

The Impact of Self-made Musical Instruments on Pupils' Motivation

Abstract

The paper gives an account of research on the impact of progressively understood instrumental activities on the motivation of pupils during the lessons of music education in the 2nd and 4th grades elementary school. We present the results of research performed through a pedagogical experiment that included various methods of pupil motivation. As a part of it we used children's self-making of simple musical instruments and playing them while also using graphical depicting of music elements in an organic conjunction with further music activities.

Key words: *Self-made musical instruments, motivation, pedagogical experiment*

Introduction

According to our previous probing, teachers in our country *traditionally* understand instrumental activities as a rare particularity of music education, while a large portion of pupils have no chance to play any instrument, and those who have that chance do it seldom and for a short time only. On the one hand, it is a consequence of poor material conditions, on the other hand, elementary school teachers have not yet duly appreciated musical instruments in pupils' hands as a significant means of their general development; neither has our music pedagogy paid adequate attention to this problem so far. In comparison with long-time experiences of international music pedagogues (Jungmäir, 2003, Wuytack, 2004), we see that this situation in our country is a deficiency. Attempting to change these circumstances, in order that the use of musical instruments is no longer an aimless game or sporadic particularity of a lesson, we defined *progressive* understanding of instrumen-

tal activities as a purposeful, systematic impact of the use of all musical instruments, including simple elementary musical instruments as well as their construction by pupils themselves, in optimal cooperation with other activities during the development of cognitive and non-cognitive pupils' functions and processes. Here we may emphasize that this understanding of instrumental activities assumes that they should become an organic part of the majority of lessons of music education in the 1st–5th grades of elementary schools.

For our investigation, from among the non-cognitive processes we choose pupils' *motivation* and its changes under the influence of the traditional and progressive understanding of instrumental activities.

A survey of used methods, organization and research progress

In our research we used the following research methods (Juszczuk, 2003) and techniques: pedagogical experiment, inquiry, observation with a notes taking technique, statistical method, quantitative and qualitative analysis. As the instrument of inquiry we used a questionnaire with scaled, open and alternative questions. Through scaled questions, pupils expressed their attitude to music education as well as to individual musical activities on music education lessons. Alternative questions examined the situation in the extra-school pupils' interests, an open question provided for a possibility of a free evaluation of music education lessons. In order to interpret pupils' attitude to music education, and thus motivation as well as its changes during the pedagogical experiments, we used the pupils' answers to the questionnaire's questions, where pupils reported in an evaluative scale of 5 stages as to how they look forward to music education lessons. We interpreted the data separately for individual grades. When working with the data, we were using the table processor Microsoft Excel.

The pre-research was implemented at the Š. Moyses Elementary School in Banská Bystrica in the 1st, 2nd, 3rd and 4th grades, with 69 respondents in the school year 2000/2001. Its goal was to verify some new methods of the use of instrumental activities, especially construction of musical instruments and graphical expressions of music, and to verify the questionnaire's adequacy for the examination of actual pupils' motivation. In Slovak music education, the methods of simple, elementary musical instruments construction by pupils as well as of graphical expressions of music are not yet widely spread, and until now, they have not been described in detail yet. Therefore, we had to take information from German pedagogy of music (Auerbach et al., 1978, Drees et al., 1980, Grünh, 1997, Jahnz, 1996) when applying the said new elements trying to modify them for our conditions.

We conducted long-term research through a pedagogic experiment in the school year 2003–2004. We chose a sample made by the pupils of the Tatranska Street Elementary School in Banská Bystrica. We used a parallel experiment (Juszczuk, 2003). This article presents the research carried out in the 2nd and 3rd grades. The *experimental group* in the 2nd grade was made up by the pupils of 2nd C and 4th C. Their teaching was realized with our methodological instructions, which utilized the above-mentioned foreign resources, by use of our proposed models of elementary musical instruments (maracas, bell, metalophone, scraper, waver *mávátko*) and their use together with additional activities including graphic expression of musical elements during music education lessons. (Janeková, 2001, Drees et al., 1980). In the *supervisory groups* 2ndB and 4thA teaching was realized without our interventions, with material equipment and teaching tools that were available as usual in these classes.

