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PROBLEMS IN MUSIC PEDAGOGY

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CONTENTS

EDITORIAL

Dear readers,

This issue of "Problems in Music Pedagogy" contains studies reflecting practical experience and methodological propositions in music education originated in the Baltic region (Finland and Latvia).

The results of three studies by scientists from Finland (University of Eastern Finland and University of Jyväskylä) open new horizons in music education. Testing the elements and applications of creative and productive music education paradigm in a primary school classroom context, Siiri AHTOLA & Antti JUVONEN concluded that with this approach it is possible to diversify music education into a new direction: increasing the appearance of creativity and productivity in music education, as well as to increase the teacher's competency in the issue. This approach gives the teacher more time and freedom to refrain from sitting behind the piano (or other instruments) and focus more on supporting students' independent, voluntary learning.

Based on the analysis of experiences gained by Vantaa's Tempo Orchestra, Maija PUROMIES & Antti JUVONEN reveal that Finland's El Sistema, which spread from Venezuela, increases contacts and interactions between immigrants and the population, and promotes partnership between children from different backgrounds as well as prevents racism while helping immigrant children and their families to integrate into Finnish life. The results of the study are particularly important in the context of the creation and development of a multicultural environment and cultural dialogue in the European Union.

The relevance of e-studies has increased due to multiform learning and individual educational paths that are not limited by time and place. The focus of the study by Katri-Helena RAUTIAINEN is students' skill learning, learning processes, and learning experiences while studying music independently through e-learning. The main result of this study is the asynchronous e-learning module. During this study, the skill of self-regulation was observed in the student reports as their ability to regulate their learning and strategy selection. Author concludes that self-regulative e-learning strengthens students' motivation and feelings of success when the objectives are suitable.

The song and dance festival is the most unifying cultural tradition of the Baltic States, which over time has become an important symbol of national identity. The acoustic environment and adaptation to it are important in the singing process of both soloists and choristers. Considering the importance of room acoustics in vocal recording, it is essential to understand that there is quite a great difference between the conditions at a rehearsal and those at a concert. Therefore, when working with choirs, rehearsal rooms should be different from performance rooms. Within the framework of the research by

Baiba TRINĪTE (Liepāja University, Latvia), the physical parameters and reverberation time of 20 rooms for choir rehearsals in Latvia were measured according to ISO 3382-1 (2009), while the rest of the data examined sound strength, area of surfaces, coefficients, and the matter of absorption obtained by calculations. The author emphasises that space is an essential factor where the sound created by the choir lives and meets its listeners: that's why conductors should pay attention not only to the choice of compositions and the professional preparedness of singers, but also to such essential and crucial factors as the choice of adequate rehearsal and concert rooms, the arrangement of choristers in the room, and length of reverberation time.

At getting acquainted with the research findings of our colleagues from various countries, we enrich our own experience, broaden our vision of a music study process and reach the conclusion that we have much more in common than different: the experience of any music teacher, student and scientist is unique. I wish inspiration, perseverance and consistence on the way toward the innovative music teaching/ learning for all of researchers, musicians and music educators.

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

Editor-in-chief
Jelena Davidova

IS THE MUSIC EDUCATION PARADIGM CHANGING? TESTING THE ELEMENTS OF CREATIVE AND PRODUCTIVE MUSIC EDUCATION APPROACH WITH STUDENT TEACHERS

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Abstract
In this article we open the focus on the productive and creative music education paradigm and test it in practice among a research group of student teachers (N=184) at the University of Eastern Finland (UEF). The productive and creative music education paradigm offers better ways of action in the use of music education pedagogy through a positive impact in pupils' motivation, self-concept, and self-efficacy beliefs, offering positive experiences and communality lifting pupils' interest to music as a school subject. Student teachers who do not have music as a minor subject were selected as a testing group for this research because they do not have a special relationship with music. In our earlier study we tested students who study to become secondary school music teachers (Ahtola & Juvonen, 2021). Our aim is to show that a change has already started in the music education paradigm from reproductive and traditional music education to creative and productive music education. In practice this is being mirrored in music educational research and in the everyday work of teachers (class teachers, class teachers with a minor in music and music teachers) who teach music from elementary classes to upper secondary school.
Our perspective is on the research of teaching practices of classroom teachers. The change of paradigm and its preconditions are visible in both practical music education work and empiric and philosophical music education research, to which we contribute with this study.
Keywords: *Creative and productive music education, change of paradigm, classroom teachers, music applications, music technology*

We mentioned the idea of a productive and creative music education paradigm and the need for a paradigm change in our earlier article (Ahtola & Juvonen, 2021; see also Juvonen, 2004b, 2006). In this article we move it another step forward, first opening the fundamental elements of productive music education paradigm and then testing some of its most important elements with future class teachers to see if it is powerful enough to become the ruling new paradigm in music education. We also offer

pedagogical solutions which could easily be carried out using the new principles in music education we have presented. We discuss motivation questions based on Eccles' and Wingfield's Expectancy-value theory (Eccles, Adler, Futterman, Goff, Kaczala, Meece & Midgley, 1983; Eccles, Wigfield, Flanagan, Miller, Reuman & Yee, 1989; Eccles, 1993; Eccles, Wigfield, Harold & Blumenfeld, 1993; Eccles & Wigfield, 1995, 2002). The concepts self-conception, self-assurance and self-efficacy expectations are based on the findings of the most important researchers in this article (Deci & Ryan, 1985a, 1985b, 1985c, 1991, 2000, 2002, 2012; Pajares, 1996, 2003; Bouffard, Marcoux, Vezeau & Bordelau, 2003; Ryan & Deci, 2017). Declarative knowledge (facts) and procedural knowledge (skills, know-how) are opened in discussing the dimensions of arts and skills in music education (Willingham & Preuss, 1995; Hietanen, 2002). The music pedagogy is also approached from curriculum's aims, teaching, and learning practices, along with the society's requirements.

Because a paradigm represents a broad view of the field of music education, we consider it necessary to reveal elements that are partly country-specific and partly international against the background of the Finnish music education and the Finnish national core curriculum. In any case, when dealing with paradigms and changing them, it is necessary to consider the various stages of development in different countries, people, and the current social situation, as well as the prevailing environmental circumstances, economic situation, philosophical and ideological differences, and other aspects of everyday life contextual issues.

