

Daugavpils University

# **PROBLEMS IN MUSIC PEDAGOGY**

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*Problems in Music Pedagogy* is an international refereed journal concerned with all aspects of music pedagogy. Topic areas include music teaching/learning process in a new education paradigm context, music learning outcomes, assessment in music pedagogy process, music teaching and learning activities, music teacher competence in the context of sustainable development, music education institutional responses to current trends. The journal is committed to promoting excellence in these fields by providing an international forum for the debate and evaluation of a wide range of music pedagogy issues and professional concerns.

The journal aims to publish articles which will contribute to improving theory and practice in the field of music pedagogy.

These articles may variously:

- raise and debate contemporary issues;
- report on new research;
- relate new research to theory;
- relate theory to practice;
- offer informed comment on contextual and professional matters;
- describe cases and their implications for a wider field;
- discuss a historical movement in terms of its relevance to present and future situations.

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## EDITORIAL

*Every second year in the time of golden autumn we organize in Daugavpils University International Scientific Conference "Problems in Music Pedagogy". During its lifetime (starting in 1998) conference has grown from the event with a rather local character to the extensive international forum comprising the diverse collection of sessions, participants from different countries. Among the 94 participants of the 8th Conference, which was held at Daugavpils University on September 26-28, 2013, there were scientists, music teachers from 11 countries (Brazil, China, Croatia, Estonia, Finland, Great Britain, Latvia, Lithuania, Switzerland, Taiwan, and Ukraine) who participated in discussions about problems in music pedagogy and demonstrated the results of research.*

*The 13th volume of the journal includes some research papers written by the participants of the 8th International Scientific Conference "Problems in Music Pedagogy" and represents the findings of young talented scientists and doctoral students in the Baltic region (from Finland, Latvia and Lithuania).*

*We continue a rubric, which was opened in 2009 - interviews with distinguished musicians, composers, and educators. In this issue we offer interview with the famous musician Gerald Welker.*

*The journal invites all the potential contributors to submit their articles for the next issues of PMP and wish them inspiration, perseverance and consistence on the way toward the innovative music teaching/learning.*

*On behalf of editor-in-chief of the journal, I express my appreciation to the authors, Editorial Board, Editorial Staff, Council of Science of Daugavpils University and the Academic Press "Saule" for successful teamwork, perseverance and valuable support to the continuation of this periodical.*

*Editor-in-chief  
Jelena DAVIDOVA*





## EXAMINATION REFORM AT THE SIBELIUS ACADEMY – CULTURAL AND STRUCTURAL EFFECTS

Isto RAJALA, Inkeri RUOKONEN & Heikki RUISMÄKI

*University of Helsinki, Finland*

*e-mails: isto.rajala@helsinki.fi; inkeri.ruokonen@helsinki.fi; heikki.ruismaki@helsinki.fi*

### **Abstract**

*This study examines cultural and structural effects of the examination reform at the Sibelius Academy in Finland. The research problem is: Which kind of consequences and effects the reform implicated at the Sibelius Academy? What kind of cultural and structural effects did the reform entail? The qualitative data consists of eleven expert interviews. The research method used was the content analyse of the interview data.*

*The results show that not only the basic examinations were reformed, but the new status had a larger input in various respects. The cultural changes include psychological equality, becoming an equal partner with scientific universities including communication and economical resources enabling internationalization on a new, higher level. The structural effects include the degree program with a new basic examination structure, doctoral studies and degrees, new study programs (jazz and folk music) and administrative changes. With a status comparable to other academies and universities, the reform entailed for the Sibelius Academy new tools for the future.*

**Key words:** *examination reform, higher education, organizational change, effects of a reform.*

### **Introduction**

In the 1970's, a huge wave in the form of examination reform swept over Europe. Even higher education in Finland would be affected. The examination reform was a project lasting for years. The official decisions at the university level were made due to the Examination Reform Act given by the Government in Finland on the 19th of December, 1974.

To launch an examination reform is also a cultural change. E.H. Schein identifies three levels of organizational culture: artifacts, values and beliefs, and basic assumptions (Schein, 2004). According to J.L. Ratcliff (1997), the educational program of an institution reflects norms, values, and behavior of the organizational culture. G. Hofstede, B. Neuijen, D. Ohayv & G. Sanders (1991) argue, that culture is a collective

phenomenon, not learned, not inherited. Human nature is what all human beings have in common.

Cultural economics (see Fernández, 2008) includes a range of approaches, mainstream and radical, neoclassical, welfare economics, public policy and institutional economics and it espouses interdisciplinary analysis connected to these topics. Organizations are not just operations: they have meaning for the individuals who inhabit them (Smircich, 1983). Understanding the meaning that the organization has for its members is critical being able to facilitate a successful change. Organization members enact shared meaning as culture (Morgan, 1986). Culture has also been defined as the way organizational members enact shared reality.

There are advantages of becoming aware of organizational culture. W.G. Tierney (1988) argues that the cultural perspective encourages members of academe to: (1) consider conflicts “on the broad canvas of organizational life”; (2) recognize how tensions in the organization are played out in operational and structural issues; (3) make decisions with “keen awareness” of their impact on groups within the institution; (4) understand the symbolic nature of seemingly instrumental actions; and (5) consider why different groups in the organization have different perspectives on how the organization is performing. This deeper recognition also allows administrators to approach change initiatives such as examination reform with understanding of how the change process can best be facilitated and how the implementation of change can be sustained.

Arts organizations consist of individuals and groups with different interests and ways of perceiving and evaluating the artistic processes. Because educational and financial policies affecting music education come from both governmental and other entities whether or not music education is connected with them, some of their effects are apparent and easily measurable while some others are not. P.M. Jones (2009) points out concepts of “hard” and “soft” policies to illustrate the situation of administrative practices concerning the music educational field.

Sibelius Academy, founded in 1882, served as a private music college in the years 1966-1980 and was nationalized in 1980. The examination reform was based on the Government Resolution of 1974. Executive Board at the Sibelius Academy, at its meeting on 15 February 1975 appointed a working group to prepare the examination reform at the Sibelius Academy. Government Decision establishing the Sibelius Academy graduation regulations issued on 29 March 1979, and could be applied from autumn 1980. Sibelius Academy is the only music university in Finland. Today it is the largest music academy with university status in the Nordic countries. Since the beginning of 2013, it is a part of the University of the Arts Helsinki in Finland.

The examination reform in the 1970s has been one of the most important events in the history of the Sibelius Academy. The outlook for organizing higher education had changed all over Europe. The economic resources compared with the increasing number of students, academic unemployment and the demands of the society were shifting. Traditional free academic studies were met by distrust.

Sibelius Academy as an academic institution is built on artistic values. Economical resources and interactivity in the university world are of utmost importance, too. According to P. Daigle & L. Rouleau (2010), arts organizations are created on tensions

between artistic and managerial values. To tackle the organizational and economic requirements set both internally and externally is, thus, crucial. To work and interact as one of the universities in the university world and in the surrounding society and, at the same time, to maintain and develop processes which the artistic performance and activities demand constitute a challenge for an arts academy (Rajala et al., 2012). The examination reform would turn out to be a process important in many interesting respects, as we will see in the results and conclusions of the research.

**The aim of the research** is to find the answer to the questions:

- Which were the consequences and the effects of the examination reform at the Sibelius Academy?
- What kind of cultural and structural effects did the reform entail?

The aim of this study is to find answers to these questions about this process to ensure the survival of an arts academy during a thorough reform.

## **Methods and Methodologies**

This is a qualitative case study. The research question focuses on process related knowledge. A method of semi-structured interviews has been used. The qualitative data consists of eleven expert interviews. The interviews have been structured and content analysed. According to M. Saunders, P.R. Lewis & A. Thorndike, a case study is a development of one or a small number of cases in relation to each other (2000, 76). The strength with case studies is that different kinds of material and documents can be used, not only interviews. In addition, even direct observation and participation by the researcher are possible (Yin, 1994, 33-34). Thus, the researcher, as a former student of the Sibelius Academy, was able to construct an overall picture of the meaning and characteristics of the processes and events within the study.

## **Results**

The results show that the examination reform at the Sibelius Academy induced cultural and structural changes. The following section introduces findings through qualitative data gathered from various interviewees participating in the study. They have been active as a student, a teacher, an administrator, an administrative assistant or a committee member at the Sibelius Academy during and after the period of examination reform (1974 -1980's).

The cultural changes consist of a new status with psychological equality, becoming an equal partner with scientific universities including communication and economical resources or enabling internationalization on a new, higher level. The structural effects include the degree program with a new basic examination structure, doctoral studies and degrees, new study programs (jazz and folk music) and administrative changes. The results of the study will be reported in this chapter.

### *The organizational culture*

Organizational culture is a phenomenon that influences behaviour and sets limits within an organization. Cultural dimension is also linked to the strategy and structure,

and cannot therefore be disconnected or discussed quite separately. Everything that affects the daily life of an organization has a connection to the culture. The situation after launching the new system is described as follows:

*According to the system, the Sibelius Academy was owned by a foundation, and that foundation had its roots within the management itself. When you went over to the state you became in a sense a state agency and the state had a lot of administrative practices you had to follow, they would organize everything in a certain manner consistent with law and the electoral process, for instance at meetings, how to choose the Board and a Scientific Council. These had official duties. All this caused some embarrassment but I have a good picture of our teachers and superintendents, they realized that it was in this way things would go forward. (Student)*

The interviewee says that previously, at the time Sibelius Academy was a private educational institution owned by a foundation, it had the autonomy to determine its own governance and structures that were considered appropriate for the control. Within the administration, the reform led to new procedures which were dictated from outside by the state represented by the Ministry of Education. Furthermore, he states, that the administration lived up to the challenges of the new situation. Among the various new quests they managed to recruit people who found themselves in a new situation and were able to perform their tasks.

What was the reaction within the teaching staff to the concrete reform? An interviewee tells:

*We should note, first, that among faculty, very little interest was shown in administrative tasks, such as finding a department director was difficult... because of that it is a task that no one thanks you for, but if there's a little something small to say, you'll find a scapegoat rapidly. (Administrative assistant)*

According to him the details of the administration are not popular amongst the teaching personnel. It was not easy to recruit teachers to the fiduciary or other such tasks. He (administrative assistant) continues:

*If you talk about the old days, when we were private or immediately after nationalization, we had the feeling that everyone at the Sibelius Academy was on the same side, we make up a budget bill, and you in the Ministry of Education begin to poke at it. (Administrative assistant)*

The interviewee means that at the Sibelius Academy there was a sense of cohesion, and all were pulling in the same direction. The Ministry was felt being on the other side. If suggestions were made to the ministry and you wanted to discuss it or in any way were questioning its proposal as such, one experienced at the academy that they had not been understood: The Ministry did not understand necessarily how they were reasoning at the academy.

### B. Positive and negative effects

The examination reform brought with it inevitable effects that one would have to cope with. In this section we deal with these effects. In the interviews, the respondents were asked to describe the positive and negative effects of the reform. How would you concretize the positive and negative sides of the examination reform? What was good? An interviewee answers:

*In this way it has been good that when a student comes in, he/she knows from the beginning how much you have time to manage a particular program, but it's hard to say if that is good or not. They all are good already when they come in and if the starting point is that one can graduate at a faster pace than previously, it is in itself true but academic freedom simply does not exist anymore. The academy is not a factory but a big farm where you grow flowers, roses. I've always likened this work at cultivating flowers or being a gardener or to seek treasure or to chastise a diamond, but a gardener is a good metaphor, we cannot pull or push the plants, but we have to let them grow at their own pace as their genotype dictates; course, we can provide water and sun and trace elements and fertilizers and see how they grow but not stretch or they will die! You cannot demand that you must perform at a certain rate, that's horrible. (Teacher)*

The interviewee highlights the deadlines set in the beginning of the studies. He says that it is debatable, whether this is positive or negative. He points out that students are individuals and each of them has his/her individual growth rate. This should be respected and they should be granted the opportunity to become mature at the pace they need. Whether the freedom that this requires is used by the students to some extent is possible. Practicing arts requires not only highly technical skills but a person who is mature as a human being, an individual with a balanced personality. The interviewee suspects that reforms cannot guarantee that such conditions materialize. To exercise artistic studies and pursue scientific studies cannot in this respect be compared, according to the interviewee.

Another interviewee (administrative assistant) talks about the harmonization of degree structures at the university level, and stresses that this has positive effects:

*And now, even we are a music university, we get a person who understands nothing about music to realize that even 'those' performs high-quality work, a dialogue is possible when using the same terminology as in the science section. (Administrative assistant)*

He argues that this unification enables a dialogue between the universities and increases understanding between them and when the terminology is consistent.

Another interviewee (student) describes teachers' responses to the reform:

*But they found their valuable time was spent at meetings, while one would have been able to practice or teach ... this dialogue was going on all the time. (Student)*

The interviewee points out that those teachers were not interested in participating in meetings and experienced almost everything that was not directly related to their own performing arts or teaching work as negative. They felt frustrated and annoyed and felt that such work does not belong to them. Further, he describes the change that took place in the teachers' position:

*Teacher service structure was reformed, wages were raised and tuition obligation was decreased. Rector was consistent: If you compared with other music institutions, the teachers had to get more room for artistic work. On one hand, occasionally, for example, you could no longer give over hours and those teachers who pretty much had invested in teaching received less pay, but on the other hand we received lecturer status, several professors and higher salary scales. (Student)*

The interviewee demonstrates that rector consistently ensured that teaching staff would get as good conditions as possible and that their position would not be impaired. Lecturer status in a state college meant a change in teaching duties and salaries. Teachers are not any more getting paid for over teaching lesson hours, as before. Another interviewee describes the positive effects for the Sibelius Academy as an educational institution including the following:

*Today one can see the positive effects: Sibelius Academy has a higher status than in the past, resources have become so good that it has been able to achieve very good results, internationalization has become at all possible and we could convey more instruction, e.g. double the lessons for teaching at the soloist department. It may be that the Sibelius Academy at the Ministry of Education direction had greater influence for the reason that academy became one of the official institutions of higher education. If you said something so they listened, even the parliament listened. (Administrative assistant)*

The interviewee takes up status, internationalization and financial resources. Higher status meant increased financial resources, strengthening the ability to convey instruction. Higher status opened opportunities for internationalization. Sibelius Academy got even more authority and the reform led to an authority greater than before.

Another interviewee contracts the outcome as follows:

*It was extraordinary that we went along with this examination reform, had we not done that, we would not have higher education. We may establish instruction of high quality on piano and other things but not having the same status and degrees as universities around the world. This was in many respects a necessary deed. (Administrator)*

Another interviewee (student) describes the conflict between the old thinking and the mind-set the reform entailed:

*If one is to say anything about the negative aspects so I do not know if it was negative, but also the old mind-set survived and it culminated in electing new rector. He/she presented the old thinking that a musician*

*needs no degree if he/she can play well. The new rector believed that the concert business was paramount and he stressed all kinds of artistic activity. At the same time it felt maybe a little foreign to him that music education and church music had taken a relatively central location at the Academy, you could hear an undertone of ... that they really do not necessarily belong to the academy. Then there arose a conflict with music institutions and this system, one based on the then new conservatories and this conflict has been going on till these days, now some of these conservatoires have become part of the polytechnics. (Student)*

In the interviews, it emerged that there were among the staff a mind-set strongly stressing that the tradition should be preserved more or less intact. The representatives of this line were not ready to face the requirement for formal qualification or the restructured degrees with the general education knowledge stuff. The competition with conservatories was mentioned. He continues:

*Well, then, we had the one huge optimism that almost knocked over. They turned up these degrees so, that they simply misjudged people's capacity and thought the students had unlimited human resources. Today (2002) the structure of degrees is being changed. It was a bit unrealistic at the time. The idea was that you would have a general educational dimension to the content of music degree and this went too far. Then it was somewhat difficult to find teachers who would be interested in the college's students and, thus, good ideas could go wrong, when the students simply did not go to some lectures. (Student)*

The interviewee says that they applied the learning by doing-method. Everything did not work right away and they had to be constantly on the alert and react to the feedback and the experience you had during the process.

Another interviewee (administrative assistant) wants to discuss methods applied to measure the performance of the college. He questions the measuring instruments that have been in use:

*It's always a question of who applies what. It is abundantly clear that everybody should act in a responsible manner. But it is also clear that if you start measuring performance with instruments that are not accurate and objective but treated as such, then you are in trouble. We can take as an example the number of graduates. We have a student who gets his final examination. Good, he has finished his studies. Then we have another student who studies with us for a three or four years, he has made progress and all of a sudden a leave of absence becomes vacant at the radio, and he is elected. He counts as a minus, though only the last formal study achievements are unmade. He completed from us to the profession he wanted and learned all the essentials with us ... okay, I admit that it is administratively easier to ask how many degrees have you awarded? (Administrative assistant)*

The interviewee (administrative assistant) refers to profit responsibilities, which really have come to its present form only in the 1990s and which are constantly evolving. He believes that the development is a result of the reform process and is

dissatisfied with the way in which this system does not take into account the individuality of the artistic studies.

An interviewee (administrator, committee member) takes up artistic freedom. The teachers experienced the new as a threat and an extra load. They wanted to concentrate on doing things as before, and not to assume new tasks.

*Well teachers think that artistic freedom was hit. It was clear that new things evolved, which then should be differentiated into music. Every teacher and every student should realize that this is necessary because it's not meant to educate musicians so that they know nothing about anything else. The so-called general education should be there, the question is to what extent, and that this does not hinder students' artistic development. This requires sufficient training time. Certainly, it was at some stage in the beginning maybe too much of everything. We ended up in a straitjacket at the beginning and it took some time before we could make ourselves free from it. (Administrator, committee member)*

### C. Critical changes

Is it right to have the formal qualifications required, and how does it match up with an artist profile? An interviewee concludes:

*It's really great that we have the same qualifications as the science colleges so that people understand that ... they do not realize otherwise that we have a very high quality education and it is just as hard, it's harder than college because so much time is spent to practice, you have all these supporting compulsory elements thereon. A student at a university does not make double work. It is absolutely right that we have doctoral or more advanced degrees. (Teacher)*

Staff and students were involved through meetings and subject groups. Many stabilized habits and processes changed. An interviewee (student) tells of internal relations and interactions with the Ministry of Education:

*I think that at that time they had no problem with the interactivity, not before either. Everyone was in the same house, and I think that communication was very simple and they knew who to talk to. (Student)*

Another interviewee (administrator) describes the relationship with the Ministry of Education as follows:

*It is clear that there was a lot of commands and instructions from the Ministry of Education and they were asked to write memos and send papers, but one just had to do it and became, thus, a part of the apparatus. (Administrator)*

How did this affect the attitude and spirit? Another interviewee (student) states:

*I think they had their artistic identity and status in their circles. They did not need to have any lecturer status, but I remember one time a teacher saying that now she called some city department and told that this is a*



*lecturer NN and they at the department immediately believed after I complained. But in general, it comes from other things and so it the professors did not need to hold a doctor's degree, especially without artistic skills. A good, high-class performer could get a vacancy, in that way they retained the old mind-set.*

*So speaking of values, side by side with this art mission and then all this which was picked out from the Ministry of Education and the administration - what I still wanted to say was that while the science colleges focused on research, which is their mission so it was defined that for us it is artistic activities this basic task. So one equated art and science as equal and then it was time for these more advanced studies came a few years later, though it then took a few years to get it all started with them. (Student)*

*That mindset survived that it is important for a musician to master his/her instrument and this has well been clear all the time, no one has questioned it. But at the same time problem of time and how to dispose it existed. As new requirements were added, e.g. general education subjects and for example to write theses, the problem with time became a perpetual question that has not yet been finalized. (Administrative assistant)*

A lot of new things and extra demands, administrative processes and negotiation patterns were available. How to adapt to them? An interviewee describes:

*Yes, and you tried to adapt so that you then could enjoy the benefits while preserving the identity and character. (Student)*

#### *D. Management practices*

One interviewee characterizes leadership and management practices before and after the change:

*One could say, that the private college faculty could pretty much be in peace and perform its work. The rector, vice rector and the small administrative staff were in charge of the administration, but since universities have autonomy pretty far so it might well be decentralized, there were all these instructions for a quorum and if you arranged a meeting of the Scientific Council so who will show up and rapporteur of cases, organized auditions, teaching skills (proficiency)... It emerged voting at meetings and so on. You just learned all the techniques. (Teacher)*

How did reform their own work? An interviewee (teacher) goes on to reflect on the question:

*Well I have to say in no way. I have taught in the same way all the time, I feel it as a calling. (Teacher)*

He was involved in a lot of bureaucracy and changes and there were new systems and rules, but he and many other teachers went their own ways. An interviewee (student) describes the change in his own work:

*It was very interesting when I started, we were not so many at that time, and we kept the strings at the Sibelius Academy. When I started, I worked around the clock all the time, did workdays of 12 hours and then some weekends so we got everything rolling. Maybe then the benefit was that no one had to write a study guide to the early morning session. But efficiency has come down, the more people who work the less effective you need to be. One can judge it as such that it was a wonder that with such a small staff we could be in charge of everything and reforms thereon ... at present if you try to get through a small reform, it takes a lot of time. But at that time, you just made it happen. (Administrative assistant, student)*

The reform was perceived differently in the light of their own work and the changes in it depending on whether one belong to the teaching staff or management staff. An interviewee (administrative assistant) through his own personal experience reflects the general trend:

*A person who taught and had not committed administrative tasks were the least loaded of changes in their work because of the reform. (Administrative assistant)*

## **Conclusions and Discussion**

Sibelius Academy, as we have learned, is the only music university in Finland. Applying academic regulations at the colleges started from autumn semester 1979/1980. The time for postgraduate degrees became in autumn 1982. Basic degree was arts degree (later bachelor's and master's degree). In addition, universities postgraduate degrees, a licentiate and doctorate degree. The similarity with the country's other universities became apparent. The beginning was not easy. Government Resolution 1974 indicates 160-180 credits leading to bachelor's degree. Study wholeness components became general studies, subject studies and advanced studies according to the degree reform in higher education in general.

The obvious problem, however, was the planning of the examination content and study modules so that the artistic college essential ingredient substances, on one hand, and support materials, general studies and other customary university related to "general education" subjects, on the other hand, would find its proper balance in the curriculum.

The emphasis came to lie in practical musicianship and performing arts. The reform led to new approaches in the management, and the new structures were dictated by the legislation in force at state colleges. The interviews suggest that Sibelius Academy was considered to have had the capacity and expertise to meet the demands of the new situation posed.

There was a sense of cohesion at the Sibelius Academy. Everyone pulled in the same direction. The Ministry of Education was felt to be on the other side. If the academy came with a proposal to the ministry and wanted to discuss it or in any way questioned the proposal, it was easily experienced at the academy that one had not been understood. The logic was not immediately identifiable. In the long run, the alignment of the system leads to a clearer formulation and use of the same vocabulary is increasing understanding between the different universities. Teaching staff was given a new status. Teaching obligation and salaries were developed. This, in particular, was taken care of by rectors.

The resources were, not least thanks to nationalization, significantly better in the post-reform. You could develop and increase tuition. You could acquire equipment better than previously. A new status for the academy meant that one received better response in the State Department and even at the parliament. The higher resources meant that Sibelius Academy was able to achieve high performance in teaching and research could be developed. It also had the resources to orient itself abroad. Internationalization became an important dimension. Higher status gave aplomb when presenting you coming from an artistic educational institution from Finland. It was possible to study arts in many places abroad, and now you could engage in dialogue at the level of these foreign educational institutions. Although Sibelius Academy has in the Finnish context a position that cannot be denied, this doesn't always go without saying abroad, without holding a university status.

The possibility to more advanced studies was a challenge. Meanwhile you at a science university emphasize research as basic task; arts were there the basic task at these artistic colleges. As critical or negative effects may be mentioned about the suspicion that a student cannot develop in his/her natural pace was still on the surface long after the reform. The mind-set strongly stressing that the tradition should be preserved more or less unmoved lived long after the reform had been approved and had begun applied. The representatives of this mind-set were not ready to face the requirement for formal qualifications or the restructured degrees with the general education knowledge stuff. Had all been content with this it would have meant that the development had ceased. Conservatories and all artistic educational institutions, since, have been forced to compete with polytechnics.

Another negative consequence of the reform was to oversize the contents of the examination. This miscalculation led to the revised student handbook and the contents of the studies for several years after the implementation of the reform had taken. Everything did not work right away. People at the academy had to be constantly on the alert and react to the feedback and the experiences during the process. The staff and the employees continued to view that the artistic freedom had suffered during the reform. They sought to find a balance between soloist and artistic substances on the one hand and the public, 'general education' subjects on the other. One interviewee felt that you are forced to do double work at arts universities and with the need to exercise music compete too much with support topics or general education. The problem with time and how to dispose it became apparent.

Bureaucratic procedures were new but they were embraced relatively painlessly. Nationalization and examination reform regarding both undergraduate degrees and more advanced studies, for its part, led to major changes and affected the

organizational cultures of the organization. Budget allocation is, more or less, tied to the number of graduates: the administration is scoring bachelor's, master's, doctoral and licentiate degrees for granting.

In performance management, operations are controlled against agreed performance targets. The foreman or lead has a relatively free hand to carry out the work in the most appropriate way. The top management responsible for the monitoring through clearly defined performance targets. The introduction of performance management is currently underway, and the primary objective is a streamlining of operations towards higher education goals. Two main objectives can naturally be identified: providing basic education needs of society and to conduct research.

The results show that the examination reform at the Sibelius Academy induced cultural and structural changes. As mentioned, the cultural changes include psychological equality, becoming an equal partner with scientific universities including communication and economical resources enabling internationalization on a new, higher level. The structural effects include the degree program with a new basic examination structure, doctoral studies and degrees, new study programs (jazz and folk music) and administrative changes. At the Ministry of Education, college matters were transferred from the art department to the department of higher education and sciences.

