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COMMUNITY RESPONSE OF ENVIRONMENTAL NOISE - AN INVESTIGATION BASED ON 16 PRIMARY SCHOOLS IN TAICHUNG, TAIWAN

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1. INTRODUCTION

Numerous studies [1,2,3] have shown the negative effects of the environmental noise on the learning and teaching activities of pupils and teachers in primary schools. But subject to the difference in personal perception and the conditions of the surrounding, the annoyance of the environmental noise to human beings is difficult to measure and compare. It was found that the correlation of the degree of annoyance to the level of the environmental noise to be less than 0.5 in most cases [4,5]. Thus some researchers [6,7] tried to evaluate the community response instead of the individual perception to the environmental noise.

In the following study, a model to evaluate the relative annoyance of the environmental noise of 16 primary schools in Taichung City, Taiwan, with the assumption of the normal distribution of the community response, would be developed. Such that the relative annoyance of a particular school could be compared with the rest of the schools in the group.

2. EXPERIMENTALS

The experimental work of this study included two parts. They are namely: the field noise measurement and opinion surveys of 16 primary schools.

Field Noise Measurement

Noise measurements were conducted in each school in different locations, such as inside the classroom and in the vicinity of that school. The average Leq will be

calculated for further evaluation.

Opinion survey

A Questionnaire survey of the pupils and teachers of 6 to 10 classes of a particular school were conducted. Besides other items, each was asked to select a level of annoyance which carried certain weight as shown in the following section.

3. MODEL DEVELOPMENT

A table of the level of annoyance was established as follows:

Tab. 1

Level of Annoyance	Weighting
Not at all	1
A little bit annoyed	10
Annoyed	100
Very Annoyed	1000

$$\text{Average Response level} = \frac{\Sigma(\text{No. of Respondents} \times \text{Weighting})}{\text{Total No. of Respondents}} \quad \text{Eq. 1}$$

$$\text{Perception Level} = \frac{\text{Average of measured Leq}}{\text{Average Response Level}} \quad \text{Eq. 2}$$

$$\text{Coefficient of Perception} = \frac{\text{Perception Level}}{\text{Medium Value of Perception Level}} \quad \text{Eq. 3}$$

$$\text{Relative Annoyance Factor} = 10 \log \frac{\text{Coefficient of Perception}}{\text{Base Value}} \quad \text{Eq. 4}$$

For Eq. 4, the Base Value = 1.

$$\text{Perceived Level} = \text{Measured Leq} - \text{Relative Annoyance Factor} \quad \text{Eq. 5}$$

4. RESULTS

The schools under investigation were grouped into 2 categories, namely: Zone II (pure residential) and Zone III (mixed, residential and commercial etc.). The Average Response Level and Perception Level of each school was calculated according to Eq. 1 and 2, the results are illustrated in Fig. 1 and Fig. 2 below. And its Coefficient of Perception ,the Relative Annoyance Factor and the Perceived Level were calculated according to Eq. 3,4 and 5 respectively. This process will be repeated for each school and for the pupil and teacher's groups. The results are summarized in Table 2.

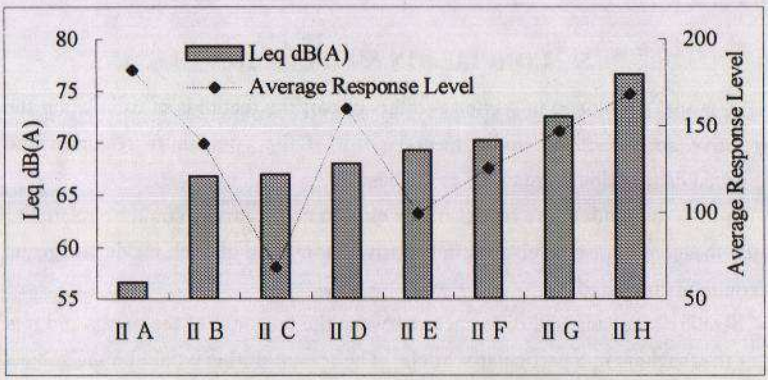

Fig 1, Summary of Zone II School's Response

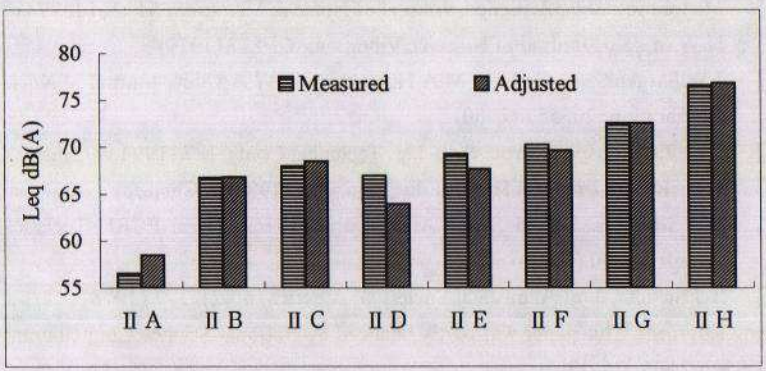

Fig 2, Comparison of Measured and Adjusted Values

Table 2 Summary of Results , in dB(A)

School	Measured Leq	Perceived Level		School	Measured Leq	Perceived Level	
		Pupils	Teachers			Pupils	Teachers
IIA	56.55	58.49	59.31	IIIA	58.90	56.63	59.10
IIB	66.75	66.80	73.39	IIIB	66.35	61.14	62.00
IIC	67.96	68.48	65.28	IIIC	66.54	68.25	68.27
IID	66.96	63.91	61.29	IIID	67.19	66.78	62.92
IIE	69.25	67.66	75.65	IIIE	67.75	71.12	63.21
IIF	70.24	69.62	67.70	IIIF	68.95	66.72	72.24
IIG	72.54	72.50	74.32	IIIG	69.39	71.22	73.13
IIH	76.58	76.18	87.12	IIIH	70.77	70.90	69.20

5. CONCLUSION & DISCUSSION

1. The model developed in section 3 offers one of the methods in calculating the relative annoyance of environmental noise, if the community response and normal distribution were taken as the basis.
2. Through the model , the results of the questionnaire survey could be related to the measured noise level. And the relative annoyance of each inside the group could be compared.
3. There are some marked differences between the response of the pupils and that of the teachers in a particular school. The reason of this would be the subject of another research.

6. REFERENCES

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