

DIAGNOSING OF THE TIMBRAL HEARING DEVELOPMENT LEVEL OF THE FUTURE PROFESSIONAL MUSICIANS

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Abstract

As a result of changes in the role of timbre in 20th – 21st century music, issues related to the phenomenon of sound nuances – timbre have begun to attract closer attention from researchers. The effectiveness of any musical activity depends primarily on the development of musical hearing. Timbral hearing's diagnostics is an integral part of the development of musical hearing.

Within the scientific literature, the issue of diagnosing musical abilities has attracted far more attention (Seashore et al., 1960; Tapacova, 1988; Swanwick, 1999; Adams, 2001; Campbell, 2008; Wallentin, Nielsen, Friis-Olivarius, Vuust & Vuust, 2010; Law & Zentner, 2012; Ullén, Mosing, Holm, Eriksson & Medison, 2014; Asztalos & Csapó, 2017). However, questions dealing with diagnosing timbral hearing problems have not so far been scientifically underpinned.

Research aim: *to elaborate and pilot indicators and assignments for diagnosing the timbral hearing development level of the future professional musicians.*

This study examines the possibilities of using indicators and assignments to identify the timbral hearing development level of the future professional musicians. Data analysis of the results of diagnostic assignments' piloting in the frames of case study allows using the obtained data for designing pedagogical strategies for the development of timbral hearing of future professional musicians.

Keywords: *levels of timbral hearing development, indicators, diagnostic assignments*

Introduction

Contemporary tendencies for society development require choosing a new pedagogical paradigm in all stages of music education, when the professional competence, as a leading and decisive result of education, becomes the principal characteristic trait of student's personality. By its nature, musical activity is very specific, and different musical abilities, emotional experience and perception are required for its disclosure. In the process of training professional musicians, relatively little attention is paid to the

development of timbral hearing. However, the development of this type of musical hearing significantly affects the formation of a musician.

In research, traditionally, musical hearing is regarded as one of the main human musical abilities (Helmholtz, 1895; Stumpf, 1883; Теплов, 1947; Seashore, 1967; Gordon, 1971). In turn, timbral hearing is one of components of musical hearing. Timbral hearing is one kind of harmonic hearing and one of the most essential components of teaching a contemporary musician's hearing (Теплов, 1947), though in the teaching praxis it has not yet been adequately reflected. A perfectly developed timbral hearing is considered the highest level of professional musical hearing and it is of a tremendous importance for any future musicians.

Timbral hearing deepens the perception of polyphonic instrumental and vocal music, increases students' self-control when performing compositions. Consequently, for a better understanding the various theoretical problems in music pedagogy and for a successful solution of practical tasks related to the professional musicians' training, a comprehensive research study on diagnosing timbral hearing is a vital necessity.

Problems of diagnosing musical abilities have received relatively significant amount of attention in the scientific literature (Stumpf, 1883; Tapacova, 1988; Swanwick, 1999; Adams, 2001; Campbell, 2008; Asztalos & Csapó, 2017). Many tests for exploring musical abilities have been developed (Seashore et al., 1960; Bentley, 1966; Lehman, 1968; Gordon, 1971; Thompson, 1987; Law & Zentner, 2012), qualitative criteria for assessing sight-singing have been established (Davidson et al., 1988), models for the development of composing have been worked out for professional composers (Bennett, 1976), as well as tests to identify the level of general musicality (Ullén et al., 2014) and musical competence have also been designed (Wallentin et al., 2010). According to K. Asztalos & B. Csapó (2017), although research on the assessment of musical abilities started several decades ago, regular monitoring of their development in educational practice requires further research (p. 683). However, issues directly related to diagnosing timbral hearing problems have not yet received any scientific underpinning and methodological support.

Research aim: to elaborate and pilot indicators and assignments for diagnosing the timbral hearing development level of the future professional musicians.

Methods and Sample

As part of the case study, the following research methods were used:

- the analysis of methodological and theoretical literature on the problem under the research;
- modelling of indicators for diagnosing the level of timbral hearing development of future professional musicians;
- piloting of the designed indicators and assignments for diagnosing the timbral hearing development level of the future professional musicians.

