will provide awareness to management of TUs to improve future students' accommodation in order to enhance their satisfaction with residences on campus. The concept and practice of POE is gaining grounds in Ghana. This study will therefore add to the body of knowledge on POE studies from the tropics.

LITERATURE REVIEW

Assessing Residential Satisfaction – definition, theories and methods

The concept of satisfaction has been defined by Parker and Matthews (2001) as a comparison between what was expected and what is received. This notion has influenced the definition of housing satisfaction or residential satisfaction by different researchers. Residential satisfaction has been extensively researched because of its impact on quality of life and migration issues as well as its role in determining the successes of housing development schemes. To some researchers, it is the contentment experienced by an individual or a group of people regarding the state of their present housing (Djebarni and Al-Abed, 2000; Alkandari, 2007). Furthermore, Mohit *et al.* (2010) define it as the positive experience expressed by occupants when their dwelling places meet their expectations. Arguing from the point of view that residential satisfaction is multi-dimensional, Mohit and Al-Khanbashi Raja (2014) consider the contentment felt by occupants when their aspirations are met by their accommodation as an all-encompassing definition.

Consequently, these definitions suggest that the level of satisfaction is derived out of experiences of living in a place. Accordingly, in numerous studies the performance of buildings has been assessed after residents have occupied the accommodation for a period (the POE approach). This approach relied mostly on questionnaire surveys for the opinions of residents and has been used by several researchers including Danso and Hammond (2017), Navarez (2017), Sanni - Anibire and Hassanaian (2016), Ajayi *et al.* (2015), Sawyerr and Yusof (2013) and Najib *et al.* (2011). Additionally, some methods such as observation and focus group discussions have been used to gather data for studies into the performance of buildings (Sanni - Anibire and Hassanaian, 2016). To further validate responses from residents, other researchers have employed the use of instruments to measure and record indoor environment quality (IEQ) parameters as part of building performance assessments. This is because Sanni - Anibire and Hassanaian (2016) suggest that more than one data collection technique be employed in order to capture the 'real picture' of a building's performance.

According to Mohit and Al-Khanbashi Raja (2014), some scholars researching on students' residential satisfaction have relied on different theories among which are the Housing Needs Theory of Rossi (1955), the Housing Deficit Theory by Morris and Winter (1978) and the Psychological Construct Theory of Galster (1985). In addition Jiang (2018) identified the Gap Theory by Galster (1987) as another theory used in residential satisfaction studies. Others have used a synthesis of 2 or more of the theories to assess residents' satisfaction. Housing Needs Theory is based on the premise that the differences arising as a result of changing life cycles and their respective accommodation needs invariably creates housing distress (dissatisfaction) for residents at each

stage. As stated by Rossi who propounded this theory, housing needs are affected by household composition; therefore, the various life cycle changes require different spaces (Crull, 1979). For instance, the residential needs of an unmarried young adult would be different from when the same is married with 2 teenage children. Again, the spatial requirements of a young, healthy couple with children would not be the same as that of an aged couple who may be plagued with infirmities. Therefore, the response to this dissatisfaction is for households to migrate from one type of residence to another which suits their needs.

Morris and Winter introduced the Housing Deficit Theory which suggests that people evaluate their current accommodation based on some familiar norms. These norms are standards set by society, cultures, family or an individual and when there is any inconsistency between the housing prescribed by the norms and the actual situation a deficit (gap) is identified resulting in dissatisfaction. Residents respond to this low satisfaction by making adjustments including partitions and adding extensions to get the desired accommodation. In some instances, the family moves to another dwelling (Crull, 1979). This theory assesses residential satisfaction from a social perspective. The Psychological Construct Theory proposed by Galster informs that individuals may build a mental image of particular aspects of their accommodation which serves as reference point of their expectations with which they compare any other residence. If their present accommodation conforms to the image, they are satisfied. The converse leads to dissatisfaction; response to which may lead to housing adjustment models such as adaptation, modification of the accommodation or residential mobility. In this theory, residential satisfaction is assessed from the psychological dimension.

Galster again introduced the Gap Theory which measures residential satisfaction by identifying gaps between the existing situation and what residents desire to experience. This theory informs that people are dissatisfied when the gap is wider (Jiang, 2018) and assesses residential satisfaction from multiple dimensions including social and cognitive dimensions. Found in **Table 1** is a summary of the major points of the theories.

