

Qualitative Adequacy of Students Hostels in Wa, Ghana

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Abstract This study sought to assess the adequacy levels of some purpose-built hostels around the Wa campus of the UDS to meet the growing students' population in the Wa township. It sought to find out the qualitative adequacy levels of the accommodation provided by these private hostels and how the accommodation provided by the private sector adequately supports the educational needs and requirements of students. It also sought to identify the key housing attributes and services (facilities) whose improvement will enhance the level of satisfaction derived from these hostels. It was a post-occupancy evaluation based on survey questionnaires of 31 housing attributes. A five-point Likert scale was used in measuring the qualitative adequacy levels of five purpose-built hostels. The data was analysed with descriptive statistical techniques. Respondents found the hostels fairly *adequate* for academic purposes. No hostel was either *very inadequate* or *very adequate*. The building component attributes rated were mainly found to be *adequate* while the ancillary services needed by students were mostly found fairly adequate. Fire safety and internet services were found to be *inadequate* and contributed least to the overall adequacy of the hostels. The results suggest the need for regulation in the planning, design and construction of hostels in Wa since about one-half of the attributes used were generally rated fair and none found very adequate. Fire safety is critical in students housing due to the multitenant nature of hostels. This was however found *inadequate*; necessitating urgent attention to avert any future disaster.

Keywords Adequacy Indices, Student's Housing, Facilities, Ghana

1. Introduction

One of the major challenges to tertiary education in Ghana is the provision of students' accommodation. Due to a rapidly increasing tertiary students' population and a disproportionate government funding, the number of halls of residence provided on university campuses does not meet the demand for accommodation for students on almost all the campuses [1-5].

In the University for Development Studies (UDS), for instance, students' admission numbers has gradually increased from 39 students in 1993/94 academic year to 7,184 in 2010/11 academic year [1]. Thus, the burgeoning poor students' housing situation in the country has become a source of concern to higher education stakeholders. This constitutes a serious threat to the welfare of Ghanaian students and negates the quest for sustainable education in Ghana [5].

A huge backlog of accommodation deficit now exists in most towns and cities with tertiary educational institutions like Wa [1-5]. This deficit filled by the profit seeking private sector. In an attempt to meet the exponential growth in demand, a number of both purpose and non-purpose-built hostels are springing up around the Wa campus of the UDS [6]. The quality and type of housing units provided by the private sector to meet specific needs of these vulnerable students are questionable and must be of interest to all stakeholders. The comfort, socio-economic, cultural and religious needs of these students appear to have been overshadowed by the pecuniary interest of these developers [7]. Students' housing challenges in Wa are therefore of both quantitative and qualitative in nature. The latter is very critical as it influences the attribute of living and affects the psyche of the students.

Although some few studies have evaluated students housing in Ghana, the scope has been mainly on the management of public second cycle and tertiary educational facilities [4,8,9]. These studies concentrate on *post ante* management (or the lack of it) of the physical fabric with little or no emphasis on the quality and adequacy of the building components and ancillary services for meeting the needs of the users. Thus, there is no assessment of whether the building meets the purpose for which it was built from the perspective of those who use it. In addition, the few studies mostly consider the infrastructure of government educational institutions, neglecting private built infrastructure which now houses a greater percentage of tertiary students in Ghana. Very little attention (if any) is given to the *qualitative adequacy* of these facilities in meeting the educational needs of students. But qualitative adequacy evaluations of occupied buildings are required to allow for feedback into next building delivery cycle [10,11]). This suggests that building faculties, regulators and designers must frequently undertake such evaluations to

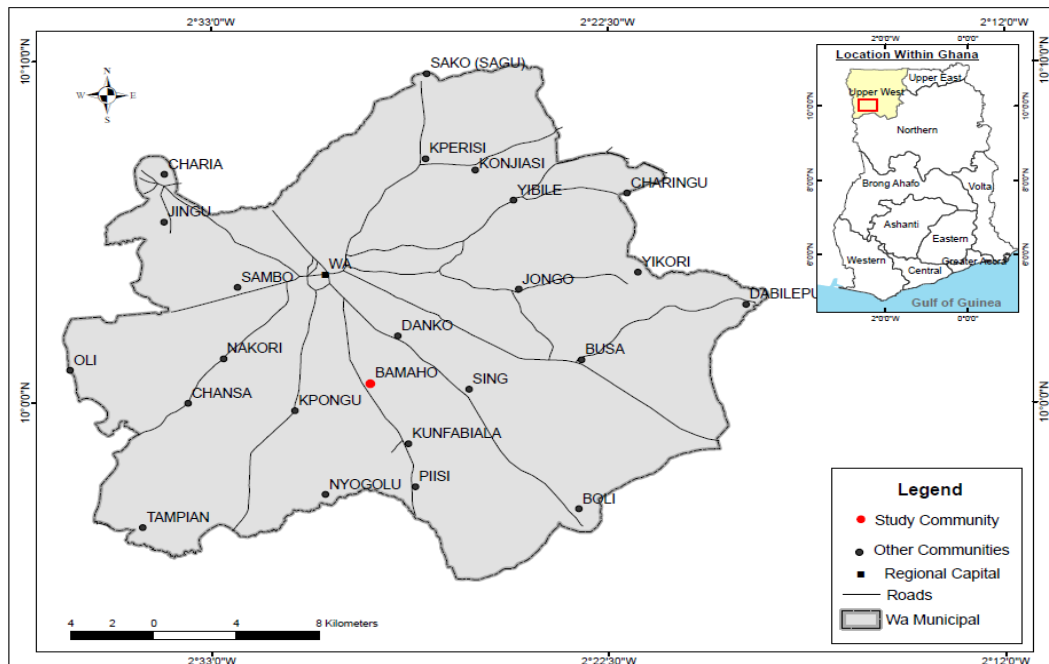
identify building components and services that require improvement for maximum benefits. This is not yet done in the Wa hostel market in particular and not regular in higher educational institutions in Ghana generally. The Wa hostel market was chosen because of the perceived challenges to the enforcement of development controls in the Wa Municipality [12]. There is very little data (if any) on the qualitative adequacy of these hastily constructed private students' hostels in Wa in particular and even in Ghana, generally. This study therefore sought to fill this gap by assessing the adequacy levels of some newly constructed purpose-built hostels around the Wa campus of the UDS. This was meant to answer three main questions. First, what are the qualitative adequacy levels of the accommodation provided by these private hostels? Second, how does the accommodation provided by the private sector adequately support the educational needs and user requirements of the students? Third, what are the key housing elements and services (facilities) whose improvement will enhance the level of satisfaction derived from these hostels? These are important for at least two reasons. First, as long as the government cannot meet the accommodation needs of tertiary students, the private sector shall continue to partner and fill that need. Therefore, checking and regulating the activities of the private sector becomes extremely important. Second, continuous evaluation of these private students' housing schemes then becomes essential to guide and regulate the design and construction of such projects [13].

