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Title: Starting points of multilateral learning in implementing a music project by utilizing music education technology

Year: 2017

Version:

Please cite the original version:

Rautiainen, K.-H. (2017). Starting points of multilateral learning in implementing a music project by utilizing music education technology. Problems in Music Pedagogy, 16(1), 63-76. http://pmp.du.lv/wp-content/uploads/2017/07/PMP_2017_01.pdf

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STARTING POINTS OF MULTILATERAL LEARNING IN IMPLEMENTING A MUSIC PROJECT BY UTILIZING MUSIC EDUCATION TECHNOLOGY

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Abstract

The purpose of the research was to find out what kind of connections a music project based on multilateral learning has on pupils' (children's) actions and learning when using music education technology as a tool, and how the music project affected the class teacher students' shared cognition and the development of their professional identity.

The project was carried out according to the principles of systems theory. During the process (the class teacher students n=21, the information technology students n=2, the educator n=1, indirectly the master´s thesis writers n=2 and the class teachers n=3) the participants' experiences were reflected and monitored in various phases. This formed the data of the research, which was analyzed by means of theory-guided content analysis.

According to the results, learning based on multilateral learning made students and children excited and inspired them to commit to their task. Children had a chance to influence their own doing. At the same time, each child's own input and effort in the project could be seen, which made them feel participated. The social aspect of communality and doing together was enforced when everyone's effort was needed. No one became a so-called free rider or an outsider. Practicing musical elements and other ambitions were carried out.

Students' shared cognition was composed of the group's strengths and sharing that knowledge with others and receiving that from others. Professional identity and self-confidence were strengthened, making students believe in their competence as acting as teachers, especially in music teaching.

As a working method and approach the activity offered new forms of working to music teaching, which students found motivating.

Key words: *multilateral learning, music education, music project, music education technology, shared cognition, professional identity, involvement*

Introduction

The purpose of my active teaching work of many years has been to promote the quality of music teaching and its pedagogy and, with the help of them, provide better learning experiences for different learners. My development work has been guided by a broader understanding of music pedagogy that includes a multidisciplinary conception of art pedagogy (Music and Art Education) and a phenomenon-based viewpoint cutting across subject boundaries. The areas of my teaching development are concerned with broader learning phenomena such as the phenomenon of learning and guiding, the phenomenon of knowhow and expertise, as well as the phenomenon of interaction and cooperation. Further, the development includes themes such as learning interaction, communal learning and learning environments, as well as professional identity. This research is limited to the application of music teaching method developed on the basis of my own teaching (Multilateral Method of Music Teaching) in the implementation of a music project by utilizing music education technology. In the next chapter I will study the phenomenon of my research's framework, in which I will highlight the concepts of professional identity, shared cognition, participation and music education technology. Before the Study Design I will describe the starting points of my method.

Theoretical background

One of the most important objectives of teacher education is to support the development of the student's professional identity and expertise. Teacher's expertise consists of theoretical knowledge that includes e.g. substance and subject-specific knowledge as well as wide-ranging knowledge about learning and guiding (see Bereiter, 2002; Tynjälä, 2004). Practical, experience-based knowledge is manifested in the teacher's expertise, for instance, as interaction and teaching skills, the ability to guide the learning, and as professional ethics. Self-regulation ability shows as an ability to guide and control one's own activity and as evaluation and decision-making skills e.g. when facing problems (see Tynjälä, 2004; Feltovich etc., 2006).

The formation of identity is always connected to the social context in which we receive feedback on ourselves and our actions via social relations and interaction, as well as emotional experiences. Our identity therefore transforms and builds up over and over again as a result of the interpretation of the resonance received through our experiences and social relations. Furthermore, factors of each era and culture also affect this very development (Cf. also Urzua & Vasquez, 2008; Beauchamp & Thomas, 2011). Identity is first and foremost considered as the property of the individual (Laine, 2004, 51-52). H. Heikkinen (2000, 13-14) divides professional identity into continuous life-long development of one's personal identity and into collective identity developed as a result of social intercourse. C. Rodgers & K. Scott (2008) have also emphasized the importance of the environment in their studies on teachers' professional identity.

