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IMPORTANCE-PERFORMANCE ANALYSIS FOR MODELLING MAINTENANCE PRIORITISATION IN HIGHER INSTITUTIONS

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ABSTRACT

University maintenance departments are usually constrained by limited funds. To set priorities therefore becomes important as it ensures the suitable utilisation of resources. The research on which this article reports applied an importance-performance analysis (IPA) to aid the process of prioritising the lecture theatres performance parameters (maintenance needs) according to students' expectation and satisfaction. Three lecture theatres were selected by means of a purposive sampling method as cases for the study; a questionnaire, with both closed and open ended questions was then used to collect data from the students. The IPA model together with both descriptive and inferential statistics was used to analyse the data. The study revealed that students perceived the satisfaction of all the performance parameters of lecture theatres as below the level of importance. However aesthetics, structural safety and lighting appear to be performing satisfactory even though they were below student's satisfaction; whereas, thermal comfort, ventilation, fire safety & exit, acoustic control, and cleanliness are clearly underperforming and require immediate attention. The recommendations based on the findings can help the maintenance department of the institution to prioritise the maintenance needs of the lecture theatres to enhance performance (utility). With this article the author also demonstrates the practicality of the use of IPA model to aid the process of prioritising the maintenance needs of the buildings in an institution.

Keywords: Building performance, Importance-performance analysis, Lecture theatre, Maintenance, Student.

1. INTRODUCTION

The purpose of any university is to promote learning, teaching and research activities (Zakaria and Wan Yusoff, 2011). Universities, institutions that play a significant role in every country, are perceived to be instruments of social and economic change (Tirronen and Nokkala, 2009); they are key institutions that produce and transmit knowledge and in the process also produce an important part of the workforce of any country (Sukirno and Siengthai, 2011; Tirronen and Nokkala, 2009). Tirronen and Nokkala (2009) argue that the roles of economic development, innovation and competitiveness of a country also rest on the education provided by the universities. Moreover, these roles are indispensable in any country, whether developed, developing or under-developed. Sullivan (2012), for instance, indicated that universities acted as the propelling engines of the economy of the United States of America. Universities certainly have an influence in every area of a country's development; however, they cannot function effectively without physical infrastructure such as lecture theatres.

Lecture theatres are an integral part of the physical learning environment of every university and an aspect that influences the whole learning process. Maintaining the lecture theatre is thus imperative. In fact, the level of maintenance carried out on a lecture theatre is known to affect its "performance", in other words the degree to which it can be utilised (Drouin, Hinum, Beeton, Nair and Mayfield, 2000). Olanrewaju (2010) emphasises that a well-maintained lecture theatre promotes the core objectives of a university; however, university maintenance departments are usually constrained by limited funds (Buys and Nkado, 2006; Olanrewaju, 2010). It is therefore crucial that priorities be set. In economics, scale of preference helps to utilise scarce resources efficiently, so prioritisation can help to utilise the money available for maintenance judiciously.

Importance-performance analysis (IPA) is perceived as a tool that can be applied to ensure the suitable utilisation of resources (prioritisation) (Matzler, Sauerwein, and Heischmidt, 2003). IPA has been applied in several studies (Ainin and Hisham, 2008) and it was seen to be appropriate for the study reported in this article. First, the level of importance students' attach to the performance parameters of lecture theatres had to be determined by means of a survey. Thereafter, the satisfaction level of the students regarding the venues had to be determined; and finally the IPA model was used to aid the prioritisation of the lecture theatres performance parameters (maintenance needs) according to the students' expectation and satisfaction. The following objectives will be reached in this article:

- Determine the level of importance students attach to specific building performance parameters of lecture theatres.
- Determine how satisfied students are with each specified building performance parameter of the lecture theatres.
- Apply the IPA model to develop an improvement priority to enhance the performance of the lecture theatres.

2. LITERATURE REVIEW

2.1 Lecture theatre performance parameters

Building performance relates to how a building contributes to fulfil the functions required by the building user (Williams, 1993).