2. The Study Area

This study focused on the private property sector of Ghana,

with particular emphasis on the private hostel segment in Bamahu, a suburb of Wa, in the Upper West region of Ghana. Wa is located in the north-western part of Ghana and lies between latitude 10°4'N and 2° 30'W [14]. It is the regional capital of the Upper West Region. Bamahu is a suburb of Wa located at the south-eastern part of Wa (see Map 1). It shares boundaries with Sinhg to the east, Kapaguri to the west, Kumfabilia to the south-east and the UDS to the south west. Quite a number of hostels are springing up in this area because of the presence of the university. Very little attention is however given to the planning and development control of this suburb, giving rise to the construction of various structures for housing students.

The Wa-Campus of the UDS was established in 2002 and, in terms of infrastructure, not well developed like the other public universities in Ghana. Accommodation for students on campus is woefully inadequate, forcing more than 80% of the students' population to look for accommodation in near-by suburbs like Bamahu. A huge backlog of accommodation deficit therefore exists in these suburbs of Wa. In an attempt to meet the exponential growth in demand, a number of both purpose and non-purpose-built hostels are springing up around the Wa campus of the UDS. The quality and type of housing units provided by the private sector to meet specific needs of these vulnerable students are questionable and must be of interest to all stakeholders. This is what necessitated the need to undertake this study in the area to evaluate the qualitative adequacy of some of these structures to provide data on building components and services that need urgent attention for improvement.



Source: Authors' construct

Map 1. A map of Ghana showing study area

3. Literature Review

3.1. Overview of Adequate Students' Housing

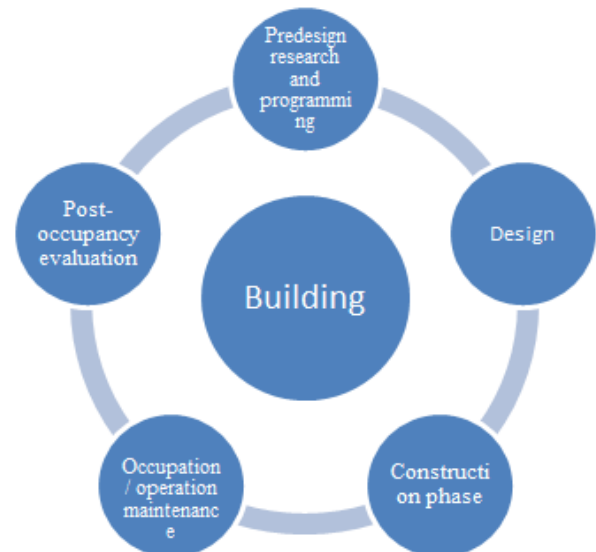
A review of contemporary housing research literature, especially in Africa, reveals two aspects of housing adequacy: *qualitative* and *quantitative* adequacy. Whereas qualitative adequacy relates to sufficiency in quality to meet the need for something [15], quantitative adequacy addresses how to increase the number of dwellings to address the overall housing deficit [16]. Thus, the housing problem of any society may relate to any of these or both. Whereas quantitative adequacy of students' accommodation has received significant attention [1,2,4,5] in Ghana, very little (if any) has been said about qualitative adequacy. The students' housing challenge in UDS, Wa campus, is both qualitative and quantitative in nature. Quantitative adequacy has received some attention and it is what researchers and commentators often talk about when it comes to students' housing generally in Ghana and in Wa in particular. On one hand, as long as funding tertiary education remains a challenge [5], little can be said about quantitative adequacy and requires another set of studies to address that challenge. As noted earlier, the gap in quantity is what the private sector seeks to address by investing in the provision of students accommodation. On the other hand, it is worthy to know how the accommodation provided by the private sector adequately supports educational goals and user requirements. Unfortunately, many higher educational stakeholders are most inclined to respond to the quantitative rather than the qualitative needs [17]. This study therefore seeks to answer the question: How does the accommodation provided by the private sector adequately support the educational needs and user requirements of the students?