Table 1: Summary of Housing Theories

Theory	Author(s) & Date	Major points	Response to Dissatisfaction
Housing Needs Theory	Rossi (1955)	a) Changing housing needs with changing household composition lead to housing distress b) Satisfaction influenced by spatial configuration of residence	Migration
Housing Deficit Theory	Morris & Winter (1978)	a) Deviation from housing norms create housing deficit b) Satisfaction assessed from social perspectives	Adjustments made to dwelling to suit norms
Psychological Construct Theory	Galster (1985)	a) Mental imagery of aspects of housing as reference points; any residence with similarities to the image, leads to satisfaction b) Satisfaction assessed as psychological aspect	Adaptation; modification of residence
Gap Theory	Galster (1987)	a) Gap exists between expected housing and what exists b) Satisfaction influenced by multi-dimensional factors	Adaptation, modification, migration

A critical analysis of the theories unearths a similarity – each of the above theories compares two scenarios; namely an expected situation and an actual situation. Users are satisfied when there is no identified gap between the actual conditions of their dwelling and their expectations. That is to say, the residence meets or exceeds their needs and aspirations. Otherwise, they are dissatisfied. Some of the expectations of building occupants include their comfort, privacy and safety as well as the functionality and quality of the residence. But although they all have a similarity, there are certain differences that distinguish one theory from another (refer to **Table 1**). Accordingly, in this research, residential satisfaction is assessed based on a synthesis of the Housing Deficit and the Gap Theories

Performance Indicators of Students' Residential Satisfaction

Several performance criteria have been used by previous researchers to assess the satisfaction of students with their residences, a summary of which have been provided in **Table 2**. Mohit and Al-

Khanbashi Raja (2014) employed a multi-facet framework involving six criteria in a review of literature on residential satisfaction. They are physical features (P), neighbourhood facilities (N), social environment (S), socio-demographic characteristics (SD), housing support services (HSS) and public facilities (PF). The work of Navarez (2017) grouped the parameters under two main headings – physical (P) attributes and social, financial, management (SFM) attributes. The sub-attributes under physical were students' living conditions, community facilities and services as well as neighbourhood physical surrounding. The SFM criteria were students' social activities, cost of living and their preferences. The study of Danso and Hammond (2017) also classified the factors into building features (BF), neighbourhood condition (NC), social amenities (SA) and management system (MS). Furthermore, Ajayi *et al.* (2015) categorised the attributes used in assessing residential satisfaction under physical (P), social (S) and management aspects (M). In this regard, physical referred to the dwelling and its surrounding environment while students' personal characteristics, feelings and perceptions formed the social aspects. The management factors comprised hygiene, maintenance, security and management-student relationships. Similarly, Sawyerr and Yusof (2013) grouped the attributes into physical (P) – the building's features – and social (S) attributes.

On the contrary, Sanni - Anibire and Hassanain (2016) assessed the student housing facilities under design quality (DQ), indoor environment quality (IEQ) and quality of building support services (QBSS). Hassanain (2008) suggested the use of technical (T) and functional (F) requirements for assessing students' residential satisfaction. In this regard, the technical requirements being acoustic, thermal and visual comfort while functional requirements involve the layout of and finishes used in the spaces. Consequently, Najib *et al.* (2011) built upon the model of Hassanain (2008) to develop the Student Residential Satisfaction (SRS) framework which was used to measure satisfaction levels.

Table 2: Attributes for assessing students' residential satisfaction

Author(s)	Attributes	Data Collection Method(s)	Data Analysis Method(s)
Navarez (2017)	P, SFM	Questionnaire	Mean, Standard Deviation, Percentages
Danso & Hammond (2017)	BF, NC, SA, MS	Questionnaire	Relative Importance Index (RII)
Sanni – Anibire & Hassanain (2016)	DQ, IEQ, QBSS	Walkthrough, questionnaire, focus group discussion	Satisfaction Index (SI), Quality Score (QS)
Ajayi <i>et al.</i> (2015)	P, S, M	Questionnaire	Frequency, Relative Satisfaction Index (RSI)
Mohit & Al-Khanbashi Raja (2014)	P, S, NC, HSS, SD, PF	Literature review	-
Sawyerr & Yusof (2013)	P, S	Questionnaire	Mean Scores, Standard Deviation
Najib <i>et al.</i> (2011)	P, S	Questionnaire	Mean Scores

Guided by the above from previous literature, this study assesses students' satisfaction with their residences from the perspective of physical features (P), social amenities (SA) and management factors (M). The sub-attributes examined under the physical features were bedrooms and sanitary facilities. These two features were further assessed under sub-sub attributes of room size, room finishes, ease of movement within room, level of privacy, number of occupants and room thermal comfort. Others are location of sanitary facilities, quantity of w/c and shower cubicles, level of natural lighting, level of artificial lighting as well as level of natural ventilation. Under the social amenities, the following variables are considered: electricity supply, water supply, availability of facilities for persons with disabilities (PWDs), access to internet/ Wi-Fi, sports facilities and Junior Common Room (JCR). Management factors include adequacy of security measures, availability and adequacy of firefighting equipment and frequency of waste disposal. The parameters of frequency of maintaining the hall, cleanliness of washrooms and speed of handling residents' complaints are also assessed under management factors. The sub-attributes in each of the categories are illustrated in **Figure 1**.