We realized *introductory measurements* of the level of motivation in all groups at the close of November 2003. Until that time in all of the classes several instruments of Orff instrumentary was used sporadically and non-systematically (which was clear primarily from the answers to the open question in this measurement, from discussions with teachers and from their lesson plans). In the *first period* of the pedagogic experiment we were systematically using self-made musical instruments. After the *running measurements* of motivation in all groups at the close of March 2004 a *second period* followed, in which pupils of 2ndC continued self-construction and use of simple musical instruments. In 4thC we decided to exclude the use of self-made musical instruments, and we limited them to a systematic use of various possibilities to play on body, in order to find out the reflection of this change in pupils' motivation. For the purpose of statistical processing, we had to exclude from individual groups those pupils that take part in music education (for example in elementary music schools, in music interest groups, and the like). At the end of the pedagogic experiment in June 2004 we implemented *final measurements* of the level of motivation in all of the groups.

All the measurement happened in the absence of teachers in order to guarantee anonymity and pupils were able to openly express their opinions.

The impact of instrumental activities on pupils' motivation

On the lessons of music education as well as in teaching generally, it is very important that the teacher ensures actual learning motivation. The aim of it is to avoid extreme situations, such as *insufficient* motivation or *conflict* motivation most frequently caused by frustration – lack of exercise, food, information, and so on

(Poliach, 2003). It is the basis for our endeavour to ensure that more permanent processes and characteristics appear in pupils' motivation structure, especially such as the *interest* in the whole complex of music arts, and related activities, which gives a basis for pupils' *positive attitude to music* as a permanent personality feature. Therefore, we focused on the possibilities of instrumental activities for creation of actual pupils' motivation on music education lessons.

As to the research problem, our research is explorative and verificative (Juszczuk, 2003). We focused our interest mainly on pupils' understanding and appraisal of their attitude to music education. Because our question was whether we could positively influence pupils' actual learning motivation at school by means of instrumental activities in an organic connection with other activities, we formulated the following hypothesis:

The main hypothesis:

Instrumental activities on music education lessons with the use of self-made musical instruments will have a significant impact on pupils' motivation.

Special hypotheses:

1. *Regular, frequent and systematic use of self-made musical instruments on the lessons of music education gives pupils a higher level or maintains the level of actual motivation, what results in joy, mobilization of their attention and a positive impact on their emotional tuning.*
2. *Regular, frequent and systematic use of self-made musical instruments on the lessons of music education has a significant impact on maintaining the level, or improvement of pupils' attitude to music education, which traditional teaching lacks.*
3. *The absence of the use of musical instruments makes pupils accustomed to frequent and progressive use of self-made musical instruments significantly demotivated.*
4. *The level of pupils' motivation under the traditional, unchanged way of teaching, with a sporadic use of some instruments of the Orff instrumentary during the school year, significantly decreases.*

A. *The inquiry* was implemented at the time of introductory, running and final measurements by means of the above-mentioned questionnaire. When assessing the differences in pupils' actual motivation in particular measurements in the experimental and supervisory groups we employed methods of mathematical statistics. Because of the small extent of selections, as well as because in some groups the division of probability of the examined phenomenon was not usual,

we used non-parametric tests: Wilcoxon-Mann-Whitney two-sample test for examinations of the level balance of two samples (Wimmer, 1993) and the Wilcoxon one-sample test to find out differences in repeated measurements (Chráska, 1991). Here we compared the difference between the introductory and running measurements (I.), the running and final measurements (II.), and between the introductory and final measurements (III.) in both experimental and supervisory groups.

Research results

By means of the Wilcoxon-Mann-Whitney two-sample test we obtained the following results:

Tab. 1. The comparison of pupils' motivation in the experimental (2ndC, 4thC), and supervisory (2ndB, 4th A) groups

Measurement	Class	u1	$W_{crit}(0.05)$	Class	u1	$W_{crit}(0.05)$
		u2			u2	
Introductory	2 nd C - E	39.0	11	4 th C - E	78.5	64
	2 nd B - K	21.0		4 th A - K	145.5	
Running	2 nd C - E	107.0	50	4 th C - E	58.0	64
	2 nd B - K	75.0		4 th A - K	166.0	
Final	2 nd C - E	69.5	59	4 th C - E	128.5	64
	2 nd B - K	140.5		4 th A - K	95.5	

When applying this method we could consider a significant difference between the two groups if one of the values u_1 , u_2 is smaller than $W_{crit}(0.05)$.