The development of teacher's expertise and professional identity requires increasingly multidisciplinary and multi-professional cooperation (cf. also Eerola & Majuri, 2006). Here, for instance, new learning environments and external networks step in (see also Jossberger etc., 2010). Teacher's reflection skills are a crucial part of the formation of the professional identity and expertise (cf. also Luukkainen 2005; Beauchamp & Thomas, 2009). Emotional experiences also play a major role in this development.

Especially the positive feelings gained from experiences and interaction strengthen the teacher's development and at the same time affect the atmosphere in the class (cf. also Day etc., 2006, 612).

Shared cognition is seen as a combination of various kinds of expertise, where the individual's knowledge and knowhow are shared with the community. In this process the teachers prepare e.g. the common lesson on the basis of different kinds of expertise. In shared cognition the individual's role is to complement other people's knowhow (see also Lehtinen & Palonen, 1997, 117), while at the same time also learn and develop into a better expert as an individual. This is also connected to the development of professional identity. In order for the teacher to be able to develop, the tasks need to be challenging enough. This motivates them to develop and broaden their own expertise into new areas, which further helps them face and learn new and challenging tasks and skills (see also Bereiter & Scardamalia, 1993, 98; Tynjälä, 2006, 161).

The experience of participation is often connected to a shared cognition, where each member's expertise is considered. H. Raivio & J. Karjalainen (2013) have identified three different areas as factors of participation. These are the entity of sufficient subsistence, wellbeing and safety (having), controlling and performing one's own actions (acting), and socially meaningful relationships, community and membership (belonging). If these factors are missing, the person withdraws and feels detached from the community i.e. becomes socially excluded. Hence, deficits in the areas of having, acting and belonging increase the risk of becoming marginalized and also decrease participation in the community. T. Kiilakoski (2012, 2016) defines participation in the school context where it is studied e.g. as an influencing opportunity and as a social participation. According to this objective, children should be given an opportunity to influence decisions that concern them, strengthen social relations and communality, as well as prevent social exclusion and bullying. Promotion of participation is seen as so vital in our society that it has been included in the curriculum of Finnish basic teaching as an important area (POPS, 2014). It is therefore useful to study and promote these areas also in teacher education.

New learning environments and digital materials in elementary schools have been promoted as one important key project by the Finnish government. The aim is to promote the development of new pedagogy, new learning environments and digitalization of teaching, as well as to renew the pedagogy by making learning inspiring. At the same time the aim is to improve learning results and respond to future needs (Valtioneuvoston kanslia = Prime Minister's Office, 2016). The fulfillment of these aims is guided by the curriculum of basic teaching, where one aim of wide-ranging knowhow is knowledge and communication technology skills (POPS 2014). The use of technology in music teaching has already been studied by several researchers (see e.g. King, Himonides & Ruthmann, 2017). In this study, too, I will touch on the fore-mentioned themes by using music education technology as a learning tool. The purpose of the research is to study and search for a new kind of approach to the pedagogy of music teaching.

Multilateral method of music teaching

In this research I used my own music teaching method, which I have named 'multilateral learning'. The pedagogical starting point of my teaching is "Multilateral learning in music teaching". It is based, for instance, on bodily activity, *all-embracing* multi-disciplinary development, problem-based perception and discovery, creative activity, participation, as well as supporting the child's/learner's overall wellbeing, and harmonizing teaching. In addition to singing, playing, listening and creative activity, the working methods also include e.g. technology and digital learning environments. Furthermore, the method pays attention to different learning styles and pupil's personal traits as well as different sensory channels. The teaching progresses phase by phase, and the student engages in the creative process by means of functional tasks. For instance concepts of music are discovered via doing and problem-solving. Concepts of music are illustrated with symbol marks (notation) (see Figure 1).

