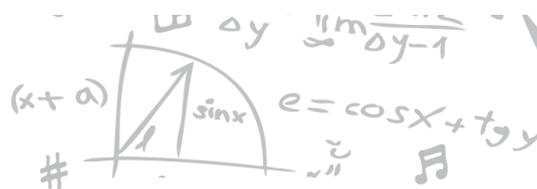


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REALISATION OF DO.RE.MAT PILOT TRANSFER

National case study - LATVIA

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DO.RE.MAT PILOT TRANSFER IN LATVIA

Introduction

The activities of LLP TOI project DO.RE.MAT included the realization of transfer action of innovative DO.RE.MAT methodology in schools of Italy and Latvia within the time period of 01/10/2013 to 31/05/2014.

To increase the transferability of the method to Latvian education context, at the initial stage a desk research was conducted. It was aimed at finding information, data, theoretical sources on methods and theories similar to DO.RE.MAT available in Latvia. The research included studying of related Internet resources, literature resources and interviews with field experts.

The reference to close relation of mathematics and music and subsequent development of cognitive skills was found in publication by professor of Liepaja University, *Dr.paed.* Jānis Imants Birzkops „*Muzicēšana – labākā intelektuālo spēju attīstītāja. Revolūcija pedagogijā.*” (*Music – best for development of intellectual abilities. Revolution in education*) Rīga, Zvaigzne ABC, 62 p. ISBN: 9789934003356, 1999.

Results of the desk research confirmed that currently there are no similar methods used in general education and VET to teach Math and Music. However in pre-school education institutions the teachers use songs for teaching numbers. This type of integrated approach has been widely used to promote mathematical thinking and teach Math concepts to pre-schoolers.

Information about the DO.RE.MAT project published on VISC (National Centre for Education) website (<http://visc.gov.lv/visc/projekti/doremat.shtml>) created a substantial interest in the methodology. Music teachers, Heads of Music methodological associations, university students, teaching staff of Academy of Music, journalist from newspaper „Izglītība un Kultūra” (*Education and Culture*) wanted to learn more about the method.

To select teachers for the transfer of methodology VISC published an open call for teachers on institution’s website. The call included short information about the project idea and listed the criteria for DO.RE.MAT teacher candidates such as – experience in their subject, high motivation to pilot new method, good command of English, willingness to disseminate the method to colleagues in school and other teachers in Latvia. Another significant requirement was commitment of school management to support the piloting of method. All candidates were required to submit a CV and a motivation letter.

Motivation letters from 14 school teams (28 teachers) were received. The main motivators mentioned were:

- willingness to promote students' learning motivation and make the acquisition of Math more exciting;
- interest in acquisition of non-traditional teaching methods;
- willingness to expand existing experience of integrated learning approaches;
- increase interest of young students in current contents of Music lessons; promote students' participation during the lessons;
- previous knowledge about *Dr.paed.* Jānis Imants Birzkops theory on the effects of music in cognitive development of a person;
- existing and long-term creative cooperation among the school's Music, Math and non-formal career oriented education teachers.

The selection process was organized in two steps. The applications received were evaluated and shortlisted candidates were interviewed to assess candidates' suitability and command of English.

As the result two schools and two teacher tandems were selected to pilot the DO.RE.MAT methodology:

1) Marupe Secondary School

Math – Ms. Zanda Romanovska, Music – Ms. Inga Cirse

2) Jelgava Spidola Gymnasium

Math - Ms. Margita Jirgensone, Music – Mr. Endijs Rozkalns

PROFILE OF DO.RE.MAT PILOT SCHOOLS IN LATVIA



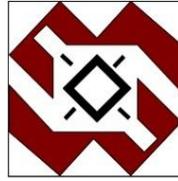
Marupe Secondary School

Marupe Secondary School is located 7 km outskirts of Riga Centre in Marupe. The history of school dates back to 1904 when it was established as a private school. In 1971 Marupe Secondary School was officially opened. In the school year 2013/2014 the school had 74 teachers and 986 students.

Currently the school runs three education programs:

- 1) Basic education program (ISCED level 1 and 2);
- 2) General secondary education program (ISCED level 3);
- 3) General secondary vocation oriented program (commerce) (ISCED level 3).

The school offers 20 non-formal career oriented education groups including 4 choirs, ensembles, drama club, crafts, chess club, visual arts etc.



Jelgava Spidola Gymnasium

Jelgava Spidola Gymnasium was opened in 1990. It is located in Jelgava city, which is 44 km from the capital Riga. The gymnasium was established soon after the collapse of Soviet Union and renewal of independence of Latvia, which was a period of national revival. It gave an impetus to complement the study process with patriotic ideas, foster acquisition of national traditions and values and Latvian history. The aim of gymnasium is to provide competitive education of high quality and to prepare students for higher education. To fulfil this aim the gymnasium sets high requirements for teaching staff, promotes their active CPD and within the teaching-learning process offers students opportunities for scientific research and project work as well as for talent development.