The participants in this research were 20 third-year students (three groups) from Daugavpils Stanislaus Broks Secondary Music School, from whom one was an accordionist, two were drummers, three - pianists, four - choir conductors, four - brass

band players (three trumpeters and one flautist), four were string instrument players (one viola player, one violoncellist, two violinists), and two - music theoreticians.

The sample for piloting is not highly representative, but it comprises participants from all specialties (with the exception of vocalists, because there are vocalists who have no previous musical education, and they study by a different sol-fa program).

Theoretical Background

Based on the findings of educational scientists (Burceva, Davidova, Kalniņa, Lanka, Mackēviča, 2010), a teacher's diagnostic activity is interpreted as identifying the level of the development of students' abilities. According to Campbell (2008), diagnosing assessment may help a music teacher to determine students' educational level and degree.

The problem of diagnosing musical aptitude is one of the most current problems of music pedagogy, since it is related to tasks of professional and individual choice. Stumpf (1883), one of the founders of music psychology, was the first person, who seriously addressed the issues of individual differences of musical abilities and tried to develop experimental tests to diagnose them. According to his interpretation, the approach to musicality was determined by theoretical perceptions about it as a psychic formation. Since that time, the whole history of music pedagogy has actually been related to testing musical abilities, which became the leading tendency in researching them.

The second trend – research on cases of exceptional musical giftedness - is also related to this. However, the diagnosis of musical aptitude, just like any other way of diagnosing, may also pursue wider scientific goals and become the basis for the research on the opportunities of its further development.

In the area of musical tests, Hargreaves (2012) isolated three main forms: tests of achievement, attitude, and ability. The last type is designed to assess musical aptitude regardless of previous musical learning or experience.

Due to the transformations in the role of timbre and other qualities of sound in music of the 20th – 21st century, the questions pertaining to the phenomenon of sound color – timbre have begun to attract increased attention from researchers' part (Zavadska, 2021). Sounds produced at the same pitch and volume, but performed on different instruments, by different voices or on one instrument but by different techniques of playing are distinguished one from the other by their timbres (McLachlan, Marco & Wilson, 2013). Other authors define timbre as the time-varying pattern of spectral components by which a sound may be recognized (Handel, 1995; Handel & Erickson, 2004).

The timbre component of musical hearing is not given a due attention: in some way, it seems to be neglected, and its development remains passive as regards to melody. In the practice of teaching sol-fa at an average professional level (music school), the line of complication of pitch, mode and harmony difficulties, is sufficiently well elaborated and methodologically well-constructed. The author should note that the amount of the taught material is reduced in timbre. The potential for diversity of a specific timbral incorporation into the music of the 20th – 21st centuries is not used enough. The basic

forms of work on the development of hearing (dictation and analysis by ear) are implemented in mono-timbral conditions – the piano (Zavadska, 2021).

Research Design

Due to the fact that this study involved 20 students (future professional musicians) of various specialties (accordion, drum, piano, choir conductor, trumpet, flute, viola, violoncello, violin and music theory), significant differences of their timbral perception should be noted. Pianists have a more developed textured, register hearing; they “hear” the sound without relying on a variety of instrumental timbres. Therefore, as a rule, this side lags behind in development. On the contrary, string instrument players often have a well-developed melodic hearing, while for the theoreticians the instrumental timbre occupies the first position among the hierarchy of expression means. Work with the teaching material in its original format is obligatory for them.

Thus, in developing timbral hearing teacher has to take into account both the major and the minor developed aspects of timbral perception. For the performers of all specialties, the timbre of one’s own instrument makes the perception easier. Writing dictations performed on ‘one’s own’ instrument gives better results (for wind instrument players - this is a melody of brass instruments from the orchestral or solo repertoire).

The research data was collected in 2020; students completed assignments during lessons in the classrooms of Stanislaus Broks Secondary Music School. The third-year students have two sol-fa lessons a week, each 40 minutes long. The assignments were completed within two weeks. Doing assignments took about 20 minutes from the total time of the sol-fa lesson, and this appeared to be enough for students to write a timbral dictation.

