EFFeCT
European Methodological Framework for Facilitating Teachers' Collaborative Learning

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CASE OF GOOD PRACTICE

(National Level)

Teachers' collaborative network as a framework for implementing a learning model based on lesson observation and analysis (Latvia)

The Centre for Science and Mathematics Education (CSME), University of Latvia, has a range of experience in teacher collaborative continuous professional development (CPD) activities: observation and analysis of lessons in a multi-level collaborative network; development, approval and analysis within teacher peer groups of lesson scenarios for contemporary innovative learning; holding teacher peer groups from a single school or multiple schools and school management groups consisting of deputy principals for research and improvement of professional action.

CSME provides for the content of the network activities, and the network has been established in collaboration with the National Centre for Education (NCE).

PORTRAIT

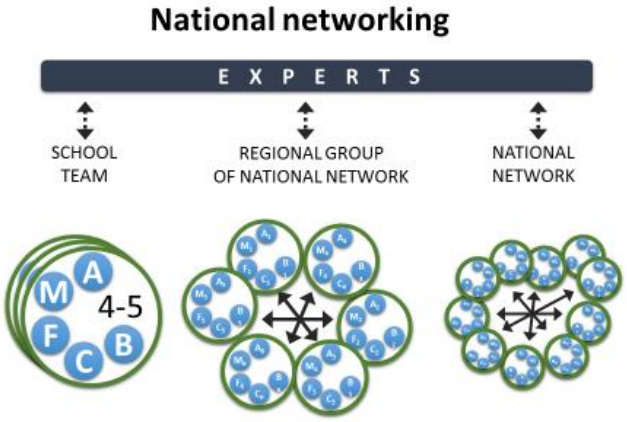
A joint collaboration network was created as a multi-level model that acts on the national level, municipality level and school level. The network serves as a framework for implementing a teachers' professional learning model of which peer-based observation and analysis of lessons is an important part. The aim of observation and analysis is to take over best practices, share learning materials, ideas and solutions, and to reflect and discuss, which is not possible through individual learning. Practice shows that interaction within the network has improved teachers' collaborative and leadership skills; teachers learn to give and take feedback on each other's performance, which is extremely important for individual professional growth. The teachers of the network have established close professional collaborative ties, a safe environment for learning and sharing experience, which is not restricted to participation at formally held workshops, but is taken further through self-driven communication.

The **national network** includes teacher teams from 22 schools representing 19 municipalities all over Latvia, from both urban and rural schools, 6 basic education schools (grades 4-9) and 16 secondary schools (3 of them with a minority language of learning). Each national network school has a team (4-5 people) of science subjects and mathematics teachers (one of each subject) and a school deputy head. The total of the participants in the national network amounts to 82 teachers and 22 school management representatives. The national network was formed from the teams of schools that already had experience in the piloting of the new curriculum within the project 'Science and Mathematics' and who had acquired a practice based professional development program of 160 lessons.

Network of schools in Latvia

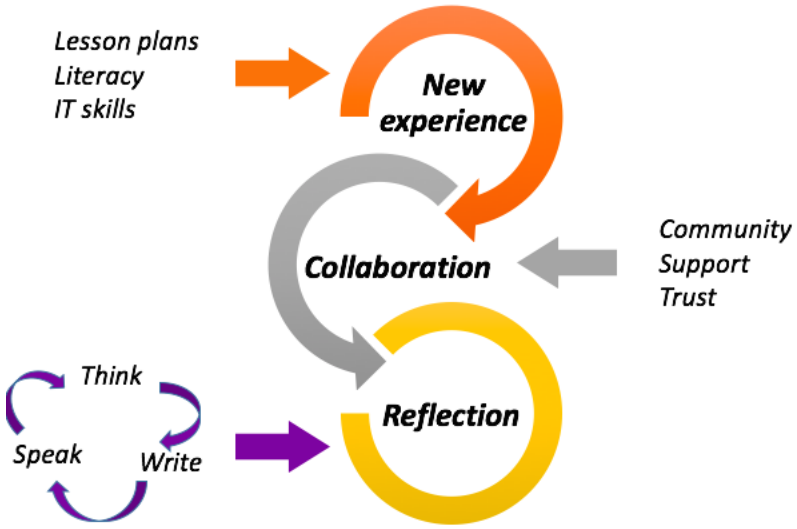
Teacher learning follows the developed program and is organized within the **regional group of national network.** One regional group included 6 schools - 6 chemistry, 6 physics, 6 biology, 6 mathematics teachers and 6 school administration representatives.

On the **municipality level**, each school is attached to a network of schools based on its location. At the beginning of the school year of 2011/2012, according to the local needs and in collaboration with the local municipality each school reached out and invited teachers of science subjects and mathematics as well as the school management representatives from the respective municipality. This was a new form of work for the municipalities because the previously operating hierarchical model was based on teachers' methodological associations with a municipality's appointed person at the head. A total of 480 teachers from 149 schools were involved in municipality level networking beginning in the school year 2011/12.