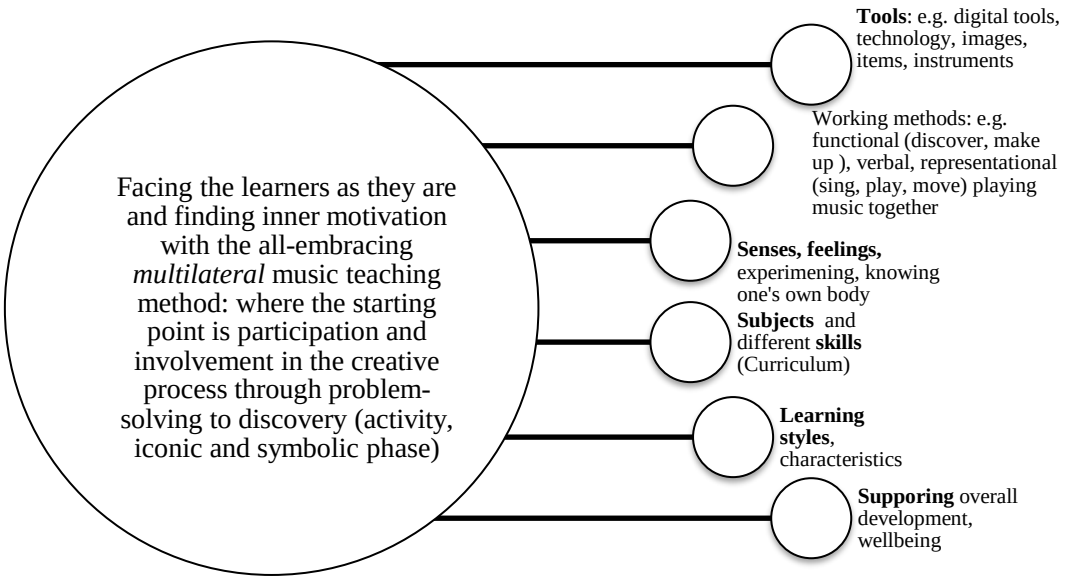

Figure 1. Pedagogical starting points of music teaching: Multilateral music teaching method

Study design

A. The research aim and research questions

The purpose of the study was to find out what kind of connections a music project based on multilateral learning has on pupils' actions and learning when using music education technology as a tool, and how the music project affects the class teacher students' shared cognition and the development of their professional identity.

B. Research data and methods

The research data consists of students' learning diaries and group discussions as well as observation data of the project days. I collected the observations by making notes, recording, photographing and videoing. Observation was also participatory, meaning

that as a researcher I was involved in situations where I made observations both as an outsider and as a participating member of the group (Cf. e.g. Metsämuuronen, 2008; Eskola & Suoranta, 2014).

C. Research strategy and data analysis method

The research strategy is based on phenomenological-hermeneutic starting points. In the data analysis the researcher engages in making direct observations, reflection and discussion of the data gained from the research object, and connecting them to the interpretative analysis of the object (see, for instance, Patton, 2015). In the analysis of the data I used theory-guided content analysis. In that I utilized the systems theory, whose methodological starting point was my teaching method i.e. inputs of multilateral learning (see Figures 1 and 2). At the initial phase the data analysis followed data-driven content analysis, where inductive i.e. data-driven deduction was used (Tuomi & Sarajärvi, 2009; Miles, Huberman & Saldana, 2014). The analysis of the data focused on the material collected from the students, which I compared to my own observations.

D. Implementation of the project by applying systems theory

I have utilized music education technology and applied the systems theory in this project (Bertalanffy, 1968; Midgley, 2002, 2011). Working was based on shared cognition, where class teacher students (n= 21), me as an educator, information technology students (=2), indirectly class teachers (n=3) and master´s thesis writers (n=2) were involved. The activity and experiences gained from it were reflected and evaluated during the entire working process. Systems theory (see Figure 2) starts off with a vision i.e. the aim, which is brainstormed together (large sphere in the center of the figure). The activities were shared between smaller groups (in the figure small spheres on the beam) that first worked independently. After that, the groups introduced their implementation plan and then evaluated it together (in the center of the figure) before finishing off the plan. The groups' practical implementation plans could therefore deviate from each other rather a lot, but they still had the same goal. After making the plans the practical implementation followed (small spheres on the beam). After the activity, students shared their experiences and evaluated them first with other members of their group and other people involved (small spheres) and then together with all the groups (in the center of the figure). The experience and knowhow gained from the activity were therefore shared with everybody. Each member of the group participated in this multiphase process, increasing the feeling of participation in the implementation of the project. In the background of the music project there were pedagogical starting points of multilateral learning i.e. the inputs in the music course for class teacher students before the implementation of the project and their application during the project.

