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Assessment of Environmental Noise in Liceo De Cagayan University Main Campus: Basis for Sustainable Intervention

JUDY MARIE R. ZOLETA
ORCID NO. 0000-0002-8251-6822
jrzoleta@liceo.com.ph

BETHE J. SACABIN
ORCID NO. 0000-0003-2031-5950
Bmj_bethe@yahoo.com.ph

Liceo de Cagayan University
Cagayan de Oro City, Philippines

ABSTRACT

The study sought to determine the environmental noise quality in Liceo de Cagayan University's main campus. Eight areas were selected, including the Entrance Gate hallway, Library façade chapel area, South Academic Cluster (SAC) building façade, parking area near the Arts and Science Building (ASB), Riverside Canteen, Heritage Building (HB), and North Academic Cluster (NAC) building façade. Spot determination of noise levels was conducted using a noise meter with a monitoring range between 30-130 dB. The data obtained were tabulated and compared with World Health Organization standards. Results showed that the environmental noise levels in all areas as at an annoyance level, indicating noise pollution and is considered a hindrance to community learning resulting in lack of focus and concentration. High noise levels were attributed to the vehicular noise both inside and outside the university and human noise generated in the aforementioned areas. Differences in noise levels were caused by the varying influx of students, staff, and faculty and degree of noise produced. Recommendations included putting up of noise signages, educating the community on health impacts of noise, periodic monitoring, use of a buffer, limiting the number of cars, and implementing enforceable noise policy institutional level.

Keywords: Environmental Noise, annoyance level, community learning, transportation

INTRODUCTION

Environmental noise includes all sounds present in an environment, including traffic noise, construction noise, and other noise intrusions that are transient like trucks, motorbikes, sirens, and aircraft. Being located at the heart of the city, the Liceo de Cagayan University main campus cannot escape the bustling environmental noise. A 24-hour survey of noise levels of tricycles revealed an exceedance beyond existing Philippine standards (Vergell et al., 2004). In this study, noise performance showed an increase in noise level with a speed level. As to the effect on the cognitive performance of students, the study of Diaco (2014) showed that it is negatively influenced by noise pollution. A similar study conducted in Davao City, Philippines the by Limjuco et al., (2013) revealed that the effect of noise intensities has no significant association with academic activities. The World Health Organization (2017) standards for environmental noise are set at 55 dBA, which is just a little bit higher than the standard noise requirement for occupied classrooms, at 40-50 dBA (American National Standard Institute, 2002). The WHO (2017) has set a standard of 45 dBA as ambient noise level for community learning, and this is being identified as a quiet noise level which is perfect for learning. Noise levels beyond the WHO standard of 55 dBA are considered as an annoyance level that causes a feeling of displeasure on the individual and is therefore considered as noise pollution, which will hinder the individual from his activities. Continued exposure at 85 dBA and beyond can cause hearing loss. The Brazilian Standard for noise assessment established a noise level of 50 dBA for educational areas Zannin et al., (2002). Problems related to attention, memory, and motivation are linked with levels in exceedance of the standard (Chan, 2015).

This study was conducted to determine if the average environmental noise levels in Liceo de Cagayan University meet the requirement of the World Health Organization (WHO) for community learning.

FRAMEWORK

This study is tied up on the concepts of Rauf et al., (2015) and Guski et al., (2016). The consensus is that noise pollution affects the learning environment and produces a cascading effect on the learning attitude. It has, in fact, a significant impact on life quality especially on public health. This stated, he

affirms that noise pollution impedes the attainment of good quality of life. He associates noise pollution with modern technology and urbanization of cities and has negative effect on student learning as student tend to not listen to the lecturer when exposed to noise pollution. Annoyance is a repeated disturbance due to noise, an attitudinal response which may create anger, and a cognitive response in which one cannot do much against.

Figure 1 illustrates the conceptual framework which underlies this paper and provides the basis along which the paper focuses on.

Figure 1. Illustration of the conceptual framework that shows the relationship of the variables under study

OBJECTIVES OF THE STUDY

The study is aimed at generating baseline information on noise quality in select areas within the Liceo de Cagayan University's main campus for sustainable intervention. Specifically, the study seeks to: (a) determine the status of environmental noise quality in different areas of the Liceo main campus; (b) compare the environmental noise levels across areas on the Liceo campus; and (c) differentiate the noise levels across weeks by area on the Liceo campus.