In the school year 2013/2014 the gymnasium had 44 teachers and 448 students.

Students' breakdown according to ethnic groups: Latvian - 423, Belarusian -3, Russian-15, Lithuanian-2, Polish-2, Ukrainian-1, German-2.

Jelgava Spidola Gymnasium runs the following education programs:

- 1) Lower secondary education program (ISCED level 2). On this level three education programs are offered: social sciences, commerce and environmental studies;
- 2) General secondary education program (ISCED level 3): environmental studies, humanities and social sciences program, vocation oriented program in commerce.

Currently Jelgava Spidola Gymnasium offers 12 non-formal career oriented education groups including dance group, music club, drama club, environmental club etc.

DO.RE.MAT METHODOLOGY PILOTING IN MARUPE SECONDARY SCHOOL

Group characteristics

Grade 9a (regular group) has 23 students (10 girls and 13 boys) aged 15-16. Math teacher Zanda Romanovska has been teaching this group for five years therefore she is able to follow the dynamics of academic achievements in Math. In general the Maths performance of students in this grade is above average. There are 5 students (2 girls and 3 boys) whose Math skills are very good; 6 students (2 girls and 4 boys) are poor at Math.

Social-emotional climate in the classroom

There is a lack of a distinct leader among the students, therefore during the academic and informal processes the group often fails to act as a team in order to accomplish common goals. They seldom support each other during the study process and out-of-class activities. There is one exceptional high-performing student who is respected by his classmates; however he is not a leader.

There is a prevalence of introvert students with only few students regularly engaging in a dialogue with teacher and asking questions. In general it is not difficult to work with this group, however to achieve positive academic results teachers and students have to work with effort. Students usually acquire the subject content comparatively slowly and they need to be provided with a variety of practical examples. Not all students are eager to hone the acquired skills, e.g. having completed a single task correctly, they consider that the thematic area is acquired.

Grade 9.b (DO.RE.MAT group) has 29 students (12 girls and 17 boys) aged 15-16.

In general the Maths performance of students in this group is assessed as good. Math teacher Zanda Romanovska has been teaching this class for five years, therefore she is able to follow the dynamics of academic achievements in Math. There are 10 students (5 girls and 5 boys) whose favourite subject is Math and who are exceptionally good at it. Math performance of 6 students (3 girls and 3 boys) is low.

Social-emotional climate in the classroom

Students in this group are socially very active and extravert, with good sense of humour and easily interacting with teachers. Teaching this group requires some effort, since half of students follow the learning process easily and are able to solve tasks with different difficulty level. The rest of the students are slower learners. In this classroom the Math teacher often uses the group and peer learning methods.

This group was selected for the pilot of DO.RE.MAT method because the students as described above were open towards new approaches.

Qualitative analysis

Group dynamics

The majority of students were seriously interested in the method and willing to support teachers since the first DO.RE.MAT lesson. Initially teaching rhythmical patterns turned out to be a challenge and it required more time than planned. As there were students in the group who attended music school the teachers decided to involve them in the teaching process to assist their peers in acquisition of notes and rhythm patterns. This example suggests that the use of method could foster the shift from traditional role of teacher as the main instructor to more flexible model where students act as co-facilitators and participate actively in the teaching process.

It is difficult to conclude whether the impact of the method on student academic performance in Math was substantial. However the application of the method allowed students to interact with each other more, improved teamwork skills as well as revealed new personality traits of their peers. In longer run the students with lower Math abilities were able to better solve the tasks. It improved their self-confidence and encouraged more positive disposition towards mathematics. On the whole DO.RE.MAT method has a significant positive effect on student's personality and peer interaction in the classroom. It can serve as a motivator for students to perform better in subject areas that are not inherently interesting to them.

Students' motivation to learn

After the first DO.RE.MAT class students expressed keen interest and were looking forward to next lessons. The majority of students actively participated in Math/Music lessons and admitted that

taking an active role in their own learning reinforces their excitement to learn and to achieve better results. Some students still considered Math to be boring.

Learning difficulties

Most of the difficulties were experienced in the beginning of the piloting phase, when the rhythm concept was introduced. Students practiced rhythmical exercises and many of them had problems with reproduction of rhythmic pulse. For several students the development of steady sense of rhythm took a considerable time period. Subsequently the teachers needed to devote more lessons than planned initially to practice rhythmical exercises.



Description of the classroom environment (social status, students with problems)

According to regulations currently in force in Latvia the teaching staff does not possess the information about student's social status and domestic situation.

The school provides assistance of psychologist and social worker to students with disadvantaged backgrounds and if necessary these specialists are involved in handling issues together with teachers and students' parents.