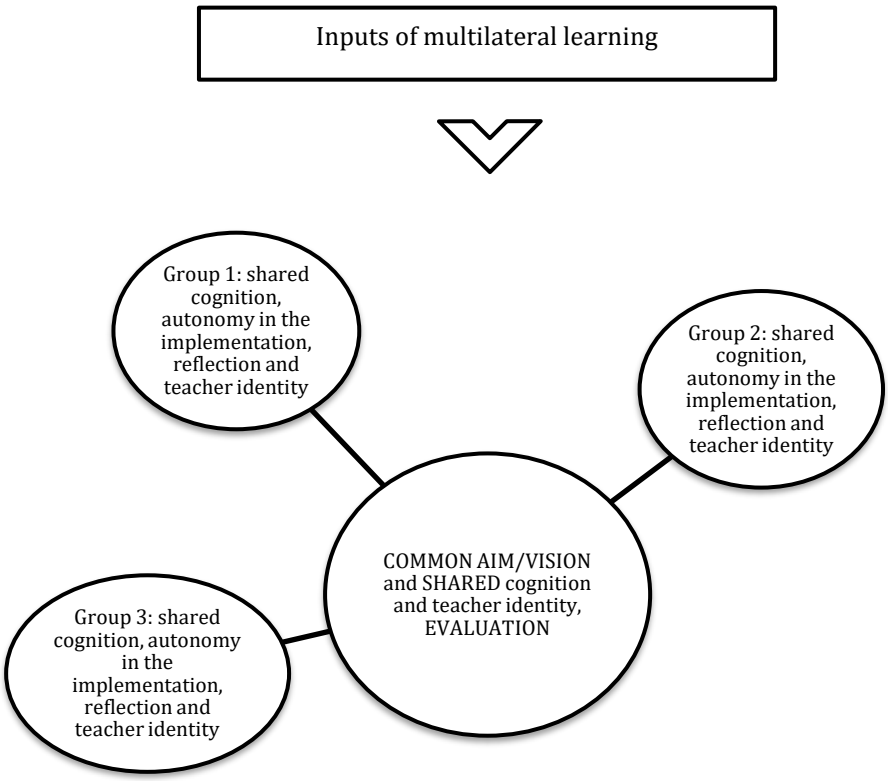

Figure 2. Functional schema of the music project applying the systems theory

E. Project work

I chose project work as the working method because it was the most suitable for the basic starting points of multilateral learning and its implementation during a short period in the school context. For instance, C. Carey & H. Matlay (2010) and G. Heitmann (1996) have defined that a project is a non-recurring event in which the aims and the plan are defined. Further, according to J. Seikkula-Leino (2007), the starting point of project working is learner-centricity, the pupil having an important role in the implementation of the project's content. C.N. Bredillet (2008) further highlights autonomy, initiative and creativity, where shared learning also takes place.

F. Participants and implementation of the project

The project was carried out in November 2016 at a comprehensive school in Central Finland, where 10-year-old pupils (n=68) participated in the project. The aim was to produce a joint music animation from the pupils' productions by utilizing music education technology. The animation was made with Imotion software and music with GarageBand software. VisPerformer software (sound and light show) was also used. It was also possible to use Music Tower in the group work and recording of the composition. Four pupils could play music at the same time with tablets, either via earphones or without them.

The music project's theme was situated in space. A rocket ship leaves the Earth and travels to three different planets and finally returns to the Earth. The project consisted of two parts. The first part focused on grounding the project (90 min.). In this part the focus was on familiarizing with the software to be used in the project and the general use of the tablet, as well as revealing the project's theme and pre-assignment. At the end of the preparing lesson each class was given their own planet and emotion (Mars-in-love; Uranus-funny; Jupiter-exciting). The emotion was related to the events on the planet and it was demonstrated/described by using elements of music. The class' task was to plan a story before the project day and bring along space creatures/characters (toys) and other props needed in the filming. The classes only knew each other's planets beforehand, but not the stories. The story based on the three classes' productions was told only after the animation had been finished.