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## **THE METHODOLOGICAL BASE FOR THE ASSESSMENT OF MASTERING IMPROVISATION**

**Jevgenijs USTINSKOVs**

*Daugavpils University, Latvia*

*E-mail: choirdaugava@inbox.lv*

### **Abstract**

*To evaluate a person's musical activity, which cannot be expressed by concrete numerical indicators, is quite complicated. The process of mastering improvisation, which has its own specific peculiarities, is especially difficult to assess. The previous researches prove a need for developing a methodological basis for assessing the level of mastering improvisation skills. At summarizing findings by various scholars, in our research we have arrived at the conclusion that a process-oriented approach based on humanistic pedagogy and constructivism is the most adequate approach to the assessment of mastering improvisation. The approach base and its indicators in improvisation art, in mastering improvisation and in assessing the level of mastering improvisation are summarized and shown in the table compiled. The research results provide methodological basis for developing a model of the assessment of mastering improvisation at music secondary school.*

**Key words:** *improvisation, assessment of mastering improvisation, humanistic pedagogy, constructivism, process-oriented approach.*

### **Introduction**

Many educators consider that to evaluate and assess human musical activity which does not involve concrete numerical indicators is a very complicated thing (Radocy, 1995; Goolsby, 1999; Cepraev, 2006; Antmann, 2007; Fautley & Savage, 2011). A. Lehmann, J. Sloboda and R. Woody (2007) believe that one of the principal reasons for this situation is the fact that a musical material is difficult to structure and therefore it can be assessed by various evaluators from different angles and their assessments can considerably differ. The American scholar, M. D. Antmann, (2007) maintains that despite the necessity to carry out the assessment in music secondary schools the problem of how to make the assessment at music classes effective has not yet been studied well enough.

In the 20th century, the interest in musical improvisation began to revive both in musical practice and music education process, and the fundamentals of improvisation are taught at schools and higher education establishments. However, not with standing certain achievements in the practical use of improvisation, the methodological base for assessing the level of mastering improvisation by future musicians at music secondary schools has not yet been worked out.

**Research aim:** to study the methodological approaches to the assessment of improvisation at music secondary schools and provide their major characterizations.

According to the findings in contemporary pedagogy (Goolsby, 1999; Brophy, 2000; Adams, 2001; Assessment Reform Group, 2002; Krastiņa, Pipere, 2004; Davidova, 2006; Коренькова, Кореньков, 2006; Краснова, 2006; Моул, Макдауэлл, Браун, 2006; Harlen, 2007; Наhele, Mīlā, Upeniece, 2009; Цейтлина, 2009; Braunlija, 2010; Алехина, Зильберштейн, 2010; Ustinskova, 2011), the assessment of improvisation at music secondary schools has to be based on the following positions:

- fostering the development of learner's personal individuality, uniqueness and creativity;
- promoting the development of learner's motivation, self-realization, self-development, self-actualization and autonomy;
- creating conditions and base for learner's further independent creative activities;
- assessment and self-evaluation have to enhance the understanding of study goals, as well as have to correct, stimulate and improve the study process, to foster students' learning and their further studies;
- assessment and self-evaluation have to be oriented towards the assessment of learners' activity and performance;
- musical improvisation consists of separate elements and they have to be arranged in a certain order;
- assessment and self-evaluation have to promote learner's ability to reinforce and align prior acquired knowledge as well as to construct new musical-theoretical knowledge and experience, to impart form and sense to one's creative activity;
- assessment has to be individual and flexible, it should be oriented towards a pedagogical process in which a learner is not compared with others, but he/she himself/herself reflects on and analyses his/her previous and present performance, achieving systematic improvements and success;
- a learner participates in all phases of a study process, plans his/her learning and his/her future;
- a continuous education and achieving success in learning; recognition of all learner's achievements;
- orientation towards co-operation – a learner has to participate in the process of assessment and self-evaluation, has to receive a feedback about his activity from a teacher;
- a teacher has to organize learner's assessment and self-evaluation; at analysing learner's activity a teacher has to add to the theoretical knowledge and practical experience of the study course;



- various kinds and forms of activity have to be used during the assessment process; they have to relate to the real process of practical music making and to real practical needs;
- during the assessment process a criteria-based approach has to be applied, as it allows specifying the assessment content, as well as provides the opportunity for a teacher to consistently and objectively assess learner's activity and for a learner to self-evaluate it.

The principles of humanistic pedagogy and a constructivism-based and process-oriented approach comply with the above listed positions best of all.

### **The Principles of Humanistic Pedagogy in Assessing Mastering of Improvisation**

Humanistic philosophy is person-centred and a human, being a basic value in it, is viewed as a wholeness of physical, emotional and spiritual dimensions. Humanistic philosophy relates tightly to pedagogy: humanistic pedagogy makes a relatively greater emphasis on human soul and spirit (Beļickis, 1995). The above said refers to the process of music studies as well, because it is focused on human thoughts, feelings and emotional experience. D. Zariņš (2003) considers that self-expression in music becomes a real opportunity for the implementation of humanism. The development of musician's individuality and uniqueness has an important role in the study process of music secondary schools. A musician is supposed to have an individuality endowed with spirituality and highly developed creative abilities.

According to D. Lieģiniece (1999), humanistic approach gives the learners the opportunity to experience the learning process as being important for them and acquire the material which is significant for them.

According to the approach of humanistic pedagogy, the function of assessment is to be the means for developing awareness about one's learning (Krastiņa, Pipere, 2004):

- promoting self-evaluation by reflection;
- assessment of learners according to the activity process;
- determination of individual differences in developmental peculiarities and abilities.

In the opinion of pedagogues and psychologists (Maslow, 1954; Rodgers, 1969; Knowles, 1980; Beļickis, 1995; Salīte & Pipere, 1998; Lieģiniece, 1999; Rubana, 2000; Špona, 2001; Krastiņa & Pipere, 2004; Brookfield, 2005; Koķe, 2006; Burceva, Davidova, Kalniņa, Lanka, Mackēviča, 2010) the major principles of humanistic pedagogy are:

- the development of a person as an individuality, because each personality is unique, each of them has a positive origin that needs to be developed;
- since each person is unique, each specific case needs separate analysis;
- humans' potentially free development, self-realization, self-development, self-actualization, self-esteem and autonomy, the development of self-confidence;
- creativity of the educational process;

- continuous education and achieving success in studies;
- orientation towards collaboration;
- learning takes place in a spiral, implementing systematic improvements and achieving success;
- control and assessment make corrections and improve the educational process;
- bringing learners' self-reflection into focus;
- orientation towards a pedagogical process and learners' involvement into the learning process;
- during the educational process a learner is not compared with others, but he/she himself/herself analyses his/her previous and present performance, plans his/her future himself/herself;
- a complex education of a person .

These principles of humanistic education are both important and topical for mastering improvisation and they also comply with the tasks of the assessment of mastering improvisation. At music secondary schools, mastering of improvisation and its assessment are done during individual classes, which provides the opportunity for applying the principles of humanistic education: to observe the individual peculiarities of each learner, to enhance the development of their personality, autonomy and self-realization, to flexibly correct and improve the study process by making systematic improvements and achieving success, to analyse learner's previous and present creative performance together with him.

### **Constructivist Approach to the Assessment of Mastering Improvisation**

Humanistic pedagogy and constructivist philosophy have much in common. First, it is the orientation towards collaboration, the development of personality's individuality and uniqueness, the development of a human potential, self-realization, self-actualization, self-esteem and autonomy, the orientation towards the creativity of a pedagogical process, towards continuous education and achieving success. Constructivism (from Latin *constructivus* - constructing) is education philosophy based on the assumption that knowledge cannot be taught to a pupil in a ready-made way, however, pedagogical conditions can be created so that learner's knowledge could self-construct and self-extend (Ryan & Cooper, 2004; Mahoncy & Granvold, 2005). Knowledge is socially constructed via human activity where experience plays an important role (Mertens, 1998). Constructivism is based on J. Piaget's theory of cognitive development (Пиаже, 1969): it has a work-oriented, pictorial and transforming tendency. According to the constructivism theory, people are purposeful individuals who strive for knowledge and who have developed the ability to understand and process information (Noddings, 1990). During his/her lifetime, each human being constructs his/her world outlook in the interaction with the environment around him/her (Reich, 1996; Mertens 1998). People construct new knowledge for themselves in the process of the interaction with the surrounding world. Everything a person sees, hears, reads, feels and touches on gets compared with knowledge and experience acquired before. If this new knowledge correlates with the prior knowledge, new knowledge can be built, which then remains with a person. Knowledge gets reinforced, if it is used also in other situations. One of the

main ideas of constructivism is as follows: a learner needs only to be helped to self-realize (Maslow, 1954; Виготский, 1991).

According to the constructivist approach, the function of assessment is to be a tool for self-constructing (Krastiņa, Pipere, 2004):

- collecting information about the results, comparing these results with the results in the past, and their relatedness to the behavior in the future;
- assessment as a source of knowledge for constructing new models of thinking activity.

In the previous research (Ustinskova, 2011) it was determined that mastering of improvisation is based on the principles of constructivist approach:

- active activity;
- order;
- existence;
- socially symbolic link;
- development throughout the whole lifetime;
- self-constructing and self-expanding of knowledge, skills and abilities;
- connection with real life and real problems;
- diversity of educational process and its stimulation;
- flexibility and individual approach to the educational process of improvisation;
- application of didactic principles;
- aspiration towards learner's individual development;
- teacher and a learners relationships based on equal rights, information exchange, collaboration, mutual learning;
- teacher's organizational function.

Reasons that underlie the importance of these principles for the assessment of mastering improvisation are as follows:

- Improvisation process is an active creative activity, and one of the tasks at mastering improvisation is involving a learner in this activity, therefore the assessment of improvisation has to be oriented towards the analysis of learner's activity and self-evaluation, a learner has to participate in the process of assessing and self-evaluating and has to get a feedback from a teacher about his/her activity;
- Musical improvisation consists of separate elements which have to be arranged in a definite order; the assessment of improvisation has to be focused on a learner's ability to put one's musical-theoretical knowledge and experience in order, to give form and sense to one's creative activity;
- Improvisation assessment forms and criteria have to be oriented towards developing learner's individuality, uniqueness and personal identity, they have to enhance learner's creativity;
- Musical improvisation develops under the influence of one's own emotional experience and under the influence of other people (composers, partners, audience), and also due to concrete social contexts and practical needs;
- Knowledge, skills and abilities necessary for improvisation imply continuous development and self-evaluation during the musician's activity; in the process

of mastering improvisation it is important for a learner to develop skills of self-evaluation, self-development and autonomy, which is essential within the context of sustainability because they provide the opportunity for independent learning and life-long development;

- During the process of assessing improvisation, a learner has to reinforce prior acquired knowledge, skills and abilities and construct new ones as well;
- Forms and criteria of assessment are not formal, they should be connected with the real process of music making and with real practical needs;
- During the assessment of mastering improvisation various kind of activities and forms, complying with real practical needs of learners, are used; the assessment supports and promotes the further learning of students;
- Assessment has to be individual and flexible – it has to correspond to the abilities of learners; flexibility of assessment relates to both the individual peculiarities of learners and the peculiarities of the improvisation process – this is an active creative activity which may have several variants of solution; and often neither the improviser nor the teacher can predict the course and results of improvisation to a full extent; the assessment of improvisation has to enhance the development of individual abilities of a learner;
- Assessment of improvisation has to be done according to the developed assessment criteria, levels and indicators which allow a teacher to specify the assessed content, consistently and objectively evaluate learner's activity and a learner to self-evaluate it;
- A teacher has to organize the assessment and learner's self-evaluation; when analyzing a learner's activity, a teacher adds to his/her own knowledge, practical experience and improves his/her pedagogical and improvisation abilities.

### **The Opportunities to Apply Process-Oriented Approach to the Assessment of Mastering Improvisation**

In her research on didactic models, I. Maslo (2001) provides the characterization and classification of these models; and cognitive, pragmatic, communicative, task-oriented and process-oriented models are offered there. Task-oriented and process-oriented models have been built on the basis of constructivism. Both task-oriented and process-oriented approaches focus on the development of individual's personality: a special emphasis is laid on learning abilities and independence, which is very essential for mastering improvisation.

According to I. Maslo, process-oriented approach is based on a dialogue with a teacher. A teacher and a learner are equally interested and motivated in the process of cognition. M. J. Mahoney and D. K. Granvold (2005) also consider that human life and consciousness are not static – one of the main principles constructivism lays great emphasis on is a process.

In I. Maslo's (2001) opinion, the key ideas of the model are:

- developing of loyal relations;
- exploring the problem;
- seeking for answers;
- learning experience.

The opportunities provided by a process-oriented didactic model are:

- to study and develop the theory and practical experience of a study course;
- to independently develop theoretical findings;
- to provide one's own creative solution instead of the traditional one;
- all sub-structures (cognitive, emotional, will/behaviour structure) participating in shaping a personality are simultaneously put in action;
- social integration of a personality is promoted;
- to learn from the learners is possible;
- to carry out scientific research;
- to offer new creative ways for solving problems.

An important condition laid down by a process-oriented didactic model is that learners should participate in all phases of educational process (Maslo, 2001).

The research conducted by P. Vucenlīdzāns (2004) testifies to the fact that an educational process oriented towards learners' activity during which learners, collaborating with a teacher, are involved in planning and assessing their learning, enhances the development of learners' professional competences and learners' skills of critical thinking and self-evaluation improve. During such educational process, the link between thinking and behaviour is created, which, according to I. Žogla (2001), provides the base for the spiritual development of a learner.

The pedagogical practice of the author of this research shows that the below listed opportunities offered by the process-oriented approach are especially vital in the process of assessing mastering improvisation:

- the opportunity to develop the theory of a study course and practical experience - the assessment in the process of mastering improvisation has to enhance the development of the study course and collaboration between a learner and a teacher; during this process the prior acquired knowledge is reinforced and new knowledge, skills and abilities related to improvisation are created;
- the opportunity to provide one's own creative solution instead of the traditional one – the assessment has to assist a learner in his/her creative quest and encourage the development of learner's independence, individuality and uniqueness;
- all spheres (cognitive, emotional, volitional) of a human personality are simultaneously put in action – during the process of improvisation all personality shaping sub-structures (perception, memory, imagination, thinking, emotions, behaviour etc.) are simultaneously put in action. By means of assessment levels, criteria and indicators the analysis and self-analysis of the development of learner's personality spheres are done.

Due to the fact that the assessment process has to be oriented to the evaluation of learner's activity and performance, many teachers think that assessment is a process which promotes student's learning (Brophy, 2000; Assessment Reform Group, 2002a; Vucenlīdzāns, 2004; Žogla, 2006; Коренькова, Кореньков, 2006; Краснова, 2006; Моул, Макдауэлл, Браун, 2006; Цейтлина, 2009; Алехина, Зильберштейн, 2010).

In this context, the principles of process-oriented approach can be applied to the assessment of mastering improvisation.

## **Conclusions**

1. In the process of the research, the methodological base for assessing mastering improvisation has been worked out:
  - humanistic pedagogy as a tool for the development of an independent and creative musician;
  - constructivist approach, enhancing the development of musician's skills of self-constructing and perfecting, as well as encouraging an active and independent creative activity;
  - process-oriented approach, focused on music secondary school learner's activity and collaboration at mastering improvisation.
2. The basic characteristics of approaches are:
  - order in musical activity;
  - self-constructing and improvement of knowledge, skills and abilities; the opportunity to develop the theory and practical experience of a study course;
  - use of a deductive principle;
  - social and symbolic link of a creative process;
  - connection of improvisation with real life and real problems;
  - active character of the activity;
  - flexibility and an individual approach during the process of improvisation;
  - aspiration towards the development of learner's individuality;
  - collaboration and mutual learning of equal partners;
  - all spheres of personality (cognitive, emotional, volitional) are simultaneously put in action.
3. The methodological base for the assessment of mastering improvisation is closely linked with the process of mastering improvisation and thus provides the opportunity for the learner to develop his/her knowledge and broaden experience in improvisation art.
4. The methodological base for the assessment of mastering improvisation makes it possible to develop the theoretical model of assessing the level of mastering improvisation, which in turn allows improving the educational process, enhances the development of learners' creativity, individuality and independence. The use of a criteria-approach based on this methodological base allows combining the qualitative and the quantitative components: to reflect the results achieved in the creative process of improvisation in the assessment indicators, to receive qualitative information about the learner's study process and to objectively determine the level of mastering improvisation.



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## THE ANALYSIS OF THE RESULTS OBTAINED IN THE SECOND STAGE OF THE PILOT STUDY ON ISSUES OF DEVELOPING MUSIC TEACHERS' HARMONIC HEARING

**Galina ZAVADSKA & Svetlana IGNATJEVA**

*Daugavpils University, Latvia*

*e-mail: g.zavadska@inbox.lv; svetlana.ignatjeva@du.lv*

### **Abstract**

*The developmental tendencies of the society determine the choice of a new pedagogical paradigm at all stages of higher education. In Latvia, the development of music teachers' harmonic hearing occupies an important place during their study process. The investigation on music teachers' opinions about issues of developing harmonic hearing can identify and determine essential problems concerning music teachers' professional training.*

**Research aim:** *to investigate music teachers' opinions as to the problems of developing harmonic hearing.*

**Research methods:** *a survey, computer data processing by SPSS, data analysis.*

*The paper deals with the analysis of the conducted research on music teachers' opinion about children's compositions (Mellor, 1999) and on music teachers' opinions as to pupils' individual differences at music classes (Hewitt, 2005). The research produces the analysis of the results of music teachers' questionnaire survey obtained in the second stage of the pilot study, conducted in both education institutions of Latvia and abroad. For the respondents the questionnaire offered alternative answers on issues of the development of harmonic hearing and forms of work at classes of music.*

*The results obtained from the questionnaire survey will promote the development of strategy and methodology for developing music teachers' harmonic hearing at sol-fa classes.*

**Key words:** *development of harmonic hearing, questionnaire, analysis.*

### **Introduction**

The developmental tendencies in the contemporary society determine the necessity to choose a new pedagogical paradigm at all stages of higher education. In Latvia, the development of music teachers' harmonic hearing occupies an important place during the process of their training, because the reality is that music teachers often have to be

also conductors of a school choir, amateur choir or some other choir. The research on this issue, done in Latvia, and findings from it (Davidova & Marnauza, 2003; Marnauza, Kriumane & Gzibovskis, 2005; Znutins, 2009 etc.) testify to this fact and also allow us to broaden our perceptions about the tendencies in the development of Latvian music culture.

The effectiveness of musical activity largely depends on the development level of musical hearing, first of all (Kazkayasi, Yetiser & Ozcelik, 2006). Harmonic hearing is a component of musical hearing (Петрушин, 1997). A consecutive and purposeful development of harmonic hearing is also an essential condition for polyphonic choral singing. The quality of intoning in a choir or in a vocal ensemble depends on the development level of harmonic hearing.

Though an extensive research on the development of harmonic hearing has been done already (Vigners, 1936; Теплов, 1947; Seashore, 1967; Hallam, Gross & Thaut, 2009); the views and experience of music teachers in this field have to be studied as well, since a detailed research on music teachers' views about the development of harmonic hearing may contribute to identifying and determining the problems and difficulties in professional training of music teachers as well as facilitate constructing a further pedagogical process and successfully deal with practical tasks of training and educating pre-service music teachers.

**Research aim:** to study music teachers' views about the problems of developing harmonic hearing on the basis of the developed questionnaire.

**Research methods:** questionnaire survey, data processing in SPSS program, data analysis.

## Methodology of the Research

To prove the topicality of the research and explore music teachers' opinion about the current situation in the field of the development of harmonic hearing, teachers' questionnaire survey is conducted in professional education institutions of Latvia and abroad (Belarus, Lithuania, Estonia). A questionnaire survey is one of the most widely spread and effective methods for collecting primary sociological and statistic information. According to A. Pipere (Pipere, 2011), a questionnaire is one of the most widely spread and effective methods of collecting information, which helps to study either the current situation of the practice of pedagogical work or teachers' opinions relating to the problem under the research.

In this research, the advantage of a questionnaire survey as a method of pedagogical investigation is seen in the following:

- a questionnaire survey provides an insight about the situation in a contemporary music education, about the level and the need to develop music teachers' harmonic hearing;
- being anonymous (without psychological pressure), a questionnaire survey leads to more well-founded answers on respondents' part;
- a questionnaire survey helps to collect information from a sufficiently great number of music teachers;

- the structure of the offered questionnaire contributes to identifying and determining the problems existing in professional training of music teachers;
- structuring of questions enables us to make the analysis of different forms and methods of developing harmonic hearing, to evaluate their topicality and interrelations with other problems;
- the use of different type of questions – closed-ended questions, which contain a full list of answer choices, and semi-closed questions, which include a list of prepared questions, but also provide an opportunity to give one's own answers. The advantages of semi-closed questions are as follows: a) they make it possible to avoid misunderstanding the questions, b) they make it simple to fill in the questionnaire and process the obtained data;
- the data obtained from a questionnaire survey can be computer-processed;
- singling out essential and problem questions provides the opportunity to concentrate efforts and resources on dealing with the most vital problems.

However, the method of questionnaire survey has its drawbacks as well, among which such can be mentioned:

- a questionnaire survey does not take into account the fact that respondents may understand the questions differently;
- the objectivity of the answers is not always high, since the respondents can sometimes give answers that might be unreliable;
- a concrete list of questions given to the respondents may operate as a factor limiting the scope of their ideas and answers, thus making them say in their answers not just what they actually think.

## **Methods and Sample**

The questionnaire survey was a pilot study – two-stage and individual. R. Weiss (Weiss, 1994) and J. Creswell (Creswell, 1998) recommend researchers conduct pilot interviews before the study begins in order to test their research questions. A pilot study allows researchers to get a clearer idea of what they want to know and how they can best find it out without the expense and effort of a full-fledged study. They are used commonly to try out survey questions and to refine research hypotheses (Grossman, 2011).

Within the frame of the pilot study two questionnaires were developed. The first stage of the pilot study was in 2011. 60 music teachers from Latvia, Lithuania, Estonia and Belarus took part in the first questionnaire survey. R. Weiss (Weiss, 1994) states that choosing 60 respondents completely independently of each other will result in a statistically significant survey of most populations.

The data collected during the first stage of the pilot study appeared insufficient for a qualitative analysis of sample cluster groups (Zavadska & Davidova, 2013). The first stage of the survey of music teachers on issues of developing harmonic hearing made it possible to identify the existing problems relating to music teacher training and determine difficulties which arose at analysing the assessments given by the respondents to work forms used for the development of harmonic hearing at music classes (Likert scale). Therefore a number of questions about work forms used for the

development of harmonic hearing at music classes were included in the questionnaire for the second time during the second stage of the study.

The identified shortcomings in the conducted pilot study of the first stage indicated to several unsolved problematic issues in the research: the analysis of the statistic data served as the basic information for constructing the second stage of the pilot study.

In the questionnaire survey (see Appendix) there participated 121 respondents from different regions of Latvia (see Tables 1 and 2). All respondents had higher music education: 70 (57.9%) – with a Master's degree; 51 (42.1%) – with a Bachelor's degree.

**Table 1. Distribution of the respondents by work places**

	FREQUENCY	PERCENT	CUMULATIVE PERCENT
General education school	49	40,5	40,5
Music school	28	23,14	63,6
Music secondary school	21	17,35	81,0
Higher education establishment	23	19,02	100,0
Total	121	100,0	

**Table 2. Descriptive statistics of respondents' age and length of service**

	AGE	PEDAGOGICAL SERVICE	SERVICE AS A SOL-FA TEACHER
Mean	43,92	20,72	5,84
Median	44,00	21,00	0,00
Mode	42 <sup>a</sup>	20 <sup>a</sup>	0
Std. Deviation	10,924	11,369	10,381
Range	41	39	37
Minimum	23	1	0
Maximum	64	40	37
25	35,00	10,00	0,00
Percentiles 50	44,00	21,00	0,00
75	52,50	30,00	9,00

Respondents' age varies from 23 to 64 years in relation to average – 44 years; the age of 25% of respondents does not exceed 35 years. The general length of respondents' pedagogical service varies within the range from 1 to 40 years, the average length of service being about 21 years; the length of service of 50% of respondents exceeds 21 years, but that of 25% of respondents is 30 years. The distribution of the respondents by the length of service is shown in Table 3. 36% of respondents have Sol-fa teacher's work experience, and average length of their service in this capacity is about 6 years. The obtained data reflect the general age tendency for music teachers in Latvia, whose average age, unfortunately, is over 40 years.

**Table 3. Distribution of the respondents by groups depending on the length of pedagogical service**

THE LENGTH OF PEDAGOGICAL SERVICE	FREQUENCY	PERCENT	CUMULATIVE PERCENT
1-5	28	23,1	23,1
6-10	19	15,7	38,8
11-20	29	24,0	62,8
>20	45	37,2	100,0
Total	121	100,0	

66 (81.5%) respondents participated in regional competitions, 44 (54.3%) – in international ones.





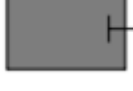





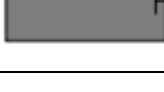
### Results of the Research

Quantitative data, statistically processed later, have been obtained in the result of the second stage of music teachers' questionnaire survey. The questionnaire was aimed at assessing respondents' attitude to developing harmonic hearing within the system of education and to various work forms used at sol-fa classes which bear on the development of harmonic hearing.

The respondents could demonstrate their attitude to developing harmonic hearing by assessing 11 indicators within the frame of bipolar scales in the range from -3 to 3. Negative grades allow reflecting critical attitude to developing harmonic hearing, while positive grades show the importance and need for this activity.