To maintain quality of the musical fragments offered for listening, audio recordings were made as separate files, which were played 8 – 10 times in a real time. Musical fragments of different musical styles were used for the timbral dictation: classical (the 18th century), romantic (the 19th century), impressionistic (19th – 20th century) and contemporary (the 20th – 21st century).

The students were given partly completed sheet music from the *Sibelius* program, preceded by some preliminary oral advice from the teacher, which the students had to fill out.

During the process of diagnosing, it was essential to identify the developmental level of every student’s timbral hearing. The comparison of diagnostic assignments and summary of the results would provide the opportunity to use the obtained data for designing the strategy and methodology for the further development of timbral hearing.

Timbral hearing can be developed with the help of a timbral dictation – one of the working forms on sol-fa. Therefore, ***diagnostic tasks were based on different kind of timbral dictations:*** rhythmic dictation, sound-pitch (melodic) dictation, dictation containing mistakes and mixed timbral dictation.

The assignments were distributed in accordance with the growing complexity: first a rhythmic dictation, then the melodic dictation, dictation containing mistakes and the

mixed type of a timbral dictation. Additionally, from the very beginning, priority was given to vocal music, as the closest in timbre to any person. In all cases, students were given partially filled-in specimens of sheet music and some small 'prompts – supports' were provided in all of these sheets.

A. Rhythmic timbral dictation

In the musical fragment of *La Grotte* by C. Debussy given below (see Figure 1), students were offered for a dictation a sound-pitch material without a rhythmic pattern.

LA GROTTÉ

Poème de
T. L'HERMITE
(1601-1655)

C. DEBUSSY
(1862-1918)

Attention au rubato !
Très lent et très doux

① 0:17

② 0:30

[•]

Figure 1. Fragment from a rhythmic timbral dictation

In the foreground, the focus is on timbre-rhythm. Students were offered to listen to a vocal composition of *La Grotte* by C. Debussy accompanied on the piano and add the rhythmic pattern to the already given sound-pitch line, and to do this by applying rules of writing a vocal grouping. The rhythmic pattern was not a simple one: there were not only crotchets, quavers and semiquavers, but also triplets. Besides, some supportive points – 'prompts' were written in correctly, so that the participants could find the right direction at doing the assignment.

B. Sound-pitch (melodic) dictation

In the next musical fragment – *Folksongs* – by L. Berio (see Figure 2), the task was oriented towards identifying and writing sound-pitch melodic line with the rhythmic pattern already given.

FOLKSONGS
3. Loosin yelav...

Texte et mélodie :
Traditionnel arménien

L. BERIO
(1925-2003)

① ♩ = 58

Voice

1. Loo - sin__ ye - lav en sa - reetz__
2. xa - varn__ ar - ten tchà - ka - tzav__

2e couplet ⑥
a Tempo

Clar.

ppp

7

sa - ree__ par - tzàr ga - da reetz sheg - leeg__ meg - leeg
oo el__ ked - neen tcha - ga tzav loos - ni__ loo - sov

② 0:27

p

Figure 2. Fragment from a melodic timbral dictation

However, the assignment was more complicated due to the fact that the accompaniment was played not on the piano, but by the instrumental ensemble, moreover, it was required to write in the given part (melody) of a clarinet solo.

C. Dictation containing mistakes

The given note material *Seit ich ihn gesehen* by R. Schumann included an extracted vocal melody containing mistakes and with a piano accompaniment (see Figure 3). Students listened to the correct melody, simultaneously marking and correcting mistakes.

FRAUENLIEBE UND LEBEN op. 42
L'AMOUR ET LA VIE D'UNE FEMME
 I. Seit ich ihn gesehen

Texte de
 A. von CHAMISSO
 (1781-1838)

R. SCHUMANN
 (1810-1856)

① **Larghetto**

Singstimme

Seit ich ihn ge - se - hen, glaub' ich blind zu sein;
 wo ich hin nur blik - ke seh' ich ihn al - lein; wie im
 wa - - chen Trau - me schwebt sein Bild mir

Figure 3. Fragment from the dictation cotaining mistakes

This type of a timbral dictation is aimed not only at the perception of timbre, ability to distinguish a melody and correctly write it down, but also at concentrating the attention and inner musical hearing.