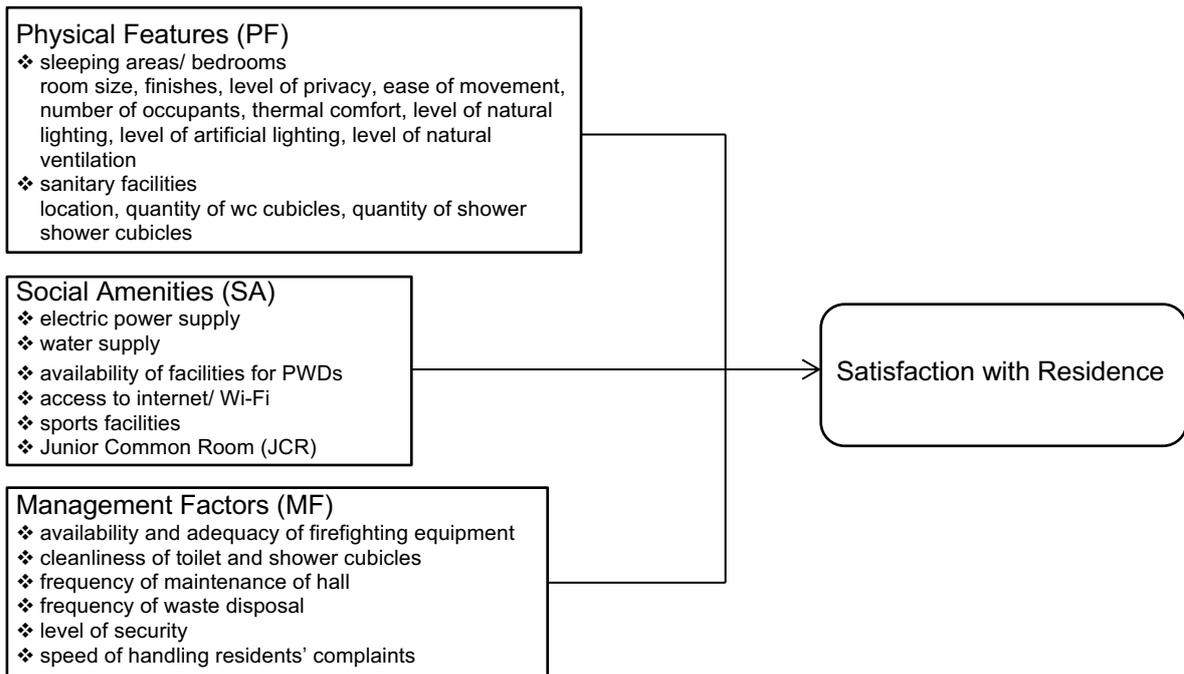


Figure 1: Conceptual model for assessing residential satisfaction at TTU

METHODOLOGY

This study involved four of the five halls of residence on the two campuses of TTU namely; Ahanta Hall, GETFund Hostel, Ghacem Hall and Nzima - Mensah Hall. The University Hall was not included in the study because at the time of data collection, it had not been occupied. Details of the halls are presented in **Table 3**; in **Figures 2a, 2b, 2c** and **2d** are the front views of each of the halls. The research design adopted a cross-sectional survey; the data-collection tools were desk study and questionnaire survey. A literature review on building performance criteria was conducted and the information gathered aided the development of the questionnaire. In order to reduce any ambiguity in the questions before being distributed to the sampled respondents, a preliminary survey was carried out on twenty residents. Of this number, 6 (30 %) did not answer all questions indicating uncertainty and requesting for clarification. The responses from this pilot study helped in the streamlining of the questions for the final questionnaires which were administered. The cluster sampling method was used where the population of 1,020 residents in the 2017/2018 academic year was grouped according to their halls of residence. This sampling method was employed because it was impractical to compile an exhaustive list of all on-campus residents; however, the residents had already been grouped into their halls of residence (subpopulations). From these four subpopulations (halls), a randomly selected total of 650 students were served with questionnaires during the second semester. Out of this number, 613 were retrieved and used in the analysis (**Table 3**).