Mean grades given by the respondents reflect their conviction about the necessity and importance of developing harmonic hearing. However, they also mention that learners do not like to do exercises on developing harmonic hearing. This testifies to the necessity of working out such practical methodological material, in which both learners' interests and their motivation for learning should have been taken into account. The respondents have also mentioned that they are not quite sure whether they devote enough time to the development of harmonic hearing during their classes. Such position, perhaps, may be attributed to the fact that teachers often do not have enough time for fulfilling tasks relating directly to the development of harmonic hearing.

**Table 4. Indicators showing the attitude to the development of harmonic hearing**

Well-developed harmonious hearing is not important for all categories of musicians		Well-developed harmonious hearing is important for any musician
There are no universal methodologies for developing harmonious hearing		There are contemporary methodologies that enable to develop harmonious hearing
There are people whose harmonious hearing cannot be developed		All people can develop harmonious hearing
During the perception of a musical composition the presence of the performer's harmonious hearing is not felt		During the perception of a musical composition the presence of the performer's harmonious hearing is felt
At assessing the performance, the presence of a performer's (performers') well-developed harmonious hearing is not taken into account		At assessing the performance, the presence of a performer's (performers') well-developed harmonious hearing is taken into account
At my classes I don't devote enough time to the development of harmonious hearing		At my classes I devote enough time to the development of harmonious hearing
Students don't like to do exercises on the development of harmonious hearing		Students like to do exercises on the development of harmonious hearing
There is not a sufficient number of methodologies on the development of harmonious hearing		There is a sufficient number of methodologies on the development of harmonious hearing
My own competence does not allow me to develop students' harmonious hearing		My own competence allows me to develop students' harmonious hearing
I don't have a very well-developed harmonious hearing		I have a well-developed harmonious hearing
Students' well-developed harmonious hearing does not influence winning prizes at competitions		If students' harmonious hearing is well-developed there is more chance to win a prize at competitions

To analyse the factorial structure of the phenomenon, the factor analysis was carried out in the space of indicators characterizing the attitude to developing harmonic hearing. The criterion of Kaiser-Meyer-Olkin sampling adequacy (Kaiser-Meyer-Olkin Measure of Sampling Adequacy – KMO) is 0.671, which indicates that the use of the factor analysis for the analysis of the questionnaire structure is useful.

Factor analysis allowed distinguishing a three-factor structure of the phenomenon under the research. The distinguished factors correspond to the grades:

- C1 – Professionalism;
- C2 – Perception;
- C3 – Musical abilities.



These denominations of factors - C1, C2, C3 - have been chosen to denote the general constituent characteristics of indicators, and they are not definitions in the true sense of the word.

C1 – Professionalism – groups the characteristics relating to the importance of developing harmonic hearing, which is the indicator of music teachers' professionalism in general.

C2 – Perception – highlights the characteristics relating to assessing the performance and to feeling the presence of a developed harmonic hearing through the perception of music.

C3 – Musical abilities – characterizes respondents' position in regard to the existence of and possibility to develop harmonic hearing as one kind of musical hearing.

Factor loadings of indicators which determine the semantics of the given factors are shown in Table 5.

The first factor (C1) accounts for 19.5% of summary dispersion, factor C2 – for 18.8%, C3 – for 15%.

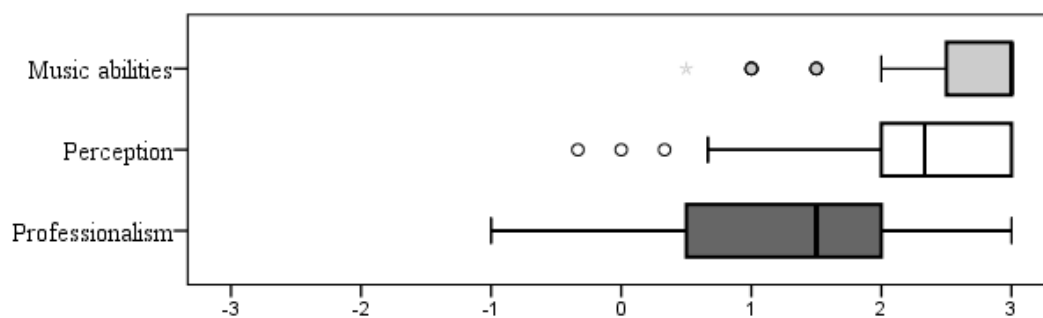
Reliability is a characteristic that reflects the consistency of the obtained measurement results. To assess the consistency of indicators of the given factors, Cronbach's Alpha coefficient was applied. The values of Cronbach's Alpha criterion: 0.682 (F1), 0.752 (F2), 0.569 (F3), which testifies to a sufficient consistency of factors.

The aggregated indicators of the identified factors are mean values of the respective factors. To better comprehend and interpret them further, the standardization of factor assessments was carried out. Standard assessments are distributed according to a normal law with a zero mean and a single dispersion. This is a convenient way to make a comparative analysis of standard assessments of various indicators or of the same indicators in different groups of respondents. Standardized assessments of indicators allow classifying the respondents by each factor depending on whether their indicators are higher or lower than the mean.

**Table 5. Factorial structure reflecting the attitude to the development of harmonic hearing**

		COMPONENT		
		C1	C2	C3
Professionalism	At my classes I devote enough time to the development of harmonious hearing	0,825		
	My own competence allows me to develop students' harmonious hearing	0,684		
	Students like to do exercises on the development of harmonious hearing	0,676		
	I have a well-developed harmonious hearing	0,642		
Perception	At assessing the performance, the presence of a performer's (performers') well-developed harmonious hearing is taken into account		0,880	

	During the perception of a musical composition the presence of the performer's harmonious hearing is felt	0,870
	Well-developed harmonious hearing is important for any musician	0,669
Musical abilities	If students' harmonious hearing is well-developed there is more chance to win a prize at competitions	0,697
	All people can develop harmonious hearing	0,544



**Figure 1. Factors reflecting the attitude to the development of harmonic hearing (box diagrams)**

**Table 6. Descriptive statistics of factors reflecting the attitude to the development of harmonic hearing**

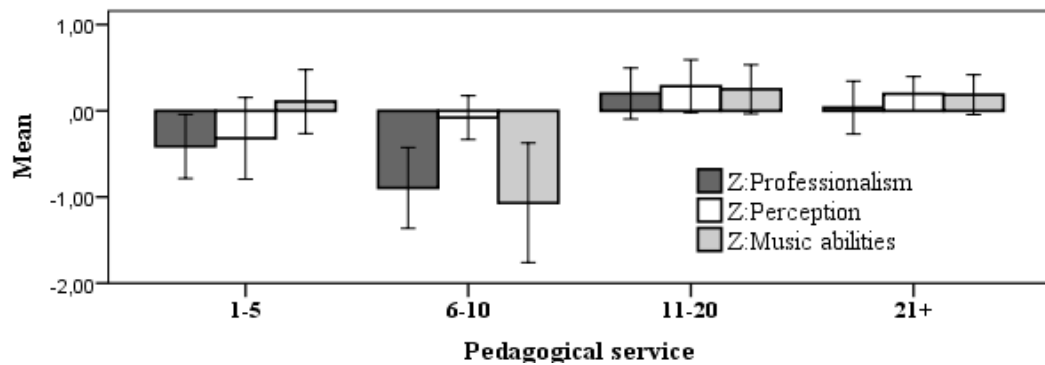
	PROFESSIONALISM	PERCEPTION	MUSIC ABILITIES
Mean	1,40	2,33	2,70
Median	1,50	2,33	3,00
Mode	0,50	2,33	3,00
Std. Deviation	0,85	0,76	0,56
Range	4,00	5,33	2,50
Minimum	-1,00	-2,33	0,50
Maximum	3,00	3,00	3,00
Percentile 25	0,50	2,00	2,50
Percentile 50	1,50	2,33	3,00
Percentile 75	2,13	3,00	3,00

C1 (Professionalism) has received the lowest assessment from the respondents, and the opinions about it vary greatly. The grades vary in the range from -1 to 3, and for half of the respondents they do not exceed the indicator 1.5 (<1.5). The highest assessment has been given to factor C3 (Musical abilities) – 50% of respondents have assessed it by a maximal indicator 3.

**Table 7. Correlation links between factors reflecting the attitude to the development of harmonic hearing**

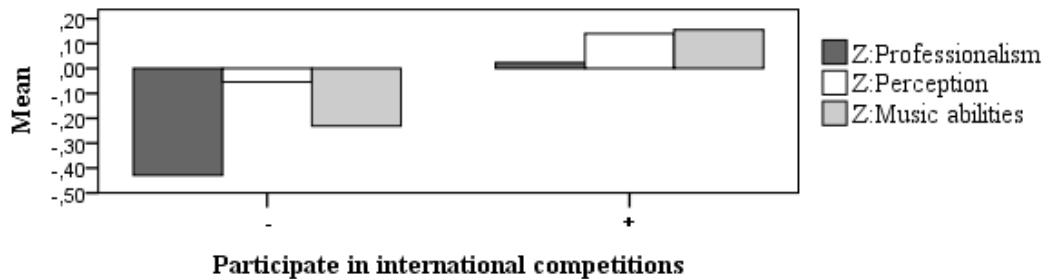
	PROFESSIONALISM	PERCEPTION	MUSIC ABILITIES
Professionalism	1	0,043	0,013
Perception	0,043	1	0,592**
Music abilities	0,013	0,592**	1

The only significant inter-correlation is observed between factors Musical ability and Perception. This correlation is direct, i.e. the high values of Perception correlate with high values of Musical abilities. The strength of correlation is average; the correlation coefficient between the respective factors is 0.592.

**Figure 2. Mean values of factors reflecting the attitude to the development of harmonic hearing of respondents with different length of pedagogical service**

Factors characterizing respondents' attitude to the development of harmonic hearing depend on the length of pedagogical service and this dependence is statistically significant. As the length of pedagogical service increases, the awareness of the significance of these factors grows simultaneously. Respondents, whose length of pedagogical service is more than 10 years, assess factors not lower than on average in totality, while the respondents whose length of service is from 6 to 10 years assess factors lower than on average in totality, assessing such factors as C1 and C3 (underestimate). Respondents, whose length of pedagogical service is less than 5 years, assess factors C1 and C3 lower than on average in totality. The shorter the respondents' pedagogical service (1 – 5) is, the less significant, in their opinion, is the performers' developed harmonic hearing at assessing their performance. And vice versa, the longer the respondents' pedagogical service is the more significant for them is the factor of developing performer's harmonic hearing and its presence at perceiving music. Concerning factor C3 (Musical abilities), the position is identical in relation to respondents' views and length of pedagogical service. The longer the respondents' pedagogical service is, the higher the indicator is possibility to develop each learner's harmonic hearing and the impact of its developmental level on the achievements in competitions.

The respondents whose pupils did not participate in international competitions assessed factor C1 (see Table 5) lower than on average in totality, and also lower than those respondents whose pupils participated in such competitions. According to Mann-Whitney Test these differences are statistically significant ( $U=1332$ ,  $p=0.014$ ).



**Figure 3. Mean value of factors reflecting the attitude to the development of harmonic hearing of respondents with different competition activity (international competitions)**

Significant correlations can be observed between the respondents' age and professional characteristics and their assessments of factors showing their attitude to the development of harmonic hearing. Age statistically significantly affects the assessment of factors C1 and C2: the older the respondents are the higher they assess these factors. Direct significant correlations are observable also between the length of respondents' pedagogical service and their assessments of factors.

**Table 8. Correlation between factors reflecting the attitude to the development of harmonic hearing and professional qualities of the respondents**

	AGE	PEDAGOGICAL SERVICE	SERVICE AS A SOL-FA TEACHER
Professionalism	0,219*	0,282**	0,432**
Perception	0,294**	0,238**	0,391**
Music abilities	0,097	0,107	0,292**

A two-step cluster analysis in the space of factors characterizing the attitude to the development of harmonic hearing allowed identifying three groups of respondents (Cluster group [C]).

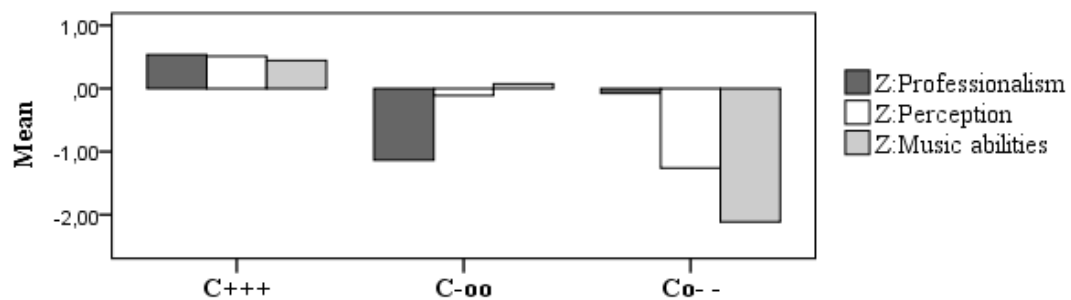
**Table 9. Frequency analysis of clusters identified in the space of factors characterizing the attitude to the development of harmonic hearing**

	FREQUENCY	PERCENT	CUMULATIVE PERCENT
C+++	60	49,6	49,6
C-oo	46	38,0	87,6
Co- -	15	12,4	100,0
Total	121	100,0	

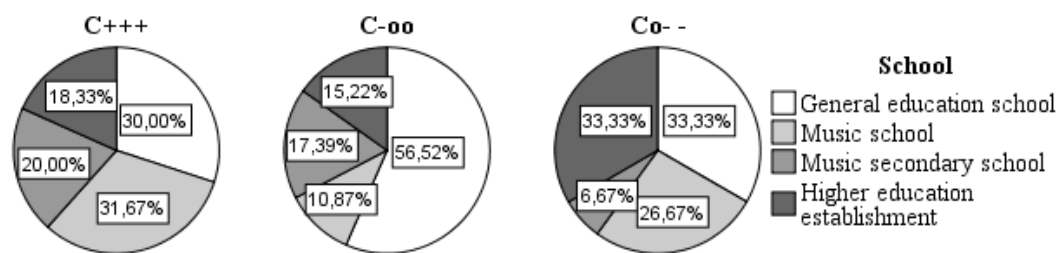
The first group of respondents (C+++ ) has assessed all factors higher than on average in totality.

The second group of respondents (C-oo ) have assessed factor C1 lower than on average in totality.

The third group of respondents (Co- -), assessing factor C1 at an average level in totality, have assessed factors C2 and C3 lower than on average in totality.

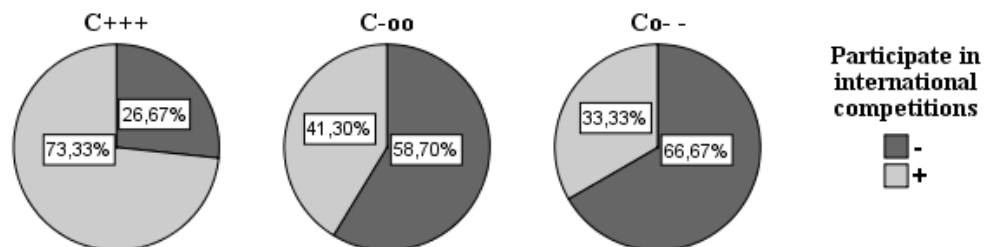


**Figure 4.** Mean value of factors reflecting the attitude to the development of harmonic hearing of respondents from different clusters identified in the space of these factors



**Figure 5.** Distribution in Cluster Group (C) of respondents working in different places

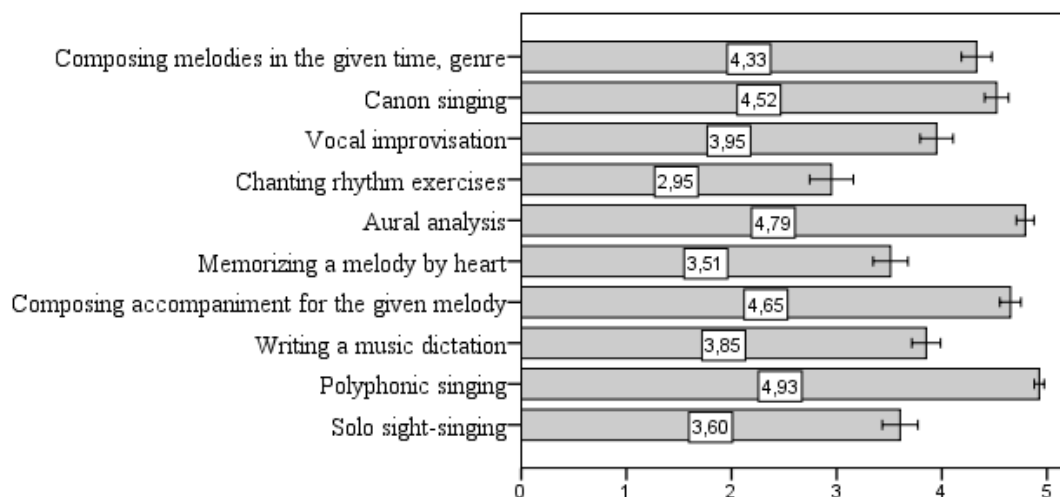
There is a significant correlation (Chi-Square Tests,  $p=0,045$ ) between respondents' work place and their distribution in Cluster groups (C). 56.5% of cluster C-oo respondents are teachers working in general education schools, while in two other clusters there are only 30% of such respondents.



**Figure 6.** Distribution in Cluster group (C) of respondents having pupils with different competition activity (international competitions)

There is a significant correlation (Chi-Square Tests,  $p=0.001$ ) between competition activities of respondents' pupils and their distribution in the cluster groups. 73% of respondents in Cluster+++ are teachers whose pupils have participated in international competitions.

A significant part of the questionnaire was the questions relating to respondents' attitude to different forms of work used to develop harmonic hearing at the sol-fa classes. The respondents were offered to assess 10 respective indicators in the range from 0 to 5.



**Figure 7. Mean values of indicators reflecting the respondents' attitude to different work forms used for developing harmonic hearing**

The diagram above shows that the respondents have given the highest grades to *polyphonic singing* – 4.93, composing the accompaniment to the given melody – 4.59, canon singing – 4.49. In respondents' opinion, the least efficient work forms for developing harmonic hearing are *memorizing the melody by heart* – 3.41 and *singing of one voice* – 3.60.

In order to reduce the scale of the work form space used to develop harmonic hearing, the factor analysis was made. The criterion of Kaiser-Meyer-Olkin Sampling Adequacy is equal to 0.696, which indicates that the application of factor analysis in the given situation is useful.

The factor analysis allowed identifying a three-factor structure of the phenomenon under the research. The identified factors correspond to such forms of work as:

- F1 – Forms of work that develop auditory self-control;
- F2 – Forms of work that develop musical thinking;
- F3 – Forms of work that develop creativity.

Factor loadings of indicators determining the semantics of identified factors are reflected in Table 10.

**Table 10. Factorial structure and factor loadings of indicators in the space of work forms used for developing harmonic hearing**

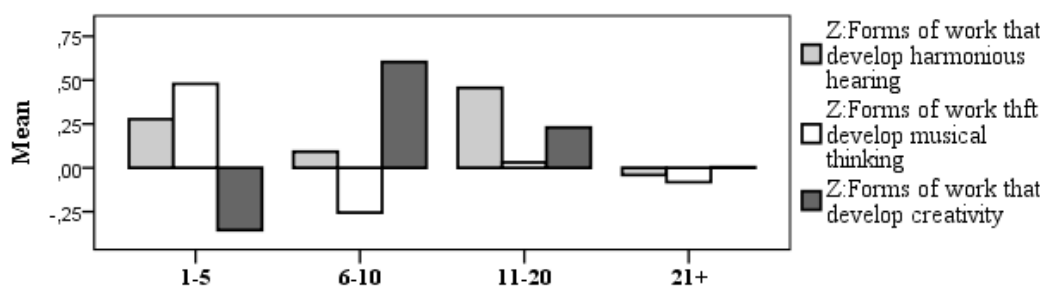
		F1	F2	F3
Forms of work that develop auditory self-control	Canon singing	0,717		
	Aural analysis	0,709		
	Vocal improvisation	0,680		
	Composing melodies in the given time, genre	0,676		
Forms of work that develop musical thinking	Writing a music dictation		0,846	
	Solo sight-singing		0,638	
	Memorizing a melody by heart		0,635	
Forms of work that develop creativity	Composing accompaniment for the given melody			0,523
	Polyphonic singing			0,745

The first group F1 includes such forms as: canon singing, aural analysis, vocal improvisation, composing a melody in the given time, genre. The inclusion of these forms into the group *Forms of work which develop auditory self-control* is to be attributed to the importance of developing inner hearing and aural perceptions.

The second group F2 comprises: memorizing the melody by heart, writing a music dictation, one-voice singing from the sheet. The incorporation of these work forms into the group *Forms of work which develop musical thinking* highlights the importance of mental operations performed at using these forms: concentration of attention, development of musical memory, analytical thinking.

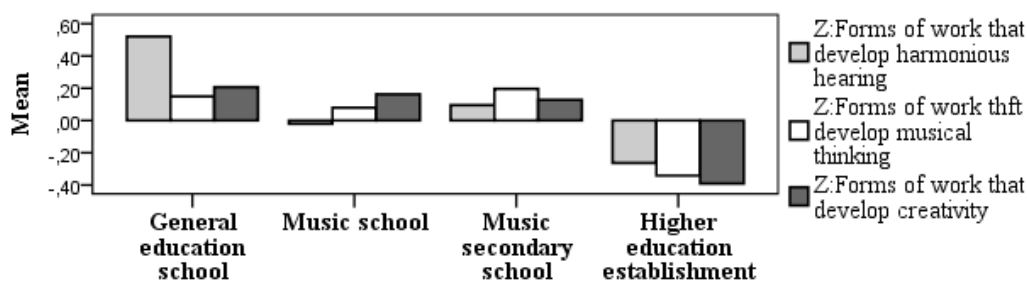
The third group F3 incorporates: polyphonic singing, composing the accompaniment to the given melody. This group *Forms of work which develop creativity* relates to music making, creative activity to a greater extent than other work form groups.

The conducted analysis allows identifying several factors. High grades to F3 (creative forms) were given by the respondents whose length of pedagogical service was from 6 to 20 years. Besides, respondents whose pedagogical service is from 6 to 10 years mark this group as the most significant, while the respondents whose pedagogical experience is short – 1 – 5 years – have assessed these work forms negatively in general. Respondents with 1-5 year pedagogical experience have highly assessed group F2 (Musical thinking), but with the increase in the length of respondents' pedagogical service, the assessment of these forms gradually becomes lower and finally is even negative. This testifies to the fact that with the increase in the length of pedagogical service, such work forms as writing music dictation and learning by heart get gradually unpopular and are seldom used at music classes.



**Figure 8. Assessment of different work forms used for developing harmonic hearing by respondents with various length of pedagogical service**

The views of teachers from general education schools are interesting: they assess all three groups positively, singling out the first group especially. Canon singing is an old tradition in Latvia's schools, and it has been cultivated by outstanding Latvian educators-musicians and methodologists in the past (Bebru Juris, Adolfs Sillers, Jekabs Vitolins, Julijs Rozitis, Jekabs Graubins).



**Figure 9. Assessment of different work forms used for developing harmonic hearing by respondents with different work places**

The two-step cluster analysis in the space of work forms used for developing harmonic hearing allowed singling out two clusters (Cluster Group [F]). The respondents of the first cluster (F+++) have assessed the significance of all forms of work not lower than on average in totality, and this makes 63.6% from the total number of respondents. But the respondents of the second cluster (F---), on the contrary, assess the significance of all work forms lower than on average in totality and they make up 36.4%. Moreover, the respondents of the first cluster (F+++) have assessed F3 (creative forms) as high, but the respondents of the second cluster (F---), on the contrary, have marked it as the less significant.