METHODS

The study area included the entrance gate hallway, Library façade chapel area, SAC building façade, parking area near ASB, riverside canteen, Heritage Building (HB), and NAC facade inside the Liceo de Cagayan University main campus.

The research design employed in this study is the descriptive type. It is most suited to describe the data on environmental noise quality inside LDCU main campus and to come up with a reasonable and logical conclusion based on the trend of noise levels over a three-week period.

The noise levels were recorded using a noise meter with a monitoring range between 30-130 dB in the aforementioned areas to determine if environmental

noise levels meet the WHO requirement. The noise meter was switched to its "F" (Fast) time weighting, with the maximum levels being reported. This procedure was carried out for three (3) weeks, four days in arrow, and the data were taken twice a day, in the morning and the afternoon. The data obtained were tabulated and compared with WHO standards. To validate results, data obtained were subjected to a statistical analysis employing F-Test.

RESULTS AND DISCUSSION

Table 1

Status of environmental noise levels in sampled areas in LDCU Main Campus over

No.	Sampled Area	Average Noise Levels AM Min-Max (dBA)	PM Min-Max (dBA)	WHO Standard (dBA)	Remarks
1	Entrance Hallway	67.6-74.1	65.4-71.1	55 dBA	Not Complied
2	Library Facade	63.3-68.1	59.7-65.2		Not Complied
3	Chapel Area	58.1-63	58.3-62.4		Not Complied
4	South Academic Cluster (SAC) Building Facade	63.3-68.5	61.4-67.2		Not Complied
5	Parking area beside ASB	59.4-63.8	60.0-63.9		Not Complied
6	North Academic Cluster (NAC) Buiding Facade	61.2-66.4	62.2-66.3		Not Complied
7	Riverside Canteen	67.8-74.4	63.9-70.5		Not Complied
8	Heritage Building Facade	63.0-69.1	63.3-69.7		Not Complied

Table 1 shows the noise levels in different areas at the LDCU campus over three week. It can be gleaned from the table that from area 1 to area 8, the minimum and maximum values were way beyond the WHO standard regulation of 55 dBA, indicating that the noise levels to which students, staff, and faculty are exposed do not comply with environmental standards for environmental noise. Further, it is considered to be at an annoyance level which, according to WHO (2017), gives the individual a feeling of displeasure.

Table 2

Noise level across weeks. (A.M.) Entrance Hallway

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the **Noise level** across weeks in the **Entrance Area** during **Morning time.**	$\alpha = 0.05$	0.0384 (4.78)	$p < \alpha$	Reject H_0 Proceed to Post Hoc Analysis

Table 2 shows that the P-value (0.0384) is less than alpha at 0.05, indicating to reject the null hypothesis. It implies a significant difference in the noise levels across weeks at the Entrance Hallway during morning schedules. The Post Hoc Analysis in the table below specifically reveals a significant difference in the noise levels between week 1 and week 2. This variation may be because week 1 was less busy than week 2. Week 2 happens to be the start of summer class, where students usually enter through the entrance hallway and stay in the side benches to wait for classmates or friends.

Table 3

Post Hoc Analysis of Noise Levels at Entrance Hallway

Paired Variables	Mean Difference	P-value	Result	Decision
Week 1 and Week 2	-8.725	0.039	$p < \alpha$	Significantly different
Week 1 and Week 3	-3.6	0.476	$p > \alpha$	No Difference
Week 3 and Week 2	5.125	0.248	$p > \alpha$	No Difference

Table 4

Noise level across weeks. (P.M.) Entrance Hallway

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the **Noise level** across weeks in the **Entrance Area** during **Afternoon time.**	$\alpha = 0.05$	0.2008 (1.93)	$p > \alpha$	Fail to reject H_0

Table 4 reveals that the P-value (0.2008) is greater than alpha at 0.05, indicating not to reject the null hypothesis. This implies no significant difference in the environmental noise levels in the afternoon across the three-week period.

This means that more or less, the noise levels belong to the same average levels that fall beyond the acceptable ambient level of 55 dBA. Therefore the noise level to which students and faculty, and staff are exposed, at an annoyance level is the same throughout the three-week period and continuously create a feeling of displeasure, according to WHO (2017). This condition may be influenced by the location of the campus, which is at the roadside and is at the location where there is plenty of vehicle pass-by.