On the actual project day (3 hours) each class split into two groups, animation and music groups, which then worked in even smaller groups. Each group was given a particular scene from the story. The group was responsible for the implementation of the theme. For instance, one group focused on composing the music for the rocket ship's take-off and landing, another group - on a menacing situation, the third one - on fixing the rocket, and the fourth - on falling in love. Further, the pupils within the group split into planning smaller areas in the project, like searching for different implementation methods for the menacing music. The ideas were collected from each group member at the end. Each pupil's production was therefore included in the final product. Students also helped and guided the pupil groups either alone or in pairs. Their role was to support the pupils and operate on the children's terms, being more like bystanders. By asking questions, the students guided the pupils to come up with creative solutions to the implementation. The tasks were problem-solving tasks where they searched for answers e.g. with the help of active listening. Students asked questions such as what exciting music is like, what instruments could be used in it, what the rhythm, tempo and the melody's motion are like, and how they would describe them by musical means. The fore-mentioned phases were mostly realized in each group, but there was variation in their implementation means. This provided interesting information e.g. about guidance of learning, division of group work, and different activity solution possibilities and organization, which were all discussed in the evaluation discussions of shared cognition. The experiences were reflected on individual and group level.

The class teachers' role (n=3) was limited to sharing pupil knowledge to the students and guiding the story with the pupils. The idea was that children themselves could decide what happens on the planet and how the plot develops. There was variation in this phase, too. The students led the implementation of scenes related to one class' story. The information technology students' (n=2) role was to guide and assist the activity, take care of the technology and edit the pupils' productions. Furthermore, two master´s thesis writers were involved in the project's reflection. They were also class teacher students. Their attention was drawn especially to the music made by the children with their tablets, but in the joint evaluation discussions they also gave feedback on the whole production. My role as a researcher was to observe each class' and student's work as well as reflect on the implementation of the project. At the same time my role was to give feedback that guided the activity, as well as share and receive cognition.

Results of the research

A. Professional identity

On the basis of the research data there are six main factors that supported the strengthening of the students' professional identity. The project participants experienced a strong (1) *positive emotional experience of success.* This further gave them (2) *confidence and certitude* to act as a teacher. It strengthened the feeling that they were in the right field and were doing fine and were no longer afraid of challenges. At the same time their vision of their future teacherhood sharpened. The project also gave the students confidence about music teaching and utilizing technology in their teaching. It gave them (3) *a new perspective to music teaching* that was much more than mere singing and playing in class. Their perspective became more multidimensional. The fourth factor strengthening the formation of professional identity was (4) *guidance of learning*, *ability* to motivate the working, group management *skills,* as well as carrying out the teaching phase by phase. Further, students thought it was important that the tasks related to teaching were (5) *challenging* enough. It *motivated* them to make more and more effort. (6) *Feedback discussion* also supported the formation of their professional identity and gave them self-confidence.

B. Shared cognition

Shared cognition consisted of each participant's (1) *strength areas and sharing and receiving knowledge*. The group members therefore complemented each other's teachings. Different kinds of knowhow and previous experiences supported the formation of new ideas and the implementation of the project. At the same time the group's i.e. the team's knowhow deepened. Everyone could bring up their own ideas and opinions, enabling group members to combine their knowledge and skills and create new knowledge together. Splitting into smaller groups within the group enabled each participant to successfully complete their own part of the project. This was considered helpful.

The group's (2) *support and help* increased trust within the group and between its members. This created a sensation of safety and peace and helped them challenge and get motivated in the best possible way during the implementation of the project. One teacher did not need to know everything, as they were supported by the group's versatile knowhow. For instance, information technology students were the experts of technology who helped to use tablets and Music Tower. Respectively, class teachers brought in music pedagogy expertise. The same atmosphere of helping was also conveyed in class working where pupils helped each other and gave tips to teachers. It created a sense of community in the class.

(3) *Managing interaction skills and social relations* was connected to shared cognition. The experts' group dynamics and paying attention to group members were considered important in the group working. Especially (4) *joint teacherhood* required a detailed plan so that everyone knew their own role. At the same time *co-planning* provided the grounds for leading the project, as everyone had the same overall vision of the implementation. This made interaction and social relations easier during the project.