D. Mixed timbral dictation

This is the most complicated kind of dictation, since it implies the ability to link the melodic pattern with its specific timbral embodiment. As an example of a mixed timbral dictation, musical fragment from a Mozart' symphony (see Figure 4) was chosen.

SYMPHONIE n° 22 K. 162
 I.

① Tonalité:
 Écrire les degrés aux endroits indiqués, jusqu'à la fin de l'extrait.

W. A. MOZART
 (1756-1791)

② **Allegro assai**

Oboi

Violoncello
 e Basso

f

③ 0:05 ④ 0:11 ⑤ 0:11

Figure 4. Fragment from a mixed timbral dictation

Tempo of this musical fragment is quite fast, but the melodic line of string instruments and later the line of the wind instruments are quite simple – according to the sounds of a major triad and singing of the second degree by the oboes. Recording of this type of dictation reflects the interrelations between timbre and melody, its impact on the perception of a sound-pitch, which is one of the aspects of acquiring timbre, but the basic stress is laid on the timbral constituent of musical sounding. The main task of a timbral dictation involves not only recording of a sound-pitch, but also studying ‘sound portraits of instruments’, broadening conceptions about their expressive, register and articulatory properties. Students’ attention is directed towards the huge variety of instruments’ expressive facets.

In the frames of this study, indicators for diagnosing the level of development of timbral hearing during writing a timbre dictation have been worked out (see Table 1):

Table 1. Indicators for diagnosing the level of development of timbral hearing during writing a timbre dictation

LEVEL, NUMBER OF POINTS	INDICATORS
Low (1 point)	Less than 50% of a timbral dictation are written correctly
Average (2 points)	a) 60% - 80% of a timbral dictation are written correctly b) some mistakes in lengths and writing notes are permissible
High (3 points)	a) 80% - 100% of a dictation are written almost without mistakes b) insignificant inaccuracies are permissible in writing notes or rhythm

On the basis of the developed level indicators of for diagnosing the level of development of timbral hearing during writing a timbre dictation, it is possible to analyze the results of a diagnostic study and develop pedagogical strategies for the development of timbral hearing of future professional musicians.

RESULTS

After completing the first assignment – a timbral rhythmic dictation *La Grotte* by C. Debussy – the results were as follows (the highest number of possible points – 44):

- Nine students reached the highest level (among them one theoretician, two pianists, two drummers, one wind instrumentalist, two choir conductors and one accordionist);
- Six students attained the average level;
- The dictations of five students were rated as low.

This type of a dictation appeared to be the easiest one and according to the indicators – having the best results.

The completion of the second assignment – a timbral sound-pitch dictation – *Folksongs* by L. Berio - yielded the following results (the highest number of possible points – 40):

- Five students reached the highest level (among them two pianists, one wind instrumentalist, one string instrument player and one accordionist);
- 10 students attained the average level;
- Five students received the lowest number of points.

After the completion of the third assignment – a timbral dictation containing mistakes, R. Schumann's *Seit ich ihn gesehen* – the results were as follows (the highest number of possible points – 34):

- Only two students attained the highest level (among them one pianist and one choir conductor);
- 10 students reached the average level;
- Eight students got the lowest number of points.

After completing the fourth assignment – timbral mixed dictation, W.A. Mozart's *Simphonie* – the results were such (the highest number of possible points – 38):

- Four students reached the highest level (among them one pianist, one theoretician, one choir conductor and one wind instrumentalist);
- 10 students attained the average level;
- Six students got the lowest number of points.