Table 5

Noise level across weeks (A.M.), Heritage Building Facade

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the **Noise level** across weeks in the **Heritage Building** during **Morning time.**	$\alpha = 0.05$	0.0518 (4.19)	$p > \alpha$	Fail to reject H_0

It can be gleaned from Table 5 that the P-value (0.0518) is greater than alpha at 0.05, indicating to accept the null hypothesis. This implies no significant difference in the environmental noise levels in the afternoon across the three-week period. This means that the noise levels are similar throughout the three-week period, which still falls beyond the acceptable ambient level of 55 dBA. Therefore the noise level at which students and faculty, and staff are exposed are at an annoyance level which creates a feeling of displeasure, according to WHO (2017). This condition may be influenced by the location of the campus, which is at the roadside and is at the location where many vehicles pass by and also due to the combined transportation sources both inside and outside.

Table 6

Noise level across weeks (P.M.), Heritage Building Facade

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the **Noise level** across weeks in the **Heritage Building** during **Afternoon time.**	$\alpha = 0.05$	0.6569 (0.44)	$p > \alpha$	Fail to reject H_0

Table 6 shows that the P-value (0.6569) is greater than alpha at 0.05, indicating to accept the null hypothesis. This implies no significant difference in the environmental noise levels in the afternoon across the three-week period. This means that more or less, the noise levels are similar throughout the three-week

period, which still way beyond the acceptable ambient level of 55 dBA. Therefore the noise level at which students and faculty, and staff are at an annoyance level. This condition may be influenced by the location of the campus, which is near the roadside and is at the location where many vehicles pass by.

Table 7

Noise level across weeks. (A.M.) Canteen

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the Noise levels across weeks in the Canteen during Morning time.	$\alpha = 0.05$	0.4952 (0.76)	$p > \alpha$	Fail to reject H_0

It can be gleaned from Table 7 that the P-value (0.76) is greater than alpha (0.05) which fails to reject the null hypothesis. This implies no significant difference in the environmental noise levels in the afternoon during the three-week period. This means that the noise levels are similar throughout that period which falls beyond the acceptable ambient level of 55 dBA. Therefore the noise level to which students, faculty, and staff are exposed at this time are at an annoyance level. This condition may be caused by the continuous influx of people during snack time.

Table 8

Noise level across weeks. (P.M.) Canteen

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the Noise level across weeks in the Canteen during Afternoon time.	$\alpha = 0.05$	0.4141 (0.97)	$p > \alpha$	Fail to reject H_0

Table 8 shows that the P-value (0.4141) is greater than alpha at 0.05, which fails to reject the null hypothesis. This implies no significant difference in the environmental noise levels in the afternoon across the three-week period. This means that more or less, the noise levels are similar throughout the three-week period, which still falls beyond the acceptable ambient level of 55 dBA. Therefore the noise level at which students and faculty, and staff are at an annoyance level. This condition may also be caused by the influx of people during snack time.

Table 9

Noise level across weeks. (A.M) NAC

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the Noise level across weeks in the NAC during Morning time.	$\alpha = 0.05$	0.3035 (1.37)	$p > \alpha$	Fail to reject H_0

Table 9 reveals that the P-value (0.3035) is greater than alpha at 0.05, indicating not to reject the null hypothesis. This implies no significant difference in the environmental noise levels in the afternoon across the three-week period. This means that more or less, the noise levels throughout the period still consistently fall beyond the acceptable ambient level of 55 dBA. This means that students, faculty, and staff are exposed to an annoying noise level which is distracting on the part of the students. This condition may be influenced by the location of the building, the ASB, and the Heritage building, which is also frequented by a great number of students.

Table 10

Noise level across weeks. (P.M.) NAC

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the Noise level across weeks in the NAC during Afternoon time.	$\alpha = 0.05$	0.1496 (2.36)	$p > \alpha$	Fail to reject H_0

Table 10 shows that the P-value (0.1496) is greater than alpha (0.05), indicating not to reject the null hypothesis. This still implies no significant difference in the environmental noise levels in the afternoon of the whole period covered by the study. This means further that more or less, the noise levels throughout the three-week period still consistently fall beyond the acceptable ambient level of 55 dBA. Therefore the noise level at which students and faculty, and staff are at an annoyance level. This condition may be influenced by the location of the building, near the ASB, and the Heritage building, which is also frequented by a great number of students This is supported by what Thattai et al., (2017) posited about the growing population and urbanization, which contributed to increasing noise levels in the community.