As to the 2nd grade, not one measurement proved significantly different, even though the final measurement approximated it. These results make us draw a conclusion that we cannot refuse the H0 zero hypothesis on 0.05 level of significance: Both selections come from the same probability allocation, therefore both levels of motivation are identical in both files.

In the 4th grade, through the comparison of the calculated values with a critical value, we found out that following the first period of the experiment we can refuse the zero hypothesis and accept the alternative H1 hypothesis: Both selections do not come from the same probability allocation, therefore the levels of the examined signs are different in both files. Since the introductory measurement did not prove a statistically significant difference, we may consider the *second special hypothesis* to be confirmed. Contrariwise, the exclusion of musical instruments in the second period in the experimental group decreased motivation, but not as deeply as to

make a significant statistical difference between the two groups, since we registered gradual decrease in the supervisory group as well.

We were also interested in whether there would appear a statistically significant shift in motivation in any of the groups during the experiment; we interpreted that by means of the Wilcoxon one-sample test. The results were as follows:

Tab. 2. The development of pupils' motivation in the experimental (2nd C, 4thC) and supervisory (2ndB, 4thA) groups

Measurement	Group	n	S +	S -	$W_{crit}(0.05)$	Group	n	S +	S -	$W_{crit}(0.05)$
I.	2 nd C - E	5	N	N	—	4 th C - E	5	9.0	6	—
II.		7	19.5	8.5	2		13	0.0	91	17
III.		5	N	N	—		12	0.0	78	14
I.	2 nd B - K	10	13.0	15.0	8	4 th A - K	8	9.5	25.5	4
II.		9	2.5	42.5	6		10	12.0	43	8
III.		7	0.0	22.0	2		10	4.0	51	8

n – the number of non-zero differences

In the 2nd grade we could not assess the difference in development against this measurement because of the low number of correct answers in the introductory measurement in 2ndC, which is marked by the letter “N” in the table. The assessment of the difference between the running and final measurement, can only be considered as valid, which did not show a statistically significant difference at the significance level of 0.05. We may state that in the experimental group throughout the second period of the experiment, the child's motivation did not significantly change, which means that *the second special hypothesis* was confirmed, since the development of pupils' attitude to music education was kept at the approximately identical level when self-made musical instruments were progressively used. In the supervisory group (2ndB), during the first period of the experiment, there did not appear any statistically significant difference in motivation, the second period showed already negative development of motivation in this class with unchanged traditional teaching. Likewise the overall difference between the introductory and final measurements was statistically significant. This proves that *the fourth special hypothesis* is right.

According to the results of the 4th grade we found out that due to a low number of non-zero differences following the first period of the experiment in 4thC class we cannot assess the improvement of motivation as statistically significant. In the

second period of the experiment we observed statistically significant demotivation when musical instruments were not used, which influenced the whole final evaluation; this confirmed the *third special hypothesis*. In the supervisory group of 4thA class in both periods we noticed decreased motivation, even though it is not statistically significant. Generally though, the decrease of motivation using unchanged traditional teaching in the supervisory group throughout the whole time of the first and second period of the experiment the decrease of motivation is statistically significant, which confirms the correctness of the *fourth special hypothesis*.

B. Observations were implemented in the period January – June 2004 in the experimental groups of all grades. The pupils were observed as to the following special *categories* of their behaviour:

- demonstrations of optimal motivation: alertness, concentration, initiative, positive emotional tuning,
- demonstrations of insufficient motivation: decreased activity, lack of concentration, decreased initiative,
- demonstrations of conflict motivation: dissatisfaction, motional restlessness, highly-strung expression, negative emotional tuning. (Poliach, 2003)