The developed Professional Learning Model (PLM) focuses on joint observation in a real-life classroom environment and lesson analyses in network regional groups. The model consists of a set of regular workshops over the period of a school year. It is based on the philosophy that change arises from a teacher's immersion in one's own and his/her colleagues' practice. It is facilitated by regular trainings of reflection skills and repeating the immersion cycle – "observe – reflect – write – discuss" as in the action research spiral[1] conducted a few times during every workshop and multiple times during the whole cycle of workshops. During two school years from November 2011 through April 2013 participants took part in two cycles of 5 workshops, each of them in a different school. The length of one workshop is 8 sessions (40 minutes each). Involvement enabled every participant to experience few roles: to lead an open lesson for colleagues (*as a leader*) and to be *a learner* and *a reflective practitioner* – learn to observe, analyze and reflect about their colleague teaching and student learning practices.

[1] Kemmis, S., & McTaggart, R. (2000). Participatory action research. In: N. Denzin and Y. Lincoln (Eds.), *Handbook of Qualitative Research.* London: SAGE.



Teacher learning model

The structure of the model includes three phases: preparatory phase, workshop at school, feedback and evaluation.

During the preparatory phase, coaches and the school team jointly plan the workshop: prepare for the lesson to be observed (the teacher plans the lesson, interacts with their peers from the school team and, if appropriate, with the CSME expert to evaluate and improve the plan); consult the leading teachers and the school management representative on the practical organization of the workshop; prepare for input sessions; prepare for analysis). The practical workshop at a school: lesson observation, analysis and reflection; input sessions. Feedback and evaluation: analysis of teachers' feedback; coaches' focus group discussion, planning for future sessions).

The workshop at a school consists of three parts:

Introduction	Introduction to focus. Input session
Joint observation of lessons	Observing of lesson No 1 (for example chemistry for chemists)
	Observing of lesson No 2 (for example physics for chemists etc.)
Joint analysis and reflection	Analysis of lesson No 1
	Analysis of lessons No 2
	Reflection about analysis
	Feedback from participants

Input session may also take place in the second part of the workshop, after analysis; the subject matter is chosen with due regard to the needs formulated by the teachers and with focus on essential aspects of learning, for example, feedback useful for the students, teaching skills and strategies for scientific inquiry, the development of HOCS, students' motivation,

etc. Subsequently, during the following workshops teachers pay special attention to those aspects when observing the lessons.

During observation, teachers use pre-prepared observation sheets to note down the facts (what the teacher does and what the students do), which later serve to ground their statements. Every participant of the observation exercise puts down what they liked most in the performance of their peer, what are the lessons they learned (these positive comments serve as the starting point of the discussion after the lesson), and also the issues that came up (the teacher who gave the lesson is heard out on these issues during analysis).

Each teacher in the workshop has a chance to observe and analyse two lessons: one in their own discipline and one more in a different discipline. In the beginning, there was some confusion among the teachers about the usefulness of observing a lesson in another discipline (most teachers in Latvia teach a single subject). However, having had this experience teachers appreciated the possibility of getting an idea about the way their peers teach and guide their students through the learning process (for example, managing effective group work, teaching students to work with information, carrying on a discussion, etc.). The experience is useful for learning teaching techniques from teachers of other disciplines, and in many cases understanding how their peers teach skills important for a number of subjects; what are the similarities and the differences and how greater sustainability of the skills acquired might be achieved; also what use we could make and how we could build on what the student has already acquired in another subject. Teachers have particularly noted that when observing lessons in other disciplines they become more focused on students: to what extent and how they can learn, think and grasp the subject during class. Teachers can experience how students feel, and this is a stimulus to change their philosophy and approach. In a number of workshops there is a special session for meta-analysis about the meaning of reflection, its form and content, which comes in useful when practicing individual analysis of the teacher's own lesson or when preparing to lead an analysis when implementing a similar practice in their own school or in the municipal network.

It is important to emphasize that the model combines the individual reflection and the group reflection. Each cycle of reflection enables the participant to compare his/her thoughts with those of his/her colleagues.

Analyses are structured to emphasize the positive and let the teacher who is leading the open lesson reach a sense of achievement as well as raise his/her self-efficacy and self-esteem. Positive emotions and awareness of his/her performance is the only way to become a good leader.


Lesson observation

School teamwork

Teacher collaborative learning takes place in the regional groups of the national network throughout the academic year. The teams of all the schools involved in the national network meet up once a year at a two days' workshop.


Joint workshop

According to the structure of the model, teacher training incorporates real practice where the teacher *(as learner* and *as reflective practitioner*) fully engages in workshops. He/she participates in each workshop several times and countless times during the whole cycle of training. This allows teachers to acquire new learning experience, collaborate and reflect on their own or their colleagues' performance. Exposure to new situations and contexts develops teachers teaching, reflection and collaboration skills.

