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STUDY ON SOUND POLLUTION AT THE UNIVERSITY ,,1 DECEMBER 1918" OF ALBA IULIA, ROMANIA

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ABSTRACT: *Sound pollution becomes an increasingly serious problem due to the significant increase in artificial noise sources.Exposure to high noise can lead to a deterioration in human health. Issues such as deafness, tinnitus, hearing fatigue, nausea, migraines, neurosis, heart disease, peptic ulcer, colitis, hypertension, sleep problemsNoise is considered a disturbing factor for study and rest, if it lasts a lot, the performance of the affected staff is significantly diminished, either student or teacher*
The purpose of this study is to determine the level of noise in the University of 1 December 1918 in Alba Iulia, to find the students' opinion on noise pollution and to find solutions to reduce noise pollution so as to improve the quality of the learning and resting activities.

Key words: *noise pollution; university; noise sources;*

Introduction

Sound pollution is a component of environmental pollution caused by noise.[1] According to Larousse, noise is an ensemble of unpleasant sounds[2] Physicists define noise as a disordered overlap of different frequencies and intensities, and physiologists define noise as any annoying sound that produces a disagreeable sensatio.[3] Man perceives the sounds at a frequency of between 16 and 20,000 vibrations per second and between 0 and 120 dB.

Noise can lead to stress, high blood pressure, colitis, hypertension, insomnia, distraction, they affect productivity and reduce the quality of life. The effects of noise are difficult to quantify because the tolerance levels are different depending on the person and the noise types that vary considerably.[4]

The purpose of this study is to determine the level of noise in the University of 1 December 1918 in Alba Iulia, to find the students' opinion on noise pollution and to find solutions to reduce noise pollution so as to improve the quality of the learning and resting activities

The 1 Decembrie 1918 University of Alba Iulia is located in the center of Alba Carolina, north of Citadel Square, where most of the cultural events take place in Alba Iulia, therefore there may be major temporary noise sources that could affect the proper development of educational activities from the University.

Material and methods

The measurements were made with an integrated precision class 1 sonometer manufactured by Brüel & Kjær. This type of sonometer has been specifically designed for occupational and environmental measurements in accordance with all national and international standards. It is a very easy to operate device. and already contains the Sound Level Meter software installed, it measures all the parameters simultaneously.[5]

Registered parameters are:

- LAF - acoustic pressure level "A";
- LAFmax - maximum sound pressure level "A";
- LAeq - the continuous sound pressure

level equivalent to "A".

Measurements have been made in accordance with the provisions of the standards so that the results obtained are accurate. Three measurements were made at each selected point, additional measurements I did not have to carry out because the difference between the results obtained in the three determinations was not more than 3 dB and the situation was representative, not deviating from the normal situation .

The sonometer was located at a distance of 1.,20 m from the ground, and the measurement time was 5 minutes, respecting the minimum value required by the standard.

An opinion poll was conducted among students accommodated. They were asked questionnaires containing questions about the noise sources, the effects of the sound pollution.

For the relevance of the study, the questionnaires were applied to a representative sample, the survey having a margin of error of 5%. The volume of the sample depends on three elements:
Maximum admissible error = Accuracy (Dx); Probability of guaranteeing results = Trust factor in responses (p); Dispersion = Spread rate of studied population (D2) .[6]

Results and discussion

In the table 1 are presented the values recorded during the measurements at the 1 Decembrie 1918 University in Alba Iulia.

In all the University buildings it was found that the common source of noise is the sudden closure of the doors. Traffic affects the noise pollution of buildings that are close to the University's access road building A, buildings B or buildings C).
The maximum permissible legal limit is 50 dB. It can be seen that this limit is exceeded. Noise sources come from inside buildings as well as from outside. A main source of noise is the sudden closure of the doors, and during summer the nearby traffic may disrupt the courses in the A, B and C buildings. Other negligible sources of noise were identified, such as the ATM (in B) audio equipment (terrace, cafeteria), refrigerators, students, etc.
To reduce the noise level on the propagation paths and the noise source, it is proposed to place the sound absorbing panels and the mounting of the fuselage.
The highest value is recorded at the canteen, and the second is a bar, with a difference of approximately 4 dB.

Table 1. Values recorded at the University of 1 December 1918 of Alba Iulia

Nr. crt.	Monitored points	Laeq (dB)	LAFmax (dB)	LAF90.0 (dB)
1	The building A	50,3	63,7	46,1
2	The building B	58,7	78,1	50,8
3	The building C	60,5	76,3	49,1
4	The building D	51,7	73,0	36,9
5	The building of Theology	55,4	75,3	47,5
6	Lecture hall	37,3	64,4	25,9
7	Bar	64,3	75,2	59,6
8	Terrace	53,2	70,9	43,4
9	Canteen	67,5	76,8	62,9
10	The main entrance into the University	57,9	70,9	47,0

The reading room provides students with favorable study conditions, the noise identified during the measurements are insignificant, the noise level remaining below the maximum allowed by the legislation

The following charts illustrate the situation resulting from the application of questionnaires related to the noise pollution in the dormitories administered by the "1 Decembrie 1918" University of Alba Iulia.

As a result of the questionnaires interpretation, it was found that in the second student hostels, 61.53% of the respondents are disturbed by the high noise level from various major sources of noise such as the sudden closure of the doors and the leisure activities compared to the interviewees in dormitory number three, where all students answered negatively the question "Are you disturbed by the noise in the student hostels?