To this end, it is important to identify the attributes set in the literature for a qualitatively *adequate* house. Ibem and Amole [15] argue that *adequate* housing can be viewed as the general characteristics of housing which determines the extent it satisfies users' need. What is '*adequate* housing' is however thought to be relative and hence idiosyncratic. It is influenced by one's value systems and expectations which are also shaped by his/her experience [18-20]. This means that what one may deem as *adequate* may be *inadequate* to another person. Evaluating one's adequacy therefore requires subjective approach [21]. Mohit *et al* [22] in that light proposed the components of such a subjective evaluation approach to include measurement of perceptions, adequacy, aspiration and disappointment. That notwithstanding, objective approach to housing evaluation is also advocated in the literature. It is documented that the objective approach could be used to evaluate the physical characteristics, facilities, services and the environment based on some predetermined attributes of comparison against which the building is judged. Local and international attributes may therefore be engaged in assessing the qualitative adequacy of housing. Various specific attributes have thus been established in the literature [15,23-26]. The UN [27] definition of an *adequate* shelter (provided in the research

design) provides a rather widely applicable attributes often adapted for post-occupancy evaluations like this study (See for instance Ibem and Amole [15]). This definition is considered appropriate because it provides for basic attributes whose provision should not necessarily attract extra exorbitant cost. Therefore, upon careful consideration of the definition, other studies and the context of Wa, thirty one (31) housing attributes were found most appropriate and relevant (see table 1) for assessing the qualitative adequacy of the hostels.

3.2. The Post-Occupancy Evaluation Concept

Post-occupancy evaluation (POE) has been variously defined in diverse cultures and contexts [28] and for different uses [17]. One of the earliest definitions, seen as 'an anthropological element' in the definitions of the concept is: "an examination of the effectiveness for human users of occupied design environments" [28]. A professional definition from the Royal Institute of British Architects' (RIBA) Research Steering Group is: "a systematic study of buildings in use to provide architects with information about the performance of their designs and building owners and users with guidelines to achieve the best out of what they already have" [29]. Preiser [13], a renowned author in the subject, sees POE as "... a process of systematically evaluating the performance of buildings after they have been built and occupied for some time". Previously, from the point of view of Facility Management, Preiser, [10] saw POE as a diagnostic tool for evaluating the performance of a building once occupied. In addition, Preiser and Schramm provided a dynamic and evolving POE process model which allows feedback into next building delivery cycle. This idea was later conceptualised by Ornstein *et al* [23] (see figure 1). A more recent and related definition of the concept is "a systematic evaluation of opinion about buildings in use, from the viewpoint of the people who use them" [30].



Source: Modification from Ornstein *et al* (2009)

Figure 1. Feedback cycle of the POE

After a thorough evaluation of the definitions of POE, Hadjri and Crozier [28] concluded that POE "...is a process that involves a rigorous approach to the assessment of both the technological and anthropological elements of a building in use." In all these definitions, the human-building interface is apparent. This interface was actually described by Preiser as the 'fit' between the users, the building and the organisation [26]. In this study, the fit between the building and the users (students) is considered, and the question that arises in the context of Wa is: What is the *fit* between the hostels and the purported users (students)?

POE has being in existence for more than four decades now and as such it is an old tool [31]. However, what is new is its recent functional value expressed by Kauntze [32] as "a business management tool by today's occupiers and as a crucial building appraisal system for property owners, managers and designers". POE has become an important building evaluation tool for, at least, the past three decades, especially in the USA, Canada and Australia [30] due to its 'mutability' to measure complex interactions in the real world, making it "'social' rather than 'scientific'" barometer in building performance assessment [17,26,28]. It allows users to measure the performance of buildings based on their experience of the built environment [24].

It is accentuated that the importance of POE has greatly increased in recent years in the "western" world (particularly in Europe and US) than it is in most developing countries [30]. Thus, the picture in Ghana is no exception. POE as a building performance evaluation model is not a common activity (if any) in Ghana generally and in higher education buildings in particular. Its importance has not caught the attention of many executives of organizations in this country. The importance of POE activities could emanate from the quote below:

The recent expansion of student intake combined with financial cutbacks has revealed to many institutions the functional shortcomings of their buildings. The need to understand the part played by buildings, teaching spaces, [halls of residence] in particular, in delivering the goals of a complex modern HE [Higher Education] establishment has never been greater. This has been recognised by the university funding body, the Higher Education Funding Council for England, that HE establishments should integrate buildings into their plans rather than "in many cases limit their consideration of estate matters to a list of projects they wish to pursue" [26]

This quote is in the context of higher education in England, but the prevalence of the problem and relevance of the admonishing in the context of Ghana (UDS, Wa campus in particular) is unquestionable. The exponential increase in student numbers in Ghanaian educational institutions, coupled with declining funding, has been experienced in the past few decades [5]. But very few studies (if any) have been undertaken to show the resultant functional shortcomings of educational built infrastructure. The few studies [9,10] rather describe the

conditions of these buildings without evaluating their performance to provide feedback into future projects. This is what Adewunmi, *et al* [30] described as "a phenomenon in third world countries... attributed largely to the reactive maintenance 'syndrome'". It is expected that the evaluation of the overall performance of higher education buildings should influence strategic planning, development and policy decision-making in order to improve the efficiency of built infrastructure [33,34]. What are the key housing elements and services (facilities) in the Wa hostel market that need to be improved to enhance the efficiency of (level of satisfaction derived from) these buildings? This, among others, is what the study seeks to do.

3.3. Student Hostels Performance Components

The design intention of a building dictates the performance criteria for POEs of that particular building and these building performance criteria have bearing on the organizational and occupants performance [13]. In this wise, performance criteria of every building depends on the needs of both occupants and the organization. Particularly, findings from POE studies on hostels globally suggest that the use of performance criteria for assessment of hostel facilities has been more robust and focused. For instance, Hassanain's [35] work on students housing facility which examined the use of indoor environmental qualities particularly used criteria such as thermal, acoustic, visual comfort and indoor air quality. In another study [36], he examined the use of five technical performance requirements, including: thermal comfort; acoustic comfort; visual comfort; indoor air quality; and fire safety. Five functional requirements of student accommodation he identified include: interior and exterior finish systems; room layout and furniture quality; support services; efficiency of circulation; and proximity to other facilities on campus [35].