Table 11

Noise level across weeks. (A.M.) SAC

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the Noise level across weeks in the SAC during Morning time.	$\alpha = 0.05$	0.2359 (1.70)	$p > \alpha$	Fail to reject H_0

Table 11 reveals that the P-value (0.2359) is greater than alpha at 0.05, indicating to accept the null hypothesis. This implies no significant difference in the environmental noise levels in the afternoon across the three-week period. This means that more or less the same noise levels are consistently recorded throughout the three-week period, which still falls beyond the acceptable ambient level of 55 dBA. Therefore the noise level at which students and faculty, and staff are at an annoyance level. This condition may be influenced by the location of the campus, which is at the roadside and is at the location where many vehicles pass by.

Table 12

Noise level across weeks. (P.M.) SAC

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the Noise level across weeks in the SAC during Afternoon time.	$\alpha = 0.05$	0.0041 (10.73)	$p < \alpha$	Reject H_0 Proceed to Post Hoc Analysis

Table 12 shows that the P-value (0.0041) is less than alpha at 0.05, indicating to reject the null hypothesis. It implies a significant difference in the noise levels across weeks at the Entrance Hallway during morning schedules. The difference in the noise levels may be influenced by the noise coming from students in the building facade. Those staying in the nearby canteen may have also contributed as well as the vehicle pass-byes at the roadside. The Post Hoc Analysis in the table below specifically reveals a significant difference in the noise levels between week one and week two and week one and week 3.

Table 13

Post Hoc Analysis of Noise Levels at

Paired Variables	Mean Difference	P-value	Result	Decision
Week 1 and Week 2	-11.35	0.010	$p < \alpha$	Significantly different
Week 1 and Week 3	-11.275	0.010	$p < \alpha$	Significantly different
Week 3 and Week 2	0.075	1.000	$p > \alpha$	No Difference

Table 14

Noise level across weeks. (A.M.) Carpark

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the Noise level across weeks in the Carpark during Morning time.	$\alpha = 0.05$	0.1319 (2.56)	$p > \alpha$	Fail to reject H_0

Table 14 shows that the P-value (0.1319) is greater than alpha at 0.05, indicating to accept the null hypothesis. It implies a significant difference in the noise levels across weeks at the car park during morning schedules. This further implies that the occurrence of environmental noise levels that are beyond the standard of 55 dBA are consistent across the three-week period indicating that the exposure of the community in the said area is creating displeasure to them and may hinder them in their activities. This may be attributed to the sound of vehicles as they come and go and the outside transportation sources.

Table 15

Noise level across weeks. (P.M.) Carpark

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the Noise level across weeks in the Carpark during Afternoon time.	$\alpha = 0.05$	0.0146 (7.01)	$p < \alpha$	Reject H_0 Proceed to Post Hoc Analysis

Table 15 shows that the P-value (0.0146) is less than alpha at 0.05, indicating to reject the null hypothesis. It implies a significant difference in the noise levels across weeks at the car park in the afternoon. The Post Hoc Analysis in the table below specifically reveals a significant difference in the noise levels between week one and week 3. This may be due to the differences in the number of vehicles that are parked in the area as well as the noise from the roadside which may also vary at any time.

Table 16

Post Hoc Analysis of Noise Levels at the Parking Area

Paired Variables	Mean Difference	P-value	Result	Decision
Week 1 and Week 2	-3.55	0.120	$p > \alpha$	No Difference
Week 1 and Week 3	-5.65	0.015	$p < \alpha$	Significantly different
Week 3 and Week 2	-2.10	0.423	$p > \alpha$	No Difference

Table 17

Noise level across weeks. (A.M.) Chapel

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the **Noise level** across weeks in the **Chapel** during **Morning time**.	$\alpha = 0.05$	0.0007 (18.20)	$p < \alpha$	Reject H_0 Proceed to Post Hoc Analysis

Table 17 shows that the P-value (0.0007) is less than alpha at 0.05, indicating to reject the null hypothesis. It implies a significant difference in the noise levels across weeks at the chapel area during morning schedules. The Post Hoc Analysis in the table below specifically reveals a significant difference in the noise levels between week one and week two and week 1 and 3. The significant difference in the noise levels may be attributed to the varied number of students that frequent or pass by the area.