Background

A. The starting points of music education

Music education recruits and combines perspectives and points of view from various disciplines in topics such as psychology, philosophy and education, acoustics, psychometry, cognitive and social psychology (Hargreaves, 1986; Hargreaves, Marshall & North, 2003). A couple of decades ago, the humanistic dimension was considered, and musicology and music education began to be explored from the human perspective and as a holistic experience. With this development, psychology and music education have converged in the research sense (Hargreaves et al., 2003).

In the United States of the 1950s, there was a perceived need for music education to find a firmer theoretical basis that could justify the importance of music in school curricula. John Dewey's educational philosophy, (trying to find a balance between the arts and skills with core subject) as well as Jerome Bruner (1960) influenced the educational philosophy of the time with their pupil-centered educational thinking. The music education philosophy was characterized by the synergy between psychology and philosophy typical of the era (Colwell & Richardson, 2002; McCarthy & Goble, 2002, 2005). The philosophy of music education reflects music education using philosophical means. Recently, the focus has shifted from psychological couplings closer to philosophical research excerpts, but it is useful to remember that the third cornerstone of music education is education. In education, music was sidelined for quite a long time: music teaching in schools was vocal instruction which was focused on pure performance and previously musicality was considered to be a talent (Stefani, 1987; Sloboda, 1993; Ahonen, 2004a, 2004b). With the elevation of the status of arts

education, music education has developed into a diverse segment of arts education, while forming an integral part of educational research (Anttila & Juvonen, 2002, 2003a, 2003b). The theoretical thinking of music education is characterized today mainly by influences derived from psychology, philosophy, and education, creating a challenge to the study of music education.

B. Definition and goals of music education

Music education can mean three things: music pedagogical research, music teaching, and education through music. Musical pedagogy may refer not only to research, but also more generally to music education activities (Väkevä, 1999; Kaikkonen, 2005). Music instruction, in turn, is defined as the development of musical abilities by pedagogical methods (Väkevä, 1999). Music education, such as upbringing, cannot generally be viewed as being detached from learning. In addition to learning music, the primary goal of music education is musical growth, which considers the full context of the upbringing and the life situation of the learner. The goal layout of music education is tied to the environment in which education takes place. From a learning environment perspective, the limits of music education are being broken. In addition to the formal learning environment (institutions such as school), learning takes place in informal learning environments (home and other social environments). The formal and informal environments differ in the decency of learning currents (Folkestad, 1996, 1998, 2006; Söderman & Folkestad, 2004; Vasil, 2019). Hargreaves (2003) also names the 'third environment', a social context in which learning takes place without teachers or parents (authority).

In the objective layout of music education, more and more frequently non-musical ambitions have begun to appear. In an extensive survey by Anttila and Juvonen (2003a), Finnish and Estonian music student teachers were asked to say why it is (or is not) important to teach music in school. The researchers divided the responses into two groups: meanings for an individual and meanings for culture. As relevant meanings to the individual, students cited factors such as emotions, creativity, and imagination, as well as an increase in mental well-being and social skills. Cultural meanings included general education, space of worldview, and meanings related to national culture (Regelski, 1981; Anttila & Juvonen, 2003a). Music is diverse and has a range of functions. Music education touches on the relationship between music and man and man and the world. In addition, music with other arts and skills offers sources of enjoyment and joy which cannot be found in other school subjects (Regelski, 1981, 1996, 1998; Reimer, 1989, 2003). These are emotional or based on emotion-focused pleasure.

C. Human conceptions in educational thinking

The premise of the review of music education is human conceptions as a system of beliefs, knowledge, and valuations about a human being. Human conception has a connection with the human perception of society and cultural specification with human conception or the view of man (Hirsjärvi, 2009). Human perception refers to the basic attitude to another human being that affects our individual interpersonal relationships (Rauhala, 2005). It is an important and ever-present basis of educational activities. Identifying one's own human perception increases the teacher's self-knowledge and ability for reflecting (Perttula, 1993; Puolimatka, 2002; Rauhala, 2005; Orpinas & Horne, 2006). The review of raising effects requires a holistic human

perception in which the use of channels of influence proceeds from holistic towards differentiated. Arts education contributes to the learner's psychic-intellectual experience (Puolimatka, 2002). The conception the pupil builds on their own activities and is based on an emotional sense of emerging which builds motivation and interest to certain school subjects leading to intrinsic enjoyment and experiences of mastery and competence (Byman, 1995, 2002; Lagerspetz, 1998).

In a practical educational field such as music education, we want answers to normative questions, namely how things should be. Music educators are often forced to justify the importance of teaching music and justifying is less effort in a society that idealizes culture. In music education, human perceptions are particularly raised in a reflection of whom music education 'belongs' to – to whom and how music is taught, and who can learn it. Changing the human image dictated by society requires modification of human perceptions (Rauhala, 2005). In a changing society, new currents of music education (e.g., special music education) require attention to new human perceptions in the layout of values, goals, and targets. In addition to these, attention is also required to music teaching practices, the classroom atmosphere, technology and pedagogical solutions and their background philosophy (Linnankylä, 1993; Kannas, 1995; Liinamo & Kannas, 1995; Creemers & Reezigt, 1999; Perttilä, Kautto, Lounamaa, Luopa, Ritamo & Rimpelä, 2003).

The literature of music education emphasizes learner-centeredness rather than teacher-centeredness (e.g., Anttila & Juvonen, 2002; Aittakumpu, 2005). Education also talks about concepts of learning (Tynjälä, Heikkinen & Huttunen, 2005). However, it has a clear difference in meaning over learner perception when referring to the theory of learning.

There is a cognitivist perspective in Western behavioral science, one in which interest is focused on describing and understanding the individual's information-building processes. The most notable variation of cognitivism is the constructivist conception of learning, which emphasizes that the individual himself, through his own actions, formulates his conception of the outside world (Piaget, 1968; Perry, 1999). To learn something, the learners must build their own understanding by tying new information to previous experiences. Cognitivist and constructivist learning theories lay the foundation for a deeper understanding of learner conceptions of music education. Learning theories affect the goals of teaching, and learner conceptions can be outlined based on a set of teaching goals. It is socio-constructivism that has been an important factor influencing the need for a paradigm shift in music education. From the traditional master-apprentice way of learning, there is a desire to move towards a modern vision in which each learner creates the prerequisites for their own learning. This way, a shift from repeating the models made by others towards creating one's own material has naturally taken place. In this case, models refer to songs, compositions, lyrics, poems, rhythm outlines, or any musical output that emerges within or outside the school context. These ideas are directly connected to creativity and creative thinking which have some demands to become true. The first is a creative way of thinking which requires active attitude towards own environment and belief in one's own opportunities to influence one's own learning processes. It means creative thinking and solving problems which did not exist in the first place. These are based on early experiences of other people in childhood, and interaction which creates the

base of the approach and attitude to different matters (Jacobs, Lanza, Oswood, Eccles & Wigfield, 2002; Running, 2008).