Furthermore, the importance of reading room library and internet facility to students' academic performance is well documented in literature [23]. The link between retention, or "student persistence", and library use is also comprehensively documented in literature drawing on sources dating back to the early 1960s [37,38]. There are many other useful literature buttressing the fact that library use contributes to academic success [37,39,40]. Hurst and Leonard [41] stressed that "...using more library resources would automatically improve a student's grade". Also, the Primary Research Group [42] in Alloway Library News [43] revealed a correlation between the students' grades and online research. Goodall and Pattern [44] also emphasized that "...students achieving a first class degree are the heaviest users of print and electronic library resources.

Moreover, an investigation of the impact of school facilities on the learning behaviours of students underlined that lights have influence on the health and performance of human beings [45]. Further, they stressed that "... an appropriate level of lighting enhances productivity, quality, staff morale, and energy conservation. Bright light can alleviate seasonal

depression ..., though too much sunlight can create a painful glare for both teachers and students". Light comes either in the form of artificial or natural means [45]. Furthermore, temperature sways thermal comfort that in turn affects health, working performance, and social behaviour. They asserted that a slightly cool room is more conducive to learning than a warm room [45-47].

Another related criterion is ventilation which affects the health and productive performance of end-users. The sources of ventilation can be natural, artificial or both [45]. Leung and Fung [45] considered "sound as a physical entity, while noise is a psychological concept defined as unwanted sound". Unnecessary and extreme noise was found to have negative health implications. Although, too low noise or silence do not yield conducive working environment, background noise (like music) with a level of about 35 decibels has been found to maximize alertness, allow relaxation, improve classroom ambience, aid learning, and improve academic performance [45,48]. Many earlier researchers have done more works on decoration. Decoration has also been found to improve

learning environment. Particularly, learners have been found to do well and are more attentive in rooms with pleasing pastels [45].

Over-crowded room is also reported to have negative effect on the performance of end-users, in that individuals who work in a crowded area may perform their work poorly; as they develop high stress, high blood pressure, or another type of illness; and experience dissatisfaction [45]. Other studies on student housing highlight the importance of telephone system [49], fire safety [50-54]; security [10]; response to complaints [46,55,47]; distance to lecture facilities and Car/Motor bike parking [56]; as well as washroom and cooking facilities [57].

From the foregoing, a number of qualitative attributes for assessing the qualitative adequacy of hostels emerge. But the Ghanaian (particularly Wa) context of this study is important in selecting the most appropriate attributes. From a careful evaluation of the definition of qualitatively adequate (student) housing, building performance evaluation studies and the context of the study, the researchers found 31 hostel attributes (presented on table 1 below) as most appropriate for this study.

Table 1. Qualitative Adequacy Attributes

No.	Attributes
1	Level of Cleanliness
2	Adequacy of natural Lighting
3	Control of Artificial Lighting
4	Adequacy of lighting levels in the corridors
5	Overall perception of lighting quality
6	Room temperature during the dry season
7	Room temperature during the rainy season
8	Overall perception of temperature in building
9	Air quality within building
10	Air quality in the corridors
11	Control of natural ventilation
12	Overall Perception of indoor air quality
13	Noise from outside the building
14	Overall perception of noise in the building
15	Overall comfort level in the building
16	Furniture arrangement
17	Amount of space in rooms
18	Common room space
19	Conversation privacy in room
20	Toilet/bath/laundry facilities
21	Cooking facilities
22	Interior design of rooms
23	Telephone system
24	Overall satisfaction
25	Car/Motor bike parking
26	Fire safety
27	Security level
28	Internet facilities
29	Visual Privacy in room
30	Response to complaints
31	Distance to lecture facilities

Source: Authors' construct from literature appraisal

4. Research Design

The qualitative adequacy measurement in this study was in the form of a post-occupancy evaluation which mainly used the survey questionnaire approach adopted from similar studies [15,23,24,45] and adapted to this current one. A questionnaire survey of purpose-built private hostels around the Wa campus of UDS was carried out by the researchers between January and March, 2013. Five purpose built hostels within a kilometre radius (from the University boundaries) were randomly selected. Only large hostels with at least 100 bed capacity were considered in this study to represent typical hostel facilities in the study area. For the purposes of confidentiality, these hostels are labelled A, B, C, D and E. Using stratified random sampling, each hostel was taken as a stratum and 100 students were selected from each stratum, given a total sample size of 500 students. The 100 students from each stratum were randomly selected from the list of students obtained from the hostel managers. This was deemed *adequate* since a similar study sampled only 30 respondents [58]. A total of 329 valid questionnaires representing 65.80% of the distributed questionnaires were retrieved. This response rate is considered *adequate* since a similar study which reported a response rate of 61.98% in Nigeria [59] was still considered valid. Table 2 below shows the distribution of the respondents from each hostel.

Table 2. Response rate

Hostel	Response rate
A	70
B	70
C	70
D	50
E	69
Total	329

The definition of purpose-built hostel in this study is adopted from the Adelaide City Council's Development Assessment [60] which finds similarities between student accommodation and housing in general. The only difference is that "student accommodation is housing specifically designed to accommodate students, such as a 'live-in' residential college, boarding house or other purpose built development containing student units with other ancillary facilities (i.e. study areas, communal lounge, and kitchens)". An *adequate* hostel, for the purpose of this study, can therefore be seen as 'similar' to '*adequate* housing' with some specific characteristics which determine the extent it satisfies students' need. The UN Member States define *adequate* housing in the following terms:

Adequate shelter means *adequate* privacy; *adequate* space; physical accessibility; *adequate* security; security of tenure, structural stability and duration; *adequate* lighting, heating and ventilation; *adequate* basic infrastructure, such as water, sanitation and waste management facilities;

suitable environmental quality and health-related factors; and *adequate* and accessible location with regard to work and basic facilities; all of which should be available at an affordable cost [57].

