

The influence of playing simultaneously with singing in flute sonority

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Abstract: *This project falls within the area of developing innovative methods in teaching the flute. It focuses on search and application of singing as contemporary technique of sound production that may contribute to the creative development of sonority of the students. The research has been conducted systematically with the aim to deepen the theoretical knowledge and practical skills of the students, learn the simultaneous singing and playing and add them to their daily studies. For this purpose, different compositions and excerpts of compositions employing singing have been selected and applied to resolve effectively various problems in sound production and result in a more grounded interpretation of contemporary music, as well as classical music.*

Key-words: *flute, sonority, playing simultaneously with singing, experimental pedagogy, Contemporary music*

1. Introduction

The flute, when compared to other wind instruments, possesses some unique particularities in its sound production which require a special demand from the use of the mouthpiece and the respiratory system. One of the disadvantages of the flute is related to it not having many high harmonics, which creates some limitations in the instrument, causing a less balanced sonority in the diverse ranges.

2. The State of Art

Positive influence of singing on instrumental playing belongs to general knowledge. Especially important is the pedagogical application of vocal technique in the field of wind instruments, because the process of respiration and diaphragm support is

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very similar. The use of singing as a special effect added to flute playing developed rapidly in jazz music. For a long time now, the flute has not been considered a unison instrument, as it once was. The technique of using *playing simultaneously with singing* in contemporary music was explored in the composition, *Voice*, by Toru Takemitsu (1971). This work was the basis for the creation of a great quantity of pieces for flutes, where the voice enriches the specific sonority of the compositions. Also, in recent pieces for flutes, we can find various types of uses for singing – *a cappella* singing and singing which blends in unison with the sound of the flute or acts independently of the flute.

Fig. 1. Excerpt from the piece, “Voice” for flute by Toru Takemitsu

2.1. Execution of playing simultaneously with singing

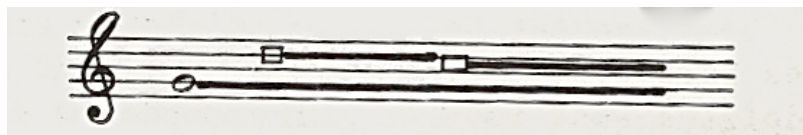


Fig. 2. Symbol of playing simultaneously with singing from book by P. Y. Artaud “Present day flutes”, page n^o 12.

Playing and singing at the same time consists in conciliating the sound, is by the vocal cords, with the use of the air exhaled which reaches the edge of the flute. The symbol was fixed by French flutist P. Y. Artaud in his book “Present day flutes” (1980). The shape of the mouthpiece which is involved in this process is normal, so that the opening between the lips becomes slightly wider. A unison sound or two independent voices can be created. This technique allows the adjacent resonance cavities to be opened. These cavities influence and significantly transform the sound which is created and heard, and, of course, are involved in its originality, given the uniqueness of each person’s physiology. The question of the application on this playing and singing to flute sonority has been mentioned by American flutist and composer R. Dick in his book *Tone Development Through Extended Techniques*

(1987). This article deals with methods of regular application in pedagogical process and verification of the acoustic effect of this technique.

3. Objectives

With this research project, we sought to provide students of the first two years of Superior Schools of Music, who already have in their repertoire fundamental pieces of all historical times and who know the instrument in general, a new learning of the flute based on new knowledge that would enable them to find their own sound and at the same time overcome the problems arising from various physical tensions. This process sought to respond to the resolution of the problems identified, in order to find possible solutions through the effective application of contemporary techniques.

The following are some of the difficulties that have arisen:

- Inflexible embouchure;
- Tense throat;
- Limited sound production in the low octave;
- Tuning problems;
- Inability to change tone colour flexibly;
- Difficulty in using different colours to differentiate historical styles;
- Insecurity in the fast passages between the extreme registers;
- Problems with creating of musical phrases.

4. Methodology

The methodology used was based on the experimental empirical method, through the analysis of scores, observation, and listening and critique of sound results. Since this project is experimental and laboratory in nature, the working methods of G. Landsheere published in his book, *The Experimental Research in Pedagogy* (1986) and Robyn Tate published in the article *Experimental Studies (Educational Research, Methodology And Measurement: An International Handbook*, John P. Keeves, 1988).

The work with the previously chosen students, was carried out with the following objectives:

- a) To gather the repertoire of pieces where it was possible to apply the singing as a contemporary flute technique and the set of possible conducts;
- b) To order such conducts according to the development vectors;

- c) Verify the empirical validity of this hierarchical organization of the repertoire through longitudinal studies;
- d) Allow students to understand the interactions with us that led to the transformation of behaviors;
- e) To catalogue the various forms of use of singing that results in a more conclusive way in the process of development of sound, following them with the theoretical justifications.

The systematization of results included sound analysis. During the work sessions, experimental work and other activities that included the evaluation of results, particular importance was given to the systematic listening of recordings made by the students. In addition, a sound - spectrogram analysis tool was used.

5. Application of the use of playing simultaneously with singing

The following is an image of spectrograms presenting the application of the technique of *playing and singing* at the same time (2nd - 4th second – *natural sound*; 4th – 6th second – *natural sound* + singing; 6th – 8th second – *natural sound*).