**Table 11. Distribution of the respondents by Cluster Groups (F)**

	FREQUENCY	PERCENT	CUMULATIVE PERCENT
F+++	77	63,6	63,6
F- - -	44	36,4	100,0
Total	121	100,0	



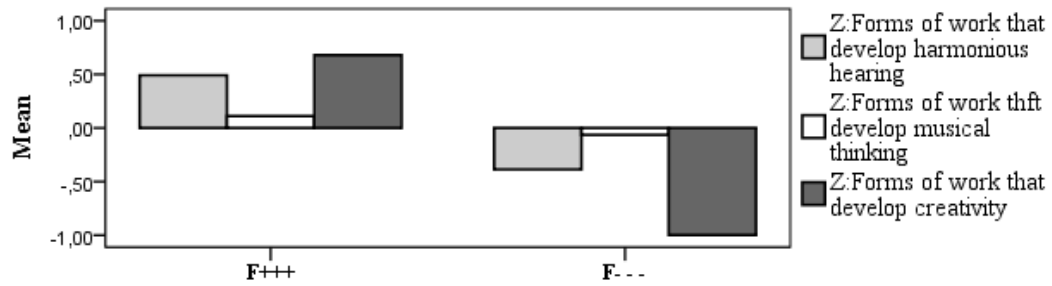


Figure 10. Mean assessments of significance of different work forms used for developing harmonic hearing by respondents in various Cluster Groups (F)

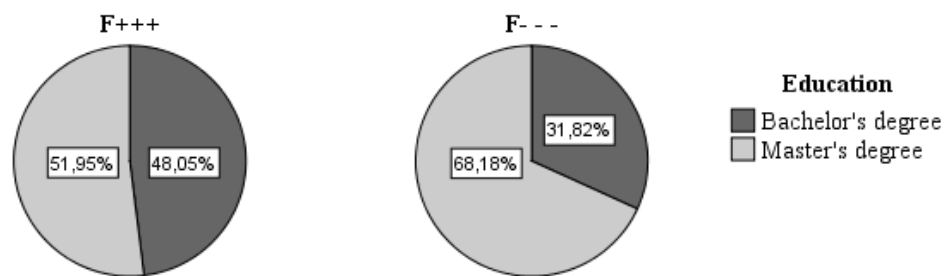


Figure 11. Distribution by Cluster Groups (F) of respondents with different level of education

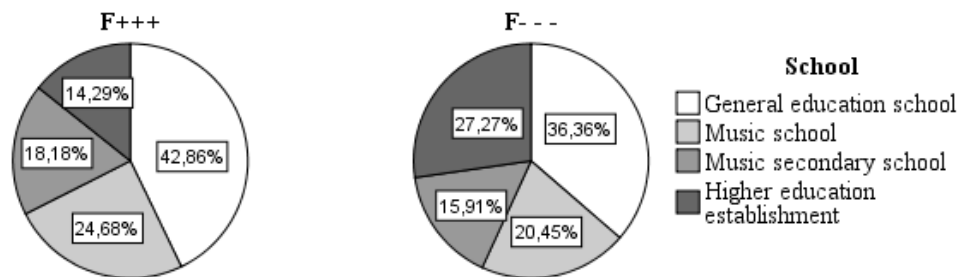


Figure 12. Distribution by Cluster Groups (F) of respondents with different work places

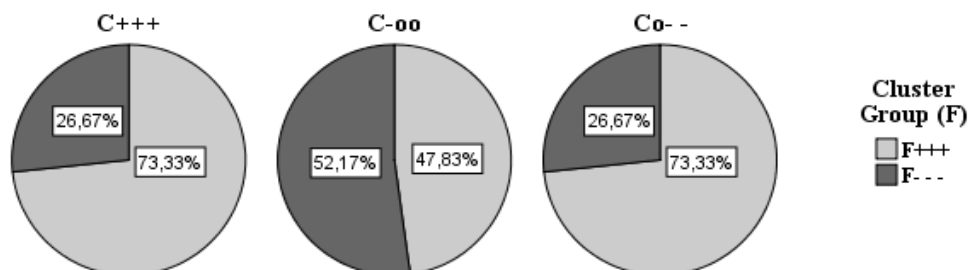
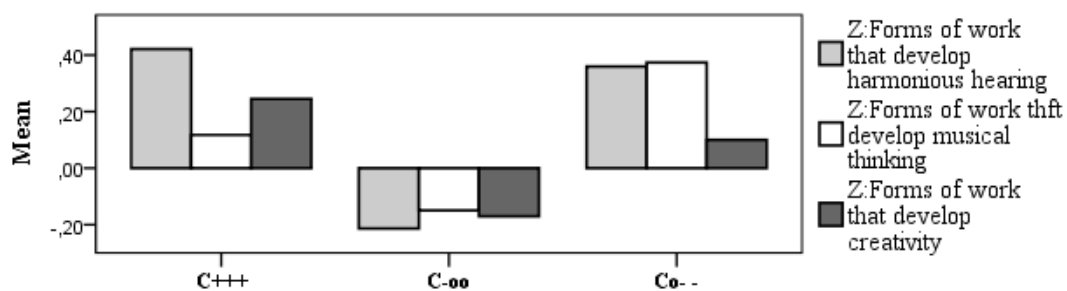


Figure 13. Distribution of respondents from different Cluster Groups (F) by Cluster Groups (C)

According to the Chi-Square Tests criterion, there is a significant correlation between the distribution of respondents by Cluster Groups (C) and Cluster Groups (F) ( $p=0.018$ ). Namely, there is a correlation between the assessment given by the respondents to factors reflecting the attitude to the development of harmonic hearing and the assessment given by them to the significance of various work forms used for the development of harmonic hearing. Cluster C-oo includes 52% of respondents from Cluster F--- (a group of respondents assessing the significance of all work forms lower than on average in the aggregate), while in Cluster C+++ and Cluster Co-- there are only 27% of such respondents. On the contrary, respondents from Clusters C+++ and Co-- assess the significance of all work forms not lower than on average in total; their views concerning the greatest significance of the group *Forms of work which develop auditory self-control* are practically identical.

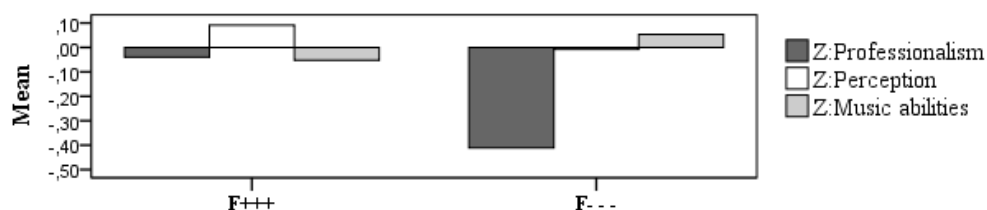


**Figure 14.** Assessment of different work forms, used for developing harmonic hearing, given by respondents from various Cluster groups (C)

**Table 12.** Results of ANOVA comparison of mean assessments of the significance of different work forms, used for developing harmonic hearing, given by respondents from different Cluster Groups (C)

		MEAN	STD. DEVIATION	MINIMUM M	MAXIMUM	F	P
Forms of work that develop harmonious hearing	C+++	4,53	0,41	3,25	5,00	6,103	0,003
	C-oo	4,19	0,65	2,00	5,00		
	Co--	4,50	0,44	4,00	5,00		
	Total	4,40	0,54	2,00	5,00		
Forms of work that develop musical thinking	C+++	3,71	0,51	2,33	5,00	2,226	0,112
	C-oo	3,51	0,76	1,67	4,67		
	Co--	3,89	0,79	2,00	5,00		
	Total	3,66	0,66	1,67	5,00		
Forms of work that develop creativity	C+++	4,85	0,27	4,00	5,00	2,800	0,065
	C-oo	4,71	0,34	3,50	5,00		
	Co--	4,80	0,37	4,00	5,00		
	Total	4,79	0,31	3,50	5,00		

Single-factor dispersion analysis allowed identifying significant differences in the assessment of *Forms of work which develop harmonious hearing* given by respondents from different Cluster Groups (C). The lowest assessment to these work forms has been given by the respondents from cluster C-oo, who, typically, underestimate factor Professionalism.



**Figure 15. Mean values of factors characterizing the attitude to the development of harmonic hearing provided by respondents from different Cluster Groups (F)**

**Table 13. Results of ANOVA comparison of mean assessments of factors reflecting the attitude to the development of harmonic hearing given by respondents from various Cluster Groups (F)**

	CLUSTER GROUP (F)	N	MEAN	STD. DEVIATION	T	P
Professionalism	F+++	77	1,51	0,83	1,973	0,050
	F- - -	44	1,19	0,85		
Perception	F+++	77	2,35	0,83	0,601	0,547
	F- - -	44	2,27	0,59		
Music abilities	F+++	77	2,68	0,63	-0,534	0,594
	F- - -	44	2,73	0,41		

Single-factor dispersion analysis allowed identifying significant differences in the assessment of factor *Professionalism* given by the respondents from different Cluster Groups (F). Respondents of Cluster F--- assess it lower than on average in totality, while the respondents from Cluster F+++ assess this factor at the level that corresponds to the average level in totality.

It should be marked that though the respondents' opinions differ, the majority of them – 63.6% - assess the significance of all work forms and Factor *Professionalism* higher than on average in totality.

## Conclusions

The two-step cluster analysis in the space of work forms used for developing harmonic hearing and single-factor dispersion analysis allow drawing the following conclusions:

1. Factors characterizing the attitude to the development of harmonic hearing, first and foremost, depend on the length of pedagogical service and this dependence is statistically significant. As the length of respondents' pedagogical service grows, the awareness about the significance of these factors also increases. Respondents' education does not influence their attitude to the development of harmonic hearing. Consequently, corrections should be made in the educational process itself, where orientation will be essential, including the orientation towards the development of harmonic hearing of future teachers of music.

2. There is a correlation between the assessment given by the respondents to factors reflecting the attitude to the development of harmonic hearing and the assessment given by them to various work forms enhancing the development of harmonic hearing. Respondents who are aware of the necessity to develop harmonic hearing assess all forms of work used at sol-fa classes positively, while those who underestimate the importance of *Professionalism* underestimate also work forms used for the development of harmonic hearing.

The data obtained from the first and second stage of the conducted pilot study reveal, first, the topicality of studying the problem of harmonic hearing and, second, the necessity to qualitatively renew part of the methodology of teaching sol-fa, oriented to the development of harmonic hearing of future teachers of music.

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## APPENDIX

## QUESTIONNAIRE FOR MUSIC TEACHERS

1. Age \_\_\_\_\_ Age of your students from \_\_\_\_\_ to \_\_\_\_\_
2. What school do you work at?  
     General education school \_\_\_\_\_  
     Music school \_\_\_\_\_  
     Music secondary school \_\_\_\_\_  
     Higher education establishment \_\_\_\_\_
3. Your education:  
     Bachelor's degree (or equal to it) \_\_\_\_\_  
     Master's degree \_\_\_\_\_  
     Other scientific degree \_\_\_\_\_
4. Length of your pedagogical service \_\_\_\_\_
5. Length of your service as a sol-fa teacher \_\_\_\_\_
6. Do your students participate in competitions?  
     In regional \_\_\_\_\_  
     In international \_\_\_\_\_  
     No, they do not participate \_\_\_\_\_
7. In the table below various answers relating to harmonious hearing are given.  
     On the basis of your own opinion and experience, please, choose one position  
     in each row

Well-developed harmonious hearing is important for any musician	3	2	1	0	1	2	3	Well-developed harmonious hearing is not important for all categories of musicians
There are contemporary methodologies that enable to develop harmonious hearing	3	2	1	0	1	2	3	There are no universal methodologies for developing harmonious hearing
All people can develop harmonious hearing	3	2	1	0	1	2	3	There are people whose harmonious hearing cannot be developed
During the perception of a musical composition the presence of the performer's harmonious hearing is felt	3	2	1	0	1	2	3	During the perception of a musical composition the presence of the performer's harmonious hearing is not felt
At assessing the performance, the presence of a performer's (performers') well-developed harmonious hearing is taken into account	3	2	1	0	1	2	3	At assessing the performance, the presence of a performer's (performers') well-developed harmonious hearing is not taken into account

At my classes I devote enough time to the development of harmonious hearing	3	2	1	0	1	2	3	At my classes I don't devote enough time to the development of harmonious hearing
Students like to do exercises on the development of harmonious hearing	3	2	1	0	1	2	3	Students don't like to do exercises on the development of harmonious hearing
There is a sufficient number of methodologies on the development of harmonious hearing	3	2	1	0	1	2	3	There is not a sufficient number of methodologies on the development of harmonious hearing
My own competence allows me to develop students' harmonious hearing	3	2	1	0	1	2	3	My own competence does not allow me to develop students' harmonious hearing
I have a well-developed harmonious hearing	3	2	1	0	1	2	3	I don't have a very well-developed harmonious hearing
If students' harmonious hearing is well-developed there is more chance to win a prize at competitions	3	2	1	0	1	2	3	Students' well-developed harmonious hearing does not influence winning prizes at competitions

8. Compare different forms of work applied at sol-fa classes for developing harmonious hearing by their significance (importance) according to a 5-grade scale (from 1 to 5), where

"1" – unimportant

"2" - more unimportant than important,

"3" – actually may agree, though it is important not always,

"4" – as a rule, it is important,

"5" – important always and to full extent for this form of work

Sol-fa work forms:

1. Solo sight-singing,
2. Polyphonic singing
3. Writing a music dictation,
4. Composing accompaniment for the given melody,
5. Memorizing a melody by heart,
6. Aural analysis,
7. Chanting rhythm exercises,
8. Vocal improvisation,
9. Canon singing,
10. Composing melodies in the given time, genre.

Thank you!

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## **USE OF MUSICAL COMPUTER TECHNOLOGIES (MCT) IN THE PROCESS OF MUSIC EDUCATION OF SENIOR PUPILS**

**Sandra RIMKUTĖ-JANKUVIENĖ**

*Klaipeda University, Lithuania*

*e-mail: sandra.rimkute.jankuviene@gmail.com*

### **Abstract**

*The article presents quantitative and qualitative data of music teachers' questionnaire revealing the peculiarities of use of MCT in the process of music education of senior pupils: the aims of use of MCT in the process of music education are analysed, the character of use of MCT and some problems are disclosed. Employing MCT, music teachers seek to develop creativity of senior pupils, to expand opportunities of teaching/learning music, to advance pupils' abilities to work with MCT. Use of MCT in the process of music education of senior pupils also stimulates pupils' motivation to study music. However, the research has revealed that there are not enough of computerized workplaces in music classrooms with music software installed, teachers lack competence in use of MCT in educational process, and during the process of music education technical problems often arise.*

**Key words:** *musical computer technologies; music education.*

### **Introduction**

The society which has entered the new millennium – 21st century – inevitably faces diversity, more and more complex life, full of media, computer technologies, and flow of continual and rapidly changing new information. Any sphere of a person's life or professional activity cannot be imagined without telecommunication infrastructure and technological instruments. Educational system is not an exception as lately in Europe it is rapidly changing due to the requirements to develop not only universally educated and creative people, but also to expand the innovation potential (decision of European Parliament and Council to declare 2009 the year of Creativity and Innovation). The aim is to foster education with regard to the new challenges facing society, to new opportunities, thus, general education at schools is being modernized, schools are being renewed, and supply of education is being improved. The programme of implementation of information and communication technologies is

being accomplished at schools alongside with creation of the maintenance basis and the system of continual update of these technologies.

The latter changes have formed the basis of integration of various computer technologies into educational system. The opportunities of applying them in different subjects are searched for. According to P. Burnard and J. Finney (2007), in music education computer technologies become instruments that help not only to involve pupils into diverse musical activity, but also to create and perform music together. They are tools by means of which music is consumed, and teachers together with pupils are given freedom of mutual participation in performance. Together with habitual computer technologies in music education, special means are employed as well: various sound and video technologies, special software for teaching/learning and creation of music, and etc. Computer, electronic technology with programmes of creation, editing or any other music related activity as well as teaching software installed, are called musical computer technologies (further – MCT).

Musical computer technologies (MCT) are a constituent part of information and communication technologies (ICT). In the articles that publish scientific research one can find different definitions of MCT. In many scientific articles published in English MCT is called „*music technology*“. According to P. R. Webster (2002), it is the means that help a person to create, recreate and better understand the art of music sounds. In the opinion of Ch. Criswell and E. Menasché (2009), MCT can be divided into five categories:

- learning and practice aids, for instance, technical or computer equipment that helps to learn to play music instruments; software for teaching/learning music theory and etc.;
- performance tools, for instance, electronic music instruments, virtual instruments, and etc.;
- music creation products – these are music software providing the opportunity to create music from provided musical templates when for any instrument a musical example is selected from the programme's library;
- music production software, providing the opportunity to record, edit, mix or change audio or MIDI soundtracks in any way;
- recording and distribution technology, for instance, audio system, mixers for recording and rendering, and etc. In accordance with the way how these MCT are used, the character of the process of music education depends.

As stated by J. Dorfman (2013), the character of use of MCT in the process of music education changes actions of participants of education as well. The author marks out the following terms of use of MCT in musical activity: *integration of computer technologies* and *Technology-Based Music Instruction* (TBMI). In the first case technologies are usually used by a teacher, and in the second case – by both participants of education: a teacher and a pupil (Dorfman, 2013). Therefore, it is understandable that the way MCT is used differs in both cases. In the process of music education use of MCT provides vast opportunities for improvement of educational process as well as for implementation of innovations in music education: programmes of arrangement allow each pupil trying one's strength in the sphere of music creation; demo programmes and equipment for reproduction of sound provide new opportunities to get acquainted with world's musical culture in a visual, interesting

and integrated way (Gall, Sammer & De Vugt, 2012). Research proves (Bula, 2011) that pupils in whose music education MCT are used differ from the ones, who are educated using traditional teaching/learning instruments.

Use of MCT in the process of music education provides quite a lot of advantages:

- enhancement of attractiveness of musical activity to pupils (Shade & Watson, 1990);
- expansion of the content of music subject, improvement of abilities to solve problems and enhancement of quality of development of musical abilities (Bresler & Thompson, 2002);
- assurance of social solidarity, realization of group identity or self-realization (Burnard & Finney, 2007);
- expansion of opportunities to create music to pupils with diverse musical experience, improvement of learning achievements, consolidation of learning motivation, organization of new musical activities, freedom of pupils' self-expression (Gall, Sammer & De Vugt, 2012).

Some authors note that use of MCT in music education particularly increases pupils' independence, creativity, develops the abilities of critical thinking (Sabaliauskas, Morkevičienė, 2007). Others distinguish opportunities of development of musical creativity while using MCT (Crow, 2006; Burnard & Finney, 2007; Criswell, Menasché, 2009; Watson, 2011). For example, according to B. Moore (2002), composing of music with computer technologies joins together convergent and divergent types of pupils' thinking.

The problem of use of MCT in music education is analysed in scientific literature of various countries; however, it is mostly recommendatory in character. There is a lack of research revealing the peculiarities of use of MCT in the process of music education of senior pupils. In the system of Lithuanian music education the beginning of use of MCT dates back only to the last decade. After implementation of Lithuanian State Education Strategy of 2003–2012 many Lithuanian schools were being modernized, information and communication technologies (ICT) were implemented in the classrooms of various subjects. When Education Supply Centre by the Ministry of Education and Science was accomplishing the project „*Infrastructure of Technologies, Arts, and Natural Sciences*”, more than 170 schools were provided with computer technologies and music software for teaching and creation of music until 2014. The Internet websites for music pedagogues present methodological aids for teaching music using MCT. However, there is no research revealing aims, character of use, advantages of MCT in music education of senior pupils. The latter and other peculiarities of use of MCT were analysed with the help of a questionnaire to music teachers.

**The aim of the research:** to reveal the peculiarities of use of MCT in the process of music education of senior pupils.

**The method of the research:** analysis of scientific literature, a questionnaire to music teachers.

## Methodology of the Research

With the aim to reveal the peculiarities of use of MCT in the process of music education of senior pupils, a questionnaire to music teachers was prepared. According to A. Valackienė and S. Mikėnė (2008), a questionnaire can be applied when the problem under research has not been sufficiently analysed from theoretical and empirical aspects. In the opinion of B. Bitinas (2006), the advantage of a questionnaire in comparison with other research methods is that using a questionnaire allows collecting information from a big number of respondents: a questionnaire diagnoses the opinion of respondents, but not a social or pedagogic phenomenon. The questionnaire to music teachers helped to investigate music teachers' opinion regarding the aims of use of MCT in the process of music education of senior pupils, its advantages and problems arising. The research also aimed at revealing

- *What MCT music teachers used while teaching senior pupils?*
- *How they organized the process of music education of senior pupils while using MCT?*

The questionnaire aimed to obtain the information of both quantitative and qualitative character. The questions in the questionnaire were divided into three groups: 1) supply of music classrooms with MCT and frequency of their use in the process of music education; 2) practical experience of respondents while using MCT (*What music teaching and composing programmes are used? How often tasks requiring use of music teaching and composing programmes are presented in a music lesson?*); 3) demographic data of the respondents.

Respondents of the questionnaire were selected purposefully, i.e. music teachers whose work environment was supplied with MCT. It was hoped that the answers of selected respondents would better reveal the peculiarities of use of MCT in music education of senior pupils. 175 teachers working at schools that were supplied with computer musical teaching aids and sets of MCT equipment in accordance with the 2nd objective of the 2007–2013 action plan of stimulation of cohesion „*Quality and Accessibility of Public Service: Health, Education and Social Infrastructure*”, the instrument VP3-2.2-ŠMM-01-V „*Implementation and Improvement of Teaching Infrastructure of Technologies, Natural Sciences and Arts at Comprehensive Schools*” and the project „*Infrastructure of Technologies, Arts and Natural Sciences*” (more about the project see <http://www.sac.smm.lt/index.php?id=26e>) were chosen to answer the questionnaire.

All the headmasters of schools that have received the sets were sent an official e-mail asking for consent to take part in the research. Having received positive answers from headmasters, 110 music teachers were invited to participate in the research. Due to various reasons (teachers refused to participate themselves, letters not containing questionnaires were received, and etc.) a part of teachers' answers was not assessed.

80 music teachers from 27 Lithuanian towns took part in the research: 35 work in big cities of Lithuania (Vilnius, Kaunas, Klaipėda, Šiauliai), 45 in different districts of Lithuania (Anykščiai, Birštonas, Ignalina, Jonava, Kėdainiai, Kelmė, Kupiškis, Lazdijai, Marijampolė, Tauragė, Trakai, Utena and etc.). Mostly teachers with long experience of pedagogic work from 21 to 25 years answered the questionnaire, almost half of the

respondents (47.5 %) have qualification of a methodologist, and vast majority of the respondents are women (80 %).

The 19.0 version of IBM SPSS (*Statistical Package for the Social Science*) software was used for processing the questionnaire data. The methods of statistical analysis were applied: Chi square criterion, calculated statistical averages, qualitative content analysis.

## The Results of the Research

### *A. Provision with MCT and frequency of its use in the process of music education*

The data analysis of music teachers' questionnaire shows that music classrooms are only partially equipped with computer hardware necessary for pupils' and teachers' work. All the respondents have their music classrooms supplied with desktop computers for teachers' work. Meanwhile, only 87.5 % of surveyed music teachers' classrooms are provided with hardware for pupils' use. Most often only four (35 % of all respondents) or eight (15 % of all respondents) have computerized workplaces in music classrooms equipped with MIDI keyboards, headphones for pupils' use. Two pedagogues have indicated having 15 and 25 computerized workplaces for pupils. The latter shows that despite the fact that majority of Lithuanian schools have computerized workplaces equipped, however, they are mostly assigned to teacher's work. Each pupil is provided with an opportunity to work on computer individually only in one third of schools that had taken part in the research. Consequently, bigger groups of pupils do not have an opportunity to work efficiently on one computer. The research data has showed that only a little more than a fourth of music classrooms (27.5 %) of schools that have participated in the research have the software for composing music installed in one computer (almost in all cases meant for teacher's work). A situation is a little better regarding implementation of music teaching software: almost half of the subjects (42.5 %) point out that the latter programmes have been installed in eight computerized classrooms.

Teachers were asked to point out the frequency of use of music software and computer hardware in the process of music education (see Table 1).

**Table 1. Provision of a music classroom with music software and computer hardware and the frequency of their use in the process of music education (N=80 %)**

<i>MUSIC SOFTWARE</i>	<i>PROVISION OF A MUSIC CLASSROOM</i>		<i>FREQUENCY OF USE</i>				
	<i>Provided</i>	<i>Not provided</i>	<i>Never</i>	<i>Very rarely</i>	<i>Rarely</i>	<i>Often</i>	<i>Very often</i>
Software for composing of music	<b>86.2</b>	13.8	12.5	20.8	<b>31.4</b>	14.5	20.8
Software for teaching music	<b>58.7</b>	41.3	<b>25.0</b>	23.3	21.0	20.4	10.3
<b><i>Computer hardware</i></b>							
Desktop computer (for a teacher)	<b>100.0</b>	0.0	14.9	2.5	1.3	7.5	<b>73.8</b>

Headphones	<b>100.0</b>	0.0	27.4	11.3	8.8	20.0	<b>32.5</b>
Microphone	<b>86.3</b>	13.7	18.6	18.8	11.3	25.0	<b>26.3</b>
MIDI keyboard	<b>86.2</b>	13.8	<b>51.1</b>	16.3	17.5	6.3	8.8
Desktop computer (for pupils)	<b>85.0</b>	15.0	21.1	10.0	13.8	<b>33.8</b>	21.3
Electronic piano	<b>83.8</b>	16.2	21.2	2.5	12.5	3.8	<b>60.0</b>
Acoustic-electric guitar	<b>81.3</b>	18.7	23.6	5.0	6.3	16.3	<b>48.8</b>
Speaker for electric guitars	<b>77.5</b>	22.5	17.4	7.5	10.0	16.3	<b>48.8</b>
Electric guitar	<b>77.5</b>	22.5	29.9	10.0	5.0	18.8	<b>36.3</b>
Bass guitar	<b>75.0</b>	25.0	34.8	3.8	11.3	16.3	<b>33.8</b>
Speaker for bass guitars	<b>75.0</b>	25.0	34.8	3.8	11.3	16.3	<b>33.8</b>
Home theatre	<b>72.5</b>	27.5	43.7	3.8	5.0	10.0	<b>37.5</b>
Record mixer	<b>61.3</b>	38.7	<b>58.6</b>	13.8	8.8	10.0	8.8
Camera	<b>57.5</b>	42.5	<b>47.4</b>	12.5	12.5	6.3	21.3
Mixer	<b>57.5</b>	42.5	<b>47.4</b>	13.8	12.5	10.0	16.3
Video camera	26.3	<b>73.7</b>	<b>75.0</b>	5.0	5.0	10.0	5.0

Though according to the project „*Infrastructure of Technologies, Arts, and Natural Sciences*” all schools that have taken part in the research had to be provided with computer hardware and software, however, the research data shows that the number of schools that are supplied with above mentioned equipment is much smaller. Only a fourth of schools-participants (26.3 %) have video cameras, a little more than a third of them have cameras and mixers (57.5 %), software for music teaching (58.7 %). All classrooms (100 %) are provided with a desktop computer for a teacher and headphones.

Most often in the process of music education teachers use the following computer equipment: a teacher's computer (73.8 %), electronic piano (60.0 %), and acoustic-electric guitar (48.8 %). Most rarely used are: MIDI keyboard (8.8 %), software for composing and teaching music (correspondingly 20.8 % and 10.3 %). We can state that the majority of teachers have sufficiently well-equipped computerized workplaces in their classrooms, however, they do not use hardware and software often enough.