Buildings are expected to meet performance requirements such as indoor air quality, noise control, privacy, lighting comfort, spatial comfort, thermal comfort and ergonomics (Atkin and Brooks, 2009; Department of Treasury and Finance, 2005). These factors require key consideration since they can have either a good or a bad influence on building users. Several researchers (e.g. Amaratunga and Baldry, 2000; Green and Turrell, 2005; Leung and Fung, 2005; Uline and Tschannen-Moran, 2008; Bishop, 2009; Uline et al., 2010) have pointed out that the performance of educational buildings has an influence on students. It is therefore essential that the lecture theatres in universities provide the best conditions to enhance the learning experience of students (Fleming and Storr, 1999). The performance of a lecture theatre is determined by a number of defined parameters (Watt, 2007). Fleming and Storr (1999); Lackney (1999); Earthman (2004); Green and Turrell (2005); Leung and Fung (2005); Uline and Tschannen-Moran (2008); Bishop (2009); and Uline et al., (2010), identified a number of performance parameters that are critical for lecture theatre performance. In this article the following performance parameters are discussed: structural safety, fire safety & exit, thermal comfort, ventilation, acoustic control, lighting, aesthetics and cleanliness.

The importance of these parameters to the total lecture theatre performance cannot be overemphasised. Safety is one of the very important issues of school building adequacy (Earthman, 2004), because the absence of safety measures can lead to accidents (Lackney, 1999) and injury. Ventilation and thermal comfort is another critical consideration. Bishop (2009) opines that any inadequacy regarding the heating, ventilation, and air conditioning (HVAC) systems in a building can cause unnecessary distraction for students. A good HVAC system can improve the indoor air quality and the productivity of students (Leung and Fung, 2005). The effectiveness of the HVAC system is dependent on how best it is regulated to achieve a comfortable thermal environment. Polh (2011) notes that the range of temperature to which the human body can adjust without discomfort is minimal (i.e. between 75°F and 68°F); hence it is imperative to regulate the HVAC system to achieve a comfortable thermal environment. Also, 'sick building syndrome', which may lead to respiratory illness, is known to be caused by poor indoor air quality which is the result of poor ventilation and cleanliness (Lackney, 1999). The cleanliness of a building is thus perceived as a crucial indicator of a building's quality (Uline and Tschannen-Moran, 2008). In fact, regular cleaning is required to keep lecture theatres in an appropriate condition.

Vision (the ability to see) is only possible when light interacts with the brain via the eye. An increase in illumination results in better visual perspicacity (Polh, 2011). Both Lackney (1999) and Leung and Fung (2005) noted that poor lighting could result in fatigue, eye strain, blurry vision and headaches; it can also affect the mental concentration and productivity of students. The ability to hear clearly in the lecture theatre is crucial to student learning (Earthman, 2004). Hearing ability is dependent on the acoustic conditions in the lecture theatre (Sutherland and Lubman, 2001). Good lecture theatre acoustics make learning easier, more sustained and less stressful, while excessive noise and reverberation inhibit speech communication thereby hindering the learning process (Sutherland and Lubman, 2001). Aesthetics i.e. the sense of beauty concerns human emotion and sensations which are determined by colours, shapes, textures, and unique features (Uline et al., 2009). An appealing lecture theatre has the ability to influence the students learning positively, because aesthetics plays a critical role in ensuring a comfortable environment (Leung and Fung, 2005). The literature suggests that all these parameters are important; however, it is necessary to prioritise these parameters since funds may often be limited.

2.2 Prioritisation of maintenance

The cost of all required maintenance tasks or needs in any one year may exceed the budget (NSW Heritage Office, 2004). Therefore setting maintenance priorities helps to utilise the money available for maintenance effectively. Factors such as health and safety, security of premises, statutory requirements, vandalism, increased operating costs, loss of revenue, disruption of business operations, likely failure of critical building fabric, decisions regarding policy, environmental impact, contractual issues, the influence of strategic factors, the perception of the community and heritage issues influence how the maintenance tasks are prioritised (NSW Heritage Office, 2004; Department of Treasury and Finance, 2005). Although all these factors are important, their level of influence on building users differs from context to context.

Horner, El-Haram and Munns (1997) explain that depending on the significance of the consequences of failure, the maintenance tasks or items in a building can be divided into two groups: significant and non-significant items. These items are briefly explained below.

1. Significant items are items whose failure affects health, safety, environment or utility:
   - health, safety and environmentally significant items
   - utility significant item: items whose failure is likely to have an effect on the direct and indirect maintenance costs, user satisfaction, appearance and serviceability.