Table 3: Overview of Study Buildings

	Ahanta	GETFund	Ghacem	Nzima - Mensah
Gender of Residents	Male	Mixed	Female	Male
Capacity (No. of Bed spaces)	130	448	150	292
Number of floors	2	4	3	3
Number of rooms	12	88	22	43
Orientation	N-S	SE-NW	NE-SW	SW-NE
Shape/ Description	Linear; rooms in a row with veranda in front	Curvilinear; double-bank rooms with central corridor	Linear; rooms in a row with veranda in front	Linear; rooms in a row with veranda in front
Year Completed	1954	2005	1974	1974
Type of Hall	Converted	Purpose-Designed	Converted	Converted
Number of Respondents	102	211	120	180



Figure 2a: External view of Ahanta Hall



Figure 2b: External view of GETFund Hostel



Figure 2c: External view of Ghacem Hall



Figure 2d: External view of Nzima-Mensah Hall

The questionnaire had two (2) parts. The profile of respondents was captured in the first part while the second part gave respondents the opportunity to rate their level of satisfaction with the halls on a 5-point Likert scale of 1 = very dissatisfied to 5 = very satisfied. Data from the questionnaires were analysed using IBM SPSS v 21 and the information on the respondents' demographics were presented as frequencies and percentages while Mean Score (MS) rankings and Relative Satisfaction Index (RSI) were used to present the levels of satisfaction.

The mean scores were calculated using the formula:

$$\text{Mean Score} = \frac{\sum n * W}{N} \quad \text{Equation (1)}$$

Where

n = number of responses to an option

W = weighting of options

N = total number of responses

The Relative Satisfaction Index (RSI) was calculated using the formula:

$$\text{RSI} = \left[\frac{\sum n * W}{A * N} \right] * 100\% \quad \text{Equation (2)}$$

Where

n = number of responses to an option

W = weighting of options ranging from 1 to 5

A = higher response integer (5)

N = total number of responses

The interpretation given to the RSI values are as used by Ojo and Oloruntoba (2012):

1.0 % – 20.9 % = Very Dissatisfied

21.0 % – 40.9 % = Dissatisfied

41.0 % – 60.9 % = Neutral

61.0 % – 80.9 % = Satisfied

81.0 % – 100.0 % = Very Satisfied

RESULTS AND DISCUSSION

Respondents' Demographic Profile

In order to place the responses within a particular context where the data will be deemed reliable, it was vital to have a fair idea of the background of the residents of the halls. Thus, the variables of age, gender, nationality, year of study (level), duration of stay at the hall and number of occupants in the rooms were examined; results of which are presented in **Table 4**.

Table 4: Background of Respondents

Demography	Variable	Frequency	Percentage
Age	Less than 20 years	124	20.2 %
	21 years – 25 years	431	70.3 %
	26 years – 30 years	45	7.3 %
	Above 30 years	13	2.2 %
Gender	Male	383	62.5 %
	Female	230	37.5 %
Nationality	Ghanaian	613	100.0 %
	Non-Ghanaian	0	0.0 %
Level of Study	HND 1	180	29.4 %
	HND 2	207	33.8 %
	HND 3	226	36.8 %
Duration of Stay	One year	231	37.7 %
	Two years	216	35.2 %
	Three years	149	24.3 %
	Other	11	1.8 %
	No response	6	1.0 %
Room Occupancy	1-in-a-room	18	2.9 %
	2-in-a-room	50	8.1 %
	4-in-a-room	343	56.0 %
	6-in-a-room	202	33.0 %

It is observed from **Table 4** that out of the 613 respondents, 431 (constituting 70.3 %) fell within the age bracket of 21 years – 25 years, while 124 (accounting for 20.0 %) were less than 20 years. Only a small fraction of respondents (2.2 %) indicated that they were above 30 years of age. The Ghana Statistical Service (GSS, 2012) identified the age bracket for enrolling into tertiary institutions as between 18 years and 21 years. Consequently, the findings of this research substantiates the data from GSS. From the respondents, a total number of 383 were male representing 62.5 % while 230 were females representing 37.5 % (**Table 4**). This result of male dominance among the student population is common in technical and technology based institutions in the subregion as observed by Ajayi *et al.* (2015). This also explains why more on-campus accommodation was provided for males. It was discovered from the distribution that first year students constituted 29.4 % while continuing (years 2 and 3) students totalled 70.6 % of the respondents. The Higher National Diploma (HND) programme runs for 3 years in Technical Universities and Polytechnics in Ghana. Therefore, this distribution indicates that the right audience was reached for their views. A greater percentage of students had resided for one year in the hall compared to other number of years. This is because of the institution's policy that accommodates first year students. A small percentage did not respond to this particular question probably because they were illegal residents in the hall (Osei - Poku, 2016). The duration of stay of respondents is captured in **Table 4**. More than half of respondents (56 %) live 4 persons to a room while 33 % indicated they were 6 in the room. Respondents in rooms with single occupancy and double occupancy were in the minority as the design of the halls made provision for few of such types of rooms. These are reserved for hall executives and leaders of student unions such as the Students' Representative Council (SRC). About 90 % of rooms in each hall are shared rooms in order for more students to be accommodated on campus. Khajehzadeh and Vale (2014) observed that highly populated shared rooms with common facilities offered opportunities for better social interactions in tertiary institutions.