The research data analysis has revealed that in some cases provision with aids does not show the frequency of their use. For example, 41.3 % of music teachers that have participated in the research are not supplied with software for music teaching, and 25.0 % of them never use it, 22.5 % of the respondents are not provided with a speaker for electric guitars, and 17.4 % of them do not use it. This shows that some teachers whose classrooms are not supplied with the aids in accordance with the project „*Infrastructure of Technologies, Arts, and Natural Sciences*” have discovered other opportunities of using MCT in the process of music education of senior pupils.

Music software embraces a big variety of separate programmes. Applying them creates conditions for increasing attractiveness of studies, generates interest in musical creation, and develops pupils' creative abilities. Therefore, it was inquired

what software for composing and teaching music teachers use in the process of music education (see Table 2).

**Table 2. Teachers who use music software in the process of music education (N=80 %)**

MUSIC SOFTWARE	TEACHERS (%)	MUSIC SOFTWARE	TEACHERS
<b>Magix MusicMaker *</b>	<b>60.0</b>	Finale	10.0
<b>Sibelius *</b>	<b>32.5</b>	Encore	7.5
<b>Sibelius Grove City *</b>	<b>27.5</b>	Microsoft Songsmith	2.5
Virtual instruments	20.0	Soundation Studio	2.5
Cubase	15.0	JamTower Solfeggio Studio	2.5
Mokomieji kompiuteriniai žaidimai	12.5	Compose	0.0
WaveLab	12.5	EarMaster	0.0
Audacity	10.0	Other	2.5

\* programmes, implemented during the project „Infrastructure of Technologies, Arts, and Natural Sciences“

In music lessons the majority of teachers (60.0 %) use *Magix MusicMaker* programme, almost a third – *Sibelius* (32.5 %) and *Sibelius Grove City* (27.5 %) the programmes developed to study notation and composing. Particularly these programmes were received and implemented during the project organized by Lithuanian Ministry of Education and Science. Some teachers (1-2 respondents) have also mentioned other programmes that have not been included in the questionnaire: *Musition*, *Notation composer*, *FL Studio*, *Chord Pulse*, *Muse Score*, *Cake Walk*, *Garage Band*, *Auralia*, *Nuendo4*, *SonarLee*. It is possible that if some teachers' and pupils' computerized workplaces do not have the software from the project „Infrastructure of Technologies, Arts, and Natural Sciences“ implemented, teachers look for other music software that is suitable for teaching and creation of music.

The research data has revealed that some teachers use computer technologies very often trying to realize various aims, while to others computer technologies are a challenge, their use is demanding to the teachers themselves. During the analysis of the questionnaire data it was verified whether the respondents' answers differed regarding the use of music software in accordance with teachers' qualification and pedagogic work record.

Statistically significant differences have been discovered among music teachers with different qualifications while using the programmes of *Sibelius Grove City* ( $\chi^2=8.328$ ;  $df=1$ ;  $p=0.004$ ) and *MagixMusicMaker* ( $\chi^2=5.017$ ;  $df=1$ ;  $p=0.025$ ). Methodologists and experts have indicated using the above mentioned programmes more often than teachers and senior teachers.

Comparing the answers of teachers that have different experience with regard to their pedagogic work record, statistically significant differences have been discovered regarding application of *Sibelius Grove City* ( $\chi^2=4.968$ ;  $df=1$ ;  $p=0.026$ ) and *Sibelius* ( $\chi^2=6.453$ ;  $df=1$ ;  $p=0.011$ ) programmes. Teachers having greater pedagogic work record, 26 and more years, use these programmes more than the ones whose pedagogic work record is from 6 to 25 years. Meanwhile, pedagogic work record does

not influence the use of other programmes; therefore, differences among groups are not statistically significant.

### ***B. Aims of use of MCT in the process of music education***

Use of music software and computer hardware in musical activity is often employed for realization of various educational aims. Therefore, teachers were asked to point out what were the aims of use of MCT in the process of music education of senior pupils. While analysing teachers' answers, several categories of aims of use of MCT have been marked out (see Table 3). A little more than a third of teachers have pointed out that they use MCT for the development of pupils' creativity:

*I seek to introduce pupils to the programmes of music creation so that they could try themselves in the process of creation, would be able to make sound recordings for school events, to manage sound systems, to make films and mount them, would be able to make phonograms, edit and arrange music records (M12).*

*I use music computer technologies with the aim to develop pupils' desire to become interested in modern technologies for creation of music. I encourage playing music while using contemporary means of music performance, seeking to develop creativity (M16).*

About a third of teachers with the help of music computer technologies seek to diversify teaching/learning of music with new work methods and instruments. Teachers use MCT for search of information, for its figurative presentation, for assessment of pupils' achievements. Some teachers state that while using MCT in music education they seek to develop pupils' abilities to use MCT.

Among the teachers surveyed there were the ones (N=3) who indicated that software cannot be used in lessons as pupils already need to have excellent knowledge of music notation (M30), need to be gifted for music (M60). These teachers point out that use of software is possible only at a music school.

***Table 3. Aims of use of music software and computer hardware in the process of music education***

CATEGORIES	EXAMPLES OF PROPOSITIONS
Development of pupils' creativity (N=36)	<p><i>Creatively apply the knowledge of music theory in practical activity, in creation of contemporary music, in ability to create musical accompaniment (M18).</i></p> <p><i>To develop a universal, creative person having a good taste in music (M24).</i></p> <p><i>To encourage pupils' creativity, to make them interested in the means for composing of music (M56).</i></p> <p><i>To encourage to model, to compose using the programme templates, to create their own songs, phonograms (M14).</i></p>
Expansion of opportunities of music education (N=31)	<p><i>Using computer technologies, to present teaching materials, to make them diverse by more abundant visual aids (M37).</i></p> <p><i>To perceive music actively: while holistically discussing composition, styles, elements of musical language, cultural outlooks, talking about technology and creation of music (M26).</i></p>



	<i>I seek to introduce pupils to diverse world of music, to a greater opportunity to find and to listen to worldwide music compositions, to teach to write music notation, to edit music, to create (M58).</i>
Development of pupils' abilities to work on MCT (N=10)	<i>While using musical computer technologies during a lesson I develop pupils' abilities to work on musical programmes (M4); I encourage to use musical computer technologies for personal needs (M26); To introduce with opportunities provided by software and hardware and to teach to apply all this knowledge in the process of creation (M51).</i>

### **C. Advantages and disadvantages of use of MCT in the process of music education**

The aims of use of music software and computer hardware that have been indicated by the teachers who have participated in the research substantially coincide with the advantages of use of MCT in the process of music education (Table 4). During the data analysis four categories of advantages of MCT use have been marked out. Almost a third of the respondents have indicated that MCT develops opportunities of teaching/learning music since a lesson becomes more figurative, pupils appropriate teaching materials better. A little more than a fourth of music teachers state that use of MCT helps to develop pupils' creativity. Moreover, music teachers who took part in the research state that use of MCT is a more interesting and attractive activity that encourages pupils' motivation to teach/learn music.

Teachers have also mentioned differentiation and individualization of education as an advantage of use of MCT in music education. Some teachers have also pointed out that use of MCT helps to solve the problems of pupils' discipline. There were teachers who did not see any advantages and mentioned only problems (for example, lack of computers limits use of MCT in music lessons, lack of pupils' motivation, lack of teachers' competence).

**Table 4. Advantages of use of music software and computer hardware in a musical process**

<b>CATEGORIES</b>	<b>EXAMPLES OF PROPOSITIONS</b>
Expansion of teaching/learning opportunities (N=30)	<i>Rapid finding of information, variety of interpretations, more interesting lessons, more possibilities for improvement (M17). Pupils are given freedom to choose musical activity: creation, performance, studies of music history (M33). A teacher can present theoretical material relating it closely with practical tasks, examples that enable better appropriation of teaching materials (M75).</i>
Development of pupils' creativity (N=24)	<i>Musical computer technologies brought pupils closer to musical creation as they allow eliminating reading and writing of notation that requires great efforts. And it is not only because of a possibility to compose templates. Musical computer technologies have transferred the subject of music from the space of performance art to the space of composing creation naturally and simply (M26). It is an opportunity to look for new means of musical expression. For a pupil an opportunity to perceive the principles of music (M37).</i>

Enhancement of music learning/teaching motivation (N=20)	<p><i>Pupils work willingly and actively, are motivated to learn music, get acquainted with musical computer technologies (M12).</i></p> <p><i>Pupils are interested; they can be presented with teaching materials more quickly and interestingly (M32).</i></p> <p><i>It is an advantage as it is very difficult to make a pupil interested these days, to involve him/her into studies of music history and theory, of musical notation, and computerized work allows at least a short presentation and discussion about great composers (M24).</i></p>
Individualization and differentiation of education (N=6)	<p><i>It is an opportunity to differentiate teaching taking into account pupils' interests (M4).</i></p> <p><i>Without a computer's help only a little number of particularly gifted children could create music or realize various musical projects, besides every computer with a keyboard is an additional musical instrument in a classroom (M9).</i></p>

The teachers who have participated in the research perceive quite a lot of problems related to use of MCT in the process of music education of senior pupils. They could be distributed into five categories (see Table 5). A third of music teachers state that the main problem of use of MCT is the lack of their own competence. Teachers mention that they have not been taught to work with music software; some of them lack skills of work with computer hardware. According to teachers' opinion, the quantity of MCT in music classrooms is insufficient for effective music education when the number of pupils in a class sometimes reaches 30. Technical problems are also encountered when computers cannot work efficiently using new music software or external hardware because of insufficient power of processor. Other teachers also state that they cannot use MCT because of small number of music lessons since during one lesson a week they are not able to teach everything they have planned, and computer hardware and/or software would not make their work easier:

*This year I tried to execute a project for 10th formers that I have been sent to regarding future exams in 2015. However, during one lesson a week working with a class of really advanced pupils I was able to fulfil only 25 percent of the programme and with other classes even less. During the school year there are holidays, epidemic of flu, and various school events. There is a lack of time for such an extensive programme (M60).*

Some other teachers have pointed out that pupils lack motivation to work on MCT and especially the ones who already know well the specificity of work with music software or are more gifted.

**Table 5. The problems of use of music software and computer hardware in the process of music education**

CATEGORIES	EXAMPLES OF PROPOSITIONS
Lack of a teacher's competence (N=32)	<p><i>I myself need to master musical computer programmes. I think that educational process depends on a teacher's ability to adapt music software to analysis of music compositions (M18).</i></p> <p><i>Teachers are completely not prepared to work with any programme; there is a lack of seminars on programmes of music teaching and creation. We study ourselves with the help of the Internet and practice (M23).</i></p>

	<i>Teachers are not taught to work with music software. Children possess better technology and are more capable of working with music software than teachers. Audio systems provided to schools from EU funds are not of the best quality and we should invest to the future (M32).</i>
Lack of provision with MCT (N=12)	<i>Computers assigned to the classrooms are not there, MIDI keyboards are locked, and we do not use them. Unfortunately, but school does not create conditions to use computer technologies in music lessons (M7).</i> <i>The number of computers in the classroom is very small. There should be a full set of them in a classroom. The quantity of legal software at school is limited, and illegal one cannot be used (M62).</i> <i>The biggest problem – there are only several computers, thus, it is very hard to organize work on them when a class consists of 20 and more pupils (M37).</i>
Technical problems (N=10)	<i>Expensive programmes, weak technical characteristics of computers (M9).</i> <i>Of technical character, for example, while listening to a composition, the Internet connection fails (M10)</i> <i>Some programmes get stuck (M40).</i>
Lack of pupils' motivation (N=8)	<i>Pupils lose interest very quickly (M15).</i> <i>A bigger percentage of pupils do not want to get interested in this activity (M80).</i> <i>It is hard to make pupils interested in musical computer technologies (M41).</i>
Lack of time (N=4)	<i>One needs to have a lot of time. And the time is limited as there is only one lesson a week (M36).</i>

#### **D. The character of use of MCT in the process of music education**

Teachers were asked how often they created conditions for pupils to perform tasks using programmes for teaching and creating music. The analysis of the research data shows that half of music teachers who have taken part in the research use programmes for teaching music and its creation only for performance of a specific project/group task. Meanwhile, evident minority of pedagogues (25 %) use programmes for teaching music and its creation systematically (each lesson or every second/third lesson). Teachers were asked how they organized a music lesson, how much of its time was devoted to work with music software. Some pedagogues state that in case of having only several computers in a classroom pupils distribute among them: while some pupils work, others observe them (22,5 %), meanwhile others state (27,5 %) that under such conditions some pupils work on computers and others are occupied with some different unrelated activity. Other music teachers who have participated in the research have pointed out that in a classroom there is a computer for every pupil (11,3 %) or two pupils share one computer (8,8 %), therefore, all pupils work at the same time. The time devoted to work with MCT in a lesson varies from 5 to 45 minutes.

Teachers were also asked to indicate how they organized teaching/learning of music while applying MCT in a music lesson. Almost a third of teachers (29,9 %) have pointed out that work with MCT is mostly organized in small groups (for example, „work in groups in turns 20 minutes each because there are not enough computers“, M12). Some teachers (N=12) have proved previously mentioned fact that there is a lack of computers in music classrooms or MCT are not installed in them, therefore, computer technologies are not used in music lessons.

## Conclusions

1. The data from the questionnaire of music teachers has revealed that use of MCT in the process of music education of senior pupils is possible if the classrooms of music teachers are sufficiently supplied with music software and computer hardware. However, provision of the classroom, in accordance with the data of research, does not guarantee the intensity of use of MCT in the process of music education. Mostly MCT meant for a teacher's work are used in the process of music education. Though MCT meant for pupils' teaching/learning of music are used quite rarely, teachers state that use of MCT helps to expand teaching/learning opportunities, to develop creativity of senior pupils, to stimulate motivation to teach/learn music, to develop pupils' abilities to work on MCT which could be applied in the process of musical creation. With regard to pupils' experience, their interests and abilities, music education can be individualized and differentiated while using MCT.
2. Music education while using MCT is organized depending on provision of the classroom. Since there is a lack of MCT in majority of music teachers' who have participated in the research classrooms, consequently, during music lessons pupils most often work by one computer in small groups in turns. Such activity is organized not every lesson, and the time devoted to work with MCT varies from several minutes of a lesson to the whole lesson.
3. Mostly, music teachers who have participated in the research in the process of music education use the software received after the implementation of the project „*Infrastructure of Technologies, Arts, Science and Nature*” such as *Magix MusicMaker*, *Sibelius*, *Sibelius Grove City*. These programmes most often are used in extra-curricular activity: for accomplishment of school events, projects. These programmes are also used in music lessons, though not very often. However, music teachers who have taken part in the research state that use of MCT is limited: there is a lack of competence to work with MCT, of knowledge how to solve technical problems of the software arising during a lesson.

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# **PROBLEMS IN MUSIC PEDAGOGY**

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## FACILITATING THE DEVELOPMENT OF MUSICAL MEMORY IN PRIMARY SCHOOL MUSIC TEACHING

**Ilze VILDE & Dace MEDNE**

*Jāzeps Vītols Latvian Academy of Music, Latvia*  
e-mail: [ivilde@inbox.lv](mailto:ivilde@inbox.lv)

### **Abstract**

*Musical memory is an ability that makes it possible to memorize, retain, reproduce and forget musical ideas, images, sound movements, pitch etc. created by the perceived music and by information it provides. Therefore musical memory is regarded as one of the components characterizing musicality.*

**The aim of the research** is to explore the development of musical memory in the music teaching process in a primary school.

*The results of the empirical research allow concluding that between the ages of 6/7 and 11/12 the musical memory of children develops rapidly, if various exercises aimed at perceiving, memorizing, retaining and reproducing the musical material are done.*

**Key words:** musical memory, music teaching at primary schools.

### **Introduction**

Musical memory and the quality of its development facilitate a successful implementation of cognitive processes and musical activities. Musical memory is a component of a cognitive activity which, combined with music perception and musical thinking, is the main condition for studying music. On this, both the musical and pedagogic activities of a composer, performer and listener are based (Петрушин, 2009). Perceptual sensitivity to music, emotionality and ability to differentially hear, remember and analyze musical form and content are the necessary prerequisites for creative music perception and imagination (McDonald, 1984), which together help to feel and understand a musical image.

Musical memory is required for all musical activities, thus, for instance, when singing songs, it wouldn't be possible to reproduce a melody by ear, if musical impressions were not perceived and retained in the memory. Practice shows that primary school pupils often have difficulties in learning a new song, because their musical memory has not yet sufficiently developed. This can be established, when monitoring the pupils we see that their musical hearing and music making skills are sufficiently well

developed, but at singing songs by heart they often make mistakes, since they do not remember the melody.

Musical memory is a component of musicality without which it would not be possible to make music and study it. At assessing the significance of musical memory, we could not overlook the need to explore musical memory and prerequisites for its development for a specific age group – children of primary school period. Children of this age are emotionally open and are willing to learn and acquire new things. This opens up plenty of opportunities for a teacher to carry out the set aims and tasks – to develop pupils' musicality and their musical memory.

**The aim of the research** is to explore the development of musical memory in the music teaching process in a primary school.

**The research object** is a music teaching process in general education primary schools.

## **Methods and Sample**

The following research methods were used in the study: the analysis of theories of psychology and pedagogy about musical memory and its types, which participate in music making and music listening processes and are components of cognitive activity; pedagogical observation; a survey and the analysis of descriptive statistics. The issue relating to the link of musical memory with other musical abilities that make it possible to perceive music is also examined, because the qualitative indicator of memory is accuracy – precise memorizing of musical material, and stability – the length of time this material is kept in memory and can be recalled. The specificity of primary school learner's musical memory has been analyzed as well.

The study gives the analysis of the data obtained from the empirical research, which allow making conclusions about the development of musical memory at teaching music in primary school.

200 primary school learners, between the ages of 6/7 and 11/12, and learning in general education institutions of rural areas participated in the study.

## **Musical Memory and its Types**

Musical memory is an ability that is an active part of human psychic processes and a component of cognitive activity. Musical memory makes it possible to memorize, retain, retrieve and forget the ideas, musical images, sound movements, pitch etc. perceived from musical material, created by information provided by this material and generated by musical experience (Snyder, 2000). Musical memory manifests itself in the ability to represent (to reflect the pitch and rhythm movements in consciousness), to retain and remember the perceived music and helps to determine changes and the logic of its development (Sloboda, 2005; Hallam, 2006).

Musical memory is a condition for a human contact with music, since in order to understand the sense of music, memory should retain sounds and their properties, harmonies and themes, changes in them and individual intonations etc. (Sloboda,

Lehmann & Woody, 2007). Musical memory fixes not only the sounding music, but also the nature of human emotional experiences, and either separates them from or merges them with images created by music (Старчеус, 2003). Musical memory integrates musical impressions, as well as the routes and techniques of their creating.

People's abilities to learn and perform music from memory are different: for some, this ability is, obviously, limited despite their good ear for music and considerable musical experience; even people with absolute pitch may have different capacities of musical memory.

Musical memory is divided into three types:

- short-term musical memory;
- operational musical memory;
- long-term musical memory (Старчеус, 2003).

Short-term musical memory is limited by its capacity and duration – images emerge for a short time at the moment of perceiving music and are retained for a couple of seconds, very seldom – for some minutes, and then they disappear. These images are characterized by a peculiar photographic property – retaining the nature of sounding, absolute pitch, timbre and intensity. This is only an individual specific perception and there is no generalization in it. Despite its vitality, in short-time memory the sound image is not stable (approximately from 6/7 to 10/15 sounds of melody or 15 seconds of duration) (Старчеус, 2003).

The sound image disappears in two ways:

- the image rapidly fades, becomes dull, loses color and disappears completely;
- the image disintegrates into small fragments or even into isolated sounds (which can retain a sensual brightness), usually into the initial and final sounds, sometimes – into a highest and a lowest sound of a melody, but later, if no reinforcement follows, even these sounds disappear (Старчеус, 2003).

The major task of operational memory is creating and retaining the musical image (wholeness) when music is perceived and made. Without this, understanding and intoning of sounds are impossible. Musical image, stored in operational memory, embodies also the psychological nature of musical understanding and of emotional experience. For the majority of people, a minimal unit of operational musical memory is a tune – a combination of sounds around a strong beat, a maximal unit – several tunes or phrases. The capacity of minimal and maximal operational units for musicians is much broader and may include long melodies as well as detailed and extensive multi-layer music fragments. The capacity of a memory operational unit can be impacted by the degree to which the style of the composition and music language are acquired (Старчеус, 2003). Operational memory takes part in the processes of learning the material with a lasting perspective.

Long-term memory, actually, fixes the whole human musical experience and holds not only sound properties, intonations, perceptions about possible relations between them, activities related to performing and learning music, but also musical experiences. Long-term musical memory is stored with a variety of music-related features included in the terms: pitch, timbre, dynamics, scales, rhythms, melodies,

harmonies, forms, genres, styles etc. as well as with the relationships between these features at different levels (Старчеус, 2003), and it makes it easier to arrange and remember them, thus creating a system of musical logic. Simultaneously, musical memory retains musical images which evoke individual experiences of man. They consist of individual expressive intonations, sound bites and movements, melodies and whole compositions. Each of our musical experience events is retained in memory in two ways – generalized and sensuously specific form.

The qualitative indicator of musical memory is accuracy, i.e., the correspondence of the perceived and memorized musical material and images with a real object. This is possible, if the ability to perceive sounds discriminatively and ability to reflect pitch and rhythm movements in one's mind are developed, and also if the stability of memory is developed – the length of time the retained material is remembered and can be recalled (Теплов, 1980). The development of musical memory can be essentially impacted by the level of learner's music perception and musical thinking, by the quality of memory training as well as by musical experience that is gained from music making, composing, listening to and analyzing music. The analysis of the heard music enhances the development of conscious musical memory which involves music perception and musical thinking – the ability to follow the changes in the mood of music, to comprehend the interrelations between intonations, melodies, images, parts of a composition, the idea as a whole, expressiveness of music language, to distinguish music means of expression (Liduma, 2004). In relation to musical thinking the perception of music contributes to the development of understanding music. In the process of musical thinking the emotional experience, knowledge of musical language, ability to control oneself during the performance of music are actualized (Подуровский, Сулова, 2001).

### **Organization of the Empirical Research and Substantiation of Methods**

The aim of the empirical research is to study the development of learners' musical memory during the teaching/learning process in primary schools of general education institutions. The empirical research was carried out in schools of rural regions where the Curriculum of General Primary School Education is implemented and music lessons are conducted twice a week. 200 primary school pupils took part in the research: at the initial stage of research they were in forms 1 – 3, while by the end of the experiment – in forms 3 – 5. The data needed for the experimental research have been collected and analyzed within the frame of three stages: S – the first; V – the second; B – the third stage. During the empirical research, the data have been collected by the author of the research – as an expert, by students – future music teachers (7 students), and by primary school learners themselves assessing their own achievements in developing musicality at music lessons.

During the empirical research, within the frame of music lessons, primary school learners' musical memory has been purposefully and regularly developed by applying various methods and techniques. In order to determine the developmental level of primary school learners' musical memory levels, criteria and indicators have been worked out, by means of which the dynamics of musical development during the singing process can be determined (see Table 1).

**Table 1. Levels, criteria and indicators of the development of primary school learners' musical memory**

CRITERIA	LEVELS	INDICATORS
1. Perceiving and repeating short phrases	1 <sup>st</sup> level	Perceives and repeats short phrases very poorly
	2 <sup>nd</sup> level	Perceives and repeats short phrases poorly
	3 <sup>rd</sup> level	Perceives and repeats short phrases satisfactorily
	4 <sup>th</sup> level	Perceives and repeats short phrases well
	5 <sup>th</sup> level	Perceives and repeats short phrases excellently
2. Perceiving and repeating broader structures (4 – 8 beats)	1 <sup>st</sup> level	Perceives and repeats broader structures very poorly
	2 <sup>nd</sup> level	Perceives and repeats broader structures poorly
	3 <sup>rd</sup> level	Perceives and repeats broader structures satisfactorily
	4 <sup>th</sup> level	Perceives and repeats broader structures well
	5 <sup>th</sup> level	Perceives and repeats broader structures excellently
3. Singing songs by heart	1 <sup>st</sup> level	Sings songs by heart very poorly
	2 <sup>nd</sup> level	Sings songs by heart poorly
	3 <sup>rd</sup> level	Sings songs by heart satisfactorily
	4 <sup>th</sup> level	Sings songs by heart well
	5 <sup>th</sup> level	Sings songs by heart excellently

Indicators and their levels allow for assessing musical memory according to the age group of primary school learners in the process of singing and rhythm beating, which are the types of activity most frequently used at music lessons in primary school. By helping of the first (*Perceiving and repeating short phrases*) and second (*Perceiving and repeating broader structures (4 – 8 beats)*) criteria it is possible to determine learner's short-term memory by applying the technique of *voice – echo*, as well as the speed of memorizing, accuracy and amount. By helping of the third criterion (*Singing songs by heart*) it is possible to determine operational and long-term memory. Songs are taught at music lessons, pupils repeat them at home and at the next lesson they sing them by heart in the classroom. The songs are repeated again in a week and in a month to verify the stability of memory.

Empirical research methods for data collecting are observation, analysis of pedagogical situations and test works, as well as a survey. The survey was used in order the primary school learners could self-assess their musical activity. The research methods and a brief description of the coverage of events are given in Table 2.