2. Non-significant items: items whose failure has no significant effect
   - After these items have been assessed a guideline could be developed for setting the maintenance priorities. Shen and Spedding (1998) give the following chronological guideline for prioritising maintenance:
     - High risk of health or safety
     - Serious disruption of the normal activities in the building, or health or safety problems, but the defect does not pose immediate danger to the building users
     - Serious discomfort to the building users
     - Damage to the image of the organisation
     - Minor problems relating to aesthetics or convenience

Wood (2009), likewise, lists the following as the order of priority:

1. health and safety
2. wind and water tightness of the building
3. continuity of business operation
4. comfort of occupants
5. efficiency, effectiveness and economy of operation

It can be inferred from the opinions of Horner et al. (1997), Shen and Spedding (1998) and Wood (2009) that safety and statutory requirements ought to be given first priority. Safety is actually a statutory consideration (Watt, 2007); consequently it demands prime attention.

Second on the priority list are items which can affect the comfort level of users and continuity of business operation such as the HVAC system and lighting. Finally, the problems relating to aesthetics or convenience can follow. For this study, an IPA, a tool that can assist in setting priorities, was used.

2.3 Importance-performance analysis (IPA)

Importance-performance analysis (IPA) is one of the tools used for analysing the relationship between the importance and performance of parameters. IPA helps to identify parameters that are the most important to customers and have the highest impact on their satisfaction, as well as those that have a low performance and need improvement (Matzler et al., 2003). IPA can also help an organisation to identify areas for improvement and actions for reducing the gap between importance and satisfaction (Ainin and Hisham, 2008). IPA uses a two-dimensional grid, where performance is on the x-axis and importance on the y-axis (Abalo, Varela and Manzano, 2007; Ainin and Hisham, 2008; Matzler et al., 2003). Although quite a number of modifications of IPA have been developed, the structure has remained the same (Sampson and Showalter, 1999). Among the alternatives of the IPA grid is the incorporation of iso-rating line which divides the graph into two great areas (Abalo et al., 2007; Leong, 2008; Sampson and Showalter, 1999). Abalo et al. (2007) explains that the iso-rating line is an upward diagonal line that represents points where ratings of importance and performance are exactly equal. Figure 1 shows an IPA model that incorporates an iso-rating line.

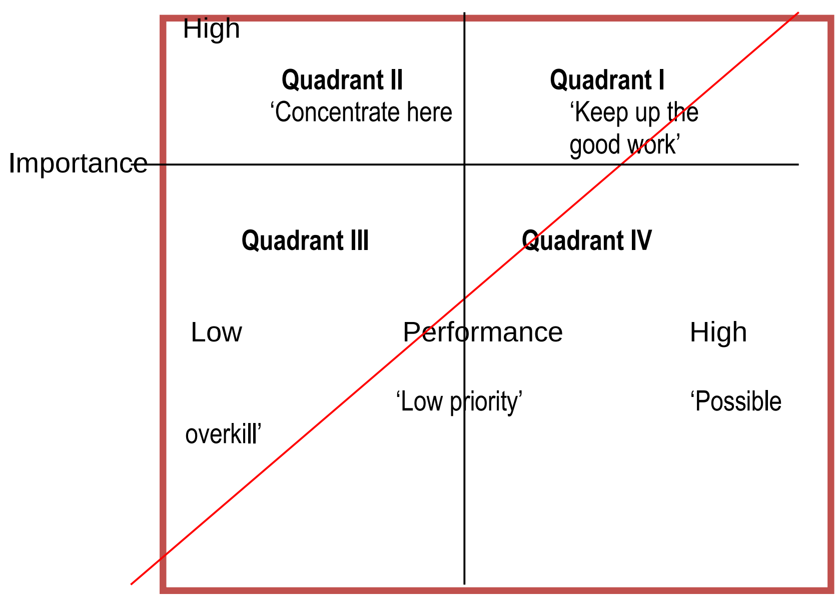

Figure 1: Importance performance model
(Adapted from Abalo et al., 2007:116)

To construct the model, data from satisfaction surveys and some form of importance measures are required (Matzler et al., 2003). Four specific quadrants are generated as the importance and satisfaction data are plotted.