Occupants' Levels of Satisfaction

Illustrated in **Table 5** are the results of the respondents' satisfaction levels. The mean score and RSI values for the purpose-built hall were used as a benchmark in ranking to clearly bring out how each sub-attribute performed in the two types of students' accommodation. Students in the purpose-built accommodation were satisfied with a total of six variables but expressed neutrality on seventeen and were dissatisfied with two. On the contrary, residents in the converted halls were satisfied with one parameter, remained indecisive on seventeen and were dissatisfied with seven. The differences in satisfaction levels confirms Jiang's (2018) assertion that different expectations concerning a particular attribute could possibly lead to differences in degree of satisfaction between individuals with the same socio-demographic profile.

Satisfaction with Physical Features

Of the twelve sub-attributes that respondents were asked to rank under physical features, residents of both types of halls were satisfied with the finishes used, ranking this variable 1st. However, this was the only parameter that occupants in the converted halls were satisfied with. While residents in the purpose-built hall were satisfied with level of natural lighting (70.4 %), ranking it 2nd, their counterparts in converted halls ranked this parameter 5th and took a neutral stance. Likewise, the room size (65.2 %) was ranked 3rd in the purpose-built hall but was rated and ranked 46.0 % (6th) in the converted halls. In the purpose-built hall, a room of size 19.00 m² accommodates four occupants while six people are assigned to a 25.08 m² room. On the other hand, cubicle sizes in the converted halls range between 6.50 m² (one or two occupants), 8.80 m² (four persons) and 18.00 m² for six occupants. The room sizes vis-à-vis the number of occupants contributes to why students from the purpose-built hall are satisfied as compared to their colleagues in the converted halls whose rooms also serve other functions aside sleeping areas. Previous studies by Sanni - Anibire and Hassanaian (2016) in Saudi Arabia revealed students were dissatisfied with their room sizes of 24.96 m² and having double occupancy. This was, however, attributed to the use of large furniture that took up most of the room space.

Again, residents in the purpose-built hall rated the location of sanitary facilities 61.0 % and ranked 4th but to those in the converted halls, this sub-attribute scored 44.2 % (7th); an indication that the expectations of the residents were met by the design of the purpose-built hall. This hall has double-banked rooms in a cluster around a central corridor for circulation with washrooms and kitchens in close proximity on every floor. The study of Khajehzadeh and Vale (2014) suggested this kind of arrangement to enhance occupants' satisfaction levels. On the other hand, the converted halls have the washrooms located on the ground floor at one end of the hall in such a manner that students

staying at the other end as well as on upper levels have to travel long distances to use the facilities. No provision has also been made for kitchens in the all-male halls. Although the all-female hall has some washrooms on one end of each floor, an additional toilet facility and the kitchens are located on the ground floor. This accounts for the low RSI values for location of sanitary facilities. Similar results were obtained by Ajayi *et al.* (2015) in Nigeria where residents expressed dissatisfaction with the location of toilet and bathrooms in relation to their rooms. Again, the research of Khajehzadeh and Vale (2014) from Iran identified that locating bathrooms and toilets further from sleeping areas reduced student satisfaction levels. The degree of residential satisfaction decreased with increasing distance between a student room and such facilities, thus Hassanain (2008) proposed that the bathrooms should be located in close proximity to sleeping areas.

On the contrary, whereas residents from the converted halls expressed dissatisfaction with the thermal comfort of room (40.4 %) and the privacy levels within their rooms (39.9 %), residents from the purpose-built hall expressed indifference with these variables. The converted halls previously had open dormitory rooms which had two window walls with a veranda in front. However, in an attempt to create more defined and private areas, the rooms have been partitioned into cubicles resulting in poor levels of natural ventilation and natural lighting. The lack of cross ventilation accounts for residents' dissatisfaction with the room thermal comfort. More so, a lack of sense of privacy and security in the converted halls is as a result of the windows that open directly into the veranda, thereby allowing noise from passers-by into the rooms.

Table 5: Satisfaction Levels between respondents in converted halls and purpose-built hall