C. Pupils' (children's) activity and learning in the project

During the entire project the children's great (1) *enthusiasm,* motivation and commitment could be seen in everything they did. The joy and excitement of doing surprised everyone involved in the project planning. Pupils could work in a casual environment with no pressure. One good example of the class' enthusiasm was when at the end of the project day one pupil said that it had been the best school day ever. When pondering about factors that affected the joy of doing, one important factor seems to be the fulfillment of (2) *participation*. In the beginning of the project, the children could independently familiarize themselves with the software after a short introduction and exercises. This enabled them to learn and make observations by themselves. Each pupil could participate according to their own skills, and everyone's effort was considered under the teacher's guidance. Children's own creativity, imagination and doing themselves were the focus, when children planned the story, the props, direction and music animation. Children therefore had a chance to influence the implementation. Further, each group member's effort was needed and appreciated, and everyone's input could be seen in the final result in one way or the other. Everyone could therefore leave their own handprint in the way they wanted. When the pupil's production was connected to a larger whole, it gave them a sensation of meaningfulness and a deeper significance.

During the project the pupils (3) *learned different kinds of skills.* The project days included practicing especially group working, interaction and social skills. Learning was built on cooperative elements in which groups built and made music and animations together. During the project the pupils practiced and at the same time also learned concepts of music as if by accident when thinking about e.g. what funny music is like, whether it is slow or quick etc. Concepts of music came up especially in composing when pupils got familiar with different rhythms, melodies, tone shades, form structures and dynamics by experimenting. Animation group received less attention in this respect. Concepts of music were only brought up when listening to the finished music animation. The importance of handling one's feelings also emerged from the data. The project provided an interesting way to handle feelings when children's own compositions and animations were used. At the same time the music concepts' power of expression could be utilized when searching for the emotional states. However, it must be noted that concepts of music were not dealt with on a deeper level. The project schedule and the general enthusiasm of doing drew the attention to the doing itself (action) where the main stress was on the children's own discovery. They used and applied the skills and knowhow they had at the time, but also learned new things from other group members. It seems that working in the project is more suitable for applying the skills and knowledge already acquired rather than for learning new ones. At least their understanding would be deeper during the activities.

Practicing active listening skills came up e.g. after the music and image editing (feedback discussion 45 min.) had been done when the children concentrated on finding their own production amongst others' and when distinguishing different elements and instruments from music. Skills related to music education technology and software also developed. For some, this was new, while some were already familiar with them. Project's implementation methods and goals made it possible to identify different-level pupils rather naturally. It basically happened with the help of choices

made by the pupils rather than by the teachers. This strengthened the pupils' autonomy and their faith in their abilities.

It seems that that just the teachers' discussions and examples guiding to learning affected the children's learning and activity. Encouraging, positive and learner-based guiding and feedback had a major impact on learning the skill. Each pupil's actions and production are appreciated regardless of the skill level. The pupil's experience of participation is also important in learning the skill.

During the project it was evident that a new (4) *music education technology motivates* pupils. With the help of music applications the pupils could easily come up with compositions describing different emotional states, even if they did not have any music playing skills. It looked like it was easier for pupils to play and try out different instruments and play music together rather than to play real instruments. At least the activity phases related to playing music proceeded more fluently than with instruments, and notes related to the playing technique received less attention. Even the threshold to try out different instruments seemed to lower. Pupils did not hesitate to try band or acoustic instruments, and they also familiarized themselves with stranger instruments such as classical music instruments as if by accident. Playing experience gained from music education technology can inspire children to try out real instruments and perhaps take on a music hobby that requires more perseverant practicing.

D. New pedagogical starting points to music teaching brought by the project

In this study the experience of participation and involvement was realized via shared cognition for students and teachers, and via project work for pupils (cf. e.g. Kiilakoski, 2012, 2016). Everyone's effort was needed and appreciated in the project and everyone's input got a meaning when everyone's handprint could be seen in the final result (cf. e.g. Bredillet, 2008). Work provided enough challenges for different-level pupils. Challenges were considered motivating in the student's work (cf. also Bereiter & Scardamalia, 1993; Tynjälä 2006). The project participants had a chance to fulfill themselves and create something new from their skilled starting points. All this motivated and inspired them.