The scaling of the axes, as well as the location of the parameters into the four quadrants helps to interpret the results (Matzler et al., 2003). Parameters in Quadrant I indicate high priority both in satisfaction and importance. In this area the maintenance department should 'keep up the good work'. Quadrant II represents low satisfaction on highly important parameters; this quadrant ought to be given top priority because, their neglect may pose a serious threat and dissatisfaction (Ainin and Hisham, 2008; Matzler et al., 2003). Parameters low in both satisfaction and importance are in Quadrant III. Matzler et al. (2003) claims that it is unnecessary to focus additional effort on parameters in this quadrant as these parameters are considered 'low priority'. Parameters which have high satisfaction but low importance fall in Quadrant IV. It is better that the resources invested in these parameters are diverted elsewhere (Ainin and Hisham, 2008). If the IPA grid that incorporates an iso-rating line is used, then the points above the upward sloping (45°) line represent points where importance exceeds performance; any parameter above the upward sloping line does not meet customers' (students' in this case) satisfaction (Leong, 2008). The interpretation of the areas below the 45° line is similar to the original IPA diagram (Abalo et al., 2007). Analysis of variance can also help to validate whether there are significant differences between importance and satisfaction data. Both the IPA model (upward 45° line) and the Analysis of variance techniques were applied in this study.

3. RESEARCH METHODOLOGY

A quantitative research design, using a case study was adopted for this research. For reasons of confidentiality the name of the institution involved is not mentioned. The data were collected by means of a questionnaire survey. The questions were both closed-ended and open-ended. The responses to the closed-ended questions were captured on a 5-point Likert scale where 1= not relevant/very unsatisfied; 2= unimportant/unsatisfied; 3= neutral; 4= important/satisfied; and 5= very important/ very satisfied. The questionnaire used was based on the relevant literature. The questionnaire had been piloted prior to the actual study to authenticate its appropriateness. Twenty questionnaires were distributed to a group of first-, second- and third-year students. The response rate was 100%. A few changes were made to the final questionnaire due to the difficulties students faced with some of the questions. Three lecture theatres were selected from the participating institution by means of the purposive sampling method. In purposive sampling, the researcher chooses people or other units for a particular purpose (Leedy and Ormrod, 2010). The selection was done purposively to include one old, one intermediate and one new lecture theatre with the intention of ensuring that all the different classes of lecture theatres were represented. The questionnaires were then issued by means of a convenient sampling method. To avoid duplication, the questionnaires were issued once-off at the selected lecture theatres. Respondents participated according to their availability and whether it was convenient for them or not (Leedy and Ormrod, 2010). Table 1 shows the distribution and response rate of the questionnaires

Table 1: Questionnaire distribution and response rate

Selected Theatres	Status	Year built	Capacity	N issued	N (%) returned
LT2 Mechanical building	New	2010	173 seats	95	84 (88.4%)
ABC Lecture theatre	Intermediate	1995	232 seats	260	131 50.4%)
LT2 Business building	Old	1986	104 seats	75	68 (90.7%)
Total				430	283(65.8%)

3.1 Data analysis

Descriptive statistics (frequency distribution and measurement of central tendency), inferential statistics (t-test) and the IPA model were used to analyse the data of this study. To ensure reliability of the research, the questionnaire (Likert-scaled question) was tested with the Cronbach's co-efficient alpha. The closer the coefficient is to 1, the more reliable the instrument item; an optimal Cronbach's co-efficient alpha value should be above 0.7. The Cronbach's co-efficient alpha value of the importance variables was 0.80 while that of satisfaction variables was 0.83. Questionnaires were also tested for content validity by first issuing out for piloting.

4. FINDINGS AND DISCUSSION

4.1 Performance parameters importance

Table 2 shows that the mean scores obtained were in the range of 4.37 (highest) and 3.71 (lowest). With the exception of aesthetics (3.71) all the other performance parameters obtained a mean score higher than 4.0. In essence, students regard all the performance parameters including aesthetics as important to their learning experience. About 70% of the students responded in the range of important and very important for all the performance parameters except aesthetics. The finding indicates that all these parameters are significant and as such need serious attention. The findings are highly supported by the reviewed literature.