The general results of the diagnostic study by level are presented in Figure 5:

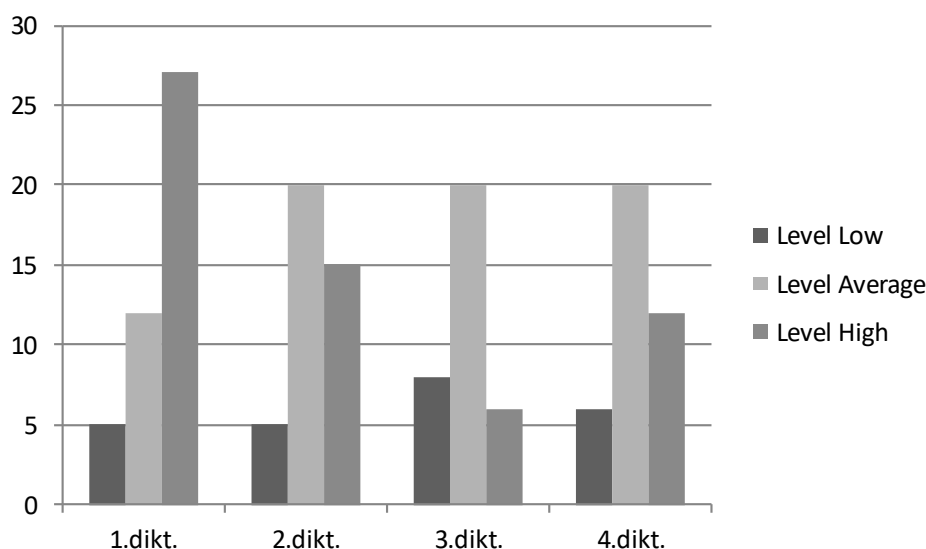


Figure 5. Results of the diagnosing research by levels

Analysis of the results of the diagnostic study allows us to state the following:

- The first task - timbre-rhythmic dictation - gives the best results. This testifies to the fact that the majority of students have quite a well-developed sense of rhythm and the change of timbers during perceiving and writing a dictation did

not impact on the quality of fulfilling the assignment. Such indicators can be attributed to the great work on the development of sense of rhythm among students in the preliminary courses. During the preliminary courses, at sol-fa lessons a lot of time was devoted to the analysis and carrying out different exercises on rhythm.

- Timbral-tonal (melodic) dictation is also performed relatively well. This indicator, too, can be attributed to the previous students' experience of writing melodic dictations.
- Complications were expected when writing mixed timbre dictations. This is a new type of a timbral dictation. Distinguishing instruments and differentiating melodic lines have to be based on a very important skill – ability to discriminate by ear a definite timbre from the context of music; however, this skill is not yet properly developed. Therefore, further pedagogical strategy towards developing timbral hearing should be based on considering this indicator.
- Unexpected difficulties arose when writing the dictation containing mistakes. Working mistakes into a musical timbral dictation involves very different aspects of hearing and various qualities of psychological activity:
 - thinking, providing comprehension of what was heard;
 - memory, giving the opportunity, through remembering, to specify what was heard;
 - inner hearing, ability to mentally hear and imagine sounds, rhythm and other elements.
- For successful work on this type of a dictation, close attention should be devoted to oral dictations. An oral dictation can develop quickness of reactions, concentration of attention, ability to quickly 'catch' and remember small fragments containing the most significant intonation difficulties, namely, all qualities that are required for the work on a dictation containing mistakes. Consequently, oral dictations should be included in the strategy for a further development of timbral hearing.

CONCLUSIONS

1. Timbre is a unique individual sound color, which belongs to a specific instrument. Timbre has assumed a special significance in a contemporary music, since it often comes to the foreground as one of the most important expressive means, and therefore during music lessons a close attention should be given to the development of future professional musicians' timbral hearing.
2. Diagnostics of the future professional musicians' musical aptitude is related to identifying and investigating the level of each student's timbral hearing. During this research, indicators for diagnosing the timbral hearing development level of the future professional musicians were worked out. Diagnostic assignments based on various type of timbral dictations were developed as well: rhythmic dictation, sound-pitch (melodic) dictation, dictation containing mistakes and a mixed dictation.
3. Analysis and summarising of the diagnostic results enable using the obtained data for further designing of pedagogical strategy and methodology for the development of timbral hearing.

4. A timbral dictation is an essential, but not the only form of developing students' timbral hearing. Along with timbral dictation, author can recommend other work forms: a comparative timbral auditory analysis, analysis with the accompanying questions, with score, creative assignments, cross-discipline forms of free use of timbral presentations (organization, arrangement a. o.).

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