Defining a Paradigm

Gage (1963; see also Yoho, 1979), but especially Kuhn (1962a, 1962b), are the definers of the paradigm concept. According to Kuhn, paradigm refers to a set of beliefs adopted in the scholarly community as a framework from which the world is explored. It includes the principles, beliefs, and appreciations of the scholarly community (Collins & O'Brien, 2003). Concepts close to the paradigm include scientific school and research tradition. The concept of paradigm is used in behavioral and social sciences, like a reference framework, to specify and justify research problems and hypotheses as a compiled logical representation in which concepts are pre-defined. At best, the presentation is already verified. Then one can talk about the theory, which is a synthesis compiled by the scholars themselves from more theories. While the theory might be seen as a counterpoint to practice or empiric work when more profoundly understood, theory is the part of scholarly work that involves the analysis and organization of already compiled data (Hirsjärvi, 1982).

When using 'paradigm', Lindholm (1979) refers to norms or conceptions compiled in a particular community of researchers that influence the conceptions of scholars, as well as what should be studied and how it should be done. The underlying is the meaning created by Kuhn for the paradigm. There are three perspectives associated with the paradigm:

a) What is understood as the problem – what is self-evident and significant and what is unsolved?
b) What is understood as an explorable problem – what can be approached by scientific analysis rather than metaphysically, religiously, or unscientifically?
c) What falls within your own science and what falls outside of it?

Paradigm change is about the 'crisis of science', an escalation that leads to fracture and a new turn. There are always two sides to a crisis: one is liberation from the old, and the other is the beginning of a new one (Lindholm, 1979). However, development does not have to depend on 'scientific revolutions'. According to another view, there is a gradual paradigm shift in science and culture, including the idea of the fragmentation of reality into non-dimensional zones of knowledge or information (Tynjälä et al., 2005). Music education does not belong to the hard sciences, where changes may suddenly occur with a new empirical finding, but the sociocultural critique of music education can be seen as a new direction in the focus of scientists, and thus a new tradition of research formation.

A. The new paradigm of music education?

Dewey has been quoted in previous theories of music education (Swanwick, 1988; Reimer, 1989, 2003; Elliott, 1989a, 1989b, 1995, 2001, 2009), but interpretations can be understood in many ways. New interpretations of Dewey provide an opportunity to combine the perspectives of aesthetic and praxial music education into complementary synthesis, unlike until now. The sociocultural perspective plays a topical role in general educational activities and educational research (e.g., Anttila &

Juvonen, 2002; Hakkarainen, Lonka & Lipponen, 2005). When examining paradigm change, three perspectives must be considered: how the concept of paradigm has been featured in the philosophical theory formation of music education, how the key concepts of the new paradigm, praxialism and pragmatism, differ, and what paradigm change looks like from a learning theoretical perspective.

B. The concept of paradigm in music education

In musical education, the concept of paradigm has referred to changes in the focus of the philosophy of music education (Väkevä, 1999, 2004). Aesthetic music education represents the prevailing paradigm and praxial music education provides an alternative perspective (Westerlund, 1997, 2002).

Paradigms parse the historical and social timeline of the discipline. Väkevä (1999, 2004) notes Reimer's aesthetic philosophy of music education as representing its own paradigm, which can be seen as a generally accepted concept. Elliott's praxial philosophy of music education can either be seen as belonging to the same paradigm or may be thought of as representing an opposing paradigm depending on the way of interpretation. According to Smeyers' and Marshall's (Marshall, 1995; Smeyers & Marshall, 1995a, 1995b) interpretation, both perspectives represent a fundamental-pragmatist philosophy of education, whose quest is to clarify concepts describing music education and structuring the principles of music education activities, each striving for different routes to the same fundamental-pragmatist goal, allowing them to be considered as belonging to the same paradigm (Väkevä, 1999, 2004).

An individual-centric and socio-cultural paradigm can be distinguished in education, as well as in music education. In the paradigm of music education, learning is considered primarily from the perspective of the individual, and the perception of the learner can be called an individual-centric paradigm. According to Kuhn's, (1962a, 1962b) definition, there is a paradigm shift in science when the way of looking at the world is replaced by a different one (see Collins & O'Brien, 2003). The paradigm shift in music education is all about change in the musical worldview. The transformation process is described by how learning in music education today is to be seen as a holistic psychic-social process, with the background factors of learning more widely considered (Anttila & Juvonen, 2002). To replace the individual-centric learning perspective, a new perspective is sought from the tradition of pragmatist philosophy.

C. Praxialism and pragmatism

Elliott's praxialism has been one impetus for the paradigm revolution in music education. But praxialism has been heavily criticized. Westerlund (2003a) states that praxialism and aesthetic music education cannot be considered as contrasts because in both aesthetic experiences is seen in an individual context. Music as a value combines praxialism with aesthetic musical education. Learning music requires an understanding of what is being done, or learning doesn't happen (Elliott, 1995). For this reason, Elliott cannot disassociate himself from the autonomy of music, despite criticizing aesthetic music education for just the same reason. However, those music education philosophers who oppose aesthetic philosophy as the basis of music education do not deny the aesthetic value of music (McCarthy & Goble, 2002, 2005).

How is Elliott's praxialism different from pragmatism, which means pure practice? In Elliott's praxialism, the value of music is measured not by a conscious action, but by the right kind of practices (Aittakumpu, 2005). Due to the difficulty and contradiction of the concepts, Elliott's philosophy cannot be directly transferred to Finnish music education, although its objectives are undoubtedly in the right direction (Aittakumpu, 2005). A clear cognitive constructivist learning conception underpinning Elliott's vision is observable, which emphasizes the importance of action and practice in a learning event. Määttänen (1997) also notes that Elliott's mindset is quite close to cognitive psychology. Westerlund (2002, 2003b) demonstrated how one can combine the perspectives of aesthetic music education and praxialism through Dewey's philosophy. Dewey does not reject the importance of individualism but sees the experience of aesthetic as relevant to the individual. On the other hand, emphasizing the action does not exclude abstract values.