**Table 2. A brief description of the research methods used to determine primary school learners' musical memory**

CRITERIA	RESEARCH METHODS	A BRIEF DESCRIPTION OF THE RESEARCH
1. Perceiving and repeating short phrases	Survey	Self-assessment done by primary school learners
	Observation	Observation of primary school learners' musical activity (singing and rhythm), assessing your ability to perceive and repeat short phrases
	Analysis of pedagogical situations	Analysis of primary school learners' musical activity
2. Perceiving and repeating broader structures (4-8 beats)	Test work analysis	Music dictations
	Observation	Observation of primary school learners' musical activity (singing, rhythm), assessing your ability to perceive and repeat broader structures (sentence, period)
	Analysis of pedagogical situations	Analysis of primary school learners' musical activity
3. Singing songs by heart	Survey	Primary school students' self-assessment
	Observation	Observation of the quality of singing songs by heart
	Analysis of pedagogical situations	Analysis of primary school learners' musical activity (singing songs by heart)

To obtain information about the developmental level of musical memory between the first, second and third stages, the analysis of descriptive statistics has been made, as well as the *Friedman test* for comparing interconnected research groups and the results obtained from this was carried out between stages 1 (S), 2 (V), 3 (B).

## Results of the Study

The assessment of the first-stage empirical research data about primary school learners' musical memory (see Figure 1) indicates that the level in the first criterion *Perceiving and repeating short phrases* is rather high (level 4 and level 5). This suggests that learners have a well-developed short-time memory. However, learners have problems with the second criterion - *Perceiving and repeating broader structures*: they reproduce those making mistakes in intonation and rhythm. Quite often, they can repeat a phrase of a longer structure only after it has been demonstrated to them several times.



### SMA1 Perceives and repeats short phrases (The first stage)

	Experts		Pupils		Students		TOTAL
Level 1	0,2%		0,0%		0,2%		0,3%
Level 2	1,0%		2,7%	■	1,0%		4,7%
Level 3	5,7%	■	4,7%	■	6,0%	■	16,3%
Level 4	12,8%	■	13,3%	■	12,0%	■	38,2%
Level 5	13,7%	■	12,7%	■	14,2%	■	40,5%
TOTAL	33,3%		33,3%		33,3%		100,0%

### SMA2 Perceives and repeats wider structures (4–8 bars; The first stage)

	Experts		Pupils		Students		TOTAL
Level 1	0,7%		0,7%		0,5%		1,8%
Level 2	5,2%	■	2,8%	■	4,8%	■	12,8%
Level 3	12,3%	■	7,7%	■	11,5%	■	31,5%
Level 4	13,8%	■	16,0%	■	16,3%	■	46,2%
Level 5	1,3%		6,2%	■	0,2%		7,7%
TOTAL	33,3%		33,3%		33,3%		100,0%

### SMA3 Sings folk songs by heart (The first stage)

	Experts		Pupils		Students		TOTAL
Level 1	0,7%		0,5%		0,0%		1,2%
Level 2	2,5%	■	2,3%	■	3,2%	■	8,0%
Level 3	10,0%	■	6,7%	■	6,2%	■	22,8%
Level 4	14,7%	■	11,8%	■	17,3%	■	43,8%
Level 5	5,5%	■	12,0%	■	6,7%	■	24,2%
TOTAL	33,3%		33,3%		33,3%		100,0%

**Figure 1. The data of the first-stage empirical research**

The data of the second-stage research show that musical memory has broadened, since the comparison of the levels with the first-stage research results shows the growth between the indicators *Perceiving and repeating broader structures (4- 8 beats)* and *Singing songs by heart*, because levels 4 and 5 have essentially increased (see Figure 2).

**VMA1 Perceives and repeats short phrases (The second stage)**

	Experts	Pupils	Students	TOTAL
Level 1	0,2%	0,0%	0,0%	0,2%
Level 2	0,2%	2,0%	0,2%	2,3%
Level 3	1,7%	5,0%	1,7%	8,3%
Level 4	13,8%	11,7%	12,8%	38,3%
Level 5	17,5%	14,7%	18,7%	50,8%
TOTAL	33,3%	33,3%	33,3%	100,0%

**VMA2 Perceives and repeats wider structures (4 – 8 bars; The second stage)**

	Experts	Pupils	Students	TOTAL
Level 1	0,2%	0,7%	0,2%	1,0%
Level 2	1,2%	2,8%	1,5%	5,5%
Level 3	9,7%	7,3%	8,8%	25,8%
Level 4	18,0%	13,3%	19,7%	51,0%
Level 5	4,3%	9,2%	3,2%	16,7%
TOTAL	33,3%	33,3%	33,3%	100,0%













**VMA3 Sings folk songs by heart (The second stage)**

	Experts	Pupils	Students	TOTAL
Level 1	0,0%	0,5%	0,0%	0,5%
Level 2	1,8%	2,3%	1,2%	5,3%
Level 3	7,5%	6,5%	4,0%	18,0%
Level 4	14,7%	11,2%	16,0%	41,8%
Level 5	9,3%	12,8%	12,2%	34,3%
TOTAL	33,3%	33,3%	33,3%	100,0%













**Figure 2. The data of the second-stage research**

The assessment of the third-stage empirical research data on the development of primary school learners' musical memory indicates that level 4 and level 5 are predominant here. This suggests that musical memory of primary school learners develops quite rapidly; it is especially indicated by the levels of the first criterion (*Perceiving and repeating short phrases*) where the highest percentage of assessments consists of level 5 (see Figure 3). In the third criterion – *Singing songs by heart* – the majority of primary school learners demonstrated level 4 and level 5 because they remembered the previously taught songs well, and they could not only distinguish and remember them but also sing, accurately reproducing melody and words.

#### BMA2 Perceives and repeats wider structures (4 – 8 bars; The third stage)

	Experts	Pupils	Students	TOTAL
Level 1	0,0%	0,0%	0,0%	0,0%
Level 2	0,8% 	0,5% 	0,7% 	2,0%
Level 3	6,8% 	5,3% 	4,8% 	17,0%
Level 4	16,0% 	13,0% 	15,8% 	44,8%
Level 5	9,7% 	14,5% 	12,0% 	36,2%
TOTAL	33,3%	33,3%	33,3%	100,0%

#### BMA3 Sings folk songs by heart (The third stage)

	Experts	Pupils	Students	TOTAL
Level 1	0,0%	0,0%	0,0%	0,0%
Level 2	0,7% 	1,0% 	0,7% 	2,3%
Level 3	6,3% 	4,3% 	2,7% 	13,3%
Level 4	13,2% 	12,8% 	13,5% 	39,5%
Level 5	13,2% 	15,2% 	16,5% 	44,8%
TOTAL	33,3%	33,3%	33,3%	100,0%

**Figure 3. The third-stage empirical research data**

The Friedman test results show significant differences between all empirical research stages, as indicated by the coefficient – significance  $p = 0.00$  for all parameters. The empirical research results allow concluding that the music teaching/learning process has facilitated the development of primary school learners' musical memory.

## Conclusions

1. Musical memory is related to general regularities of memory processes which involve memorizing, retaining and reproducing; as a primary school learners' musical ability it manifests itself in the memory for pitch and rhythm.
2. Musical memory develops in step with primary school learner's musical hearing, perception and musical thinking, and this contributes to hearing and analyzing the heard material, enhances the understanding about the style and genre of music, and enables to perceive music emotionally and intellectually. Primary school learner's attention plays an important part in performing an activity, and the stability of attention is maintained by diverse methodological techniques, visual aids and change of musical activities.
3. Between the ages of 6/7 and 11/12 the musical memory of children develops rapidly, if various exercises aimed at perceiving, memorizing, retaining and reproducing the musical material are done.

4. Short-term memory can be trained by various (singing, playing, rhythm) *voice-echo* exercises (pupils repeat the tune, phrase or sentence they have heard), flash-dictations (the pupils respond to the melody the teachers is playing by giving names of notes or degrees, or respond by rhythm syllables to a rhythm patterns of a phrase beaten by a teacher) etc.
5. Operational musical memory can be developed by learning songs by ear and by reading music, as well as by playing different scores on some musical instrument or participating in a collective music making, and by recalling and analyzing the heard musical material, too. The development of long-term memory can be facilitated by singing songs by heart, listening to music pieces and then recognizing them after some longer time (e.g., in two weeks, in a month or half a year).

Overall, we can conclude that at teaching music in primary schools, the development of musical memory is enhanced by the quality of musical hearing, perception and attention; it is facilitated by the involvement of musical thinking and a purposeful and regular employment of exercises, as well as by the diversity of musical experience, learners' interest and desire to work creatively.

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## LEARNING STRATEGIES FOR THE DEVELOPMENT OF THE COORDINATION BETWEEN A 7-YEAR-OLD GIRL'S VOCAL APPARATUS AND MUSICAL HEARING IN THE PROCESS OF SINGING ACQUISITION: CASE STUDY RESULTS

Jelena DAVIDOVA & Oksana ŠERŠŅOVA

Daugavpils University, Latvia

e-mail: jelena.davidova@du.lv; osivohina@mail.ru

### Abstract

*One of the most essential problems that come up at developing the coordination between the vocal apparatus and musical hearing is a superficial listening to one's own singing and appearance of shouting-like sounds in the singing. The paper will be concerned with the description of a case study aimed at exploring the opportunities of developing the coordination between a 7-year-old girl's vocal apparatus and musical hearing by applying an individual learning strategy for a specific case. The research involved 7-year-old girl from Ilūkste Secondary school. The direct observation was used in the research.*

*The authors of the paper observed the development of the coordination between the girl's vocal apparatus and musical hearing during the process of her singing acquisition. This was done using the criteria, levels and indicators of the development of the coordination between the 9-8-year-old children's vocal apparatus and musical hearing which have been developed by J. Davidova and O. Šeršņova (2012). During the research 1) the problems of the coordination between the vocal apparatus and musical hearing were identified; 2) the individual learning strategy was determined; 3) the effectiveness of this strategy was verified.*

**Key words:** *learning strategies, vocal apparatus, musical hearing, coordination, process of singing acquisition.*

### Introduction

One of the central problems in the development of musical hearing is the formation of coordination between musical hearing and the vocal apparatus, because singing is a complex process of sound formation, and coordination between musical hearing and the vocal apparatus, or the correlation between a precise intonation in singing and sense of hearing, is very important for it. The age of 6 – 7 years is favourable for

developing the coordination between the vocal apparatus and musical hearing, because:

- at the age of 6 children's vocal muscles start to form;
- at this age a child just starts to unconsciously remember the activity of voice muscles in singing;
- at the age of seven the musical education can affect the expansion of range and appearance of traits of chest register (Thurman & Welch, 2000).

In the development of coordination between the vocal apparatus and musical hearing a lot of attention has to be paid for achieving of an even, calm and deep breath, because breathing affects the quality of singing, the precision of intoning its sounding, which tells upon the development of coordination between child's vocal apparatus and musical hearing. It is essential that all parts of the vocal apparatus perform completely and interactively.

Within the frame of this research, the attempt was made to determine a learning strategy for a girl Marta (the name Marta is pseudonym) in order to promote the development of the coordination between her vocal apparatus and musical hearing, by taking into consideration her individual qualities.

**Research object:** the development of the coordination between 7-year-old Marta's vocal apparatus and musical hearing in the process of singing acquisition.

**Research aim:** to develop and experimentally verify a learning strategy for the development of the coordination between the 7-year-old Marta's vocal apparatus and musical hearing in the process of singing acquisition.

## **Methodology**

In the present research the empirical case study was used, because, according to P. Swanborn (2010), a case study makes it possible to study a specific participant of the research and each case comprises individual peculiarities. B. Gillham (2000) asserts that a case study is concerned with studying an individual human activity, which can be investigated, but whose borderlines are difficult to distinguish. The case study is aimed at finding a number of solutions to different problems, which then are compared in order to find the best solution to the problem. In this research authors chose a case study methodology because it is a qualitative research that allows investigating the development of the coordination between the vocal apparatus and musical hearing of a specific learner during the process of singing acquisition.

In our case the development of coordination between 7-year-old Marta's vocal apparatus and musical hearing was studied, because the problems of the development of coordination may be different, due to the peculiarities of children's individual physiological development.

## The Description of a Case Study

In this research the following aspects have been selected for a more detailed investigation:

1. Characterization of the case.
2. Chronology of the events in the development process.
3. Summary of the results obtained during the development of the coordination between 7-year-old girl's vocal apparatus and musical hearing.

### 1. Characterization of the case

In the characterization of the case study the diagnostics of the development level of the coordination between Marta's vocal apparatus and musical hearing and identification of the problems was included. The research lasted for one school year. It started on September 10, 2010 and finished on May 20, 2011. The diagnostic results yielded by the direct observation have been analysed and interpreted. The classes were conducted twice a week and lasted 30 minutes each. 10 minutes were allotted to practicing so that to prepare the vocal cords for activity, and approximately 20 minutes were devoted to identifying problems of the development of coordination between the vocal apparatus and musical hearing. The work with the girl was individual in order to discover the causes of the problems concerning the development of the coordination between the vocal apparatus and musical hearing more specifically.

Marta has been singing individually for a month. The girl does not have the basis of singing skills yet, as before school she had not attended a preschool establishment and has not been singing anywhere else. Her singing is limited by two to three sounds; her memory is based only on bright impressions. The diagnosing of the development level of the coordination between Marta's vocal apparatus and musical hearing was carried out on the basis of the criteria, levels and indicators of the development of the coordination between the vocal apparatus and musical hearing for 6-8 year-old children developed by J. Davidova and O. Sersnova (2012).

**Table 1. Diagnosing the level of the development of the coordination between the 7-yr-old Marta's vocal apparatus and musical hearing at the beginning of the research**

No	CHILD'S NAME	MUSICAL AURAL REPRESENTATIONS AND PERCEPTION		MUSICAL THINKING		CONTROL OF MUSICAL HEARING AND THE MUSCLES OF VOCAL APPARATUS		MUSICAL MEMORY		TOTAL	GENERAL LEVEL
1	M.	1	2	1	2	3	1	2	1	2	5 average reproductive - productive
		8	4	4	7	7	2	2	4	4	

Low (receptive) 1 – 4 grades

Average (Reproductive-productive) 5 – 7 grades

High (productive-creative) 8 – 10 grades

At summarising the problems of Marta's singing it was stated, that the girl's problem of coordination between the vocal apparatus and musical hearing is not sensorial but functional. Marta hears that she is singing a wrong pitch from what was asked, but is not able to sing it precisely. J. McMinn (2006) notes that that usually happens when children use only chest resonator in voice formation when they speak. Their speech is monotonous, intonation-wise unsaturated with a narrow diapason of sounds. The same happens during singing, when a child tries to sing, by using only his/her chest resonator. The child is not able to expand his/her diapason of voice sounding as he/she does not know how to use other ways to control vocal cords, which are necessary to sing higher sounds.

L. Dmitriev (Дмитриев, 1966) points out that head and chest resonators have the determinant role of training vocal apparatus, however, it is not recommended to use in singing only head resonator or only chest resonator, as it can damage voice:

- by using only head resonator in singing, the voice sounding gradually becomes narrower;
- by using only chest resonator in singing, the voice becomes heavier, register transitions become more obvious and it becomes more difficult to reach high pitches.

Therefore, chest and head resonance are important feelings in the singing acquisition process, which allow to judge correctly about one's own voice timbre quality and activity of vocal cords.

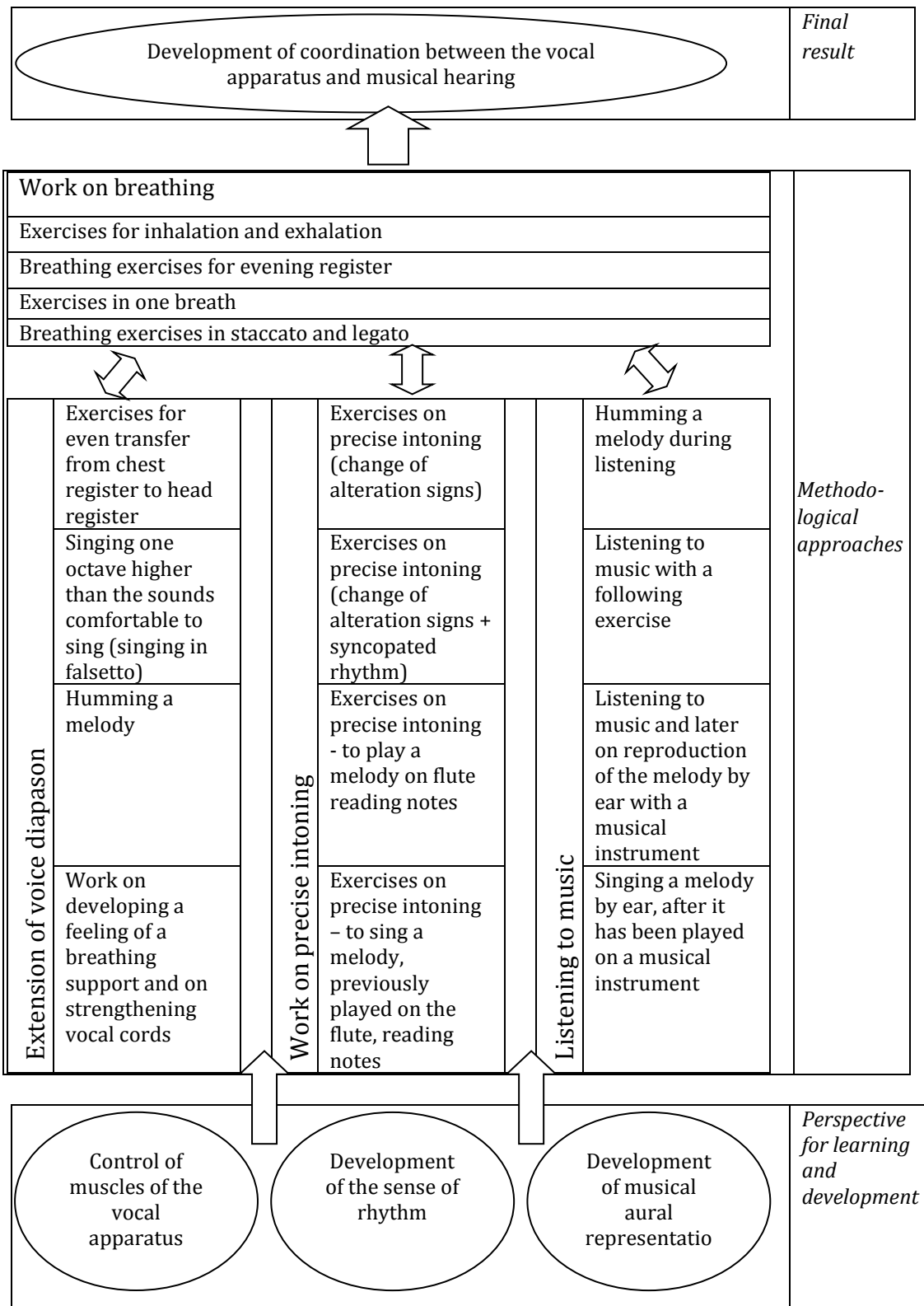
It was observed that one of the reasons for imprecise intoning for Marta is a careless listening to herself, appearance of screaming in singing. The girl lacks smoothness in singing and precision in intonation, it seems that Marta speaks (hums) not sings. The case of Marta is very interesting, because it was observed that the girl correctly names the songs played by the teacher on the piano. The girl notices all changes that the teacher does while playing a song (for instance, plays a different rhythm, changes the melody, etc.). Marta has been learning to play the flute since she was six. It was observed that sometimes she plays a melody by ear without difficulty, but is not able to sing it precisely.

Knowing the capacity of Marta's voice (range, sense of rhythm, intoning) and the problems of the development of the coordination between the vocal apparatus and musical hearing, an individual learning strategy for the development of the coordination between the vocal apparatus and musical hearing was worked out.

## ***2. Chronology of the events in the development process***

This stage of the case study involves solving problems concerning the development of the coordination between Marta's vocal apparatus and musical hearing by applying an individual learning strategy for a specific case.





**Figure 1. Learning strategy of 7-year-old Marta for the development of the coordination between the vocal apparatus and musical hearing**

According to G. Taylor (2002), a learning strategy is the upper level of pedagogical level elaborated in theory. It is implemented in order to reveal the true reasons of a problem, as well as to find the link between the theory and practise. Learning strategy ensures successful tactics, namely, the direct and indirect relations with the pupils in the learning process. J. O'Malley and A. Chamot (1990) emphasise that strategies, which directly affect the learning, include clarification/verification, monitoring, memorization, guessing/inductive reasoning, deductive reasoning, and practice. Strategies that contribute indirectly to learning include creating opportunities for communication or mutual collaboration between the pupil and the teacher. This statement made by J. O'Malley and A. Chamot (1990) is important in developing vocal apparatus and musical hearing coordination for 6 – 7 years old children, because for children at this age the learning atmosphere and emotional background are especially important. The authors (O'Malley & Chamot, 1990) also mention that both direct and indirect strategies should be used: when learning strategies are applied the pupil cannot be left all by himself/herself; the teacher should follow pupil's learning process all the time, however the teacher should not be carried away, so that the learning strategy does not change into teaching strategy, where the pupil loses his/her own individual learning strategy and relies only upon the teacher.

During the first lessons the girl willingly made a contact, she was ready to do all requirements made by the teacher. At first, the Marta's voice diapason was established, in order to improve the development of coordination between the girl's vocal apparatus and musical hearing. Furthermore, when her musical hearing was tested, it was observed, that the girl hears but is not able to reproduce the sounds and compositions played by the teacher. At the beginning of the research Marta's voice diapason was from  $E^1$  to  $G^1$ .

E. Blades-Zeller (2002) states that in most cases a child, who cries in the chest register, usually in low sounds, starts to intone correctly, if he/she is worked with individually. In order to achieve positive results it is important to start singing acquisition from the comfortable sounds and gradually expand voice diapason by a semitone up and down. For M. the comfortable sounds for singing are those ones, which the girl uses when she cries out all melodies, and they are the octaves  $E$ ,  $F$ ,  $G$ . During the direct observation it was established that for Marta the reason for imprecise intoning are the efforts to transmit her way of speaking into singing. The impression was that the girl is not singing but talking, by only lengthening the words.

In this case a precise intoning in singing is considered in the development of coordination between the vocal apparatus and musical hearing. A learning strategy for development of coordination between the vocal apparatus and musical hearing, which is linked to cognitive processes, promotes a qualitative development of coordination. A precise intoning in the singing acquisition process is essential for development of coordination between Marta's vocal apparatus and musical hearing. It was observed that when the girl sings she is timid because of her own voice sounding. She unnaturally strains her face and body, a scream often appears in singing.

On the basis of the designed learning strategy, 7-year-old Marta was offered four themes to cover during the classes that followed. 20 contact hours were allotted to each theme.

*Theme 1 – Work on breathing.* A correct breathing in the singing acquisition process is necessary, complex and a skill that needs longer practice. It is important that the child is aware of breathing during singing. In order to develop and balance 7-year-old Marta's breathing in singing, exercises developed by T. Thornton (2005) were offered, these exercises are designed for beginners, as well as for those who have sung for a long time but still cannot control their breathing in the singing acquisition process. These exercises may be used for improvement of intonation in singing:

1. Calm inhalation and calm short exhalation: inhalation and exhalation is repeated two to three times following the movement of the teacher's hand. Monitor that the position of body and head is calm and unstrained. Calm and even inhalation and considerably longer exhalation following the movement of the teacher's hand and as she counts (one, two, three, and so on). The number can be gradually increased, so that the child counts by herself during exhalation. In this exercise, it is important to follow, that the pupil does not inhale too much air.
2. Do a short inhalation and after a short pause gradually exhale on š-š-š-š until a complete exhale. Follow that the child does not raise her shoulders.
3. Do a long inhalation, hold breath and exhale quickly and actively on f-f-f-f-f.
4. Inhale air with short inhalation through nose, do not raise shoulders, and put one hand on the diaphragm. It should feel as pumping a ball up. Exhalation is done with the body leaned down.

P. Phillips (2012) notes, that breathing exercises should be started from the person's average voice diapason, so that the transfer from chest register to head register is more even:



**Note example 1: Breathing exercise for evening out the register (Phillips, 2012)**

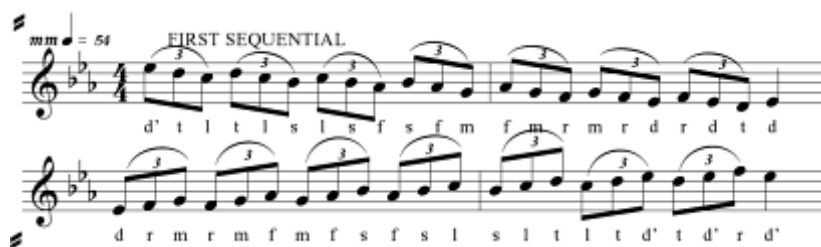
This exercise which is done in one breath helps to feel how this transfer is done. The exercise should be done on "ma-a-a-a-".

In the work with 7-year-old Marta the following breathing exercises elaborated by J. Bartle (2003) were used:

1. Sing "ma", "me", "mi", "mo", "mu" in one breath and one sound. This exercise shall be started from the sounds comfortable for singing. It should be monitored that the singing is precise and unified. This exercise should be expanded by a semitone up till  $D^1$  and after that down till  $E$ . In order to develop a precise intoning the teacher should follow that the pupil sings this exercise in one breath for preparing vocal cords in the middle diapason.
2. Next exercise is similar to the previous one, in one breath the girl had to sing "fli", "fle", "fla", "flo", "flu". M. tried very hard tossing it precisely, and such

composition of sounds caused some problems for the girl. While she was performing the exercise it seemed as if Marta has a potato in her mouth.

3. Next exercise is very effective for strengthening breathing. Marta was offered to sing in *staccato* "ho" starting with the comfortable sounds for her and then going up and down by one semitone.