Table 18

Post Hoc Analysis of Noise Levels at Entrance Hallway

Paired Variables	Mean Difference	P-value	Result	Decision
Week 1 and Week 2	-11.4	0.002	$p < \alpha$	Significantly different
Week 1 and Week 3	-11.375	0.002	$p < \alpha$	Significantly different
Week 3 and Week 2	0.025	1.000	$p > \alpha$	No Difference

Table 19

Noise level across weeks. (P.M.) Chapel

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the **Noise level** across weeks in the **Chapel** during **Afternoon time**.	$\alpha = 0.05$	0.0006 (18.51)	$p < \alpha$	Reject H_0 Proceed to Post Hoc Analysis

Table 19 shows that the P-value (0.0384) is less than alpha at 0.05, indicating to reject the null hypothesis. It implies a significant difference in the noise levels across weeks at the chapel area in the afternoon. The Post Hoc Analysis in the table below specifically reveals a significant difference in the noise levels between week one and week two and week 1 and 3. The significant difference in the noise levels may be attributed to the varied number of students that frequent or pass by the area.

Table 20

Post Hoc Analysis of Noise Levels at the Chapel area

Paired Variables	Mean Difference	P-value	Result	Decision
Week 1 and Week 2	-9.075	0.004	$p < \alpha$	Significantly different
Week 1 and Week 3	-11	0.001	$p < \alpha$	Significantly different
Week 3 and Week 2	-1.925	0.624	$p > \alpha$	No Difference

Table 21

Noise level across weeks. (A.M.) Library

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the Noise level across weeks in the Library during Morning time.	$\alpha = 0.05$	0.0023 (12.87)	$p < \alpha$	Reject H_0 Proceed to Post Hoc Analysis

Table 21 shows that the P-value (0.0023) is less than alpha at 0.05, indicating to reject the null hypothesis. It implies a significant difference in the noise levels across weeks at the Library facade during morning schedules. The Post Hoc Analysis in the next table specifically reveals a significant different in the noise levels between week one and week two and week 1 and 3. This significant variations may be due to the differences in the number of passersby along the library area as well as those staying on the benches outside it.

Table 22

Post Hoc Analysis of Noise Levels at Library Facade

Paired Variables	Mean Difference	P-value	Result	Decision
Week 1 and Week 2	-12.15	0.003	$p < \alpha$	Significantly different
Week 1 and Week 3	-9.05	0.017	$p < \alpha$	Significantly different
Week 3 and Week 2	3.1	0.489	$p > \alpha$	No Difference

Table 23

Noise level across weeks at the Library Façade (P.M.)

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the Noise level across weeks in the Library during Afternoon time.	$\alpha = 0.05$	0.0006 (18.69)	$p < \alpha$	Reject H_0 Proceed to Post Hoc Analysis

Table 23 shows that the P-value (0.0006) is less than alpha at 0.05, indicating

to reject the null hypothesis. It implies a significant difference in the noise levels across weeks at the Library façade in the afternoon. The Post Hoc Analysis in the table below specifically reveals a significant difference in the noise levels between week one and week two and week one and week 3. This may be because week 1 was less busy than week 2. These significant variations may be due to the differences in the number of passersby along the library area as well as those staying on the benches outside it.

Table 24

Noise level across weeks at the Library Façade (A.M.)

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the Noise level across areas during Morning time.	$\alpha = 0.05$	0.0006 (18.69)	$p < \alpha$	Reject H_0 Proceed to Post Hoc Analysis

It can be gleaned from Table 24 that noise levels across weeks showed a significant difference, with the p-value (0.0006) being less than alpha at 0.05. However, the difference according to the post hoc analysis in Table 25, is between the entrance hallway and chapel, entrance and carpark, canteen and carpark, and canteen and chapel. Significant variations among these areas may be due to the differences in the influx of people and the number of vehicles that come and go at varying times as well.

Table 25

Post Hoc Analysis of Noise Levels across weeks (A.M.)