A number of schools have implemented collaboration and lesson based professional training for all teachers at their schools. A school administration representative: *We are learning to open the classroom door, to reflect and not to be afraid if we make mistakes. We will continue to practice joint learning, collaboration lessons, observation, analyses and joint lesson leadership. We will reflect and discuss teacher progress in organizing learning in the classroom. We are certain that 10% of a teacher's work time must be allocated to efficient professional training.*

With the multi-level collaboration network and the teacher PLM implemented within the national network, teachers will engage in more extensive self-educating process (including leadership skills) on the municipality level network, and afterwards the municipality level practice will measure the acquired leadership skills in action. School and teacher leadership will be manifested through the school team applying the acquired ideas in the local network, sharing experience with regional schools, and transferring the experience from the national network to the school as a whole. Forms of work and the number of involved schools and

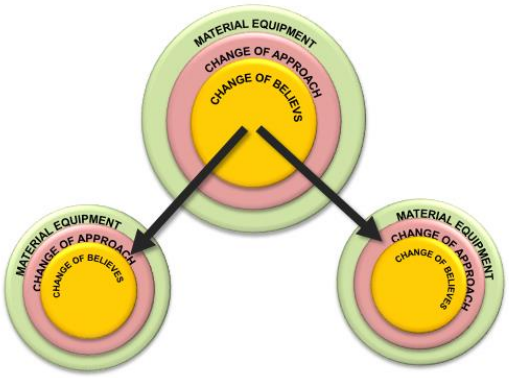
teachers differ. The school team jointly plans, implements and evaluates different activities for further development and dissemination of the ideas of innovative sciences education among other teachers. Network members share mutual trust and support, learn together through workshops and seminars, exchange of study aids, leading and mutually observing lessons, etc. The municipal network horizontally involves a large number of teachers who learn from each other, exchange experience in real-life settings at school and focus on the lesson.

All in all teachers from local networks highly value the opportunity to acquire a different kind of experience by lesson observation. Asked about their future wishes, teachers from the local network wrote that they would like to continue learning together with other teachers "*how to successfully carry out scientific inquiry assignments in the classroom, how to lead group work, develop scientific modules, improve pupils' scientific inquiry in lessons, encourage cognitive skills in students, etc."* (cited from reflections of teachers).

Coaches' analyses of the teachers' feedback single out some levels showing the contribution of the training to a gradual development of teachers' analyzing and reflection skills. The easiest level is to take particular elements from the observed lesson and use them 1:1 in a similar situation in the classroom. On the second level the teachers advance to seeking answers to the following questions: what is happening, how and why it is happening in this lesson and how I can incorporate it into my practice. On the third level the teachers perform independently and analyze the effect of the implemented changes on the performance. Moreover, on completion of the cycle of the workshop experience the time and depth of teachers' reflection is increased and teachers' awareness of the importance of lesson analyses is deepened. At the beginning of the cycle teachers would ask: *What is the sense of getting so detailed?* The questions were in large part the same in the middle stage: *It is all the same over and over again, it is getting boring* and *Aren't we focusing on the same things too much?* However at the end of the second cycle the nature of the questions and comments had completely changed: *We ran out of time! We had no time to discuss everything we wanted*!

Long term involvement in lesson observation seminars shows gradual changes to the teaching approach; and reflection sessions demonstrate the change in teachers' opinions.

We have the metaphor about peeling off the hazelnut shell: Any exterior changes (employment of the equipment, ICT tool, a particular teaching method, etc.) are but the very upper layer (the green leaves around the nut that have to be removed). The hard shell of the nut is the change of the approach; but the center – the kernel – represents the views on teaching (change of teaching philosophy). It is here at the core where the teacher buys into a sense of ownership when he/she applies the particular skill or teaching approach because it has been mastered as his/her own. Having found the edible kernel of the nut makes the teacher become a leader and work with his/her colleagues on implementing changes and dissemination of a new approach or ideas. The teacher can inspire and support his/her colleagues when he/she has fully comprehended the value of the new approach, that is, the teacher has obtained the ownership of it.