Paradigm Shift from the Learning Theoretic Perspective

Based on the study of cognitive perception, problem solving and reasoning, a good understanding of the nature of human intelligent operation has been achieved in education. However, traditional cognitive research has begun to be considered limited and there has been increasing interest in how communal participation supports individual learning (Hakkarainen et al., 2005). Learning theoretical discussions have created a synthesis of different approaches and started to regard them as complementary structures (Anttila & Juvonen, 2002). The basic premise of modern constructivism is the assumption that knowledge is structured both socially and cognitively (Tynjälä et al., 2005), which is also true in music education.

The Finnish constructivist focus is challenged by a realistic view: the purpose of teaching is to bring the learner into contact with reality (Puolimatka, 2002). There has been an emphasis on the social and cultural context in education. The focus of the human sciences is the development of a socio-cultural environment and contexts and networks containing the development and activities of the individual and community (Hakkarainen et al., 2005). The evolution of cognitivism towards sociocultural power thinking radiates into musical education, in which an individual's experience should be incorporated into action and the sociocultural environment. The learning theoretical perspective on music education embodies a change of direction from cognitive perspective towards socio-culturalism, and learner's conceptions of music education involve the entire spectrum of constructivist learning theory from cognitive-constructivist to the socio-cultural dimension.

The Formation of a New Paradigm

A new parsing of the paradigmatic state of music education has been sought in recent years from socio-cultural criticism to refer to the discourse leaning on the tradition of Dewey's pragmatist philosophy (Westerlund, 2002, 2003a, 2003b; Väkevä, 2004, 2006). In this study, we have not taken a position in favor of an aesthetic or praxial musical education perspective, but we have mainly looked at the change of paradigm from the perspective of changing in the fundamentals of teaching, and how the transformation and development of the world has created new conditions for music

education, offering a starting point for new music education that is quite different from those of traditional music education. In other words, the basic structures of traditional music education are changing and losing their previous dominance as being the only proper basic premise of making music, since new devices and methods provide a new way to activate creativity, understanding music and a shortcut to making music and its world of expression. This is not to say that all traditional music education completely loses its relevance, but that a traditional edifice based on a hierarchical musical worldview changes its order within the hierarchy and shifts towards cultural and autonomous emphasis.

Music education needs a reassessment of the theoretical basis, and taking the socio-cultural educational perspective as a basis for the values and goals of music education is an important step towards shaping a new paradigm. Quite recently, pragmatist philosophy has been seen as providing tools for the explication of the sociocultural approach to music education. In turn, this has increased the importance of interaction in upbringing in general, and in music education in particular. All educational activities are about interaction, and its importance can easily be understood to be emphasized in musical activities, especially in music playing and singing. From our point of view, the paradigm shift in music education is not such an essential division of the emphasis on individual and sociability perspectives. The perspective of this article does not attach itself to the essential priorities of practical music education activities, but instead seeks to find solutions where both mentioned perspectives are balanced. The interaction and the individualist's perspective are well suited to the thought patterns of productive music education, supporting and reinforcing each other.

Paradigm transition is all about re-outlining the temporal dimension. From the point of view of productive music education, it can be considered that the development has brought music closer to the everyday life of every person and its relevance. In turn, this is likely to highlight the arguments that justify the value and importance of music, both in the school world and as part of people's daily lives. Changing the paradigm is a natural demonstration and consequence of the development and transformation of the industry and its basic premise, the music itself. To achieve its full measure, it needs both scholarly research and practical verification in music education.

The research at hand relates to the changing paradigm of music education from one of the essential parts. There have been major changes in practical music education through the changing genres and styles of music, the development of devices and attitudes, the changing and molding of essential musical concepts, and the development of other contextual aspects. These have contributed to the reallocation of teaching priorities and new objectives throughout the field of music education. There have also been many changes in the mainstream content of music, and the power relations between different musical styles and subgenres have experienced major overhauls and changing of emphasis. These have led to the faltering and changing of musical institutes, concert practices and training, both in content and goals. The transformation of basic concepts of music has contributed to the change in the actions of people working with music, and the development of the professional titles they use in utterly new directions.

In this study, we examined the ongoing transformation of the reproductive paradigm into a productive one (see also Ahtola & Juvonen, 2021). While the reproductive

approach to music education is not necessarily about a totally new paradigm, it has nevertheless contributed to a major shift in thinking patterns of music education and practical music education. Underpinning the change are major changes in teaching-learning perception, music perception, perception of composing and the knowledge of music theory it requires, the perception of how to handle musical material utilizing new digital instruments, applications, and a considerably changed perception of how music is understood in general and how it is produced. This change of paradigm is also closely connected with motivation, winning challenges, self-competence, mastering one's own learning, experiencing success, and creativity appearing in diverse issues and forming a starting point for a productive approach to all music education (Bandura, 1997; Eccles et al., 1998).

Traditional instrument management, a thorough knowledge of music theory, knowledge of stages and stylistic aspects of music history, or so-called musical craftsmanship for managing sheet music writing and other musical expression have been changing decisively during the last decades. On these grounds, a paradigm shift may well be considered to be underway in music education. In this study, we take no position on a sociocultural or individual-centric approach, nor do we take any viewpoints of Elliott's praxial or traditional aesthetic musical education, even though our approach is close to a praxial thinking base.

Our perspective is based on the reproduction (reproductive) of pre-composed and produced music and the creation of new music and material (productive), which produces new musical expression and self-created material, based on music education and music education in a destabilizing fundamental premise difference that results in verifying the content of music education, reforming teaching methods and refreshing musical thinking. This process is also connected to creativity and ascending motivation of pupils as their independence, mastering their own learning and self-efficacy beliefs get stronger through experiencing success in their productive projects. The efficacy beliefs take advantage of cognitive, social and behavioristic skills and it points to the belief of an individual to be able to carry out the given task successfully (Deci & Ryan, 2012). These positive changes are connected to the increasing use of divergent thinking which is more highlighted in creative processes of creating one's own music which are closer to playing and gaming than planned proceeding. The traditional music education was more based on convergent thinking which bases on conscious thinking. One can also consider that the general musical worldview changes because of the above considerations. Although it is not a 'scientific revolution', one could speak of a kind of 'crisis' in a traditional music education, because the change is needed. Table 1 outlines the differences between productive and reproductive music education. When approaching the paradigm of productive music education, the previous music tradition is not to be forgotten, but what is learned from the past is utilized by adding new methods of music education (Ahtola & Juvonen, 2021).