Paired Variables	Mean Difference	P-value	Result	Decision
Entrance and Hb	-5.21	0.609	$p > \alpha$	No Difference
Entrance and canteen	-0.408	1.000	$p > \alpha$	No Difference
Entrance and Nac	-6.93	0.228	$p > \alpha$	No Difference
Entrance and SAC	-5.01	0.660	$p > \alpha$	No Difference
Entrance and Carpark	-9.29	0.024	$p < \alpha$	Significantly different
Entrance and Chapel	-10.06	0.009	$p < \alpha$	Significantly different
Entrance and Library	-4.73	0.723	$p > \alpha$	No Difference
HB and canteen	4.81	0.706	$p > \alpha$	No Difference
HB and Nac	-1.72	0.999	$p > \alpha$	No Difference
HB and SAC	0.208	1.000	$p > \alpha$	No Difference
HB and Carpark	-4.075	0.852	$p > \alpha$	No Difference
HB and Chapel	-4.84	0.698	$p > \alpha$	No Difference
HB and Library	0.483	1.000	$p > \alpha$	No Difference
Canteen and Nac	-6.525	0.304	$p > \alpha$	No Difference
Canteen and SAC	-4.6	0.752	$p > \alpha$	No Difference
Canteen and Carpark	-8.88	0.038	$p < \alpha$	Significantly different
Canteen and Chapel	-9.65	0.015	$p < \alpha$	Significantly different
Canteen and Library	-4.325	0.807	$p > \alpha$	No Difference
NAC and SAC	1.925	0.998	$p > \alpha$	No Difference
NAC and Carpark	-2.36	0.992	$p > \alpha$	No Difference
NAC and Chapel	-3.125	0.961	$p > \alpha$	No Difference
NAC and Library	2.2	0.995	$p > \alpha$	No Difference
SAC and Carpark	-4.28	0.815	$p > \alpha$	No Difference
SAC and Chapel	-5.05	0.650	$p > \alpha$	No Difference
SAC and Library	0.275	1.000	$p > \alpha$	No Difference
Carpark and Chapel	-0.77	1.000	$p > \alpha$	No Difference
Carpark and Library	4.56	0.761	$p > \alpha$	No Difference
Chapel and Library	5.325	0.583	$p > \alpha$	No Difference

Table 26

Noise level across weeks. (P.M.)

Null Hypothesis	Level of Significance	P-value (F-value)	Result	Decision
H_0: There is no significant difference in the **Noise level** across **area** during **Afternoon time.**	$\alpha = 0.05$	0.0019 (3.59)	$p < \alpha$	Reject H_0 Proceed to Post Hoc Analysis

Table 26 shows that the p-value (0.0019) is less than alpha (0.05), suggesting to reject the null hypothesis and indicating a significant difference in the noise

levels across weeks in the afternoon, which is the same as the previous table on the morning schedule. However, as shown on the table on paired variables in Table 27, the significant difference lies the between entrance hallway and chapel area only. All the rest are more or less in the same noise range but beyond the 55 dBA standard.

Table 27

Post Hoc Analysis of Mean Noise Levels across weeks (P.M.)

Paired Variables	Mean Difference	P-value	Result	Decision
Entrance and Hb	-2.55	0.962	$p > \alpha$	No Difference
Entrance and canteen	-2.38	0.974	$p > \alpha$	No Difference
Entrance and Nac	-3.43	0.832	$p > \alpha$	No Difference
Entrance and SAC	-4.325	0.594	$p > \alpha$	No Difference
Entrance and Carpark	-6.025	0.164	$p > \alpha$	No Difference
Entrance and Chapel	-7.275	0.038	[illegible]	Significantly different
Entrance and Library	-6.525	0.096	$p > \alpha$	No Difference
HB and canteen	0.17	1.000	$p > \alpha$	No Difference
HB and Nac	-0.88	1.00	$p > \alpha$	No Difference
HB and SAC	-1.78	0.995	$p > \alpha$	No Difference
HB and Carpark	-3.475	0.823	$p > \alpha$	No Difference
HB and Chapel	-4.725	0.475	$p > \alpha$	No Difference
HB and Library	-3.975	0.696	$p > \alpha$	No Difference
Canteen and Nac	-1.05	1.000	$p > \alpha$	No Difference
Canteen and SAC	-1.94	0.992	$p > \alpha$	No Difference
Canteen and Carpark	-3.64	0.784	$p > \alpha$	No Difference
Canteen and Chapel	-4.89	0.426	$p > \alpha$	No Difference
Canteen and Library	-4.14	0.649	$p > \alpha$	No Difference
NAC and SAC	-0.89	1.000	$p > \alpha$	No Difference
NAC and Carpark	-2.59	0.958	$p > \alpha$	No Difference
NAC and Chapel	-3.84	0.733	$p > \alpha$	No Difference
NAC and Library	-3.09	0.896	$p > \alpha$	No Difference
SAC and Carpark	-1.7	0.997	$p > \alpha$	No Difference
SAC and Chapel	-2.95	0.918	$p > \alpha$	No Difference
SAC and Library	-2.2	0.983	$p > \alpha$	No Difference
Carpark and Chapel	-1.25	1.000	$p > \alpha$	No Difference
Carpark and Library	-0.5	1.000	$p > \alpha$	No Difference
Chapel and Library	0.75	1.0000	$p > \alpha$	No Difference