'Hazelnut'

Many teachers have never been exposed to leadership training, and they have to "break out" of their past practices, because opening of the classroom door to their colleagues has not been a common tradition in our practice. Although the survey from 2013 shows that only 8% of teachers expressed willingness to lead, in several cases their performance already demonstrated a strong presence of leadership skills. According to teacher A: "*A heated discussion broke out during analysis of a lesson. At the beginning I got extremely confused – how do I resolve this situation? However, I was able to concentrate and lead the discussion successfully. It was a great experience to learn how to lead any process in the desired direction toward the set goal (in the classroom and collaborating with other teachers)".* School deputy heads admit that *Teacher improvement is enormous! From "ordinary teachers" they have turned into confident classroom leaders with authority on the school and regional level.*

A teacher from school X admitted the following*: Change of thinking and attitude is the key. For it has been incredibly difficult to give up my old stereotypes. However, this year I have more or less succeeded to do that to an extent. It is my biggest benefit because I am not an optimist by nature, and I always tend to see the negative first, and only then I notice the positive. Together we learned to look at things differently. We learned to see the positive and this was huge for me. If you see the positive, it lifts you up and gives you strength to accomplish just about anything.*

CONTEXT

The teacher collaborative network which serves as a framework for a learning model based on observation and analysis of lessons was established in the academic year of 2011-2012. The foundation of the network was rooted in literature studies and analysis of the teacher training needs and their implementation in innovative ways with a high practical impact (courses as the traditional form of professional development experienced by teachers do not result in a similar impact) and in the former co-operation experience of CSME and math and science teachers.

Implementation of changes in science education (introduction of scientific inquiry approach etc.) showed that new practices are extremely slow to reach current lessons. In order to facilitate changes, forms of teachers'learning and collaboration that have an impact on the performance of the teachers have to be determined.

In the western world different teachers' collaboration groups and networks have been operating at least since the 1980s. Latvia took the first steps in this field quite recently. During

the national development project "Science and Mathematics" (2009 – 2011) a successful teacher learning model was developed, where teams of science and mathematics teachers learn together. The idea was that well-developed teamwork improves the quality of practices as teachers work and learn from each other[2]. Collaboration within this model was organized as sharing (materials & teaching strategies) and joint work – where teachers teach, plan or inquire into teaching together.

In 2011 there was a clear need to seek alternative ways of facilitating dissemination of the new teaching approach, ideas and changes, and sustain the progress achieved during the previous projects. The need to develop lead schools for dissemination of new teaching and learning experience among other teachers became obvious. Consequently, a national joint collaboration network of schools with innovative experience was established under the National Center for Education (NCE) and the Center for Science and Mathematics Education (CSME) at the University of Latvia. The goal was to set a precedent and create schools where teachers are willing to open doors to their classrooms and share their experience of planning and leading lessons by demonstrating the new approach. This would enable other teachers to see a different way of teaching and to discuss their observations during lessons, which would encourage teachers to incorporate the new practice into their own classrooms.

Despite the evidence and the fact that almost every other profession conducts most of its training in real- life settings (doctors and nurses in hospitals, clergy in churches. Very little teacher training takes place in a teacher's own classroom, the place in which it would be precise and relevant enough to be most effective[3]. Therefore we focused teachers' learning on real-life practice at school.

There was an obvious necessity to create a structure:

- that can achieve a particular goal – to disseminate innovative ideas of teaching science (IBSE, effective lesson, formative assessment etc.),
- that is based on real-life school practice when teachers learn from each other,
- where teachers learn by collaboration and experience exchange,
- where teachers feel their colleagues' support,
- where teachers have supportive feedback about their practice,
- where teachers can learn how to reflect,
- that is coordinated but not hierarchical,
- where the activities are regularly performed.

[2] Fullan, M. (2011). Whole system reform for innovative teaching and learning. In ITL Research. *Innovative teaching and learning research: 2011 Findings and Implications* (pp.30-39). Retrieved from http://www.itlresearch.com/research-a-reports/2011-itl-research-findings

[3] Barber, M. & Mourshed, M. (2007). *How the world's best performing school systems come out on top.* McKinsey & Co. On http://www.smhc-cpre.org/wp-content/uploads/2008/07/how-the-worlds-best-performing-school-systems-come-out-on-top-sept-072.pdf

METHODOLOGY

Our work has resulted in a teacher learning model within a collaborative school network which includes the content of the curriculum; preparation, implementation and assessment of workshops, incl. worksheets for lesson transcription, worksheets for lesson analysis, sections informing conclusions on teacher skills and advancement abilities, workshop procedure and recommendations for leading lesson analysis.

In order to determine teachers' understanding of the skills they need to improve, a teacher needs questionnaire (2011, 92 respondents – science and mathematics teachers) served as a tool to study teachers' learning needs (adapted from PROFILES[4] project). The questionnaire consisted of 40 questions on teachers' confidence in certain skills and emphasis for professional development. Respondents evaluated each of their skills according to the Likert scale (1- definitely no need to acquire, 5- a very necessary skill). Six questions covered the teachers' reflection skills – recording the facts and using them as basis for analyses; focus on the efficiency of the lesson; providing and accepting feedback; awareness of own strength and weaknesses; immersion in own professional activity in order to improve teaching.