Table 2: Importance of performance parameter to learning experience

Performance parameters	Not relevant		Un important		Neutral		Important		Very important		Total	Mean	Std. Dev.
	N	%	N	%	N	%	N	%	N	%			
Lighting	2	0.7	5	1.8	21	7.5	110	39.4	141	50.5	279	4.37	0.76
Structural safety	3	1.1	8	2.9	22	7.9	107	38.6	137	49.5	277	4.32	0.83
Cleanliness	3	1.1	8	2.8	30	10.7	96	34.2	144	51.2	281	4.32	0.86
Ventilation	5	1.8	10	3.6	22	7.9	94	33.8	147	52.9	278	4.32	0.90
Thermal comfort	3	1.1	9	3.2	50	18.0	84	30.2	132	47.5	278	4.20	0.92
Acoustic control	6	2.2	8	2.95	36	12.9	105	37.8	123	44.2	278	4.19	0.92
Fire safety & exit	14	5.0	10	3.6	50	17.8	67	23.8	140	49.8	281	4.10	1.12
Aesthetics	6	2.2	20	7.2	89	32.1	94	33.9	68	24.5	277	3.71	0.99

4.2 Students' satisfaction level with lecture theatre performance

The mean scores obtained as shown in Table 3 suggest that students were satisfied with two of the parameters, namely structural safety and lighting. The mean scores obtained for the remaining parameters suggest a feeling of neutrality. The two least satisfying parameters were thermal comfort and ventilation.

Table 3: Satisfaction of performance parameter to learning experience

Performance parameters	Very unsatisfied		Unsatisfied		Neutral		satisfied		Very satisfied		Total	Mean	Std. Dev
	N	%	N	%	N	%	N	%	N	%			
Structural safety	10	3.6	17	6.1	87	31.1	127	45.4	39	13.9	280	3.60	1.15
Lighting	9	3.2	25	9.0	88	31.7	109	39.2	47	16.9	278	3.58	0.98
Cleanliness	18	6.4	42	15.0	83	29.6	103	36.8	34	12.1	280	3.33	1.07
Fire safety & exit	23	8.2	46	16.4	79	28.1	93	33.1	40	14.2	281	3.29	1.15
Acoustic control	17	6.1	48	17.3	89	32.1	95	34.3	28	10.1	277	3.25	1.07
Aesthetics	19	6.9	44	16.0	115	41.8	75	27.3	22	8.0	275	3.13	1.01
Ventilation	21	7.6	62	22.5	88	31.9	81	29.3	24	8.7	276	3.09	1.08
Thermal comfort	26	9.3	65	23.3	76	27.2	90	32.3	22	7.9	279	3.06	1.12

Students were also requested to provide comments on their satisfaction and/or dissatisfaction with the specified performance parameters. With regard to the comments, the outstanding concern of students was the HVAC system (ventilation and thermal comfort) which they felt was either not functioning or not functioning effectively. Second in the row of concerns was safety. Students were worried about fire & exit safety, because some exit doors of some lecture theatres were usually locked during lectures. Third were concerns with cleanliness; students felt the lecture theatres were not cleaned regularly. Concerns were also raised about the acoustic control (e.g. malfunctioning public address system) and also with the aesthetics of the lecture theatres.

4.3 Importance-performance analysis

The analysis of variance (Table 4), suggests that students' perceived the satisfaction of all parameters as below their level of importance. Though the degree of differences demonstrated varied, the significant 2-tailed value obtained for all the parameters were less than 0.05, demonstrating that there were statistically significant differences between the mean scores for importance and satisfaction. Students' importance mean scores were significantly higher than the performance mean scores. From the variance analysis, it is obvious that ventilation, thermal comfort, cleanliness, fire safety & exit and acoustic control had high gap scores, indicating big variations between importance and satisfaction. On the other hand, aesthetics, lighting and structural safety obtained comparatively low gap scores, suggesting that the current performance levels were quite satisfactory even though they were below students' satisfaction.