**Note example 2: Breathing exercises on staccato and legato**

Singing in *staccato* strengthens breathing, improves musical hearing and expands voice diapason. Later on this exercise should be repeated in *legato*. The lower jaw should be relaxed and lowered.

*Theme 2 – Expansion of voice diapason.* The lessons were aimed at expanding the voice diapason. In order to train 7-year-old girl's vocal apparatus muscles the widely used method developed by P. Phillips (2012) was used, in which it is asked to sing an octave higher from the comfortable sounds for singing: it helps to switch the voice sounding to another register – falsetto. By expanding Marta's voice diapason the necessary condition was a correct breathing during her training, as well as finding the comfortable sound for her singing. A comfortable sound is the sound which the girl is able to sing precisely without making much effort. For Marta such sounds were the first octaves E, F, G. In the beginning the girl was offered an exercise for an even transfer from the chest register to the head register. In order to start this exercise she was asked to open her mouth widely, raise the tip of her tongue and touch with it the upper jaw. In such position the lips should be rounded and sing on the vowel "o".



**Note example 3: Exercise for an even transfer from the chest register to the head register (Phillips, 2012, 151)**

When the tongue is raised and slightly touches the upper jaw, the lower jaw lowers, the sound is rounded and the mouth is opened correctly as it should be opened during singing. This exercise was used for the reason that according to the statements made by R. Miller (2004), A. Bradley (2009), P. Phillips (2012), children, who sing within the range of two to three sounds, should feel the right pitch of a sound, in order to expand their voice diapason it is necessary to use high pitches in warming up exercises and in singing, because high sounds are easier to perceive than lower sounds. The above mentioned authors assert that the usage of high pitches in singing provide for excellent results.

Further in this lesson the girl was offered to sing any melody that is one octave higher. As an example several simple songs were offered. For instance, *Cīrulīša mazputniņa dziesma* [The song of lark the little bird] by S.Mežore:

**Cīrulīša mazputniņa dziesma**

S. Mežore

Kad pir-mie sau-les sta-ri-ņi, kā sī-ki ma-zi ga-ri-ņi steidz zie-mu pro-jām dzīt

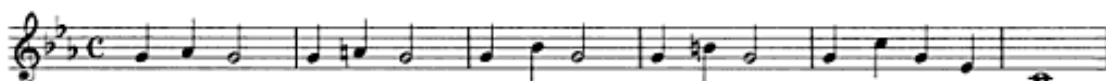
**Note example 4: The song of lark the little bird one octave higher**

This method was used because of the fact that by singing the same melody one octave higher another way of sound formation has to be used; therefore the girl switched and started to intone precisely.

In order to calm vocal cords and stabilise the melody of the song in girl's memory, it was offered to hum a melody of a song with cheeks blown.

Work on developing a feeling of a breathing support and on strengthening vocal cords is done due to exercises when the child stands in a position of a straddle, slowly inhales, holds his/her breath so that the chest is slightly raised, but abdomen pulled and diaphragm is tense, holds breath and very slowly exhales singing the necessary sounds.

*Theme 3 – work on precise intoning.* When Marta's musical hearing was tested, an interesting fact was discovered: she hears the sounds played by the teacher, without much effort can repeat them and play on the flute, but is not able to sing them. The girl without much effort notices changes in the melody or the rhythm. In order to help the girl to solve the problem of intoning with the frame of Theme 3 we decided to focus more attentively on the coordination between Marta's musical hearing and vocal apparatus or on precise intoning in the process of singing acquisition. In this regard for exercises offered by T. Benjamin, M. Horvit, R. Nelson (2008) an absolute precision and clearness of intonation is vital. These exercises should be started very slowly, considering the rhythmical precision.



*Note example 5: Exercise on precise intoning  
(Benjamin, Horvit & Nelson, 2008, 147)*



*Note example 6: Exercise on precise intoning  
(Benjamin, Horvit & Nelson, 2008, 147)*

When these exercises were performed it was essential that Marta's vocal apparatus is developed. In order to ease the development of coordination between the vocal apparatus and musical hearing of a girl, during these exercises she played some of them on the flute and after that sang them by ear.

*Theme 4 – listening to music.* Marta was offered to do the following listening exercises:

1. Humming a melody while listening to music.
2. Listening followed by an exercise. While listening to a recording the girl had to hear what music is played by its nature and dynamics, what instruments can be heard in it (Huyser, 1999).
3. Listening and later reproduction of the melody by playing it on a musical instrument. Play the previously heard music on any instrument (as M. can play the flute well, the girl played it) (Huyser, 1999).
4. Singing this melody after it has been played on a musical instrument (Huyser, 1999).

### ***3. Summary of the results obtained during the development of the coordination between 7-year-old Marta's vocal apparatus and musical hearing***

A learning strategy, focused on a precise intoning during singing acquisition, was designed for Marta. Thanks to this strategy the girl developed self-control (control of breathing, articulation, muscles of the vocal apparatus), her vocal range expanded, the sense of rhythm improved. All this motivated the girl to sing.

During the research it was noticed that such method as change of melody by one octave higher, has a special effect on girl's intoning precision. Marta was not able to sing the melody within the diapason of her comfortable sounds; however when asked her to squeak one octave higher by using a different style of sound formation, the girl started to intone precisely. During the research it was necessary that Marta's voice sounds in falsetto. The development and strengthening of this skill at each lesson, helped to expand her voice diapason and improve girl's intoning precision.

The reason for the problem of development of coordination between Marta's vocal apparatus and musical hearing was singing or roaring in 2-3 sounds, the girl was not

able to repeat with her voice a sound she had heard. Considerable improvements in intoning appeared when girl's attention was focused on singing high pitches.

By the end of the research, a repeated diagnosing of the development of the coordination between the vocal apparatus and musical hearing was carried out in order to determine what changes have been established in the development of the coordination between Marta's vocal apparatus and musical hearing (in the course of the case study the girl has already reached the age of 8).

**Table 4. Diagnosing the level of the development of the coordination between the 8-year-old Marta's vocal apparatus and musical hearing at the end of the research**

No	CHILD'S NAME	MUSICAL AURAL REPRESENTATIONS AND PERCEPTION		MUSICAL THINKING			CONTROL OF MUSICAL HEARING AND THE MUSCLES OF VOCAL APPARATUS		MUSICAL MEMORY		TOTAL	GENERAL LEVEL
		1	2	1	2	3	1	2	1	2		
1	M.	8	6	6	7	7	4	4	6	6	54	6 average reproductive - productive

In the process of the research it was established that the girl makes much effort to perceive loud sounds than quiet or moderate sounds. Without making much effort Marta could hear the high sounds of the first octave and not the lower sounds. The loud sounds weaken the attention and musical hearing. A calm and even singing at a medial voice sounding improved the activity of her larynx. It was observed that a systematic soft singing at a medial voice sounding on the achieved height gradually improved the activity of vocal apparatus, expanded voice diapason, and finally, a normal and natural singing was observed. And so already at the end of the research Marta's diapason was from  $C^1$  to  $C^2$ .

In the work with the girl's voice diapason, it was essential to correctly determine her initial voice possibilities, in order to effectively organise the work with development of coordination between her vocal apparatus and musical hearing. First of all, girl's comfortable singing sounds were determined, which matched with her calm way of speaking. Secondly, to strengthen these sounds, the girl was asked to keep the sounding for a longer period of time, for example, by singing the vowel *a*. Thirdly, singing by a semitone up and down on *la-la*.

By working with Marta, a special attention was paid to warming up exercises. The warming up exercises included special voice exercises so that she could do the intoning precisely and expand her voice diapason. As the girl's voice diapason was very narrow at the beginning of the research, Marta's lessons mainly consisted of warming up exercises. By working with the girl a special attention was paid to the selection of exercises, so that they would be universal and consistent, for improvement of a technique, as well as that the amount and level of complexity of the exercises would gradually increase. In the work with the girl the most important condition was singing from the comfortable sounds. The work was gradual and

without haste, in the girl's moderate voice sounding to avoid forcing her voice. A lot of attention was paid to the evenness and strength of sounding, in the beginning on one sound, then on a phrase. At the end of the research a significant improvement was observed: the girl started to intone precisely, her diapason was expanded, and coordination between her vocal apparatus and musical hearing was developed.

## Conclusions

1. The individual learning strategy for 7-year-old Marta was developed on the basis of her physiological and psychological peculiarities and on the problems concerning the development of the coordination between the vocal apparatus and musical hearing, taking into account training of precise intoning as the reason for the problem of development of coordination between the vocal apparatus and musical hearing.
2. The precise in intoning in the process of singing relates to cognitive processes: representations of musical hearing, perception, musical thinking, and musical memory. Therefore, the correlation between the precise intoning and cognitive processes is the basis of the designed learning strategy for the development of the coordination between 7-year-old Marta's vocal apparatus and musical hearing.
3. Applying this strategy during the case study, the girl's intoning precision considerably improved during the case study, as well as the development of the coordination between the vocal apparatus and musical hearing was established: the voice diapason was expanded, the breath and articulation got stabilized, and the sense of rhythm also became stable.

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## OPTIMIZATION OF THE BRASS PLAYING BREATHING PROCESS IN ACCORDANCE WITH THE PHYSIOLOGICAL PROCESSES OF NATURAL BREATHING

**Sandis BĀRDIŅŠ & Māra MARNAUZA**

*Riga Teacher Training and Educational Management Academy, Latvia*  
*e-mails: sandisbardins@hotmail.com; mara.marnauza@choir.lv*

### **Abstract**

*In brass playing pedagogy the most essential and difficult element is the process of breathing. The analysis of viewpoints on breathing presented in popular textbooks on brass instrument playing and their comparison with physiological processes of natural breathing reveal essential discrepancies, which actually make instrument playing difficult, create muscular tensions and even health problems undesirable for the musicians. To avoid using quite inadequate but by generations inherited approaches to teaching/learning breathing during playing, it is essential to know physiological processes of natural breathing and try to maximally approximate the brass playing breathing process to them. Such optimization of breathing provides an opportunity to increase the volume of the air used during playing, to reduce the tension of the thoracic (chest) and other muscles involved in playing and to improve the possibilities of musical expression.*

**Key words:** *brass playing pedagogy, breathing, diaphragm, breathe support, physiology of breathing.*

### **Introduction**

When comparing the physiological processes of natural breathing with methods of teaching/learning breathing patterns used in brass playing, we have to acknowledge that the pedagogy of brass playing is often based on concepts and ideas contradicting the processes of natural breathing. According to B. Frederiksen (2006), regarding to breathing during wind instrument playing, conceptions about the diaphragm, breath support or methods of contracting the abdominal muscles borrowed from vocalists have traditionally dominated in wind instrument playing for many years, but they contradict the process of natural breathing and do not contribute to efficient use of breath during playing wind instruments. Even today, when physiology and regularities of the respiration process have been thoroughly studied, we frequently

encounter myth-based expressions and understandings which do not reflect the real nature of breathing.

When analysing the physiological processes of natural breathing and volumes of different breathing phases, it becomes clear that in the brass playing the traditional conceptions and methods of breathing should be abandoned and a new methodology of learning breathing based on nature-corresponding principles of humanistic pedagogy should be developed. By optimizing the brass playing breathing process (i.e. – approximating it to the physiological model of natural breathing) it is possible to simplify the process of the teaching/learning, to make the process of gas air exchange in the lungs easier during the play, to reduce muscular tension and to delay onset of muscle fatigue, which frequently interfere with brass playing. Besides, an increased volume of the air available for use may leave a positive impact on both the quality of sound and the capacity of musical expression. Moreover, avoidance of breathing actions which contradict laws of nature during playing wind instruments is a vital prerequisite for preventing breathing-related occupational diseases.

**The research aim** is to offer recommendations for optimizing the brass playing breathing process.

**The research task** is to study the correspondence of methods used in brass playing pedagogy for teaching/learning breathing with the processes of human natural breathing, to de-construct myths and misconceptions in understanding breathing and offer solutions for optimizing the breathing process when playing.

## **Methods and Methodology**

In the research, the analysis of theoretical conceptions on brass playing and methods for improving breathing has been done (Stamp, 1978; Quinque, 1980; Sandoval, 1991; Frederiksen, 2006 a. o.). The viewpoints on wind players' breathing and methods for its development widely spread in literature and practice are compared with respiration mechanisms and processes reflected by the research in anatomy and physiology of respiration (Carola & Harley, 1990; White, 2005; Parker, 2007; Valtneris, 2012 a. o.). During the analysis, the most logical pedagogical solutions for teaching/learning breathing of wind instruments play are sought for.

Traditionally, brass playing pedagogy has borrowed much from vocal pedagogy, this concerns specifically the problem of how the breathing process is understood and trained (Frederiksen, 2006). Unfortunately, the uncritical approach to sources has created a situation, when for more than a century methods of brass playing breathing which teach to breathe contrary to natural breathing processes of a human body have been cultivated, thus creating stress and undesirable muscular tension in the body as well as decreasing the respiratory volume to be used, which in turn negatively influences the quality of sound. M. White (2013), the researcher of human breathing, points out that as far as human daily breathing is concerned, there exist numerous theories, applications and exercises – almost every well-known spiritual trend includes some covert knowledge about breath and how it is used. However, the various breathing techniques often have specific aims and they frequently contradict to the principles of natural breathing, therefore uncritical application of these techniques may create minor or major problems in life of their users (White, 2005).

Sometimes wind instrumentalists, too, try to include in their training process elements of breathing techniques seen somewhere else, but this often does not produce positive effect.

Two concepts used least justifiably in pedagogy of wind instrument playing are diaphragm and breathe support. To understand the process of breathing elementary knowledge about the anatomy and physiology of breathing is needed. The only and single place where breathing occurs is in the lungs, but the breathing movements are provided by the bodily muscles around the lungs – neck, intercostal, abdominal and spinal muscles, as well as the diaphragm, which all, mutually interacting, coordinate different phases in a breathing process. During inhaling the thoracic cage expands, the air pressure in the thoracic cage becomes smaller than the atmospheric pressure and – according to Boyle's law when the pressure of gas in two joint compartments should equalize – the air from outside flows into the lungs. This takes place due to the activity of the diaphragmatic muscles when, at contracting, a dome-shaped diaphragm goes downward. At the same time the abdominal muscles relax, while the external intercostal muscles lift the ribs by the so called bucket-handle movement, which enlarges the diameter of the thoracic cage cross-section (Carola & Harley, 1990). Actually, the thoracic cage goes upwards due to the interaction between the air pressure and external intercostal muscles. As the ribs are attached to the backbone, their front rises upwards and expands the lung volume like a bucket handle (Frederiksen, 2006).

As we know it, the diaphragm is a thin dome-shaped muscle which separates the thoracic cage from the abdominal cavity and on contracting downwards expands the lung volume, thus making the inspiratory process possible. During the expiratory process it relaxes and returns to its initial – dome-shaped – position (Hall, 2011). As the sound formation on wind instruments is directly influenced by the expiratory process, we can infer that the diaphragm actually does not play any role in forming a sound, and such encouragements like *play on the diaphragm*, *use the support of the diaphragm* and the like do not have any rational base. C. Gordon, a trumpeter, and L. Miller, a specialist in pulmonary diseases, have proved it by exploring the activity of a professional trumpeter's diaphragm in different situations and applying the method of fluoroscopy in their research (Gordon, 1987). The musicians had to perform different tasks during which the activity of their diaphragmatic, abdominal and intercostal muscles was observed:

- a) they had to play a long note (G in the staff) with crescendo until the breath had finished;
- b) they had to play a triad from C in the staff to the high-C above staff in half-notes, playing four additional high-C in conclusion;
- c) the musicians were asked to consciously move the diaphragm;
- d) the musicians were asked to tense the abdominal, thoracic and spinal muscles as it takes place on intensive exhalation and then consciously change the position of the diaphragm.

Tasks c) and d) proved that professional trumpeters are not able to consciously affect and control the activity of the diaphragm; during task d) the movement of the

diaphragm was observed only in relation to the activity of abdominal, spinal and thoracic muscles. But tasks a) and b) proved that actually the diaphragm does not have any impact on the process of exhaling. On inhaling the diaphragm tenses and moves downward, thus increasing the lung volume and reducing the air pressure in the lungs, and the inhalation occurs when the air pressure in the lungs and the pressure in the atmosphere equalize. At producing the first sound and continuing to play, the diaphragm does not change its position (while respiration muscles – abdominal, spinal and intercostal muscles – gradually contract and start pushing the air out of the lungs), until at some moment it relaxes upwards while the expiratory muscles continue to tense and push the air out of the lungs. When the whole air is exhaled and the expiratory muscles have relaxed, the diaphragm immediately goes down and takes its initial position. When playing the C major triad upward in the high register (according to many educationalists' and musicians' opinion, playing in the high register requires the largest diaphragm force), at G above staff the diaphragm relaxes and occupies its upper position, thus taking no part in the process of exhalation even at a heavier load when the high-C above staff is played repeatedly, while the expiratory muscles continue to contract (Gordon, 1987). During this experiment C. Gordon observed another aspect which contradicts the opinion of many teachers, stating that on exhaling the abdomen should be thrust forward. On the contrary, the stomach of all participants of the experiment had been pulled in and its perimeter had not become larger either (Gordon, 1987).

It is quite obvious that during the breathing process the activity of the diaphragm applies only to the inspiratory process and its efficiency. Contrary to the assumption about the great role of the diaphragm and its provided air support, so popular among wind instrumentalists and vocalists, physiologically the diaphragm does not play any role in either creating the so called stamina (German – *Stütze*) or controlling the expiratory process (Gumm, 2009; Alcantara, 2009). In fact, it is possible neither to consciously feel and control the muscle of the diaphragm nor to specially train it, and it has no impact on the improvement of skills of exhalation either. Too intense concentration on breath support and the activity of the diaphragm may entail greater tension of expiratory muscles (abdominal, spinal, intercostal muscles) and thus create reflexive resistance in the pharynx and the tongue muscle, thereby provoking the so called Valsalva maneuver which is naturally needed in the process of the child-birth and defecation, but creates only problems in wind instrument playing (Howland, 2013).

Knowing the mechanisms and principles of the diaphragm activity, it is clear that a pupil learning to play wind instruments does not need to be told about the diaphragm and its activity, or to be made to breathe from the diaphragm and play on the diaphragm support even more so, because this has little to do with how we feel breathing and even less with how it actually occurs.

The next issue that creates quite a considerable confusion to understand the breathing process is the division of breathing into chest, diaphragmatic and combined types of breathing, which has been borrowed from vocal pedagogy, though actually in any of these variants the breathing process occurs only in the lungs. This division into types of breathing indirectly indicates that part of the lungs which is more involved in the process of breathing. A full breathing is recommended to be the most effective type of breathing for the brass instrumentalists, though the diaphragmatic breathing also

ranks high, while the chest breathing is often considered too shallow and lacking sufficient diaphragmatic support for wind instrument playing, thereby creating a careless attitude to the upper or chest breathing. Unfortunately, a lot of musicians use only the abdominal or the so called diaphragmatic breathing, neglecting the upper chest breathing. However, *"...a full breath cannot be taken without expanding the lungs in the upper chest"* (Frederiksen, 1996, 104-105). Though the greatest lung volume is formed by the lower lobes of the lungs, to achieve the maximum of the lung capacity the upper lobes of the lungs should also be used effectively. As large amount of the air is essential for brass playing, especially for low brass instruments, the ability to use a full lung capacity - both the upper and the lower lobes of the lungs - would be physiologically grounded.

Many teachers of wind instruments do not allow their pupils to lift the shoulders on inhaling, thereby stimulating the use of the lower part of the lungs and abdominal muscles (diaphragmatic breathing) while playing. However, physiologically this restricts the expansion of the chest and the flow of the air into the upper lobes of the lungs, due to which the lung potential is not being used fully. On the other hand, when only the upper or chest breathing is used, the potential of chest expansion is being used fully, but the lower lobes of the lungs, which are much more capacious than the upper lobes, are not used: *"Most players would benefit from having a larger quantity of air to spend while playing"* (Wekre, 1994, 46). The skill to efficiently use both breathing types simultaneously (i.e. – a full breath) is an important factor for improving both breathing and all other parameters of playing.

With regard to these three breathing types, physiologically two movements could be singled out in the inspiratory process (see Figure 1):

- 1) the diaphragm contracts downward and pulls the upper part of the lungs with it, thereby increasing their volume and allowing the air to flow into the upper part of the lungs;
- 2) external intercostal muscles lift the ribs up and thus expand the chest (the bucket-handle principle).

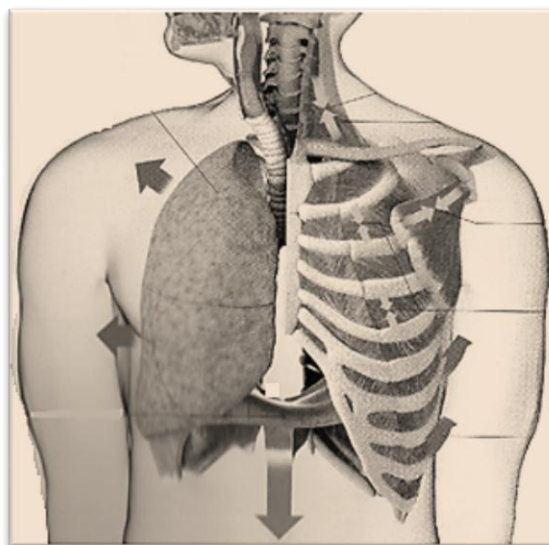
The movement of the diaphragm downwards corresponds to the diaphragmatic type of breathing, while lifting the chest upwards – to the chest type of breathing. If both movements are produced simultaneously, the combined inhalation is implemented.

The analysis of physiological processes of breathing shows that the chest and the diaphragmatic breathing are the two extremes of the breathing process:

- 1) during the process of breathing the expansion and contraction only of the stomach are apparent ( so called baby or diaphragmatic breathing);
- 2) during the process of breathing only the chest expands and contracts (chest breathing).

When speaking about the breathing types and belonging of musicians to any of them, the question essentially is about which part of the lungs is being used more actively or about the dominant expiratory movement: the diaphragm downwards or the chest upwards. The inhalation is most efficient if both types of breathing are used

simultaneously: “We need both of these extremes in breathing and many variations in between at different times in the music” (Werke, 1994, 46).



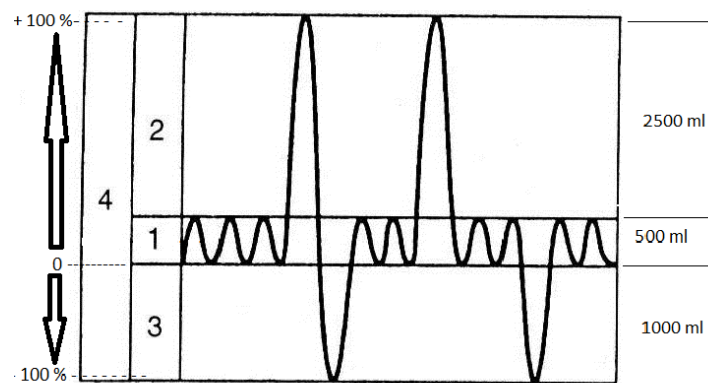
**Figure 1. Directions of breathing movements. Inhalation occurs in two planes – the diaphragm pulls the lungs down while the intercostal muscles raise the chest up (Parker, 2007, 136)**

“Although the increase in size of the rib cage during inspiration requires muscular effort, the decrease during expiration is merely an elastic recoil, produced by the lungs and costal cartilages” (Carola & Harley, 1990, 279). On intensified exhalation, required by speaking, singing or wind instrument playing, the exhalation is controlled by the muscles – abdominal, spinal and intercostal muscles, and the air pressure in the lungs, thus, becomes even lower than that in the atmosphere. Contractions of the abdominal and spinal muscles push the diaphragm upwards while internal intercostal muscles lower and make the chest narrower, thereby pushing the air out of the lungs (Frederiksen, 2006). An intensified exhalation is especially needed, if inspiratory reserves and respiratory volume have been spent but the musical phrase still requires additional air flow. Consequently, a musician is forced to use the expiratory reserve volume. This expiratory phase consumes much energy and creates fatigue. A physiologically logical solution for this fatigue problem would be to avoid using the expiratory reserve volume as much as possible. On playing wind instruments, this problem can be resolved by increasing the efficiency of inhalation and simultaneously avoiding the use of expiratory reserve volume in the process of playing.

After a deep inhalation, when the diaphragmatic and external intercostal muscles have created a negative pressure in the lungs and have relaxed, the air pressure in the lungs under the pressure of abdominal cavity organs and weight of the chest has become greater than the external one – the air pressure in the atmosphere. During the expiratory process the diaphragm relaxes and under the pressure of abdominal cavity organs rises upwards taking its original position, but the chest deflates and goes down taking the low position. Consequently, the lungs decrease their volume and equalize the air pressure between the lungs and the atmosphere. Normal or calm exhalation is a passive process, for it the relaxation of respiratory muscles is enough: “A deep



*exhalation is an active process which occurs due to the contraction of the accessory expiratory muscles – internal intercostal and abdominal muscles” (Valtneris, 2012, 72).* During a normal daily breathing regime (see Figure 2) the expiratory muscles work minimally. During an intensified exhalation, required by speaking, singing or playing the wind instruments, the exhalation is controlled with the help of muscles – the abdominal, spinal and internal intercostal muscles, due to which the air pressure in the lungs becomes even lower than that in the atmosphere. Contractions of the abdominal and spinal muscles push the diaphragm upward while the internal intercostal muscles lower the chest and make it narrower, thereby pushing the air out of the lungs (Frederiksen, 2006). If inspiratory reserves and breathing volume have been spent during playing but the musical phrase still requires an additional flow of air, a musician is compelled to use the expiratory reserve volume, which involves a rapid growth of tension in expiratory muscles.