The impact of the performed cycle of workshops in the network was analyzed with the help of teacher questionnaires after the first and second year of running the model (2012, 74 respondents) and (2013, 82 respondents). Each questionnaire included information about the improvement of teachers' skills in seminars; including collaboration and leadership skills, 6 questions refer to teachers' reflection skills. Evaluation was made according to the Likert scale (0 – the skill has not improved, 5- completely agree). The reliability (Cronbach's alpha) for each questionnaire is analyzed.

Teacher focus group discussions take place at regular intervals; they are recorded in an audio format, transcribed and encoded.

Analysis was conducted with due regard of the school team documents: collaboration plans with teachers of other schools from the same region and evaluations of such collaboration, for example, surveys of teachers from collaborating schools on the benefits gained and recommendations for further collaboration.

Teachers provided written feedback after each workshop by giving written answers to the same questions: benefits from lesson observation and from lesson analyses.

The expert participating in the lesson observation and analyses makes a lesson transcription and takes notes of the lesson analyses as well as summarizes teachers' feedback. After seminars, the feedback is coded through content analyses. This helps obtain data on the changes in teachers' understanding of the importance of lesson analyses and depth of reflection. CSME expert focus group discussions take place after every workshop. Experts from CSME are 8 people with expert and coaching experience of 5 – 15 years, who have been initially trained to analyse video recorded lessons, by noting down the compliance of activities to specific criteria and levels and reconciling opinions, and also to lead analysis and give feedback. Two experts participate in the workshop based observation and analysis of the lesson.

[4] PROFILES (Professional Reflection Oriented Focus on Inquiry-based Learning and Education through Science) project (EK FP7 Science in Society)

PRACTICE

Data show that a teacher will grow into a reflecting practitioner and leader if he/she takes an active part in the collaboration network on the national level and in the school team. These kinds of experience help develop leadership qualities. Analysis of the benefits reveals that the teacher CPD model operating in the regional groups of the national network has had the largest impact on the development of leadership skills. The model has fostered teaching skills in the classroom as well as the reflection skills, and has significantly improved teacher awareness of the need to immerse themselves in their professional performance.

Teacher activity, in its turn, in their own developed local network has had the largest impact on the improvement of lesson analysis and mutual collaboration skills. Teachers assign the biggest significance of the local network as a motivator for immersion in teacher performance and sharing experience.

School teams are described as the best facilitators for developing skills to provide feedback and recommendations to colleagues. Team work has facilitated readiness to share ideas and experience, form mutual trust, and experience the feeling of receiving the biggest support and shouldering from colleagues. The significance of collaboration within the school team is supported by data summarized in the survey.

The survey of teachers, conclusions of experts and teachers' feedback all demonstrate that the model enhances the development of teaching skills as well as reflection and collaboration skills. Teachers of the national network admit that they have improved their own lesson planning and leading. By observing their colleagues' lessons teachers take ownership of particular teaching methods. Teachers assert that leading and analysing lessons has helped evaluate their strengths and weaknesses and improved skills to reflect on their performance with colleagues. Teachers confirm that they have learned how to reflect on the goal and efficiency of the lesson with other teachers. Among other benefits teachers listed that an insight into colleagues' performance encourages to think about their own, they gained ideas of how to trick students into thinking etc.
CSME experts concluded that "*teachers have become better observers and analysts, teachers' self-confidence has grown as well as their ability to reflect on their performance and formulate success and aspects that still have to be improved."*

According to the teachers' questionnaire for 2012 (Cronbach's alpha 0.87), teachers indicate that leading and analyzing lessons has helped individuals to become more competent professionals and to achieve the skills and assurance that are crucial for being good teacher leaders. The teachers' questionnaire for 2013 (Cronbach's alpha 0.94) shows that teachers' participation on the national level and the mutual collaboration of the school team have a significant impact on the development of leadership skills and assurance.

For example the teachers of the Vecumnieki school team act as "lead teachers". They hosted and lead 11 workshops on the national level and 10 on the municipality level with lesson observation and analyses as well as 14 workshops in other regional schools and 3 school level seminars. For two years each teacher of the team has been leading an action research group at the school. The teachers have developed new PROFILES teaching materials and have organized a range of activities for students to facilitate their interest in science and mathematics lessons.

PARTICIPATION

Cooperation within this model was organized as sharing (teaching strategies & materials) and joint work – where teachers teach, plan or inquire into teaching together.

Initially the network included 22 school teams of 4-5 teachers from every school. The experience obtained in the national network was transferred by the school teams to the municipal collaborative network which they developed themselves by inviting and engaging teachers from other schools who volunteered to join the collaborative and learning activities.

As the school team extended its activities to the whole school, every teacher had the opportunity to become involved. For example, in one of the network schools, namely, Vecumnieki Secondary School collaboration started in a team of 5 now includes 26 colleagues (from 34) who actively collaborate. Since 2011 the school has had mutual lesson observation and analyses, since 2012 – 5 action research groups. Organizes monthly meetings of AR groups and a follow up conference. Every semester provides training workshops, workshops are organized for all teachers.