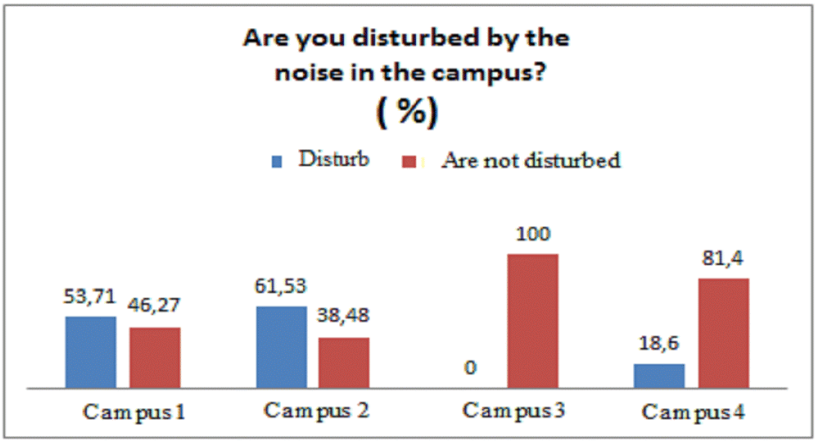

Fig. 1. The students' answer to the question "*Are you disturbed by the noise in the campus*"

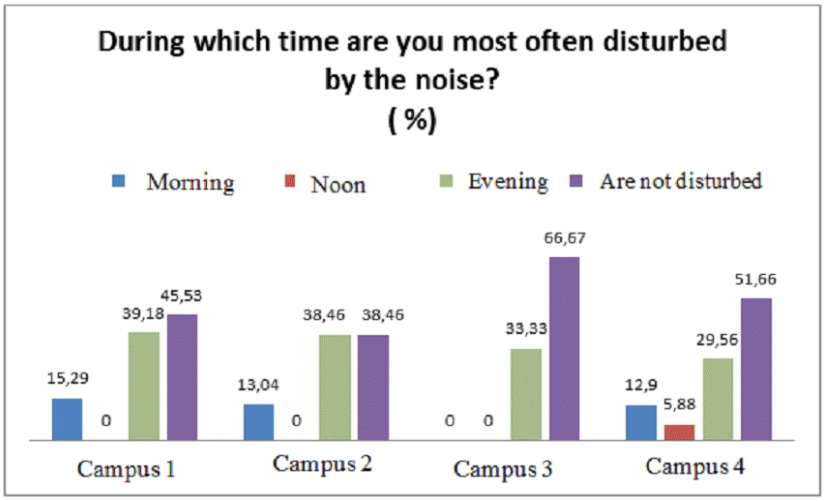

Fig. 2. The students' answer to the question "*During wich tine are you most often disturbed by the noise*"

The time of the day when the noise is worse is evening, and the day of the day when noise is lower is noon.

Only 42.21% of all interviewed students responded that they were affected by noise during the first part of the day.

To the question "What is the impact of noise on you?" 38.4% of campus 1 students say that noise affects their sleep and 24.8% claim that noise pollution affects their learning. In second dormitory 40.1% of students have sleep problems due to noise pollution and 39.4 can not learn because of this problem.

No student has health problems due to noise according to students' answers.

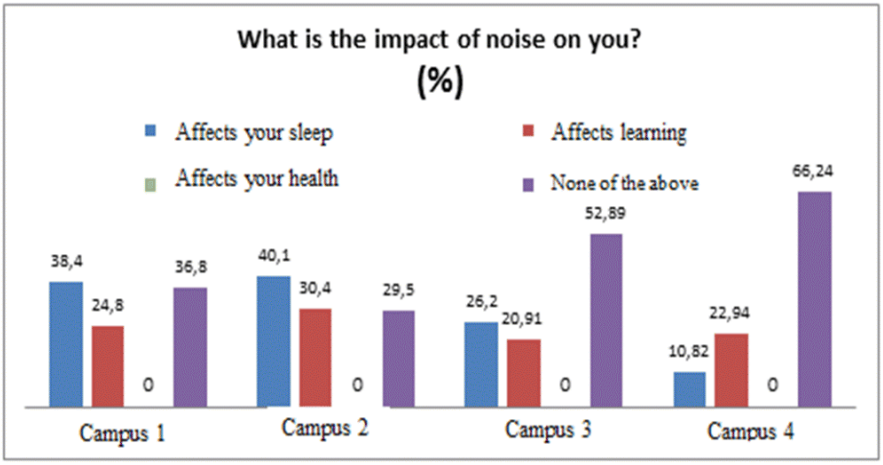

Fig.3 The students' answer to the question ,, What is the impact of noise on you"

Conclusions

Following this study it can be concluded that the University 1 Decembrie 1918 of Alba Iulia offers satisfactory conditions for the development of educational activities

Following monitoring, the following Laeq ranking was obtained: Building C (60.5 dB), Building B (58.7 dB), Faculty of Theology (55.7 dB), Building D (51.7 dB), Building A (50.3 dB).

As a result of applying the questionnaires, it was found that most of the students participating in the study are disturbed by the noise generated by internal sources (such as closing doors, colleagues' activities) and external sources (traffic, neighborhood activities).

In order to significantly reduce the impact of noise on the personnel employed within the University, as well as on the students accommodated in the four dormitories, a method of lowering the noise level, insulating the door, planting the trees around the dorms / courtyards, is proposed.

The role of implementing these methods is to improve the quality of the conditions for conducting educational activities.

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