

# What defines acoustically listening quality in a venue?

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## Introduction

The study conducted to answer 'What defines acoustic listening quality in a venue?' by examining and evaluate the speech quality of Rock and Pop music in venues with different conceptual and architectural designed five venues in Cyprus based on the relative importance of each acoustic parameter linked to acoustic quality to create a mathematical formula, this formula aims to show the difference of one space from another and how good it is and subjective questionnaires by defining the core parameters which strongly contribute the room acoustics quality.

## Aims and Objectives

- 1-) Background research on room acoustics to consider the importance and ideal values for each acoustic factor.
- 2-) Venues must be measured with standards and at the same time the measured values must be assest and evaluate according to the literature review that gathered from background research.
- 3-) The acoustic performance results obtained within the spaces should be compared and discussed with each other
- 4-) The weightnings of acoustic factors in the room in the research should be found as in percentages in the space. The acoustic factors must be put into a mathematical formula(algorithm) that will determine how good or poor the quality of the room will be.
- 5-) Venues will be test by the audience to give a listeners preference by subjective questionnaires to support records and formula.

## Synthesis Formula

### Acoustic Quality Formula of Performance Space

$$\frac{(RT \times 25.53) + (Modes \times 17.02) + (EDT \times 16.30) + (C \times 12.06) + (BR \times 11.35) + (G \times 10.65) + (Background \text{ Noise} \times 7.1)}{100} \times 100 = \%$$

Equation 1: Evaluated quality formula with seven parameter's relative importance weightings.

## Methodology

This section focusses the procedures, techniques and standard methods employed to gather the needed and required data of the information seven parameters which contribute acoustic quality; Reverberation time(RT), Modes, Early Decay Time(EDT), Clarity(C50/C80), Bass Ratio(BR), Sound Strength value(G) and Background Noise. Two different stages were focused on determining overall acoustic quality:

**1-) Objective Measurements**

**2-) Subjective Questionnaire**

## Results

Figure 1 represents the percentile of the overall quality results of the measured parameters evaluated on the formula, while Figure 2 shows the venues that has the best quality according to the preferences of the 10 people selected for the subjective experiment among the five musical performance spaces.

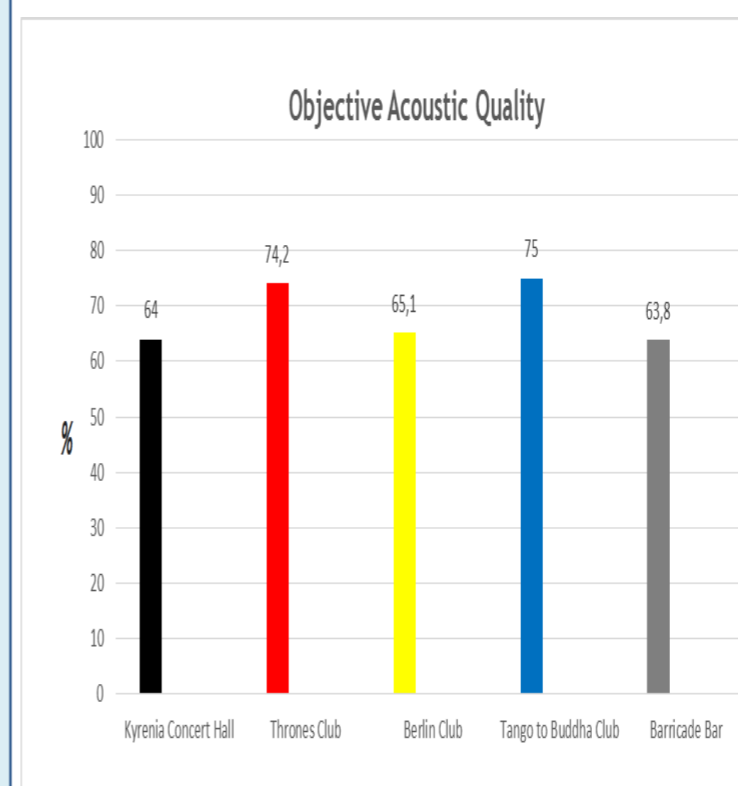


Figure 1: Objective quality.

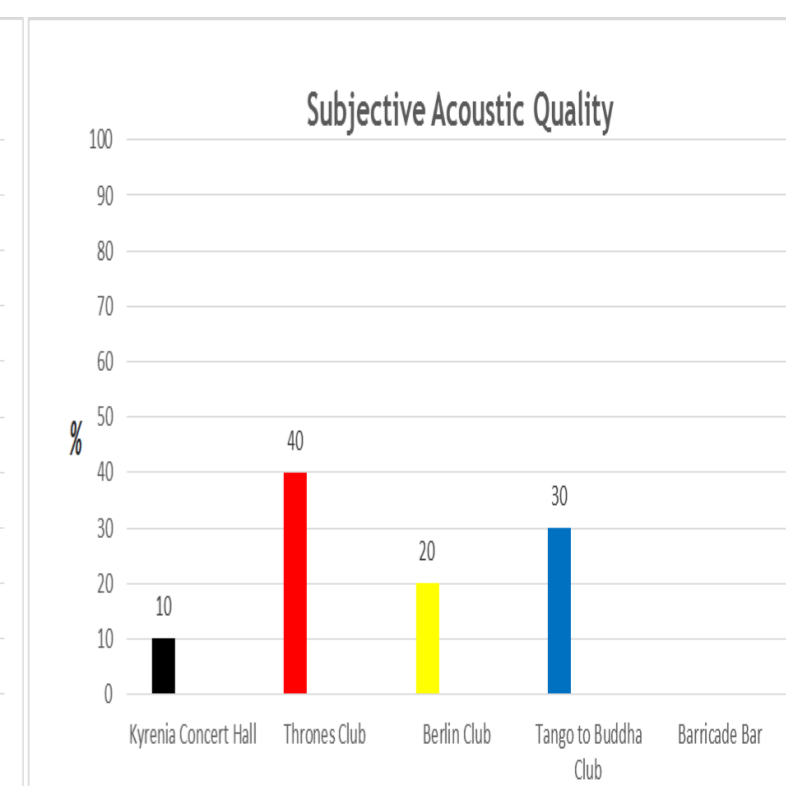


Figure 2: Subjective quality.

## Conclusions

The formula produced shows the appropriate values for parameters to reach their ideal values, as well as specifically showing the acoustic quality of a space. The great correlation between subjective and objective experimental results is sufficient to confirm the theory of the method, it is also an important and efficient factor for audio engineers and musicians to be used in music industry.