Attributes	Converted Halls (N = 402)				Purpose-Built Hall (N = 211)			
	M S	RSI	Rank	Interpretation	M S	RSI	Rank	Interpretation
Physical Features:		47.2				58.8		
Finishes	3.20	64.0	1	Satisfied	3.71	74.2	1	Satisfied
Natural lighting levels	2.31	46.2	5	Neutral	3.52	70.4	2	Satisfied
Room size	2.30	46.0	6	Neutral	3.26	65.2	3	Satisfied
Location of sanitary areas	2.21	44.2	7	Neutral	3.05	61.0	4	Satisfied
Level of natural ventilation	2.52	50.4	3	Neutral	3.00	60.0	5	Satisfied
Number of w/c cubicles	2.14	42.8	9	Neutral	2.86	57.2	6	Neutral
Number of shower cubicles	2.04	40.8	10	Dissatisfied	2.79	55.8	7	Neutral
Ease of movement	2.36	47.3	4	Neutral	2.77	55.4	8	Neutral
Room thermal comfort	2.02	40.4	11	Dissatisfied	2.68	53.6	9	Neutral
Artificial lighting levels	2.98	59.6	2	Neutral	2.62	52.4	10	Neutral
No. of occupants	2.21	44.2	7	Neutral	2.54	50.8	11	Neutral
Level of privacy	1.99	39.9	12	Dissatisfied	2.48	49.6	12	Neutral
Social Amenities:		40.2				49.3		
Junior common room	2.75	55.1	1	Neutral	3.67	73.4	1	Satisfied
Water supply	2.57	51.4	2	Neutral	2.66	53.2	2	Neutral
Electric power supply	2.03	40.6	3	Dissatisfied	2.52	50.4	3	Neutral
Availability of facilities for PWDs	1.43	28.6	6	Dissatisfied	2.24	44.8	4	Neutral
Internet / Wi-Fi	1.71	34.2	4	Dissatisfied	1.94	38.8	5	Dissatisfied
Outdoor sports facilities	1.55	31.0	5	Dissatisfied	1.76	35.2	6	Dissatisfied
Management Factors:		44.0				52.7		
Availability and adequacy of firefighting equipment	2.06	41.2	7	Neutral	2.88	57.6	1	Neutral
Frequency of waste disposal	2.29	45.8	2	Neutral	2.79	55.8	2	Neutral
Level of Security	2.14	42.8	5	Neutral	2.69	53.8	3	Neutral
Cleanliness of the toilet	2.20	44.0	3	Neutral	2.54	50.8	4	Neutral
Speed of handling residents' complaints	2.19	43.8	4	Neutral	2.53	50.6	5	Neutral
Frequency of maintenance of hall	2.14	42.8	5	Neutral	2.52	50.4	6	Neutral
Cleanliness of the shower	2.39	47.8	1	Neutral	2.49	49.8	7	Neutral

Satisfaction with Social Amenities

With regards to social amenities, respondents from both types of halls ranked the JCR as 1st. This implies that irrespective of the type of hall (purpose-built or converted), the recreational needs of residents are met by design. The JCR serves as a meeting room, TV room and a space for playing indoor games. Meanwhile, water supply and electric power supply were ranked 2nd and 3rd respectively by residents in the two types of halls with residents indicating dissatisfaction and / or remaining neutral. The dependence on the national grid for both water and electric power supply to the halls of residence accounts for the low RSI values. Consequently, whenever there is rationing for

any of these utilities, the effect is felt by residents. Frequent power outages at the time of undertaking this study could be a contributing factor to the dissatisfaction from the residents of the converted halls. This is unlike the results of Ajayi *et al.* (2015) where the highest satisfaction indices were recorded for electricity and water supply. Again, it is observed that residents from both type of accommodation scored low RSI values for facilities for persons with disabilities (PWDs). This is because in all the halls, vertical access from ground floor to upper floors is only by means of staircases; a situation that limits the movement of PWDs within the halls. Thus, they are only allocated rooms on the ground floor and have to be assisted when the need arises to use the upper floors. Occupants in purpose-built as well as converted halls were dissatisfied with the internet connectivity to their hostels as well as the lack of outdoor sports facilities.

Satisfaction with Management Factors

As shown in **Table 5**, all the residents were indecisive on management factors with none being satisfied or dissatisfied. However, the RSI values of the purpose-built hall were above 50.0 % while that of the converted halls were less than 50.0 % and closer to the lower end of the range (i.e. 40.0 %); suggesting perhaps dissatisfaction. A contrary result came from the study of Danso and Hammond (2017) where residents were satisfied with management of their accommodation. From both types of halls, low RSI values for frequency of hall maintenance as well as cleanliness of shower and toilet cubicles explain their dissatisfaction. The findings of Botha *et al.* (2015) revealed that students with clean and hygienic environments in their housing were much satisfied with their accommodation.

Even though residents in the purpose-built hall were satisfied with some sub-attributes, their overall mean RSI (54.8 %) showed that they were neither satisfied nor dissatisfied with their accommodation. Similarly, results from the converted halls (44.6 %) indicated an indecisive stance (**Table 6**). However, the latter was closer to the lower end of the range on the neutral RSI scale from Ojo and Oloruntoba (2012); pointing more to dissatisfaction than the former. Based on the Gap Theory (Galster, 1987), it can be seen that the gap between the expectations of residents and what has been provided in the residence is wider for occupants of the converted halls. It can also be argued that the overall neutral results for both halls were arrived at because the respondents were given a chance to select indecisive responses on a 5-point Likert scale, unlike the study of Najib *et al.* (2011) which utilised a 4-point scale forcing respondents to incline towards either satisfied or dissatisfied.