One central aspect was the skill of guiding the learning and carrying out teaching situations phase by phase, directing and guiding the activities in a learner-centered manner. The teacher's role was to be an encouraging by-stander. The people planning the project learned that there are various ways to arrange music teaching and consequently, their entire way of thinking about music learning and teaching broadened. On the other hand, during the evaluation and feedback discussions, I, as the guiding teacher, noticed that the personally experienced working method resulted in a deeper understanding than other classes verbally presented experiences did. For instance, group work resulted in a better outcome when each group member had their own tablet. Here each group member got to try out a solution to the future joint production in their own way, which was later shared openly with the group. Here the lack of tool or sharing was not an obstacle for the group work; whereas those classes that had two or three pupils per one tablet felt that the cooperation was not as successful as in their solution. The groups could decide themselves what was the significance of the feedback received during the shared cognition divided according to

the model applying the systems theory (see Figure 2), and autonomously make their own decisions (cf. Midgley, 2011). In spite of divergent perspectives, the significance of feedback and guidance was considered crucial in order to develop the teaching and guidance and modify it the right direction when needed.

Music education technology worked as a tool that was utilized in the music project (cf. e.g. King, Himonides & Ruthmann, 2017). Here new possibilities offered by technology were utilized in the implementation of a creative process in music teaching, with the methodological starting points of multilateral learning in the background. For regular writing and drawing, the tablets and their software as well as Music Tower as working tools provided new variation, which further motivated and inspired the project participants. At the same time the positive experiences gained from the project also strengthened the formation of the professional identity.

The research provides a new approach to the pedagogy of music teaching. Here it is limited to the implementation of a music project by utilizing music education technology. The realization of methodological starting points requires e.g. solid expertise in education sciences, substance knowhow and pedagogical skills from the teacher, where learner-based skills of guiding the teaching become central. The global and social change of shared cognition challenges teachers to search for new and sustainable solutions to the culture of learning (cf. Salonen, 2010) to which shared cognition offers multi-dimensional approaches. By searching for what is new, one can pursue a more individual-friendly and participatory measure to music teaching and the problematic issues of teaching.

Conclusions

1. Positive emotional experience of success gave confidence and certitude to act as a teacher. Factors strengthening the identity were the ability to guide the learning, challenging and motivating tasks, and new perspective to music teaching supported by the feedback discussion.
2. Shared cognition consisted of the group's strength areas and sharing and receiving knowledge. Good management of interaction skills and social relations and careful co-planning were helpful in this respect. The group's support and help created safety and strengthened the sense of community at the same time.
3. Enthusiasm, motivation and commitment prevailed the activity and learning. Their most significant factor was the experience of participation. The activity got a meaning when it was appreciated in the group and everyone's input could be seen in the final result. The project participants also got to influence the group process and come up with their own creative solutions to the implementation of the task. During the activities pupils learned different kinds of skills such as interaction and social skills, concepts of music, expression of feelings, and active listening skills. Further, music education technology appeared to be motivating. Requiring no previous playing skills, it enabled pupils to easily and quickly move on to making music and playing instruments. At times it was difficult to tell the difference between the teacher and the learner.

4. Multilateral music teaching method offers a new approach to the problematic issues of music teaching. The starting point of multilateral music teaching method is facing the learners as they are and awakening their inner motivation and enthusiasm. This means that, for instance, the learner's traits, development level and skills are considered in the teaching so that they correspond to learner's needs in the best possible way. Teaching is planned to be functional, using e.g. different sensory channels, and processes, working methods and tools guiding the learning, and themes cutting across subject boundaries. The pupil participates in all activities, and above all the learner's feeling of participation is supported in the creative process and activity. In the process of guiding the learning it is crucial that elements related to music are first handled and processed by functional means, after which the teacher guides the learner in a problem-based manner through active listening and/or activity to observe a certain element or area of music. After that the observed element is practiced and applied in new situations. Finally, the music element gets a conceptual name and symbol and is further applied by using different working methods.

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Received: 09.05.2017
Accepted: 27.05.2017

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