In general the students in this group are friendly, eager to work with new technologies, open to new teaching methods. They were extremely supportive during the pilot process and participated with great enthusiasm in several open lessons which were delivered to Marupe school staff and teachers from other schools.

The management of time and space by the side of the experts adopting the method

The transfer action was implemented from 09/01/2014 to 15/05/2014; 16 Math/Music lessons were conducted.

The main problems appeared in the designing of DO.RE.MAT lesson plan since the teachers' remuneration system in Latvia does not foresee the presence of two teachers in a single classroom. As both teachers have heavy workloads and tight lesson schedules and the Music teacher also leads two choirs, it took much effort from school's management to tailor the lesson plan to allow both teachers to work together in DO.RE.MAT lessons.

Another challenge was to start the piloting process in the second semester when grade 9 students have to prepare for and pass national exams.



The students' response in terms of learning outcomes

The teachers concluded that students' academic performance in Maths has not

improved significantly and the results have remained stable. However the noticeable improvement occurred in Music subject.

The use of the method over longer period of time made a positive impact on students' self-confidence, especially those with persistently low Math achievements and low interest towards the subject.

The teachers noticed that students with lower self-confidence were able to better demonstrate their potential. The overall atmosphere in the classroom gradually became more positive and there was a constant development of mutual trust.

Teachers' interaction with students improved considerably and the status differences between teachers and students were minimized. It is of key importance in today's school that teachers and students can "speak the same language". It was evident that students also enjoyed the regular Math and Music lessons more.

The teachers reflected that working as a team was a unique experience because it empowered

them to work in an energetic, creative and confident manner. As an added value teachers mentioned that receiving colleague's immediate support and feedback helped to reflect on the teaching-learning process and reshape the process accordingly.

Analysis of the theoretical components of the methodology and organizational aspects implied by the DO.RE.MAT Method

- The method is exciting and motivates students to acquire Math and Music;
- In the context of Latvian Math curriculum, the thematic content areas covered by the method better correspond to students of age group 13-14, i.e. grades 7-8;
- It would be worth for teachers from other schools to learn about the method and about its application in teaching-learning process;
- The method is innovative and demonstrates that every subject could be acquired more effectively by using inborn abilities and acquired skills;
- Provision of a CPD course for teachers is necessary to master the method;
- Every subject can be taught by using various methods and this is one of the methods;
- The teaching-learning process would have been more efficient if the teachers had access to the whole didactical manual not just some theoretical components. Lack of full version of manual caused fragmented approach and was a barrier to sustainable implementation of the method;
- It would be useful to have video and other materials (e.g. for white board) to support the implementation of the method.



DO.RE.MAT METHODOLOGY PILOTING IN IN JELGAVA SPIDOLA GYMNASIUM

Group characteristics

The group for piloting of DO.RE.MAT method was comprised of 27 students (21 girls, 6 boys) aged 15-16. Generally in Jelgava Spidola Gymnasium for Math lessons students are divided into groups according to their academic ability. The students were from three forms each acquiring different education program – 9kom (commerce), 9soc (social sciences) and 9v (environmental studies). There is a constant competition among students within this group and the atmosphere is sometimes quite tense. There are students who regularly point out the mistakes of others. Nevertheless some students are open and motivated to take part in innovative learning experiences.

Qualitative analysis

Group dynamics

Before piloting of the method, the students were given the Entry test in Maths and Music. There were 74% correct answers given in Math test, 26 % were wrong, while in Music test students gave 48% correct answers and more than a half was wrong. The Post test was given after DO.RE.MAT lesson cycle. In the Math part students gave 90% correct answers with only 10% wrong. For the Music part the progress was even more evident. 76% students answered correctly, 24% gave wrong answers.

Students' motivation to learn

Upon the introduction of the method, the teachers identified two dominant reactions from students. The first group was enthusiastic and keenly interested, the other was extremely sceptic and expressed a point of view that introduction of new methodology would make the acquisition of Math even more complicated. That opinion was expressed by students who did not like Music as subject or were not good at it. There were 3 students in the group who go to the music school. In general, students enjoyed two teachers conducting a lesson and were eager to have DO.RE.MAT lessons again.



Learning difficulties

Both teachers and students identified the following difficulties: the methodology to be acquired was rather complex. Only few sample exercises were provided in the methodological manual. The level of complexity grew rapidly, especially in Music, and it was not easy for students with lower musical abilities to follow the pace. To cope with this challenge the teachers had to improvise and develop new examples for students to practice or ask students to make examples for their peers.

Description of the classroom environment

According to regulations currently in force the teaching staff does not possess the information about student's social status and domestic situation.

In DO.RE.MAT group there was one student with vision disability; several students were from large families and few came from families with very low income.

The management of time and space by the side of the experts

The transfer action was implemented from 27/02/2014 to 06/06/2014; 24 Math/Music lessons were conducted.