The analysis of experiment's first period. The pupils showed joy and delight at the first construction of a metalophone, they were actively and creatively experimenting and conceiving various ways of the new instrument's use; they did it often in spite of the teacher's prohibition. They found out that they could use the instrument to function as a drum (I quote – Attaboy, drum!), or a big rattle, they invented an interesting way of use of the elasticity of the band that was connecting individual parts of the instrument while playing on this "drum", they contrived new possibilities of stones' location so that the sound was better and louder. Some expressed their interest to construct such an instrument at home as well, (I quote: "Madam, where can I get it?" asking about stones – author's note I want to make it myself at home?", and the like). Step by step the pupils got used to this instrument and its use. While employing the group method of work, if any pupil groups were not adequately made busy by the teacher, those pupils began to show signs of subdued activity (yawn, bedding on the desk, and so on); others showed additional signs of conflict motivation, such as displeasure, unasked-for lashing of sticks against instruments, against the desk, and the like. Every appropriate use of musical instruments, however, caused pupils' activity and increased attention. Increased attention was caused by a new elementary musical instrument – one pipe of elementary Pan Flute. All pupils tried actively and with maximum effort to obtain a well

clanging tone, and they wanted to take the instrument home. In 2ndC class one of the pupils successfully and with much joy created a tone by overblowing into higher octave. His intensity, however, was very strong and influenced other pupils negatively so that they shut their ears and gave a verbal notice. The teacher, however, did not respond to this situation in class. In all of the lessons, the pupils showed playfulness, musical instruments drew their attention, they aroused their interest, and they fulfilled their hunger for activity. Some pupils, who retained their own elementary maracas, played with it over the lesson, if the teacher did not adequately made them busy, namely if she did not make use of the method of activation for most pupils in an optimal period of teaching.

The analysis of the experiment's second period

In 2ndC class we often used graphical expression of rhythmic parts and their play on both musical instruments and their body. These activities always attracted attention of all pupils, they were successful always and for everybody providing there was sufficient space for all pupils to master them, and thus they brought a possibility of motivation through *appreciation*. The fact that the pupils were creating new elementary musical instruments on music education lessons and construction education with the homeroom teacher acted positively as well. The pupils looked forward to using their self-made musical instruments on the music education lessons. One of the pupils of that class showed off that he and his sister made the same music instrument, they had constructed it at school, and at home as well (elementary scraper); this can be assessed as a positive impact on his interest and on his extra-school activities. In the same way we can also evaluate obvious interest of all children to have a chance to take self-made musical instruments home and to use them.

On the other hand, in the second experiment's period in 4thC class, where elementary musical instruments were no longer used and instrumental activities in our understanding were limited to the play on body, the signs of insufficient or conflict motivation, such as motional restlessness, lack of concentration, no job participation, verbal expressions like "Are we not going to play on boxes?" and the like, obviously began to prevail when pupils took part in those lessons with the majority of vocal activities. The play on body actuated them and caused their attention, and at that time they did it singing attentively with much interest, step by step, however, it was losing its attractiveness.

Based on the observations we may state that the use of self-made musical instruments takes a *collative* effect, and therefore it is really a suitable method of pupil motivation. During the construction of musical instruments as well as play on them, by means of tasks with appropriate mastering of the elements of graphic

expression of music we also focused on motivation through *complex development of cognitive functions*, namely at sensomotoric and pre-operational levels. This method proved to be more successful for 2nd graders compared to 4th graders. The self-dependent construction of elementary musical instruments, even though according to a model prepared in advance, functioned as a *creative* task when discovering various sound possibilities, ways of playing as well as when trying to improve the construction. On the basis of observation we can judge that the *first and third special hypotheses* were confirmed.

These results enable us to state the accuracy of the traced *main hypothesis* for our sample of respondents, because we always pursued a significant positive impact of instrumental activities with the utilization of musical instrument construction on either keeping or increasing of the level of actual pupils' motivation on music education lessons in the course of a year. We are aware of the fact that the research samples are not representative, and from the statistical point of view we cannot generalize them. Since we also verified our findings by the method of observation, we may state that the research indicates general relevance of our hypotheses; however, we would have to verify it through a bigger sample. Since this was groundbreaking research in its complexity in our country and we did not find this specific copy angle in foreign literature either, it may become a starting point for additional research of a broader range.

Conclusions

Our presupposition on a positive impact of the use of various methods and strategies of pupils' motivation with the use of self-made musical instruments on music education lessons was verified by our research results. It appeared as well that teachers cannot rely on the attractiveness of any elements of teaching only; they should master and adequately use all available methods of pupils' motivation during lessons. At the same time, we may state that our models for the construction of musical instruments proved to be good and contributed to the positive impact on pupils' attitude to music education, which eventually can mean one of the possibilities of a noticeable approximation of children to the world of music.

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