Table 1. The differences between reproductive and productive music education

Reproductive music education	Productive music education
– The material played in the class consists of previously composed music, familiar classics represented by a range of music styles. – Knowledge of music theory is needed to be able to create music and compose. – Music is learned by studying, learning to play instruments, by listening and by reading literature. – Instrument skills are needed to be able to create music. – Music is made based only on real instruments. – The study of music theory is obligatory and learning music cultures is teacher-led and does not offer opportunities for creative work. – Creativity cannot be expressed without some knowledge about music theory and instrumental skills. – Pupils' musical skills are measured by tests which often cause anxiety and can lead to a negative self-image in music in general.	– The pupil is regularly offered opportunities for improvisation, composition, lyricizing, arranging and other creative musical activities. – No need to avoid making mistakes. – Anyone can be a composer; no music theory knowledge is needed. – Instrument skills are not needed to be able to create own music. – Music can also be made using technological applications. – Real instruments can go hand in hand with virtual instruments. – Learning to create different soundscapes using sounds from everyday life. – Creativity can be used immediately in practice. – Anyone can create music that sounds like recorded in a professional studio. – Music can be learned through playing real sounding virtual instruments. – Music theory as well as music cultures are also approached in creative ways where the students can use their creativity. – Motivation ascends. – The experiences of success and mastering one's own learning rises. – The self-efficacy beliefs strengthen. – Strengthening social skills through collaborative projects.

A Peak in Creative and Productive Music Education

A. Composing music

Composing and other creative and productive activities are significant parts of music education in the Finnish National Core Curriculum 2014. However, school music lessons still focus on playing and singing readymade songs. When pupils often work in large heterogeneous groups in classrooms, many teachers find it a too great challenge to implement productive music education in form of composing own music at regular music lessons (Ruthmann, 2009; Karjalainen-Väkevä & Nikkanen, 2013). Teachers often perceive a lack of equipment, knowledge, and that too much time is required to

take on creative or productive tasks that require more organization and group knowledge from the teacher (e.g., Partti & Westerlund, 2013).

At its best, whether a primary school pupil or university student, music, productivity, and creativity work together to create a totally new learning situation in which participants learn to tolerate and resolve conflicts, learn empathy, listen to others, think more creatively, and throw themselves into the flow and uncertainty of music, without knowing the outcome but still enjoying it (Csikszentmihalyi, 1997a, 1997b, 2000, 2002; Lehtonen & Juvonen, 2009). This process has a lot to do with intrinsic enjoyment which produces intrinsic motivation and enables self-expression, which is difficult to find in other school subject activities (Regelski, 1996, 1998). Intrinsic motivation is connected to lifelong learning, which is one of the goals of the curriculum at school. The human development and learning in this way take some time, but as it is based on practicing, it creates experiences of succeeding, gaining competence, and mastering one's own life. Young pupils also consider the visual and musical stimuli as a part of their own identity, which makes their significance even bigger as time passes. This way the productive and creative music education is also connected strongly with affections and emotional development. In relation to self-expression the whole creative process has an impact on children's development of self-concept, self-assurance, and self-efficacy beliefs. Our point of view is based on the target-orientation theory and self-determination theory, as the elements of self-determination and affective factors are especially prevailing in music education (Deci & Ryan, 2012; Ryan & Deci, 2017; Yang, Shen, Lin & Lin, 2021).

Productive music education is focused on the various processes of musical invention, improvisation, arranging, composing, and utilizing music technology. Traditionally composing was seen possible only by professionals or experienced musicians with a high level of instrument control and knowledge about music theory. The studies in composing focused on western classical music and the composing process was aimed merely at the final product, the final composition (Ojala, 2009; Ojala & Väkevä, 2013). A lot of this has changed. The process of composing can be seen as a research process which helps to discover music cultures in a new way. By studying composing as a process, we can find new perspectives emphasizing individual growth and opportunities for community interaction (Ojala & Väkevä, 2006, 2013; Ruthmann, 2009). Music can be seen as a practice through which sound is used as a means of action aimed at influencing oneself or others (Ojala, 2009). When composing, we relate sounds to our past experiences, our ways of thinking, and our perceptions, and each new experience either reinforces or challenges them, and leads to new interpretations of the meaning of sound. This makes it possible to present experiences and situations with the help of musical sounds that linguistic communication is not capable of. One important point in making up one's own songs in the way described is the immediate feedback received from peers and the teacher, maybe even from friends on another continent via the Internet. The teacher works as a co-composer, motivator, helper in problem situation, and documenter (Ruthmann, 2009; Muhonen, 2013, 2016). All these are motivation factors which strengthen through meaningful learning experiences.

It is important to see composing from the perspective of music education as a part of musical activity for everyone (Muhonen, 2013, 2016). Such a perspective allows for a broader view of the composing process and the perception of all the music as a

meaning-seeking activity, contrary to what has traditionally been the custom in Western music culture and music education (Ojala & Väkevä, 2006, 2013). From this point of view the pupils feel that they are important and are heard by the others, which is important. This immediate feedback from the teacher and school mates is important as it also brings immediate enjoyment of success (Eccles, Wigfield, Harold & Blumenfeld, 1993). It is also easy for a teacher to offer tasks which are challenging enough to commit the pupils (Eccles et al., 1998). The tasks can also be divided into smaller parts which support the intrinsic motivation building (according to the target-orientation theory) (Bandura, 1997). In the best possible situation this leads to gaining experiences. The more pupils feel they are able to impact the results of activities, the more the motivation grows. Deci and Ryan speak about control-beliefs (Deci & Ryal, 2000; Ryan & Deci, 2000).

Technology and a variety of applications have become available to everyone. Making music no longer requires a wide understanding of music theory, special technological skills, or instrumental skills. What are needed are just creativity, enthusiasm and some idea of what the creator wants the result to sound like. The whole concept of composing has changed, it has become possible for anyone, and the line between professional composers and enthusiasts has blurred (e.g., Partti & Westerlund, 2013). As earlier mentioned, creative and productive musical activity is an important part of the Finnish school's music education (Finnish National Core Curriculum, 2014). It was defined in the 2004 Curriculum, but it seems not to have been carried out in every-day schoolwork. Still, as the pupils are strongly motivated to use technological gadgets (like laptop computers, smart phones, and tablets) it also works in music lessons as a source of energy and provides direction for the behavior affecting intensity, stability and choosing the action and carrying it out (Roberts, 2001; Lundberg, Malm & Ronström, 2003; Mollborn & Fomby, 2020).