The school team has a decisive role in the entry and implementation of changes in the school on the whole, which allows the school to become a real leader among schools. A school deputy head said that: *Progress of the network teachers inspires other teachers to pursue their personal development.*

Implementation of the model in new groups of teachers helps teachers see how their colleagues apply teaching skills that the teacher himself/herself is hesitant to apply. The hesitancy may arise from the lack of application skills, assumption that he/she has no knowledge of how to do it or because nobody has been practicing these skills. The model can motivate changes in the practices of those teachers who completely lack different teaching experience.

Consequently, collaboration and reflection is the necessary precondition for the model to succeed. At the same time, regular practice develops collaboration skills - 96 % of teachers (2013) agree that participation in seminars has been extremely beneficial in this aspect. Teachers admit that collaboration with colleagues has made them ready to share ideas and experience (88% - *yes* and *definitely yes*), develop trust in mutual relationships and acquire safety 86%, sense of 'shoulder and support 89%; 89% enjoyed positive emotions, and common value (teaching philosophy) ownership 93% which is supported by the following quotes: *Lesson observation by colleagues is very helpful – they notice significant nuances that need improvement. Coaches and colleagues help me understand if I am going in the right direction.*

Collaboration, when the school team teachers jointly observe and analyse the lessons, lies at the basis of this model and helps improve a teacher team player's skills.

DEPTH

A teacher can help his/her colleagues only when he/she has developed assurance that he/she is capable of providing real assistance. School deputy heads admit that *Teacher improvement is enormous! From "ordinary teachers" they have turned into confident classroom leaders with authority on the school and regional level.*

Teachers noted the benefits of collaborative learning, which at the same time speaks of the solidarity of the group, its supportiveness and impact. In surveys from 2013 teachers admitted

that collaboration with colleagues developed trust in mutual relationships and provided a sense of safety (*definitely yes and yes* 86% - teachers), a sense of shoulder and support - 89%, 89% enjoyed positive emotions. At the same time approximately 30% admitted the presence of stress, the figure went up to 53% regarding cases when the particular teacher had his/her lesson observed and analyzed. At the same time 100% of teachers asserted that collaboration motivated them to improve their skills.

Quotation from 2012:

Lots of stress before the open lesson – it is absolutely normal and helps focus on the goal. Lesson analyses reveal the lesson from a different perspective. Colleagues often find more positive than I do myself. This is very inspiring.

Demonstration of best practices is really helpful – we can watch other teachers perform and this encourages me to take over the good practices.

Lesson observation by colleagues is very helpful – they notice significant nuances that need improvement.

Coaches and colleagues help me understand if I am going in the right direction.

School deputy heads admit that *Teachers have overcome their fear of seeing observers in their lessons because the follow up discussions are conducted in a professional manner and each party is open to learn.*

The following quotes from coaches' transcripts: *Irrespective of sometimes passionate discussion people appreciate the progress achieved through exchange of opinions and ideas. I enjoyed the discussion and I highly appreciate the openness and different views revealed during the discussion.*

Teachers admit that collaboration with their colleagues has developed a common ownership of values (teaching philosophy). However, the way ownership works resembles the chicken and the egg - in order to be willing to go deeper and invest more, the teachers have to at least express the desire for ownership.

EQUITY

Accessibility

Initially the national collaborative network involved school teams of a defined prior experience. The limited resources required for various networking needs posed a restriction to a meaningful expansion of the network. Consequently, participation in the network was not accessible for all the schools in Latvia. At the same time, the network is open for all teams that would like to collaborate locally with the schools of the national network. Practice shows that there are schools that closely work together with national network schools located as far as within another region; there has even been one case when such a school has gone further and joined the activities of the national network itself. This means that possibilities are open for schools that pro-actively seek collaboration for teacher training.

Currently, there is an actively operating elementary school (grades 1-4) network on a national level where teachers practice collaborative learning by creating scenarios of lessons for contemporary and innovative learning – they are piloted, analysed and assessed, and the lessons where the approaches are applied are mutually observed. It means that the experience gained from the collaboration of math and science teachers can be transferred to other teacher

groups. This is corroborated by experience from the network schools that implement the model in their own school by engaging all the teachers in it.

The municipalities also have a role to play. CSME is aware that municipalities have supported and financed teacher collaborative learning within a model similar to the one described by engaging all the schools located in the municipality. As a result, the model has been tested in several other groups of teachers pursuing professional development within the schools of one municipality (Riga, Ventspils). There have also been cases when school management has initiated teacher learning activities in their schools through mutual observation and analysis of lessons by bringing in CSME experts (gymnasium of Limbazi region).