It is however acknowledged that adequacy often varies from country to country since it depends on specific cultural, social, environmental and economic factors. Therefore, the attributes in this definition were adopted and adapted for the purpose and context of this study (as mentioned earlier). The selection of attributes was also informed by the 'seven key dimensions of building performance' for building-in-use assessment developed by Horgen and Sheridan [24]; as well as other studies referred to in the literature review. A total of 31 hostel attributes were extracted and used for the study (see table 1 on page 9).

Questionnaires were administered to elicit information needed for calculating the adequacy indices of the attributes and the hostel. The respondents were asked to rate the adequacy level of each of the hostel attributes using a five-point Likert scale with *very adequate*, *adequate*, *fairly adequate*, *inadequate* and *very inadequate* rated as 5, 4, 3, 2 and 1 respectively.

The data was analysed as follows in two ways. Firstly, for each of the five hostels, adequacy index (AI_H) was obtained by finding the sum of the actual scores a respondent gave to each of the 31 attributes (i.e. Hostel Adequacy Score – HAS) and expressing it (HAS) as a percentage of the possible total maximum score (HAS_{max}) a respondent could give using all the 31 attributes, expressed mathematically as:

$$AI_H = \left\{ \frac{\sum HAS}{\sum HAS_{max}} \right\} \times 100$$

Where

AI_H – Hostel adequacy index

HAS – a respondent's actual scores for all the 31 attributes for a hostel

HAS_{max} – possible total maximum score for a hostel by a respondent using all the 31 attributes

Thus, from the scale of 1 – 5, the possible total maximum hostel adequacy score (HAS_{max}) is 155 (5 x 31); and the possible total minimum hostel adequacy score is 31 (1 x 31). Hence, the possible minimum and maximum hostel adequacy indexes (AI_H) were also 20 [i.e. (31/155) x 100] and 100 [i.e. (155/155) x 100], respectively (see Ibem and Amole, 2011). The actual scores of a respondent determined his/her rating index which must fall within this range. This was used for assessing the adequacy of each hostel from the perspective of the respondents (users).

Secondly, the adequacy indices for the attributes were calculated as the sum of all the scores given to a particular attribute, a , by all respondents, ΣY_a ; divided by the possible total maximum score for the attribute, ΣY_a ; multiplied by hundred. This percentage gave the adequacy index (AI_a) for that particular attribute a , from the perspective of all respondents. This is expressed algebraically as:

$$AI_a = \left\{ \frac{\sum y_a}{\sum Y_a} \right\} \times 100$$

Where:

AI_a – the adequacy index of a particular attribute ‘a’ (determined by all respondents),

y_a – respondents’ actual scores for a particular attribute a

Y_a – the possible maximum score for a particular attribute a.

Similarly, given the scale of 1 – 5, the possible total maximum score for an attribute (Y_a) is $5n$ (where n is the number of respondents, 329); and the possible total minimum score for an attribute is n (i.e. $1n$). Therefore, the possible minimum and maximum attribute adequacy indices (AI_a) were 20 [i.e. $(329/1645) \times 100$] and 100 [i.e. $(1645/1645) \times 100$], respectively. Using the above scale, the respondents’ ratings of the attributes were calculated from the above formula and the ratings were expected to be within the range of 20 – 100. This was used in assessing the adequacy of each attribute as well as the contribution of each of the 31 attributes to the overall adequacy of all the five hostels.

Table 3 below provides the framework for interpreting the results obtained from the adequacy indices (both AI_a and AI_H). The indices that were within the ranges (e.g. 20 – 35) were identified, counted and recorded under the frequency for easy interpretation. Since the ratings of each respondent generated an index, the number of hostel adequacy indices generated for each hostel needed to correspond with the number of respondents in the hostel. And using the index per respondent and the framework, the researchers identified how many respondents rated a hostel *very inadequate*, *inadequate*, *fairly adequate*, *adequate* and *very adequate*. The results are presented and analysed in the next section.

Table 3. Adequacy Indices

Adequacy Level	Adequacy Indices
Very inadequate	20 - 35
Inadequate	36 - 51
Fairly adequate	52 - 67
Adequate	68 - 83
Very adequate	84 - 100

Source: Ibem, 2011 (Tabulated by researchers)

5. Analysis of Results

5.1. Features of the Respondents and Halls of Residents

Table 2 indicates that the maximum and minimum occupancy rates are 6 (3.95%) and 1 (1.22%) persons to a room, respectively and a modal occupancy rate of 4 persons (52.28%) to a room. All respondents answered the question on room occupancy. Less than half (32.52%) of the respondents indicated the availability of reading rooms in their respective hostels with the greater percentage (67.48%) indicating otherwise. In hostels A and E, the respondents unanimously indicated that they had no reading rooms in their hostels whereas in the others (B, C, and D), the students were divided on the availability of reading rooms in their hostels. Only 6

(1.82%) respondents indicated the presence of library facilities in their hostels. It could be a mistake on the part of some respondents for indicating this given the larger number (98/18%) of responses to the contrary. A reading room could have been mistaken for a library.

Table 4. Sex Distribution of Respondents and features of the Halls

Features of the Respondents and Halls	Frequency (n = 329)	Percentage
<i>Occupancy</i>		
1	4	1.22
2	99	30.09
3	38	11.55
4	172	52.28
6	13	3.95
<i>Reading Room</i>		
Yes	107	32.52
No	222	67.48
<i>Library</i>		
Yes	6	1.82
No	323	98.18

5.2. Qualitative Adequacy of Individual Hostels

Table 5 presents the adequacy index for all the attributes for Hostel A. Only 5.71% of respondents (or, of the indices computed) from the hostel found it *very inadequate* and 12.86 found it *inadequate*. Whereas a greater percentage of 64.29 rated it *fairly adequate*, the remaining 17.14% found the hostel *adequate*. None rated the hostel *very qualitatively adequate* for academic work. Overall, the hostel may be qualitatively described as *fairly adequate*.