While residents from the converted halls were dissatisfied with the social amenities provided for their use and remained neutral on the physical features and management factors, respondents from the purpose-built hall had neutral results for all three attributes. These results (**Table 6**) inform that the expectations, needs and requirements of the occupants of both halls are not adequately met, buttressing the position of Najib and Yusof (2010) that the provision of excellent facilities in student accommodation is one major factor that influences the satisfaction of residents. Yet, making reference to the Gap Theory, the gap is wider for the converted halls than the purpose-built hall.

Table 6: Summary of Occupants' Levels of Satisfaction

	Converted Halls (N = 402)			Purpose-Built Hall (N = 211)		
	Mean RSI	Rank	Interpretation	Mean RSI	Rank	Interpretation
Physical Features	47.2	1	Neutral	58.8	1	Neutral
Social Amenities	40.2	3	Dissatisfied	49.3	3	Neutral
Management Factors	44.0	2	Neutral	52.7	2	Neutral
Overall Satisfaction Level	44.6		Neutral	54.8		Neutral

CONCLUSIONS

This study compared the performance of two types of student residential accommodation on the campuses of Takoradi Technical University, Ghana. It aimed to measure and compare the user-satisfaction levels among residents in converted halls and purpose-built halls to provide a guide for the design and construction of new accommodation facilities. Attributes used to examine the levels of satisfaction were grouped under physical features, social amenities and management factors. From the results, it has been established that there is a disparity in the level of students' satisfaction with their type of accommodation on TTU campuses. Though the overall satisfaction scores showed a neutral stance, individual RSI values suggest that students in the purpose-built hall are more satisfied

with their accommodation. Residents from the converted halls are dissatisfied with the quantity, quality and location of some facilities. Furthermore, the results evince that residents are indecisive on majority of the attributes.

Some recommendations for the improvement of residential satisfaction in the existing halls of residence include undertaking future renovations to meet the needs of residents. This includes, as a matter of urgency, the provision of internet access (Wi-Fi) and improved water supply by the provision of more overhead water storage tanks. Electric power supply should be improved by fitting solar panels to generate electricity to augment what currently exists. Again, management of the halls should improve daily housekeeping practices and frequency of waste disposal to keep the halls neat. In order to address students' complaints promptly, hall administrators should undertake frequent inspections and set up a fund out of which maintenance requirements would be addressed. The study further recommends frequent POEs to identify the challenges faced by occupants of the on-campus accommodation.

A more sustainable approach to enhancing user-satisfaction with on-campus residential accommodation involves the design and construction of more halls to accommodate the large student population on campus. In this regard, the sizes of the shared rooms in the new halls should be increased to conform to universal design standards in order to improve user-satisfaction. The rooms should have balconies where students can sit, relax and get some fresh air. Again, the new designs should be provided with the following facilities on every floor: study/ reading rooms for students to have their private studies as well as kitchens, washrooms and areas for washing and drying wet laundry. These facilities should be located such that there are reduced distances and travel times from the bedrooms to each of them. New designs of halls should be done to provide quieter and more secure circulation spaces through the reduction of corridor lengths and eliminating of long verandas in front of rooms. Barrier-free systems should be incorporated so that more PWDs can have access to most parts of the halls. As a cost-effective measure, new halls should have increased floor levels to a minimum of five floors so that lifts can be incorporated as mandated by the Disability Act (2005) of Ghana. The provision of sports facilities such as gym in the halls would ensure that residents have sound minds in sound bodies. The new halls should employ sustainable water and power generation methods such as rainwater harvesting and storage for use as well as incorporating solar systems for affordable and clean electric energy.