Impact on students

The direct impact of the collaborative learning model on the principle of equitable treatment of all students has not been specifically studied. However, in our particular context, it is worth noting that improvement of a teacher's own collaborative skills and their ability to take and give valid feedback is intrinsically important: only teachers who themselves have experienced and benefited from the experience will be able to transfer it meaningfully to a student learning situation (most of the teachers who currently practice the profession have not studied formative observation in university and have not been trained in group management techniques). It is important for every student to be able to engage in collaborative learning with their peers and to have professional support from their teacher during the learning process with clear and positive acknowledgement of what has been well mastered, what needs improvement and what steps are to be followed to improve the result.

Notably, teachers – as they observe a lesson – also focus on the learning process of the student and the teacher's support, including differentiation and motivation. As one of our teachers noted: *I learned how to encourage pupils to think, how to organize learning, how to encourage students' activity.*

The research conducted offers evidence that the network learning model helps to improve teachers' skills including reflection and collaborations skills as well as to develop their leadership skills. The benefit gained is a more effective teacher led learning process during the lesson with subsequent improvement of student skills, and teacher skills to collaborate and support other teachers and help them learn.

LEARNING (DEEP LEARNING)

The model has been built with a view that the aspects discussed at the input sessions will not just remain as something the teacher knows or is aware of – they are implemented in lessons and in the subsequent workshops teachers give a practical demonstration of their effort, which is observed by their peers. Thus, the new knowledge is put into effect and the new experience is transferred to the teacher's own practice.

Complete understanding of the implementable approach is not enough to make changes happen in the classroom (for example, inquiry based science education, acquiring new learning methods, practicing them in action and receiving professional feedback). Teachers'learning is based on the philosophy that change arises from the teacher's immersion in practice. In order to make changes happen, teachers have to be immersed in their own and their colleagues' experience analyzing and reflecting on it. It is crucial to create learning situations that allow teachers to acquire different kinds of experience, take part in discussions, exchange opinions, practice, analyze and reflect on their own and their colleagues' learning, that is, facilitate immersion.

Deeper changes are associated with regular reflection skill trainings, for example, multiple practice of the 'Observe – reflect – write – discuss' a few times during every workshop and multiple times during the workshops cycle in each seminar. After observing the lesson, teachers analyse it individually according to the selected criteria; and then insights and opinions are compared between peers with discussions following and improvement sought.

During interviews school deputy heads admitted that "*It is not enough for a teacher to see and hear new things – they have to be discussed with a focus on how we can apply the experience, try it out and demonstrate to others. Discussion facilitates our professional capability".*

Improvement does not remain the private business of an individual teacher; through simultaneous innovation and collaboration of all the parties involved the impact can be faster and more significant. During a lesson, the teacher is left alone with their students, and it is extremely important for them to form an unbiased understanding of their own performance and professional skill level. It is good to have colleagues at one's side who learn together and have common goals and understanding, and are ready to give support. In the survey from 2013, 90% of teachers admit that they have improved their evaluation of personal performance and their accepting (91%) and giving feedback (80%) – evaluation 5 on Likert scale 5 - 0.

Teachers quotes 2012: *When I lead a lesson and get feedback I often find out things I was not even aware of. I learned how to positively evaluate and analyze the lesson. I was learning to understand what my actual knowledge and skills were and what I had assumed I knew and was able to perform.*

Observation and analysis of each other's lessons improve the analytical and reflexive skills of every individual teacher and their insight; it is an enriching experience improving individual practice. The importance of the reflection skill is underscored by the fact that it is crucial for teachers' daily activity as well as implementing any changes in the future. Teachers of the national network agree that they benefited most from observation of practical teaching and learning methods in their colleagues' lessons. Consequently, the most visible direct gain for the teachers is learning skills which are directly observed in a lesson of a different teacher and transferred to the teacher's own classroom. Teachers have testified to the following: *Finally I saw a group work that I could learn from. I learned several 'tricks' from other people that I can use in my lessons. I gained new, creative ideas and benefited from the exchange of experience. I was encouraged to use more scientific inquiry in my lessons!*

According to the teachers' questionnaire (2012), teachers indicate that leading and analysing lessons has helped evaluate their strengths and weaknesses (62% completely agree, 30% agree). Seminars have improved my lesson planning and leading skills (41 % ; 45%). According to the teachers' questionnaire (2013) collaborating with their colleagues during the workshops teachers have immersed in their professional work (77%, 19%). Quote from 2012: *I became aware that my way of teaching met the requirements of a modern lesson.*

FACILITATORS

Successful teacher learning and growth in the collaborative network is facilitated by:

- Every individual teacher's wish to engage, learn and collaborate
- Awareness and support of the school management, and their active involvement
- Highly professional experts
- Interest from other teachers; their wish to improve
- Positive approach and mutual trust

- Sustainability and continuity
- Clear, specific and coherent goals (of the network, school, school team and individual teacher)

Teachers highlight the role of school administration as a factor that has a significant impact on the joint collaboration with colleagues. Understanding and interest was named crucial by 53% teachers, support in resolving practical problems was mentioned by 59% teachers. Results are better if school administration work as real leaders of the learning process, support their teachers and facilitate team collaboration within the school. In the circumstances of Latvia, a direct, regular involvement of school management in the work of the school team and providing incentives turned out to be the key to success. Involvement of the management ensured joint understanding and immediate support. Schools that lack such involvement fail to reach a high level of leadership.