Table 5. Qualitative Adequacy of Hostel A

Adequacy Scores	Rating	Frequency	Percentages
20-35	Very inadequate	4	5.71
36-51	Inadequate	9	12.86
52-67	Fairly	45	64.29
68-83	Adequate	12	17.14
84-100	Very Adequate	0	0.00
Total		70	100.00

From Table 6, 1.43% and 4.29% of the respondents respectively found the attributes of hostel B *very inadequate* and *inadequate* for academic work. A significant proportion of 24.29% found it to be *fairly adequate*. More than half of the respondents (67.14%) rather found the attributes of this hostel to be *adequate*; with a very small fraction (2.86%) indicating that it is *very adequate* for its purpose. It is the highest rated hostel out of the five.

Table 6. Adequacy Index of Hostel B

Adequacy Scores	Rating	Frequency	Percentages
20-35	Very inadequate	1	1.43
36-51	Inadequate	3	4.29
52-67	Fair	17	24.29
68-83	Adequate	47	67.14
84-100	Very adequate	2	2.86
Total		70	100.00

As can be seen from Table 7, respondents from hostel C were of diverse opinions on the adequacy of it. Whereas 4.29% and 1.43% found it to be *very inadequate* and *very adequate* respectively, 22.86% and 25.71% also respectively found it to be *inadequate* and *adequate*. Unlike hostels A and B, only 45.71% (less than half) of the respondents found hostel C *fairly adequate*. By the rule of simple majority, the respondents here averagely rated this facility.

Table 7. Adequacy Index of Hostel C

Adequacy Scores	Rating	Frequency	Percentages
20-35	Very inadequate	3	4.29
36-51	Inadequate	16	22.86
52-67	Fair	32	45.71
68-83	Adequate	18	25.71
84-100	Very Adequate	1	1.43
Total		70	100.00

Table 8. Adequacy Index of Hostel D

Adequacy Scores	Rating	Frequency	Percentages
20-35	Very inadequate	1	2.00
36-51	Inadequate	2	4.00
52-67	Fair	30	60.00
68-83	Adequate	16	32.00
84-100	Very Adequate	1	2.00
Total		50	100.00

Table 8 shows that quite a significant majority (60%) of the respondents rated hostel D to be fairly adequate. A significant proportion (32%), though not the majority, found the hostel to be qualitatively *adequate*. From table 9, no respondent found hostel E *very inadequate*, only one student found it *inadequate* and *very adequate* in each case. The hostel is found *adequate* by a significant percentage (43.48%) of the respondents with about 53.62% of them fairly rating its adequacy.

Table 9. Adequacy Index of Hostel E

Adequacy Scores	Rating	Frequency	Percentages
20-35	Very inadequate	0	0.00
36-51	Inadequate	1	1.45
52-67	Fair	37	53.62
68-83	Adequate	30	43.48
84-100	Very Adequate	1	1.45
Total		69	100.00

5.3. Overall Adequacy of the Five Hostels

The overall evaluation of the five hostels are summarised in table 10. Overall, the hostels are found to be fairly *adequate* by simple majority of 48.94% of all the respondents (all the indices computed). This notwithstanding, quite a significant proportion (37.39) also indicated that the hostels are qualitatively *adequate*. Only 5 out of 329 (1.52%) actually found these hostels very qualitatively *adequate* for the purpose of academic work.

Table 10. Overall Adequacy of the five hostels

Adequacy Index	Rating	Total	Index
20-35	Very inadequate	9	2.74
36-51	Inadequate	31	9.42
52-67	Fair	161	48.94
68-83	Adequate	123	37.39
84-100	Very Adequate	5	1.52
Total		329	100.00

5.4. Contributions of the Attributes to Overall Adequacy

Table 11 summarises both the attribute scores and adequacy indices of the 31 attributes used in this study arranged in descending order of their adequacy indices and contribution to overall adequacy of the hostels. An examination of the results from the table reveals that eleven (11) attributes had adequacy indexes between 69.18 and 78.05; which are mostly lighting and ventilation attributes (hall unit attributes) of the hostels found to be *adequate* by the respondents. The attributes with indices between 52.52 and 67.48 comprising mainly ventilation, internal configuration as well as internal facilities attributes were found to be fairly adequate. The hall attributes with indices between 42.05 and 47.60, found *inadequate* by the respondents, were mainly services, security issues and external facilities. No attributes were found to be very *adequate* and very *inadequate*. Out of the 31 attributes used, the table shows that the level of cleanliness, a facilities management attribute, had the highest attribute score of 1284 (78.05) and thus contributed most to adequacy of the hostels. This was followed by adequacy of natural lighting (77.69). On the other hand, internet facilities, a hostel service attribute, contributed least (42.01) to the adequacy level of the hostels. The results also show that despite the perceived congestion in some of the hostels, respondents were still fairly satisfied with the amount of space in the rooms. In all, hall attributes found to be *adequate* by the respondents contributed most to adequacy level. Those evaluated as fair made moderate contribution while attributes found to be *inadequate* made low contributions to the adequacy index of the respondents. Overall, the attributes, as well as the hostels, can best be qualitatively rated as *fairly adequate*, using average and median statistics and the rule of simple majority.