Balkin (1990) defined the concept of creativity by comparing it to talent, which is an innate, unlearned gift, while creativity is a learned, acquired, and developable behavior. Talented can be creative and creative can be talented, but there is no causal correlation between these concepts (Balkin, 1990). Elliot (1989b) sees creativity as a combination of concepts that are often confounded with originality. The creative process is engaged in through activities such as composing and improvising, which lead to a product which becomes a combination of familiar, previously learned and the unknown. Laczó (1981) found that children's improvisation skills are primarily determined by musical skills and previous musical experiences, whereas age is not a significant factor. According to Clark (1986), a teacher can offer the tools to be creative, but it doesn't necessarily lead to a creative product. He sees that is impossible to separate the creative product from the process. This idea is also supported by numerous recent studies (e.g., Ojala & Väkevä, 2013). Clark believes that using examples is an effective way to teach creativity and the teacher can pass on openness to creative practices to students (Clark, 1986; Running, 2008). Behind the enjoyment that this kind of activity creates, there is the individual's attachment to the group and community, which require equality, trust and feelings of safety connected to positive feedback, linked to enjoyment at school and interaction skills. Creation of one's own songs and music feeds the pupil's emotional concept about own survival in different areas of life, at the same time lifting their appreciation and motivation of other school subjects (Eccles & Wigfield, 2002; Running, 2008; Ruthmann, 2009; Muhonen, 2013, 2016).

B. Technological revolution in music education

The variety of ways to practice, consume and learn music has extended exponentially over the last few decades. Today, anyone can produce, compose, and create music, making it sound professionally produced for free. The devices are no longer computer-based, and with applications, music-making is possible with tablets and mobile phones. In addition to schools and colleges, the Internet with its offerings has significantly expanded the field of informal music education environments and practices (e.g., Salavuo, 2005; Myllykoski, 2009; Partti & Westerlund, 2013; Vasil, 2019). Online music communities are diverse platforms for musical activities and interaction, as well as a broad field for research of informal learning. In addition to the use of technology in music making, one can chat with others and appraise music made by peers (Myllykoski, 2009). This is also an element which enhances pupils' enjoyment at school, which has traditionally been poor in Finnish schools. The creative work at school also has its therapeutic aspect, something which should not be forgotten. The rapid development of computers and applications has made the devices familiar to even small children before they start school (Mollborn & Fomby, 2020). When they go to school, they often know how to use a computer or a smart phone, which can be turned into a positive learning aspect by using their skills in productive and creative music making. This meets their three important psychological needs (which come from the self-determinate theory): experiences of efficacy, autonomy, and social cohesion. When these needs are fulfilled, strong motivation follows (Deci & Ryan, 2000).

It is also possible to publish and earn with self-made music on the large publishing platforms like Spotify, Soundcloud or YouTube, and the use of these has expanded lately. People in Spain, Italy, and the United States have chosen musical activities in addition to exercise as the most effective coping mechanism for the COVID-19 pandemic (Hansen et al., 2021). Music makers and teachers have learned to use the various music platforms in a new way. Online communities make it easy to share and compose music together, and new platforms are constantly being developed. Touchscreen devices (like iPads and Chromebooks) can be found in schools, and pupils are already accustomed users in elementary school. Tablets also make it easy to play virtual instruments (Kaikkonen & Laes, 2013a). A variety of applications make studying music theory fun, not to mention the ease of composing and creating one's own contemporary music and own pop-rock songs. The process of making one's own music is a significant experience which adds meaningfulness to the whole of life. Until ten years ago, most applications remained at the experimental level (Folkestad, 1996, 1998), but today they are usable thanks to their versatility, low cost, and easy interfaces. Technology and the Internet's new platforms have revolutionized the opportunities of composing with peers around the globe (Kaschub & Smith, 2013). In collaborative creative activity with peers in live situations or via the Internet the opportunity to come up with one's own solutions and decisions is high and the pupil gets to deal with experiential learning connected to emotions (Deci & Ryan, 2000; Ryan & Deci, 2000, 2017; Jalovaara, 2005; Kutnick & Blatchford, 2014). This usually leads to the use of task-oriented strategies. This strategy is in connection with positive self-concept, motivation, expectations of success, persistence in trying, concentration on the current task, and active planning. All these together usually lead to success in the given task (Aunola, 2001; Onatsu-Arvilommi, Nurmi & Aunola, 2002).

There are four factors which can explain the pupils' enthusiasm in using technological devices:

- Intrinsic motivation, which has grown in their early childhood when they have learned to use computers and smart phones to play numerous games. Simultaneously they have learned to use the computers well, including the use of the Internet.
- The benefits of being able to use the device. Starting from the joy of playing, modern children have learned to find the issues in which they are interested from the Internet. They have found it to be quite useful in many connections, including several school subjects.
- The value of attaining something. This usually starts with the playing of games. Children compare their achievements in different games by trying to attain better results than their friends. Later this changes into other targets, which can include making their own music with applications.
- All the need for practicing, and all troubles the child must go through before learning how to use applications, the rules of a game or finding solutions to problems on using the internet (Applied according to Eccles' and Wigfield's motivation theory) (Eccles et al., 1983, 1998).

C. Study targeting and starting points: Studying music offered during teacher training for class teachers at the University of Eastern Finland

At the UEF, the classroom student teachers study music as part of teacher training in skills and arts subjects during three courses which include art and skill subjects. The first of those courses was a major group lecture course in 2021 which was executed as distance learning, covering skills and arts subjects in general. The next two courses included the pedagogical basics of skills and arts subjects and both were eight credit courses, of which the second one was conducted in the fall of the second year of studying to be a class teacher and the last one in the spring. The courses include the pedagogical basics of physical education, crafts, skills, and music, and in the subject of music, in fall the focus was specifically on learning the basics and the application of skills learned in spring. Teaching takes place as a close education.

The intervention was carried out as part of the last course (of the three mentioned). Second-year student teachers improvised, wrote lyrics, composed, and produced music in groups using music technology (see a more detailed description of the program at UEF in Ahtola & Juvonen, 2021).

In the study at hand, we looked at the central elements of productive music education, producing music in its multifaceted occurrence (improvising, composing, lyricizing, rhyming, re-arranging songs, creative musical exercise, movement, improvisation, and creating own musical ideas and styles). This intervention is generated by a course which is offered as part of the program studied by class student teachers. Our goal was to anticipate and shed light on a real-life future situation for the (general) student teachers where new ideas and approaches to music education come into practice. In our previous article, we considered a similar approach for music student teachers (N=8) (Ahtola & Juvonen, 2021). We can consider that the music student teachers' orientation to music, i. e. orientation towards speciality, is considerably greater, deeper, and stronger than the orientation of general classroom student teachers who

do not have music as a minor subject and have only general musical orientation (Juvonen, 2000, 2008a). They mainly represent the overall musical orientation which does not include active instrument playing as a hobby (Juvonen, 2000, 2003a, 2008b). Another big difference between the two sets of students under study is the size. The number of students studying to become music teachers was small (N=8) and the number of general student teachers was much larger (N=184) and all of them were second year student teachers who had not yet chosen their minor subject. This division quite adequitely describes the real-life situation where about 10% of the incoming student cohort chooses music as their minor subject.