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References

- Adebisi, O. S., Oletubo, A.A., Alade, T.J., & Ekpekepe A. (2017). Perspectives of Students on Private Hostel Facilities in Proximity to the Federal University of Technology, Akure, Nigeria. *Journal of Poverty, Investment and Development*, 33, 31 - 36
- Ajayi, M., Nwosu, A., & Ajani, Y. (2015). Students' Satisfaction with Hostel facilities in Federal University of Technology, Akure, Nigeria. *European Scientific Journal*, 11(34), 402 - 415
- Akinluyi, M. L. (2013). Post Occupancy Evaluation of on-Campus Students Hall of Residence: A Case Study of Obafemi Awolowo Hall of Residence Ile-Ife. *Greener Journal of Science, Engineering and Technology Research*, 3(1), 001-011
- Alkandari, N. (2007). Students' Perceptions of the Residence Hall Living Environment at Kuwait University. *College Student Journal*, 41(2), 327 - 335
- Attakora-Amaniampong, E., Ameyaw, S. & Akortsu, W. (2017). Qualitative Adequacy of Students Hostels in Wa, Ghana. *Civil Engineering and Architecture* 5(6): 193 - 206
- Botha, F., Snowball, J., de Klerk, V., & Radloff, S. (2015). Determinants of Student Satisfaction with Campus Residence Life at a South African University. In F. Maggino (Ed.), *A New Research Agenda for Improvements in Quality of Life, Social Indicators Research Series 57*. Switzerland: Springer International Publishing
- Crull, S. R. (1979). Residential Satisfaction, Propensity to Move, and Residential Mobility: A Causal Model. *Retrospective Theses and Dissertations*. 7198. <https://lib.dr.iastate.edu/rtd/7198>
- Danso, A. K., & Hammond, S. F. (2017). Level of Satisfaction with Private Hostels around KNUST Campus. *International Journal of Science and Technology*, 6(3), 719 - 727
- Djebarni, R., & Al-Abed, A. (2000). Satisfaction Level with Neighbourhoods in Low-income Public Housing in Yemen. *Property Management*, 18(4), 230 - 242
- Ghana Statistical Service. (2012). *2010 Population and Housing Census*. Accra: Ghana Statistical Service
- Hassanain, M. A. (2008). Post-occupancy Indoor Environmental Quality Evaluation of Student Housing Facilities. *Architectural Engineering and Design Management*, 3, 249 - 256
- Jiang, W. (2018). Gap-Theoretical Analyses of Residential Satisfaction and Intention to Move. Eindhoven: Technische Universiteit Eindhoven. Retrieved from https://pure.tue.nl/ws/files/92557658/20180328_Jiang.pdf on 22 Oct 2018

- Khajezadeh, I., & Vale, B. (2014). Shared Spaces in a Student Dorm: A Post Occupancy Evaluation. In F. Madeo, & M. A. Schnabel (Ed.), *Across Architectural Research through to Practice: 48th International Conference of the Architectural Science Association*. The Architectural Science Association & Genova University Press
- Khozai, F., Hassan, A. S. & Khozai, Z. (2010). Undergraduate Students' Satisfaction with Hostel and Sense of Attachment to place: Case study of University Sains Malaysia. *American Journal of Engineering and Applied Science*, 516 - 520.
- Mohit, M. A., & Al-Khanbashi Raja, A. M. (2014). Residential Satisfaction – Concept, Theories and Empirical Studies. *Planning Malaysia: Urban Planning and Local Governance*, 3, 47 - 66
- Mohit, M. A., Ibrahim, M., & Rashid, Y. R. (2010). Assessment of Residential Satisfaction in Newly Designed Public Low-cost Housing in Kuala Lumpur, Malaysia. *Habitat International*, 34(1), 18 - 27
- Najib, N. U. and Yusof, N. A. (2010), "Identifying Factors Affecting Satisfaction with Student Housing: A Research Framework", *Proceedings of the 2nd International Postgraduate Conference on Infrastructure and Environment*
- Najib, N. U., Yusof, N. A., & Osman, Z. (2011). Measuring Satisfaction with Student Housing Facilities. *American Journal of Engineering and Applied Sciences*, 4(1), 52 - 60
- Navarez, J. C. (2017). Student Residential Satisfaction in an On-Campus Housing Facility. *DLSU Research Congress*. Manila, Philippines: De La Salle University
- Ojo, I. & Oloruntoba, K. (2012). Public Housing Provision and User Satisfaction in Ondo State. *British Journal of Arts and Social Sciences*, 8, 103 - 111
- Oladiran, O.J. (2013). A Post Occupancy Evaluation of Students' Hostels Accommodation. *Journal of Building Performance*, 4(1), 33 - 43
- Osei - Poku, G. (2016). Post Occupancy Evaluation of the Ahanta Hall of Takoradi Polytechnic, Ghana. *Greener Journal of Science, Engineering and Technological Research*, 6(2), 040 - 047
- Parker, C., & Matthews, B. P. (2001). Customer Satisfaction: Contrasting Academic and Consumers' Interpretations. *Marketing Intelligence and Planning*, 19(1), 38 - 46
- Sanni-Anibire, M. O., & Hassanain, M. A. (2016). Quality Assessment of Student Housing Facilities through Post-Occupancy Evaluation. *Architectural and Design Management*.
- Sawyer, P. T., & Yusof, N. (2013). Student Satisfaction with Hostel Facilities in Nigerian Polytechnics. *Journal of Facilities Management*, 11(4), 306 - 322
- Singh, H. (2006). The Importance of Customer Satisfaction in Relation to Customer Loyalty and Retention, pp. 1-7
- Thornton, J. D. (2006). *A Study Examining the Relationship between School Building Conditions and the Achievement of Students Identified in the Subgroups of Economically Disadvantaged and Minority in the High Schools in the Commonwealth of Virginia*. The Faculty of the Virginia Polytechnic Institute and State University.