Teachers' comments and interviews with school management highlight the significant role of the team in the initial stage of the activity and point to the team as a contributor or hindrance to the progress; teachers especially emphasize importance of the team in situations when teachers face misunderstanding and resistance from their colleagues.

Implementation of changes, acquisition of assurance and ownership takes time and a focused goal. School managers think like wise: *Continuous mutual experience exchange among teachers and piloting different teaching strategies create a lot more stable grounds for permanent changes.*

The outcome depends on the teachers' own learning skills, his/her willingness to get involved, to develop and to balance the individual development needs with the goals and needs of the team. Changes happen if the teacher knows how to immerse him/herself in his/her own practice. In the case of a leader – if the teacher acquires ownership of the idea; if he/she accepts it and learns how to apply it in order to be ready to share the experience with others.

Teachers highly value the role of coaches: *Support is crucial, especially feedback.*

The significance of expert's time invested in consultations to teachers, the expert has to be able to immerse him/herself in the particular issue and promptly give a professional evaluation of the lesson in order to build professional analyses. Therefore experts' focus groups' discussions before and after each seminar as well as regular individual lesson observation trainings are of major importance.

Those teachers who collaborated and developed mutual trust during the workshops came to a common understanding of teaching science and learning as well as disseminate it among other teachers. It is important to note that joint learning and collaboration among a group of teachers has been going on for a period of least four years already. In this model the relationship of trust among teachers and between teachers and experts is crucial.

BARRIERS

Implementation of the model has several limitations. Factors to be taken into account and possible risks when establishing collaborative learning of the type described above:

- Resources: getting to another school of the network;
- Organizational issues: network activities take place during school hours (in order to observe a real lesson). This means shifting classes in the involved schools on the specific day;
- Personality and character of each individual teacher;

- Lack of support from school management;
- Time for establishing good collaborative relationships and trust;
- Skeptical and negative approaches from peers; attempts to focus on weaknesses;
- Time for expert professional development and number of experts.

At the beginning, lesson observation and analyses are taught through videos, lesson plans, etc. Seminars with live lesson observation follow afterwards. Live lesson observation is extremely important as part of the change of teachers' approach and views. It enables a teacher who has never practiced the particular method to see how it is applied by his/her colleagues and then believe that it can work with real students in a real school environment in his/her own lessons. An important risk factor is the stress arising from the presence of colleagues in the lesson. The model will be successful only if there is trust among the teachers themselves and the teachers and experts. Trust forms if the same group of experts has a long term work relationship with the same group of teachers. Getting to know each other eliminates the stress, especially over a longer period of time. A relationship of trust takes time to build. In a new group of strangers the model may be used formally, superficially, and fail to achieve the desired results.

There is another limitation which is related to the quality of lessons. Confidence of the teacher who is leading the open lesson contributes to the benefit of all participants. Therefore school team teachers' collaboration during the preparatory phase should be encouraged and experts should be working with the teachers and consulting them on lesson plans. A medium quality lesson does not really influence analyses and reflection trainings for the participants. However the teacher who is leading the class fails to receive the much needed positive emotions and the sense of achievement. An unsuccessful lesson creates a negative emotional background and may create obstacles for objective lesson analyses. Sometimes teachers identify with their colleagues' failure and view the desirable as the existing. Results are better if school leaders work as real leaders of the learning process, support their teachers and facilitate team collaboration within the school. The model also has practical limitations which are related to rescheduling lessons so that teachers can visit their counterparts in different schools. Therefore without the support from the school leadership the model is likely to fail. In Latvia, the model has been successful within the network where a school leadership member is on the school team. Over a period of time the school leaders have appreciated the benefits of the long term gains over the particular acute difficulties of lesson rescheduling.

Further reading on the Latvian experience in organizing network based teacher collaborative learning:

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Namsone, D., & Cakane, L. (2012). Experiences from Latvia – Science Teachers learning from other teachers to Improve teaching and reflection Skills. In C. Bolte, J. Holbrook, & F. Rauch (Eds.), *Inquiry-based Science Education in Europe: Reflections from PROFILES Project* (pp. 127–129). Berlin: Alpen-Adria-Universität Klagenfurt . Retrieved from https://ius.uni-klu.ac.at/misc/profiles/files/Profiles Book 2012_10.pdf

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Networking to forge teacher leaders for dissemination of innovative practice (ESER 2015)