Research Set, Its Acquisition and Description

The data were collected using an electronic questionnaire which the students answered in their own time. In the initial inquiry we asked about student teacher's general relations with music and technology, and their memories about creative or productive musical activities or the use of music technology during schoolyears. 67% of the participants were female, and 33% were male. The median age of respondents was 23 years.

A. The intervention

In January 2021, the first author of this article (S.A.) taught second-year teachers who participated in an intensive period of productive music education, which was a section of their multidisciplinary skills and art subjects. During four teaching sessions, each lasting 90 minutes, students learn how to use several different music applications that run on an iPad. The course was carried out using a variety of creative tasks and practical exercises. The purpose was to introduce students both to using music technology and creative music education practices, and to test their abilities of and attitude to new ways of teaching music, which we call a productive music education. Applications were varied from a pedagogical point of view, yet easy to adopt during a single teaching session.

Ten student groups (17–23 students per group) studied eagerly for four weeks to become familiar with the practices of creative and productive music education using new technology and music applications. This was offered to them as part of their music education. It was obvious that there was high demand (and need) for a course like this (see Juvonen & Anttila, 2006, 2008; Anttila & Juvonen, 2006, 2008). No prior musical or technological skills of any kind were required of students to participate in the course. In addition to our research targets, the purpose was to expand the musical tool pool of students and teach tangible practices to how improvisation, composing, lyricism, music production and a range of creative and productive activities can be taught in the school's music class, regardless of the age, skill level, group size, or status of the students.

Students worked either in pairs or in small groups planning small music tasks whose configurations varied depending on the task. Typically, the groups comprised three or four students, and the goal was to achieve an active participation of each in the design, execution, and presentation of the final output to the rest of the student group. It was possible to disperse small groups of students into different spaces, allowing each group to have peace to work. Such a situation is ideal when implementing the

practices of productive music education, as this allows each group to work without distraction and the teacher can monitor the work effortlessly.

For each assignment, students were first allocated iPads and other necessary tools, and a teacher-guided assignment was first illustrated as well as the basic functions of the music application indicated. Subsequently students were divided into small groups and the groups started by brainstorming the structure of the project. The time limit set for this work was within the frame of half an hour and an hour, and finally, the finished output was presented to the rest of the group at the end of the teaching session. The applications used at the first teaching session were easy, and as the period progressed, the user interfaces of applications also got diversified as the students' skill level became more accessible. Students welcomed the presentation of the outputs to the rest of the group and there was a positive, supportive, and safe atmosphere at the lessons. As the period progressed, students felt that it was easier to introduce their own ideas from hour to hour, and their own technological know-how became more accessible.

iPad apps used in the month-long period to encourage musical creativity were:

- Launchpad (application for making and remixing electronic music with beats, basslines, melodies, vocals, and effect loops);
- Incredibox (music-making application in which the user can create a mix by managing seven animated beatboxers and twenty different sound icons that are categorized to beats, effects, melodies, and voices);
- Samplebot (application for crafting songs with recorded or imported samples that can be looped;
- GarageBand (fully equipped application for creating music and podcasts. Enables user to record voice or real instruments, create multiple tracks with sound libraries, presets, and audio loops).

Applications that facilitate future music education in the work force as well as their own musical perceiving included:

- Ukeoke (application for learning ukulele; chords, strumming and accompanying);
- Rhythm Swing (playful application for learning rhythms and how they are written with music notation);
- Chordify (online music education service that transforms music into chords and makes accompanying easy to follow).

B. Purpose of research and research questions

The purpose of our research was to find out the elements which prove the attendance of a new productive music education paradigm through testing the elements and applications of creative and productive music education with traditional music education-oriented student teachers as a novel approach to composing, improvising, arranging and all forms of independent producing of musical material in a primary school classroom context. The starting point is that most of the future class teachers in this research have almost no musical background or skills whatsoever from areas of music theory, history, or especially composing, composition, matching, or improvisation when they start studying to be a class teacher. In the group, there might

be some students who already know how to write music and are otherwise interested in music, but overall, the set is completely heterogeneous, unselective, and have no specific musical orientation. Through the intervention in this study, we explored students' prepositional attitudes to music, its various dimensions, technology, and its use, as well as self-expression and the use and application of their own creativity in new productive tasks. In turn, these represent the key starting points and elements of the productive paradigm of music education.

To talk clearly about the paradigm change, or the need for it, there must be a need to find new practices and to abandon the old basic premises. In traditional music education, one of the more important basic premises has been learning and management of sheet music writing, which has formed the basis for all activities in examining styles of music, historical study of music genres, and various musical analyses, for chords matching and composing as well as for voice-leading in polyphony, homophony, and in the use of other musical styles in the areas of light music as well as the so-called classical music.

Research questions

RQ1 What music relationship do the student teachers have?
RQ2 What attitudes and relationships did the student teachers have to music, music technology and creative and productive music education before the intervention?
RQ3 How did attitudes to music technology and creative and productive music education change during the period?
RQ4 What experiences did students get with the application of technology?
RQ5 How do future class teachers perceive the use of technology thinking about the future – what hopes and expectations will they put in their future work?

Results

More than half of students in this research (56%) responded that they still had or used to have music as a hobby, which might be a good starting point for studying music education. Almost two out of five respondents (38%) said that they actively listened to music and only few (6%) said they did not listen to music nor had a musical hobby. Those who reported that they had, or used to have music as a hobby, reported that their instruments or way of making music were piano, accordion, guitar, ukulele, cross flute, violin, drums and other percussion instruments, bass, trumpet, vocals, chorus, clarinet, or band playing. In addition, there were mentions about DJ jobs and making their own songs with music programs (nine respondents 5%). Band playing was mentioned by seven respondents (4%). Music perceived as being significantly important by about 30 respondents (16%) and, accordingly, music was of little importance or of no relevance to eleven respondents (6%). For most of the respondents, the importance of music was neutral (78%).

A. The respondents' relationship with music

Many of the respondents (104 people) had had music as a hobby (15%) or had music as a hobby by the time this research was undertaken (41%). Two thirds of respondents were active music listeners (69 people, 37%) and only 11 people (6%)

hardly ever listened to music or played any instrument as a hobby. Typical answers from music hobbyists described their music playing since they were children. Some had stopped the hobby as a teenager but started again with teacher training.