The results again show that level of cleanliness contributed most to the overall adequacy of hostels A and E. For hostels B and C, it is the lighting attributes that enhanced their adequacy most. Interestingly, it is the washroom facilities (toilet/bath/laundry) that rather contributed most to hostel D. Thus, although the hostels are in the same location and of similar designs, data suggest that different factors enhanced their adequacy levels. On the other hand, whereas distance to lecture facilities was rated lowest by the respondents of hostels A and B, internet facilities rather received the least ratings by the respondents of hostels C, D and E.

Table 11. Adequacy Levels of Attributes

	Hostel	A		B		C		D		E		Overall		
	Number of Respondents (n)	70		70		70		50		69		329		
	Maximum Score ($5 \times n$) – ΣY_a	350		350		350		250		345		1645		
	Index: $AI_a = (\Sigma y/\Sigma Y) \times 100$													
No.	Attributes	Score (Σy_a)	Index	Score (Σy_a)	Index	Score (Σy_a)	Index	Score (Σy_a)	Index	Score (Σy_a)	Index	Score (Σy_a)	Index	Rating
1	Level of Cleanliness	271	77.43	290	82.86	222	63.43	192	76.80	309	89.57	1284	78.05	Adequate
2	Adequacy of natural Lighting	267	76.29	301	86.00	247	70.57	183	73.20	280	81.16	1278	77.69	Adequate
3	Toilet/bath/laundry facilities	260	74.29	300	85.71	210	60.00	202	80.80	269	77.97	1241	75.44	Adequate
4	Air quality in the corridors	259	74.00	300	85.71	210	60.00	192	76.80	262	75.94	1223	74.35	Adequate
5	Adequacy of lighting levels in the corridors	228	65.14	306	87.43	211	60.29	183	73.20	256	74.20	1184	71.98	Adequate
6	Control of Artificial Lighting	237	67.71	292	83.43	215	61.43	180	72.00	256	74.20	1180	71.73	Adequate
7	Air quality within building	248	70.86	274	78.29	215	61.43	183	73.20	247	71.59	1167	70.94	Adequate
8	Room temperature during the rainy season	221	63.14	266	76.00	237	67.71	188	75.20	244	70.72	1156	70.27	Adequate
9	Overall comfort level in the building	240	68.57	266	76.00	216	61.71	174	69.60	243	70.43	1139	69.24	Adequate
10	Overall perception of lighting quality	218	62.29	288	82.29	211	60.29	175	70.00	246	71.30	1138	69.18	Adequate
11	Control of natural ventilation	239	68.29	258	73.71	220	62.86	183	73.20	238	68.99	1138	69.18	Adequate
12	Overall perception of temperature in building	214	61.14	249	71.14	223	63.71	177	70.80	247	71.59	1110	67.48	Fair
13	Overall Perception of indoor air quality	217	62.00	252	72.00	223	63.71	166	66.40	237	68.70	1095	66.57	Fair
14	Noise from outside the building	209	59.71	267	76.29	210	60.00	167	66.80	242	70.14	1095	66.57	Fair
15	Overall satisfaction	220	62.86	244	69.71	200	57.14	162	64.80	240	69.57	1066	64.80	Fair
16	Cooking facilities	173	49.43	294	84.00	198	56.57	168	67.20	224	64.93	1057	64.26	Fair
17	Overall perception of noise in the building	216	61.71	264	75.43	202	57.71	154	61.60	220	63.77	1056	64.19	Fair
18	Conversation privacy in rooms	216	61.71	256	73.14	186	53.14	163	65.20	227	65.80	1048	63.71	Fair
19	Amount of space in rooms	247	70.57	185	52.86	221	63.14	172	68.80	221	64.06	1046	63.59	Fair
20	Common room space	223	63.71	232	66.29	194	55.43	175	70.00	211	61.16	1035	62.92	Fair
21	Interior design of rooms	182	52.00	259	74.00	196	56.00	156	62.40	226	65.51	1019	61.95	Fair
22	Furniture arrangement	204	58.29	215	61.43	207	59.14	137	54.80	217	62.90	980	59.57	Fair
23	Visual Privacy in rooms	195	55.71	235	67.14	177	50.57	131	52.40	236	68.41	974	59.21	Fair
24	Security level	182	52.00	217	62.00	203	58.00	140	56.00	210	60.87	952	57.87	Fair
25	Response to complaints	165	47.14	211	60.29	177	50.57	124	49.60	213	61.74	890	54.10	Fair

26	Room temperature during the dry season	171	48.86	159	45.43	198	56.57	152	60.80	184	53.33	864	52.52	Fair
27	Car/Motor bike parking	153	43.71	193	55.14	185	52.86	119	47.60	214	62.03	864	52.52	Fair
28	Telephone system	151	43.14	155	44.29	189	54.00	111	44.40	177	51.30	783	47.60	Inadequate
29	Fire safety	130	37.14	165	47.14	188	53.71	108	43.20	188	54.49	779	47.36	Inadequate
30	Distance to lecture facilities	108	30.86	103	29.43	169	48.29	145	58.00	191	55.36	716	43.53	Inadequate
31	Internet facilities	115	32.86	201	57.43	139	39.71	96	38.40	140	40.58	691	42.01	Inadequate
	Summary Statistics													
	Maximum	271	77.43	306	87.43	247	70.57	202	80.80	309	89.57	1284	78.05	Adequate
	Minimum	108	30.86	103	29.43	139	39.71	96	38.4	140	40.58	691	42.01	Inadequate
	Median	216	62	256	73	207	59	167	67	236	68	1057	64	Fair
	Average	206	58.79	242	69.10	203	58.06	160	63.97	230	66.53	1,040	63.24	Fair