1 – tidal volume (resting breathing), 2 – inspiratory reserve volume, 3 – expiratory reserve volume, 4 – vital lung capacity

**Figure 2. Respiratory volumes and their proportions**

There are always 1000 ml of air left in the lungs after maximum exhalation, which is called residual volume. Assuming that the total lung capacity of an adult is 5000 ml, only 10% of this volume or 500 ml of the tidal volume are being used during the process of normal daily breathing. 50% of lung vital capacity or 2500 ml constitute the inspiratory reserve volume which can be inhaled in addition to the tidal volume. It is possible to exhale 20% or 1000 ml of expiratory reserve volume in addition to the exhalation of the inspiratory capacity by maximally contracting the expiratory muscles. As it is impossible either to completely compress or completely empty the lungs, about 20% of the total lung capacity – 1000 ml or the residual volume - remains in the lungs. The positive air pressure zone in the lungs is designated by 0 up to +100%, the negative pressure zone in the lungs – by 0 up to -100% (adapted according to Valtneris, 2012, 74).

In pedagogy of wind instrument playing, it is important to distinguish two diametrically opposed phases in the process of breathing – when the air in the lungs is either with a higher or with a lower pressure than the air pressure in the atmosphere. The moment, when the air pressure in the process of breathing equalizes and is the same in both the lungs and the atmosphere, may be called a zero point. The positive

air pressure zone in the lungs is from 0 up to +100%, the equalized air pressure zone is a zero point, and the negative air pressure zone is from 1 up to -100%. In nature, breathing approaches the position of zero when a human is in a rest state and breathes very quietly. When speaking in a low voice, too, human's breath is close to the zero position.

Inhalation with a positive pressure in the lungs (above zero) provides possibility for a free, relaxing exhalation, without involving expiratory muscles. The exhalation takes place when the difference between the air pressure in the lungs and that in the atmosphere naturally equalizes. Certainly, wind instruments playing may require a stronger expiratory air flow than that ensured by a natural exhalation: in such case exhalation has to be strengthened by means of expiratory muscles. However, the rule is simple – the deeper the inhalation, the higher the pressure in the lungs, and the less of the force of expiratory muscles is needed to create expiratory air flow. The more the breathing process is in the negative zone of the lung pressure, the greater efforts and muscular force are required to provide the expiratory air flow. In fact, any exhalation below a zero position is forced, because in a geometric progression it activates expiratory muscles and creates muscular tension, which is undesirable in the brass playing process.

Practice shows that students usually do not give full attention to full inhalation and often play by using air reserves available in a negative pressure zone. This leads to creating an unnecessary tension and stress in the body, because the natural inspiratory reflex (so-called *Herring-Breuer reflex*) is not implemented (White, 2005), and also contributes to the expiratory muscle fatigue and rapid decrease of the physical endurance – general for the body, because the body is not supplied with oxygen, as well as embouchure, which receives a reduced amount of air for creation of a sound and has to compensate it by pressing the mouthpiece against the lips.

For wind players, the recommendable working area of breath is a positive pressure zone – when the air pressure in the lungs is higher than the atmospheric air pressure and the air freely and effortlessly flows into the instrument: *“In the positive pressure zone, when breathing out normally, large quantities of air naturally and easily flow from the body to the lower pressure outside the body. To play an instrument, this is the ideal range in which to work”* (Frederiksen, 2006, 117). Such breathing does not wear a musician out and produces a relaxing effect on respiratory muscles and a nervous system, as well as creates basis for producing a relaxed, flowing sound. Playing an instrument in a negative pressure zone, a disproportionately great muscular force is needed to push the air out of the lungs, which progressively grows as the difference between the pressure in the lungs and in the atmosphere becomes larger. *“Jacobs encourages his students to breathe deeply and frequently and avoid dipping below the point of zero pressure where they would have to work too hard and use more effort to move the air”* (Frederiksen, 2006, 118). Additionally, B. Fredriksen also points out that *“most wind players use less than one-half of their vital capacity when playing their instrument”* (Frederiksen, 2006, 116), but the insufficient inspiratory amount, in its turn, is compensated by a forced exhalation.

Unfortunately, observations from practice show that the majority of students - wind instrumentalists use inspiratory reserve volume incompletely and therefore they often find themselves in the zone of expiratory reserve volume or negative air

pressure. This manner of breathing consumes much energy and soon wears a performer out, which in its turn makes a real impact on the quality and durability of the performance.

One way how to train exhalation, often mentioned in brass playing pedagogy, is training of expiratory muscles (Quinque, 1980; Gordon, 1987; Sandoval, 1991). Another option is to increase elasticity of the chest not only in the direction of expansion, but also in the direction of the contraction, i.e., to allow chest and shoulders to go down even lower and reduce lung volume with the help of minimal muscle effort, therefore delaying the activation of inspiratory reflex and reducing the level of muscle tension and fatigue, thus at the same time increasing the expiratory volume.

The third possibility becomes quite evident after studying the proportions of the volume of respiratory phases (see Figure 2). It is obvious that the inspiratory reserve volume has a much greater potential for playing than the skill of pushing the air out of the expiratory reserve volume. Besides, the air of the inspiratory reserve volume is under the pressure needed for playing even without the exertion of muscles, while this pressure in the expiratory reserve volume has to be created by means of expiratory muscles, with the force growing in a geometrical progression (Frederiksen, 2006). From the viewpoint of the physiology of respiration, the most logical solution for this in wind instrument playing would be using the zone of inspiratory capacity or a positive air pressure as much as possible, and avoiding the use of the zone of expiratory reserve volume or negative air pressure. This means that in pedagogy of wind instrument playing a greater attention has to be consciously given to the inhalation process and the efficiency of inhalation has to be increased, simultaneously avoiding the use of expiratory reserve volume during the process of playing. Students' playing skills would essentially improve, if they made greater use of the inspiratory volume available in the positive pressure zone. This implies that good inspiratory skills need to be developed by using a full inspiratory capacity, and the flexibility of intercostal and spinal muscles is to be developed as well.

If we mathematically compare the inspiratory reserve volume with tidal volume and expiratory reserve volume (see Figure 2), we get the following proportions: 5:1:2. Respectively, the proportion between the positive inhalation and the negative exhalation is 6:2. It is obvious that a much greater amount of the air for playing wind instruments is available when inspiratory reserve volume is used. In everyday life the majority of musicians and students are not accustomed to actively use inspiratory reserve volume, therefore during playing wind instruments, too, they most often tend to use the tidal volume and expiratory reserve volume. During the process of training wind instrument playing, it would be advisable for a teacher to direct full attention to the development of the inspiratory process and to a conscious use of the potential of the inspiratory reserve volume.

## **Research Results**

The research revealed that there are essential discrepancies between the methods applied in wind instrument pedagogy for training breathing patterns and processes of natural breathing, determined by the human physiology (see Table 1).

**Table 1. Aspects interfering with breathing during playing and aspects helping breathing during playing**

ASPECTS INTERFERING WITH BREATHING DURING PLAYING (-)	ASPECTS DEVELOPING BREATHING DURING PLAYING (+)
Concept of the diaphragm for exhalation	Use of natural breathing reflexes
Idea about the breath support or stamina	Exhalation as a flow created by the pressure of the inhaled air
Division into chest and diaphragmatic breathing	Use of a two-way expiratory movement
Constant contracting of the diaphragmatic and expiratory muscles	Relaxation of muscles uninvolved in the movement in order to rest and to be more relaxed
Maximal use of expiratory reserve volume	Use of inspiratory reserve volume

The left side column in the Table 1 includes techniques of breathing which create tension and limit the breathing process; the right side column shows breathing techniques which relax the respiratory system, increase the volume of breath and economize musician's physical resources.

The concepts of the diaphragm and breath support used for generations are in contradiction to the processes of natural breathing. For the sake of greater clarity, the idea about the chest, diaphragmatic and combined breathing has to be supplemented by the knowledge about the two opposite inspiratory movements – movement of the diaphragm downwards and movement of intercostal and chest muscles upwards. Besides, the research on the volume of various respiratory phases showed that it is the inspiratory reserve volume that has the greatest air volume potential for wind instrument playing.

Knowledge of physiology of respiration logically leads to the necessity of developing those parameters of breath in wind instrument pedagogy, which have greater potential for increasing player's skills and abilities, namely – the inspiratory reserve volume. One of the developmental directions here is the optimization of the breathing process which would be based on processes of relaxed, natural breathing, increasing only the amplitudes of breathing movements. The second direction is awareness about inhalation as a complicated two-way movement and enhancing the efficiency of these inspiratory movements by facilitating the coordination and elasticity of muscles. It is recommendable to use both the above mentioned directions for the development of breathing.

This approach to mastering breathing patterns in wind instrument playing has several advantages:

- 1) the amount of the air to be used has been increased, which provides greater opportunities for musical expressiveness (quality and timbre of a sound, length of phrases, expression);

- 2) the zone of positive air pressure has been increased, which allows relaxing respiratory muscles and therefore also – a greater endurance, and a more resonant sound;
- 3) a more stable air flow which relieves work of the embouchure, thus increasing its endurance and working limits in ultimate registers.

### **Recommendations to Optimize Breathing in Brass Playing**

During the research the procedural model for the improvement of breathing in wind instrument playing has been developed (see Figure 3), which can be used to develop a better coordination of breath and to increase the amount of the breath to be used.

As recommended by a breathing trainer M. White, the first thing to do in order to learn a correct inhalation would be to stabilize natural breathing reflexes:

- 1) to sit or stand straight, slowly exhale the air out of the lungs until it is no longer possible to exhale it;
- 2) to allow the air freely and effortlessly flow into the lungs, simultaneously feeling inhalation in the whole body (White, 2005).

This exercise makes it easy to understand where and how a natural, relaxed breathing occurs in the body, because in brass playing it is more efficient than overdone, tension limited inhalation which is often used by the students due to their misconception about diligence. M. White points out that practicing natural breathing or the renewal of natural breathing reflexes is good for all people, and it leads to the state of deep relaxation (White, 2005). Relaxation, as we know, is an important factor for increasing both the life quality and abilities to learn (Schachl, 2005).

When the skill to inhale and exhale freely – without any stress and tension - is acquired, the next step in the development of breathing is to show students how it is possible to increase the inspiratory volume by maintaining the feelings and principles of natural breathing – without forcing, strength and overdoing, only by means of increasing amplitudes of inspiratory and expiratory air amount:

- 1) to observe the process of natural breathing – to feel how the breath comes in and goes out;
- 2) to gradually increase breathing amplitude, maintaining feelings and working principles of natural breathing;
- 3) to consciously follow the movement of the air in the body and try to feel how much unused breathing space there is in your body, if you consciously relax it and allow it to expand.

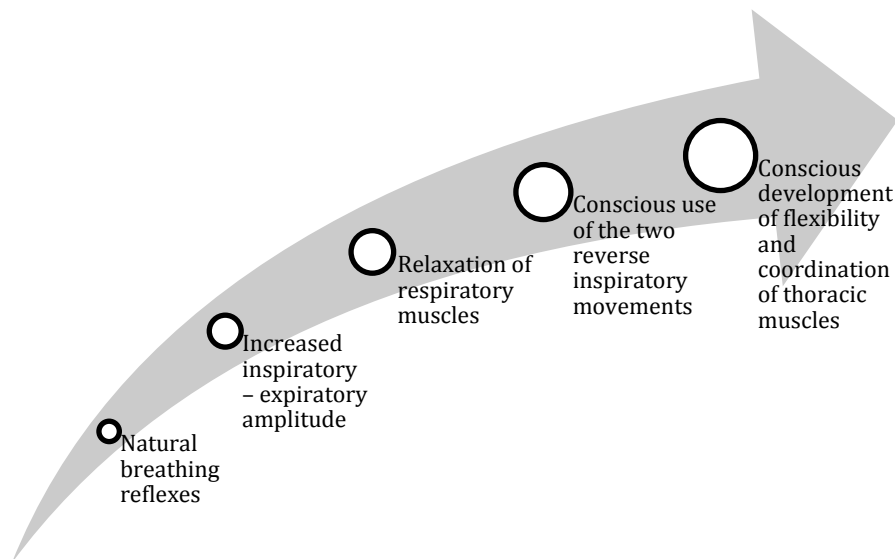
This exercise enables us to demonstrate to the students the maximum of their inspiratory amplitude and help them to release the tension which blocks the inspiratory process long before the maximum of inhaling is reached.

While doing this exercise, it is advisable to mentally intensify the movements of air within the lungs by demonstrating it with hand movements in the area of the solar plexus (namely, on inhaling the space between the palms increases, on exhaling – decreases, the movements are up and down). Thus, a barely perceptible feeling of the air movement in the lungs is being intensified by the perceptions of visual and kinaesthetic senses (Gumm, 2009).

The ability to consciously relax specific muscles – antagonists, uninvolved in the breathing activity, can contribute much to increasing the efficiency of breathing movements. Namely, on inhaling expiratory muscles have to be maximally relaxed, but on exhaling – inspiratory muscles, so that breathing would not be based on isometric tensions, which actually are unable to influence the more efficient air movement either within musician's lungs or in the instrument.

The next step towards expanding the respiratory volume in playing is the use a full inspiratory reserve volume. In order to do this, we have to be aware of the fact that a full inhalation is provided by two reverse movements – the movement of the diaphragm downwards and the movement of the chest upwards – and employ this physiological peculiarity to increase the air volume used in playing.

A higher level in the process of increasing the vital capacity of the lungs is the development of flexibility and coordination of thoracic muscles. For this purpose various exercises, designed for increasing flexibility of intercostal muscles in both directions - expansion and contraction - can be used, thereby extending the duration of exhalation in a positive air pressure zone.



**Figure 3. Procedural model of increasing the respiratory amplitude and air volume during playing**

Taking into consideration the fact that in case of children and teenagers, the training of muscular mass is comparatively ineffective and the increase in strength is more often achieved by improving the movement coordination (Jansone & Krauksts, 2005; Haywood & Getchell, 2009; Hall, 2011), for brass playing it is preferable to develop correct – close to a natural breathing process - breathing movements, as well as to

strengthen expiratory muscles and gradually, without overloading, to increase expiratory force and intensity. In such aspect, optimal breathing model designed by M. White, which contributes to developing and deepening a natural inspiratory reflex, in combination with exercises devised for increase of the amplitude of breathing, and the relaxation of muscles – antagonists, uninvolved in the activity, as well as the improvement of coordination of breathing movements, is the optimal solution for teaching brass players.

## Conclusion

The research has revealed that in the pedagogy of brass playing, often teaching of breathing patterns is not based on knowledge about real, physiologically determined processes of natural breathing, because:

- the use of the concept of the diaphragm contradicts the physiological processes of breathing;
- the idea about the breath support is usually being related to this contradictory use of the diaphragm concept. Besides, it requires serious analysis and revision in order to avoid misconceptions about the necessity of isometric contractions of expiratory muscles to create breath support;
- the traditional division into chest (thoracic), diaphragmatic and combined breathing does not create a clear perception about breathing as a two-way movement, where the elevation of the chest on inhalation allows for the so called chest breathing type to dominate, the lowering of the diaphragm allows the diaphragmatic breathing type to dominate, but these two movements performed simultaneously create the so called combined breathing type;
- instead of working in order to increase the inspiratory volume which would resolve many problems of playing, the force of expiratory muscles is being developed, which provides lesser benefits and could create excessive muscle tension and entail risks for musician's health in addition.

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## **AN INTERVIEW WITH GERALD WELKER: PUBLIC PERFORMANCE AND SOLO DEMONSTRATIONS**

**Michael F.SHAUGHNESSY, Jason VEST & Kayla PAULK**

*Eastern New Mexico University, Portales, New Mexico  
e-mail: Michael.shaughnessy@enmu.edu*

Technical Sergeant Gerald L. Welker, horn, is a native of Tuscaloosa, Alabama. Gerald earned both the Bachelor of Music degree and the Master of Music degree from the University of Alabama, while also serving as the Graduate Teaching Assistant. He is an active clinician, having given master classes throughout the United States and at the Royal Academy of Music in London. As a performer G.L. Welker was principal horn with the Huntsville Symphony, associate principal/3rd horn with the Macon Symphony, and assistant principal horn with the Tuscaloosa Symphony Orchestra. Gerald is an active soloist and chamber musician.

Most notably, G.L. Welker won the Second Prize in the professional division of the 2007 International Horn Competition of America, as well as being a featured soloist at the 37th Annual International Horn Society Summer Symposium. He has also been named a Yamaha Young Performing Artist, the National Federation of Music Clubs Brass Soloist of the Year, and has performed as a member of the world-renowned Transatlantic Horn Quartet. G.L. Welker joined the United States Air Force Band of Mid-America in 2006. He joined the Air Force Academy Band in 2009 and performs with the Marching Band, Concert Band, and Academy Winds.

Technical Sergeant G.L. Welker recently visited the Eastern New Mexico University (ENMU) campus as part of a three-day Air Force-sponsored visit, which included: a collaborative performance with Mrs. Kayla Paulk, pianist; a chamber music recital with Dr. Jason Vest, tenor, Mrs. Kayla Paulk, pianist, and a graduate string quartet from Texas Tech University; a recording session; master classes with both instrumentalists and singers; and private lessons with ENMU horn students. Inspired by Mr. G. L. Welker's artistry, passion for teaching and advocacy for music education, Dr. Jason Vest and Mrs. Kayla Paulk and Mr. Michael F. Shaughnessy conducted the following interview with Mr. Welker.

1. *Gerald, you are a member of the prestigious Air Force Academy Band and perform with the Marching Band, Concert Band and Academy Winds. How do you manage to*

*maintain your exceptional artistry and virtuosity when performing with so many different groups?*

I was raised in a family full of world-class musicians. So, it was instilled in me early to always hold myself to the highest of standards. I always aim to do my best to serve the music. If I allow my technique to suffer, then I have failed the composer and the listener. To me, this is unacceptable. So, I make sure, no matter how busy I get, to find time to constantly improve in daily practice.

*2. You are also involved with chamber music and have also given master classes at the Royal Academy of Music in London. It must be a challenge to have to be proficient in so many different realms. How do you maintain your balance, composure and acumen?*

I am at home when I am dealing with music, whether it be performing or teaching. I welcome any challenge as a performer. It is like an athlete making it to the final championship game. Yes, there is a lot of pressure to perform, but the thrill of the opportunity makes the experience well worth it. I also love to teach students who are hungry to learn. I then, in turn, learn from the students. I have been very blessed in life to have some of the world's finest teachers, and I wouldn't trade my experiences for anything in the world.

*3. With the various United States ensembles, much of your performances are public, but at the same time you do master classes- what are the challenges and how do you make these continual transitions?*

You keep close to your roots. I was brought up to be a strong solo horn player. So, I use that knowledge and dedication toward all musical genres/situations that I find myself put in. There is a wonderful rush in performing for the public with the USAF Academy Band. We bring the message of Air Force professionalism to smaller communities that might not usually get to see the uniform. We get to relay this message through the universal language of music. The power of music can never be over-emphasized. Teaching master classes gives me the ability to give to others what I have been given. It is simply a way to pass the torch on to the next generation of musicians. It is an honor to do so.

*4. Can you describe the world-renowned Transatlantic Horn Quartet? When did it begin and who performs in it? How are its members chosen?*

The Transatlantic Horn Quartet is comprised of two British, and two American horn players. It came to fruition in the late 90's. The charter members of the group were Michael Thompson, Richard Watkins, Eric Ruske, and Charles Snead. Michael and Richard teach horn at the Royal Academy of Music in London, are both former principal hornists of the London Philharmonia, and are arguably two of the finest horn soloists who have ever lived. They also play in London studios which produce such movie soundtracks as the Harry Potter and Lord of the Rings films. Eric Ruske is probably the most famous American horn soloist in the world. Charles Snead is widely sought after as both a horn player and teacher. He was my horn teacher from the age of ten, and I consider myself so lucky to have such a wonderful mentor to look up to. Over the years, the group has only changed in by one individual. Eric Ruske left the group fairly early to give more attention to his solo career. After this, the famous

Canadian Brass hornist, David Ohanian took his spot. After David, I was in the group with the other original three members. So, my experience performing with some of the most famous players in history was one that I will never forget.

*5. Now, problems in music pedagogy: what are the challenges you face when conducting master classes, and how difficult is it to work with "up and coming" musicians?*

Sometimes you are faced with students who come to you uninspired. I try to read that student. What do they feed off of? What is their sensitivity level? Are they really giving their all, or is there more to find deep down. I love seeing a spark when the students realize that they are beginning to move beyond the technique and are starting to make true art. Music is such an emotional rush that if we only look at it through the eyes of academia, we lose the magic that it can create.

*6. How do you continue to find the "drive" and renewed enthusiasm in your artistic pursuits, since one often thinks of the military band experience as repeatedly playing prescriptive repertoire?*

That is actually a false assumption. Being in the Academy Band has given me more opportunity to expand my musical horizons. Yes, we play for ceremonies where we perform memory marches, etc., but that is only part of our job. Being in the Academy Winds, I am given an abundance of creative license and freedom to have a say in what is programmed for a certain show. I also get the opportunity to compose/arrange many pieces for my group. So, hearing your work come to light from some of the finest musicians around is not a horrible thing at all.

*7. Can you please discuss the importance of the military bands in musical advocacy in the United States? I know this is a somewhat hot topic right now, based on recent articles in the Washington Post about the approximately \$500 million spent annually on military ensemble personnel.*

Military bands currently are going through significant cuts. This really has hindered our ability to function without serious sacrifices. The bands mission is more important than most people would think. Sometimes, music can be the best form of human relations that this nation can offer to other nations. Through our deployments, we reach some many people who have a negative view of our country. When our groups are done performing for these same people, they are converted to a new belief that they can find common ground with us. This is so powerful! Also, the numbers in the Washington Post article were nowhere near accurate. If music is taken out of our military, then this country is in deep trouble. In many ways...it is our "saving grace".

*8. You have had wonderful musical influences in your life, especially in your Mom and Dad. Both are very well-respected music educators and performers. Can you describe what it was like to have the love of music passed on to you from two people who you loved and respected so much?*

You can't really explain it. I love and respect both my parents. My mother, Dr. Leslie G. Welker, was my band director through my junior high/high school years. She continues to be the band director at Hillcrest Middle School in Alabama. She has such an incredible connection to her students, and I was so lucky to have such a wonderful musician as my teacher. My father, Dr. Gerald L. Welker, was the founder of the

Alabama Wind Ensemble, and I had the honor of being his principal hornist from 1999 to 2006. My father passed away in 2007, but I will never forget his wonderful mentorship. I miss him every day. I am also very proud of my beautiful sister, Adrienne Welker Moore, who is a saxophonist with the United States Navy Band in Washington D.C.

*9. Since you have three young daughters and a wife, can you discuss maintaining a healthy balance between a demanding performing schedule and spending time with your family?*

We continue the Welker tradition in my young family in Colorado Springs. My wife, Joy, is a world-class flute player and all around musician. My daughters are also musicians. Lauren, my 10-year-old, plays the violin and sings. My 8-year-old, Emily, plays the flute, harp, and she sings. My 6-year-old, Sophie, plays the harp and sings as well. As far as keeping the busy performing schedule...my family sacrifices to give me these opportunities. So, I am always extremely grateful for their love and support.

*10. What do you want your legacy in life to be?*

First and foremost, I want to be remembered for being a good man, husband, and father. As a musician, I would like to be remembered as an artist who was always a servant to the music. I love to perform. I love to teach and be taught. I love to create music with others, and I will never stop striving to be the absolute best I can be for myself and those whose lives I touch.

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Manuscripts, ideally between 5000 and 8000 words (including abstract, diagrams, references and tables), should be sent as an attachment in original format or Word document format (DOC). Manuscript should be submitted in English and only for *Problems in Music Pedagogy* in accordance with the publication manual of the American Psychological Association (APA).

### REFEREEING

All manuscripts are normally reviewed by at least two referees (in addition to the Editor). Refereeing is anonymous unless a referee chooses otherwise. Referee comments are passed intact to authors, apart from editing. Proofs should be returned to the Editor as soon as possible. The Editorial Board has the right to reject a manuscript if after the first review it is submitted repeatedly with unsatisfactory corrections. The selection of articles for inclusion in the journal will be based on these reviews.

### SPECIFICATIONS FOR CONTRIBUTIONS

Manuscript must be typewritten with a font size of 12 points (font *Times New Roman*) on one side of A4 paper. Contributors are asked to use MS Word 5.0 or a later version.

### Style

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Manuscripts should begin with an *Abstract* of up to 120 words that contains concise factual information on objectives, methods, results, and conclusions.

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The body of the text should begin with a statement of the objectives of the work. It should include citations of published related work and sections on *Methods*, *Results*, *Discussion* and *Conclusions* of the study.

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**Figures.** Graphics files are welcome if supplied as Tiff, JPG. A minimum resolution for images is 600 ppi. The minimum line weight for line art is 0.5 point for optimal printing. When possible, please place symbol legends below the figure image instead of to the side.

Tables, drawing, diagrams and charts with a clear title should be numbered by Arabic numerals. The approximate position of these materials should be indicated in the manuscript.

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Hallam, S. (1998). *Instrumental Teaching: A Practical Guide to Better Teaching and Learning*. Oxford: Heinemann.  
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Brown, H. (1994). *Citing computer references*. Retrieved April 3, 1995 from <http://neal.ctstateu.edu/history/cite.html>

### ALL CONTRIBUTIONS AND CORRESPONDENCE SHOULD BE ADDRESSED TO:

Professor Jelena Davidova,  
*Problems in Music Pedagogy*,  
Daugavpils University,  
Parades 1-205,  
Daugavpils, LV 5400, Latvia.  
Tel.: +371 29140287.  
**E-mail: [jelena.davidova@du.lv](mailto:jelena.davidova@du.lv)**



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