Table 4: Importance satisfaction relationship (analysis of variance)

Performance parameters	Importance mean	Satisfaction mean	Means' difference	t value	Sig. (2-tailed)
Ventilation	4.32	3.09	-1.23	14.852	0.000
Thermal comfort	4.20	3.06	-1.14	13.213	0.000
cleanliness	4.32	3.33	-0.99	12.096	0.000
Acoustic control	4.19	3.25	-0.94	11.249	0.000
Fire safety& exit	4.10	3.29	-0.81	9.390	0.000
Lighting	4.37	3.58	-0.79	11.072	0.000
Structural safety	4.32	3.60	-0.72	10.868	0.000
Aesthetics	3.71	3.13	-0.58	6.824	0.000
Mean average	***4.19***	***3.29***			

The IPA model (Figure 2) shows that all the parameters fall above the 45° line. According to Leong (2008), parameters above the 45° line need attention. However, the level of attention needed depends on the position on the model. Clearly, there is a need to pay more attention to ventilation and thermal comfort as they all fall in Quadrant II. Ainin and Hisham (2008) as well as Matzler et al. (2003) note that parameters in this quadrant ought to be given top priority, since their neglect may pose a serious threat and dissatisfaction. The comments provided by the students support this analysis. It is also evident that lighting, structural safety and cleanliness are all in Quadrant I (high in both satisfaction and importance) but also fall above the 45° line, implying that students are somewhat unsatisfied with these parameters but not as unsatisfied as with ventilation and thermal comfort. Actually, cleanliness is close to the midpoint toward Quadrant II, hence the need for critical attention. Aesthetics is located in Quadrant III. Matzler et al. (2003) suggest that it is unnecessary to focus additional efforts on parameters in Quadrant III. Considering the location of aesthetics (above the 45° line), it is important to ensure careful deployment of resources. In fact, students raised few concerns with aesthetics, hence the need for thoughtful consideration. Also, fire safety & exit and acoustic control falls above the 45° line, and are respectively located in between Quadrant II and Ill and Quadrant III and IV and also close to the midpoint. The implication is that fire safety & exit and acoustic control also need thoughtful attention.

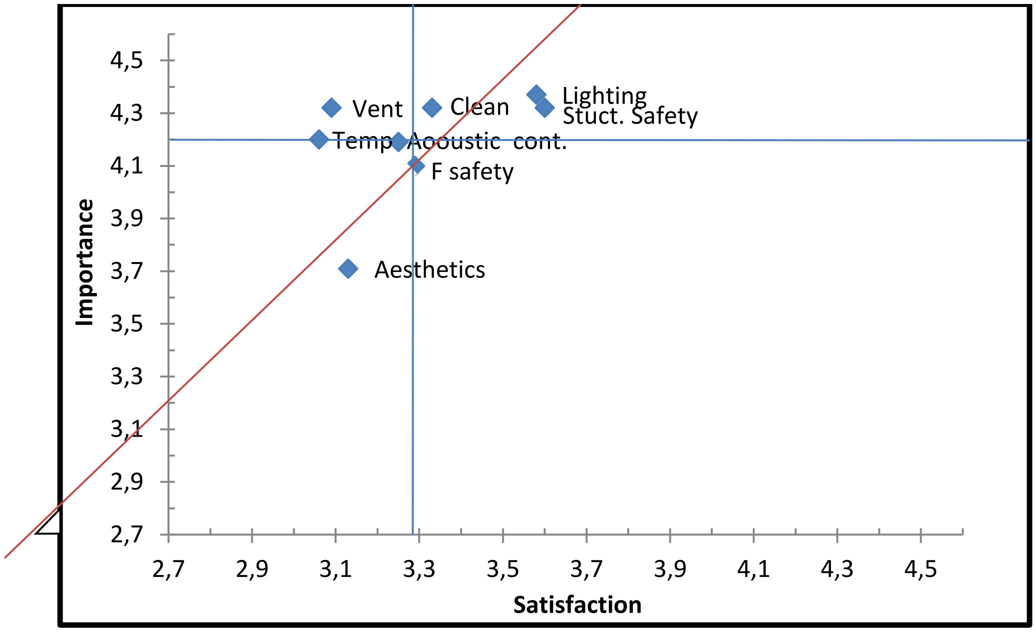

Figure 2: Importance satisfaction relationship (IPA model)

4.4 Improvement priorities

The lecture theatre does influence students' learning experience; hence it is vital to ensure that the performance of lecture theatres is conducive to students' learning. The mean scores obtained show that all the performance parameters of the lecture theatre are very important. To determine the parameters which need improvements, the IPA analysis and ANOVA were applied. The IPA analysis and ANOVA helped to identify the well-performing and underperforming parameters. Improvement priorities are accordingly proposed based on the IPA analysis, ANOVA and the literature review. It is hoped that the gap between importance and satisfaction will be reduced to ensure students' satisfaction if the proposal is implemented. Below is the proposed order of improvement for the identified underperforming parameters to ensure students' satisfaction. The motivation for the order is also presented.