6. Discussion of Key Findings

6.1. Room Occupancy Rate

The modal occupancy rate was 4 students to a room in most of the hostels with as many as 6 to a room. In some of the hostels, the rooms were intended to have 2 occupants per room originally. However, with the motivation to make profit on the part of hostel investors, they allowed 3 to 5 occupants in the midst of insufficient student accommodation on campus and a larger in-take of students at Bamahu campus of the UDS in Wa. The congestion could also be attributed to affordability as the rent per head decreases with increase in room occupancy. Some hostels in the neighbourhood charged rent per room per annum irrespective of the number of students who occupied the room. Hence as many students as possible could share the annual rent and occupy a room, and, the few wealthy ones could pay and live alone in a room [61]. This explains the responses under occupancy rate in Table 4. As a result, these hostels and their facilities were over-stressed and could experience high deterioration rate. Subsequently, the life span of these hostel investments could be shortened if they are not properly maintained. Again, the congestion could reduce the *adequacy* of these hostels and have negative impact on students' performance. This could be why the respondents rated *room space* attribute to be only *fairly adequate*. A possible reduction in occupancy could improve the adequacy levels of these hostels.

6.2. Adequacy of the Hostel Attributes

Out of the 31 attributes, only 11 (mainly lighting and air quality attributes) were found to be *adequate* by the respondents. Sixteen (16) attributes were found *fairly adequate*; with the rest (4) rated *inadequate*. The attributes found to be *fairly adequate* were mainly ventilation, internal configuration as well as internal facilities attributes. Those found *inadequate* by the respondents were mainly services, security issues and external facilities. The hostels however provided adequate cleaning services and sanitary facilities and had adequate illumination in the rooms (Table 11). Fire safety measures (found inadequate) were generally lacking in these multi-tenanted facilities. It is a critical issue which requires immediate attention for both the safety of the students and the investors given the rampant fire outbreaks in recent times in Ghana. No attribute was found to be *very adequate* and *very inadequate*. Overall, the hostels were mainly rated by the respondents to be *fairly adequate* for their purposes. All the qualities that the respondents found adequate (or fairly adequate) were building components except cleaning services, which is a building service. This suggests that the respondents did not actually have problems with the architecture but the ancillary facilities that must complement the usage of the buildings. However, a "fairly adequate" overall index is unacceptable given that these are

twenty-first century buildings.

6.3. Ancillary Facilities

The results show that the hostels do not adequately meet the needs of the post-modern students. Three out of the five hostels had no reading rooms; none had library and internet facilities. In addition, the hostels had modal room occupancy of 4 and as high as 6 (maximum) in some instances (Table 4). Without spacious library and/or reading rooms, how did the students study, given that students have variant reading hours? Without these key facilities, the students' performance could be affected negatively. This is because the Bamahu campus of the UDS in Wa has a very small library which closes very early (19:00 GMT). The lack of these facilities reduced the overall adequacy of these hostels. The provision of a basic facility as a reading room in each purpose-built hostel would do a great service to these students. Internet services have become an integral component of the needs of contemporary students. The lack of it could hamper the performance and development of students. And that means they have find another means of accessing the service which may often come at exorbitant cost. It is therefore not surprising to be among the least rated attributes of the hostels. Some services that are provided were found to be only fairly adequate (see table 11). Just a few (11) of the attributes used were found to be adequate.

6.4. Attributes that Need Improvement

From the results, it is clear that almost all the attributes need some improvements in the planning, design and construction of the hostels in this location to increase the adequacy levels of the hostels. All the first eleven (11) attributes found adequate can still be improved to be very adequate. About half (16) of the attributes were only fairly rated, suggesting that they need serious improvements. The bottom four(4) were found inadequate; warranting serious attention on the part of policy makers, building regulators, designers and developers. Among the bottom four, fire safety is the most important attribute that need urgent attention. Given the multitenant nature of hostels, the absence of fire safety measures endangers the lives and property of the residents; and puts the developers' investments at very high risk.

6.5. Practical Implications

The overall *fairly adequacy* index for the hostels show that there is more room for improvement in the design, construction and operation of hostel facilities in the study area. The Wa Municipal Assembly (WMA), the local authority in-charge of development, must enforce the national building codes regulating the design and construction of such facilities. The Ghana National Fire Service (GNFS) must first educate the operators of these

facilities on fire safety measures and then enforce the fire safety requirements for such facilities. Both present and prospective hostel investors in the study area must endeavour to provide reading rooms, at least, in their facilities. These would not only help the students but would make such facilities more competitive in attracting students. The UDS, WMA and Government must facilitate and ensure the enactment and enforcement of regulations for the operation of these facilities. Such regulations must include, among others, a standard for room occupancy with respect to the total floor area. In addition, the regulations must provide for some basic external facilities required for the health, safety and the convenience of these vulnerable students. A further investigation into adherence to planning and development controls and building regulations in the study area is recommended.

7. Conclusions

The qualitative adequacy of five (5) purpose-built hostels has been assessed in Wa. The users of these facilities mainly found them *fairly adequate*. This is deemed unsatisfactory given that these are modern facilities. A number of these facilities keep springing up making the hostel market in the study area more competitive. It is therefore very imperative for both existing and prospective investors to feed their facilities or designs with lessons from POEs for stronger adequacy index to make their facilities more competitive in order to also stand the test of time. In the quest to respond to the growing demand for such spaces to meet the exponential growth in student numbers, it is also important for private investors to know that the quality of such facilities is more important than the quantity in the market. Technological advancement in the quality of labour, building materials, design and construction calls for quality in built facilities. There is therefore more room for improvement in the quality of all future projects in the study area. Quality is an important consideration as quantity. Therefore, qualitative adequacy of these hostels must equally be of concern to the University management, parents, government and all other stakeholders to ensure the health and safety of these vulnerable students in the pursuit of knowledge.

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