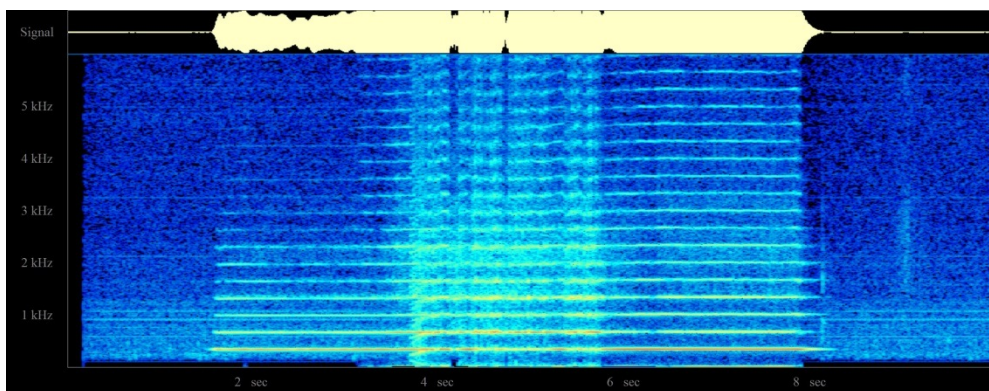


Fig. 3. Images of spectrograms showing the application of the technique of playing and singing at the same time from thesis “*Influência das técnicas contemporâneas na sonoridade de flauta*” by Monika Streitová (2011).

When we compare the sound quality before and after the use of the technique of playing simultaneously with singing, we see that the sound spectrum was enriched through the increase of superior harmonics which were better defined, especially starting from 2.5 Hz. The *acoustic results* were highly conclusive. The sound became more brilliant in the measure that singing was applied. From the analysis of the

obtained results we can conclude that it is not only the shape and size of the cavities which influence the sound, but also the capacity of their openings and the way in which they are used. These aspects are essential and predetermine the character of the flutist's sound. The cavities collaborate in the sonority of the sound, together with the correct opening of the lips. This, in addition to the tension and the speed of the exhaled air, should be strictly controlled, and the lips should be relaxed. After, both these requirements collaborate with a complete chest resonance, with the resonance of the open throat cavities and the openings of the nose and ears.

The main reason why it is possible to enrich the flute's sound through the application of singing is due to the fact that the cavities involved in the creation of the voice, the throat cavity and the mouth cavity, are also the two main cavities involved in the creation of the flute's sound quality, being that during exhalation, both with the flute and with singing, air circulates from the lungs to the larynx. In the case of the voice, the vocal cords in the larynx are also activated and with their vibration, sound is created.

Jan G. Svec affirms that in the case of the voice, "in the first phase, originally a pressure of static air, created by the compression of the lungs, is transformed by the influence of the vocal cord vibrations into acoustic pressure, thereby creating the first sound. In the second phase, this sound is transformed in the resonance cavities of the supraglottic aperture"² (Ibid.).

In the case of sound creation with the flute, the respiratory support resembles the creation of sound in singing and in other wind instruments. However, as previously referred to, being that the lips are not fixed upon the instrument, two-thirds of the air escapes, which results in the necessity of a greater support, as compared to reed instruments.

Creation of sound in singing:

"Air pressure – vocal cords – the first sound – resonance cavities – final sound"³ (2006, p. 17).

Creation of sound in the flute:

Air pressure – resonance cavities – air oriented for the opening angle of the flute – final sound.

In this way, the air, before entering the cavities, is propelled by the vocal cords, which causes the first sound and whose vibrations initiate the process of widening and preparing the cavities so that they open and reverberate. This moment is

² Translation by the author. Original text "V prvním stupni je puvodne statický vzdušný tlak , vznikající kompresí plic, transformován vlivem kmitání hlasivek na tlak akustický a vzniká prvotní zvuk.

³ Translation by the author. Original text "Tlak vzduchu – hlasivky – prvotní zvuk – rezonanční dutiny – výsledný zvuk".

paramount when the physical apparatus, which puts the voice into practice, gains the necessary conditions for the production of a higher quality sound. The main benefits of singing include the total relaxing of the throat and putting it to work in a conscious manner with the resonances of the throat cavity and the mouth cavity, in the formation of vowels. The coordination of the neuromuscular mechanisms which give rise to the voice are extremely important, being that it is possible to improve them through training.

The produced sound may also reflect various types of physical tensions. Tension in the throat, which is a frequent problem, is sometimes caused by the inability of some instrument players to correctly use the voice in the conversion, which is reflected after in the reduced quality of the flute's sound.

6. Conclusion

By comparing the graphic and sound results before and after the use of singing simultaneously with playing, we have proved the existence of spectrums which are notably enriched by the high harmonics. The final result was a resonance caused by alterations in the forms of the cavities. The use of singing while teaching the flute (singing together with the creation of sound and singing before playing) is one of the most efficient solutions to relax the tensions in the throat, thereby obtaining a more resonating sound.

7. Acknowledgment

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