CONCLUSIONS

The current study found that the environmental noise levels in different areas in LDCU main campus were higher than the level (55dBA) set by the World Health organization and noise levels for educational areas of 40-50 dBA. This result indicates the occurrence of noise pollution. This further indicates that students are exposed to environmental noise at an annoyance level which hinders the learning community from focusing very well on their activities.

RECOMMENDATIONS

Management Implications

1. Noise signages to keep noise level at a minimum should be placed in facades and halls.
2. Community Education should be conducted with emphasis on its impact on health and learning.
3. A Noise Instrument budget should be allocated for research and monitoring purposes.
4. Additional trees and plants should be planted near fences to buffer outside noise coming from vehicle passby.
5. The number of cars allowed to park within the campus should be kept at a minimum to help reduce noise levels.

LITERATURE CITED

Chan, K. M. K., Chi, M. L., Estella, P. M. M., Edwin, M. L. Y., and Bradley, M. (2015) Noise levels in an urban Asian school environment. *Noise Health*. Jan-Feb; 17(74): 48–55.doi: 10.4103/1463-1741.149580

Diaco, S. B. (2014). Effects of Noise Pollution in the Learning Environment on Cognitive Performances. *Asian Scientific Journals* (Vol 10 No. 1). http://asianscientificjournals.com/new/publication/index.php/ljher/article/view/655

Schreckenberg, D., Meis, M., Kahl, C., Peschel, C., & Eikmann, T. (2010). Aircraft noise and quality of life around Frankfurt Airport. *International journal of environmental research and public health, 7*(9), 3382–3405. https://doi.org/10.3390/ijerph7093382

Limjuco, R.P., Capricho, N. C., Moso, R. S., Chavez, F. C., & Enero, A.J. P. (2013). Noise Intensities in Davao City Campuses and their Perceived Effects to Academic Activities of the Learners. *PHILIPPINE E-JOURNALS* (Vol. 4 No. 1).https://ejournals.ph/article.php?id=2860

New York: American National Standards Institute. (2002). American National Standards Institute. American National Standard Acoustical Performance Critera, Design, Requirements, and Guidelines forSchools (ANSI S12.60-2002).

Rauf, K.M., Hossieni, H., Ahmad, S. S., Ali, H., Kawa, H. (2015). Study of the Improvement of Noise Pollution in University of Sulaimani in both New and Old Campus. *Journal of Pollution Effects & Control*. DOI: 10.4172/2375-4397.1000143

Thattai, D., Sudarsan, J. S., Sathyanathan, R., and Ramasamy, V. (2017). Analysis of noise pollution level in a University campus in South India. IOPSIENCE. https://iopscience.iop.org/ article/10.1088/1755 -1315/80/1/012053

Vergel, K. N., Cacho, F. T., & Capiz, C. L. E. (2004). A Study on Roadside Noise Generated by Tricycles. *PHILIPPINE ENGINEERING JOURNAL*,25 (2), 1-22.

World Health Organization (WHO), "Occupational and Community Noise," Fact sheet, no. 258, WHO, Geneva, Switzerland, 2001.

Zannin, P., H.F.B. Diniz & W. A. Barbosa (2002). Environmental noise pollution in the city of Curitiba, Brazil. *ScienceDirect.* (Issue 4) Pages 351-358. https://doi.org/10.1016/S0003-682X(01)00052-4

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