- Fire safety and exit
- Ventilation and temperature (HVAC system)
- Cleanliness
- Acoustic control
- Aesthetics

The first parameter for improvement is fire exit & safety: fire safety & exit is not the least satisfying parameter; however, it is proposed that it is given the first priority because of the danger it can pose to students. According to Shen and Spedding (1998), safety items have a high risk on health or safety and could pose serious potential danger to the building users (students in this case). Lackney (1999) also pointed out that the absence or malfunctioning of safety items could result in casualties. It is also recommended that all exit doors be unlocked during lectures.

The second parameter for improvement is ventilation and thermal comfort (HVAC system): ventilation appears to be the parameter with which the students were least satisfied. The second least satisfying parameter was thermal comfort. A functional and effective HVAC system can help to avert the problems of ventilation and thermal comfort. The HVAC system in the institution should therefore be given the second priority. The impact of ventilation and thermal comfort was reviewed in the literature. Polh (2011) notes that the range of temperature to which the human body can adjust without discomfort is quite minimal (i.e. between 75°F and 68°F); hence it becomes imperative to regulate the HVAC system to achieve a comfortable thermal environment. It is also proposed that all malfunctioning HVAC system be repaired.

The third parameter on the list for improvement is cleanliness: firstly, improving on cleanliness will not require too much effort and secondly cleanliness has health implication. It is highlighted in the literature that cleanliness is one of the crucial indicators of building quality (Uline and Tschannen-Moran, 2008). In addition, the lecture tsheatre's air quality can be influenced by cleanliness.

The fourth consideration for improvement is the acoustic control system. The literature emphasises the importance of acoustics to the learning experience; it is recommended that the PA systems which are not functional be repaired.

Fifth in the order of importance regarding improvement is aesthetics. Some students voiced complaints about the state of beauty of the lecture theatres. It is recommended that some level of attention be giving to the old lecture theatre.

The performance of the other parameters, namely lighting and structural safety, was seen as satisfactory. Students had virtually no negative comments on these two parameters.

5. CONCLUSION

Lecture theatres of universities are an integral part of the physical setting which contributes to providing an environment that is conducive to learning. It is evident from the literature that the performance of lecture theatres does have an influence on the learning experience of students. The performance (functionality) of a lecture theatre is dependent on how well maintenance is carried out, among other factors. The need for effective maintenance of the lecture theatres of universities is thus imperative. Yet, university maintenance departments are usually constrained by limited funds. It then becomes vital to set priorities as it ensures the apt utilisation of resources.

In the research reported on in this article, an IPA was applied to develop a system for prioritising the lecture theatres' performance parameters (maintenance needs) according to students' expectation and satisfaction. To achieve this aim, the level of importance the students attached to the performance parameters of lecture theatres and how satisfied they were with the performance parameters were determined by means of a questionnaire survey. The importance and satisfaction data deduced from the survey were then plotted on the IPA model. Analysis of variance was also used to determine whether there were statistically significant differences between the importance and satisfaction mean scores. The prioritisation of parameters was developed afterwards.

The findings suggest that there were statistically significant differences between the mean scores for importance and satisfaction. In other words, students perceived the satisfaction of all parameters as below their level of importance.

The IPA model also indicated that all the performance parameters of the lecture theatres were below students' expectation. However, the degree of differences demonstrated indicates varied levels of satisfaction. Based on the IPA model and the analysis of variance, parameters that require critical considerations are; ventilation, thermal comfort, fire safety & exit and cleanliness. These parameters have high gap scores and are located in or close to Quadrant II, indicating big variations between importance and satisfaction. The comments provided by the students also confirm that these parameters were underperforming. The gap scores of aesthetics, lighting and structural safety and their location on the IPA model suggests that the performance levels were tolerable, though they were below students' satisfaction. This article demonstrates the practicality of the use of the IPA model for prioritising the maintenance needs of the buildings in an institution. Maintenance departments of institutions can apply this prioritisation system to manage the maintenance needs of buildings under their care.

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