Conducting DO.RE.MAT lessons in tandem was very innovative and exciting experience for both teachers, as they have not practiced this before. The greatest challenge was the drafting of DO.RE.MAT lesson plan. The thematic areas covered by the method had to correspond to the topics and requirements described in the National Standard.

Teacher tandem organised several planning meetings together with the school management before the piloting was started. Although teachers worked a lot on preparation of lesson scenarios, examples and handouts, during the lessons they had to be flexible and improvise to comply with students' levels of understanding.

The students' response in terms of learning outcomes

In the 2012/2013 school year the average score in Math for the particular form was 7.67 (ten-point evaluation system), in the school year 2013/2014 the performance increased to 7.93 wherewith the average score has grown for 0,26 points. One of the reasons for improvement

could be the national exam at the end of the school year. Usually students work harder to achieve better results in exams. It has to be admitted that the DO.RE.MAT method has also contributed to improvement of the learning environment and students' performance.

For the regular Music lessons students are not divided according to their academic ability. The chart below presents academic achievement of each form in Music.

Class	Average score at the end of 1st semester	Average score at the end of school year
9.kom	8,6	8,8
9.soc	8,3	8,6
9.v	8,8	8,4

It can be observed that Music performance improved in forms 9kom and 9soc, while in form 9v class the performance slightly lowered. Overall the tendency was positive and the scores grew, especially for the students who participated in DO.RE.MAT lessons. The DO.RE.MAT methodology provided better understanding and stimulus for acquisition of both subjects Math and Music; especially it helped to fill the knowledge gaps in Music.

As it was mentioned before the Math in Jelgava Spidola Gymnasium is taught for selected group of students from three different forms. Learning and performing together in DO.RE.MAT lessons provided opportunity for students to learn more about each other; reduce scepticism and discover their talents and abilities. As the lessons were conducted in a relaxed and non-formal atmosphere, students' attitudes towards teachers became more friendly.

Analysis of the theoretical components of the methodology and organizational aspects implied by the DO.RE.MAT Method

Positive aspects of introduction of DO.RE.MAT method into school's curriculum:

- 1) The method allows forming cross-curricular links and enables students to make connections between areas of learning and extend their skills and knowledge; students are given multiple opportunities to reinforce and demonstrate their knowledge and skills in a range of settings;
- 2) The method facilitates independent analytical thinking and motivates students to learn;
- 3) The application of methodology makes the classroom atmosphere more relaxed and informal, promoting students' learning by doing;
- 4) The method can be applied to satisfy needs of students with different learning styles;
- 5) Cross-curricular approach helps students to remember the acquired knowledge better;

Above mentioned positive aspects show that this method can be applied in the teaching-learning process in Latvia. DO.RE.MAT method can be introduced in Latvian schools as an alternative method of instruction. It is important to match the thematic areas offered by DO.RE.MAT with National Standard requirements for particular age group.

Challenges for implementation of the methodology:

- 1) How to ensure availability of Math and Music teacher as a teaching tandem;
- 2) How to provide CPD for teachers on DO.RE.MAT method
- 3) How to motivate the school's management to introduce the method
- 4) How to find additional financial resources for implementation of the method

MAIN CONCLUSIONS AFTER DO.RE.MAT PILOT TRANSFER IN LATVIA

The DO.RE.MAT method pilot transfer was implemented in Latvia from 09/01- 06/06/2014 in two schools Marupe Secondary School and Jelgava Spidola Gymnasium. The introduction of DO.RE.MAT method in Latvia can be best illustrated by enthusiasm of schools in selection process, significant interest of independent education experts towards the method and commitment of teachers demonstrated throughout the transfer phase.

Considering the feedback received from teachers and students participating in the piloting, the following conclusions and reflections can be drawn:

- Interactive and engaging method which fosters active participation of students in the teaching-learning process and allows students to become teaching facilitators;
- The application of method allows students to learn in a more relaxed, experimental atmosphere;
- Use of method promotes cross-curricular approach to learning and in a longer run develops students' ability to make logical connections and the link between mathematics and music becomes natural;
- The method accommodates all three learning styles – visual, audial and kinaesthetic;
- The method is applicable for different age groups. In Latvia the thematic areas covered by the method correspond to Math curriculum for students aged 13-14;
- The use of method promotes active teacher cooperation and helps to form closer cooperation between school management and teaching staff;
- Without provision of additional training (CPD course) it would be complicated for other teachers to independently acquire the use of method;
- Not all Math and Music teachers might be able to work as a teaching tandem;
- The method can be used as an alternative tool for instruction in Latvian education context as it does not fully cover all thematic areas of Math curriculum;
- It was not possible to provide a complete assessment of effectiveness of the method as during the piloting process teachers did not have access to full theoretical framework and lacked accompanying materials, which can be identified as a key barrier to sustainability of the method in Latvia.