Music hobbyists:

- *Music has a big role in my life. I listen to music a lot and I have been playing piano since I was a very small kid.*
- *I played flute for 10 years in music school. I have learned to play the piano, ukulele, and guitar by myself. I play these instruments from 3 to 10 hours per week.*
- *I listen to music a lot. Music is very important for me to recover and relax, I can play the piano.*

Former hobbyists, active listeners:

- *I listen to music a lot; I played piano for several years as a child.*
- *Earlier I played piano for 10 years, but I have not played in a couple of years. I listen a lot to music, and it works as a means of concentration and relaxation, I am interested in all kinds of instrument playing. I was in special music classes in grades 3 to 9.*
- *I listen quite a lot to music and play guitar for my own pleasure, I used to take lessons in it at music school.*

Music has no significance and listens hardly ever:

- *Very weak relationship with music, I listen seldom to music, and I never have had music as a hobby.*
- *I do listen to music, but not much. I don't have music as a hobby; it is totally strange to me because music teaching at my school was lousy. Also, musical concepts are strange to me.*

B. The respondents' attitudes and relationship with technology

More than half of respondents (66%) had a positive attitude to technology at a general level and 12% were negative. About every fifth respondent (22%) had a neutral relationship with the general use of technology. When asked about the use of music technology at the respondents' school years, most respondents (84%) did not recall anything related to music technology being used. Those who had experiences in music technology mentioned the GarageBand application, which comes with the iPad and is a versatile music recording program. In general, the technology was welcomed by most respondents and reported that they used it daily in forms of writing, listening to music or spending time with social media applications (WhatsApp, Instagram, Facebook, YouTube etc.).

Table 2. Attitudes to music technology before the intervention

Before intervention	Completely or almost same opinion
I was familiar with the use of music technology before the course	16%
I have a positive attitude to the use of music technology in teaching	90%

Positive attitude towards technology in general:

- *It is present in my every-day life. I think that it brings a lot of benefits, help but also brings entertainment into my life.*
- *I was born with a tablet on my lap; technology is interesting and helps in every-day life, easy to use.*
- *To me studio applications and audio/music plug-ins are really familiar; they form a big part of my hobby.*

Neutral attitude:

- *I don't get very excited about technology, but I can use it quite well, I think.*
- *I am not dependent on technology. I can live without using it. Still, I try to keep up with the development.*
- *My attitude is controversial; in future technology probably will be the main working instrument in the world. I don't like when technology takes the place of social life.*

Negative attitude:

- *Using new technology makes me anxious.*
- *I have generally quite poor abilities in technology. That is not my area of strength.*
- *It is an every-day necessary obligatory evil.*

These results show that the respondents have a clear need to get more knowledge about the use of the technological applications in music teaching, but also in general use of technology and applications. A part of this need shows as a negative attitude against all technology or the use of it, not always depending even on the skills of the respondent.

In some areas it may be that technology usage has been brought to schoolwork too fast. The teachers who are already working have not been ready to take the use of technology in their management as they were forced to use it in distance teaching during the covid-19 pandemic. These messages have been heard among the student teachers in UEF, for example, during their practice periods at schools.

C. The student teachers' attitudes and relationship with creative and productive music education before and after the intervention

According to latest research, 60% of Finnish classroom student teachers feel it challenging or even impossible to teach music, although class teacher training should provide (according to the curriculum and the teacher's certificate) the skills to teach

all skills and art subjects (Suomi, 2020). This percentage (60%) is the average of all Finnish teacher education institutes, but in UEF Joensuu campus the measures are much better than the average (see Suomi, 2020; Mäkinen, 2021).

As one solution to the situation the intervention in this study is aimed to expand the tool pool of Joensuu campus' class student teachers to teach music through various technological applications. One of the biggest reasons for believing not to be able to teach music at school is caused by low self-confidence and self-concept. The musical self-concept is built in the childhood and at home, peers and the first schoolteacher have a big influence on the structure of the musical self-image and attitudes towards music (Juvonen & Anttila, 2008). Teaching various practices and utilizing applications are also tought to unravel a certain kind of stigma from around, for example, composing and improvisation, which, in principle, before the episode began, were perceived challenging and being possible only for the musically gifted and those who have studied a lot of music theory.

In addition, only one third (36 %) of the target group of this research remembered doing anything creative at music lessons. This percentage may seem quite high, but our classification of creative tasks is permissive, and we tried to see responses in a positive light.

Change is happening slowly but surely

In traditional Finnish music education creative tasks like improvising and composing songs in a classroom have been rare. This was due to the basic thinking model: to be able to compose music one should first know the music writing quite well, to be able to write down the melodies of the new composition. Secondly, to put the chords in the melody requires a lot of knowledge about harmony and tone-leading to make it sound good.

Even more important is the starting point of the music education: a big part of working music teachers still have the aesthetic starting points in their music educational thinking, because of the education they were offered during the time of their studies. The modern thinking about music education of, for example, David J. Elliott reached Finland only about two decades ago, and even to this day has not reached all music teachers who still are working. So, there is also a change of generations going on in Finnish music education and it takes several years of time, maybe even decades.

In this research we classified all tasks with even a small hint of creativity as creative music teaching. So, such tasks as making new words to a song (11%), writing an own song (16%), or arranging an existing song for school instruments (6%) and improvisation (3%) we counted as creative memories from music lessons, although the reality may have been quite different also in these cases because of the reasons told before. All these counted together make the 36% which we mentioned in the beginning. There are some mentions about writing one's own songs, but they are more exceptions than a rule, and they have appeared usually only in special music classes:

- *We wrote new lyrics to familiar songs, but never composed anything new.*
- *I was on special music class, and we made among others, a song built of one pupil's lyrics.*

- *We made a musical and composed all songs for it. (Pupil from special music class.)*
- *In upper secondary school we learned some GarageBand, but I remember nothing else.*
- *I don't remember anything creative, we mostly concentrated in readymade material and playing it.*
- *There was one time when we tried to make our own lyrics.*
- *In high school we made a record full of our own songs.*
- *In a band club we tried to make 'an own song' but mostly it was just messing around with friends.*

The school years of the respondent group were mostly 2006–2017. The Finnish core curriculum of music education already then mentioned diverse musical agency, functionality, development of creativity and self-expression, and integration with other subjects (Finnish National Core Curriculum, 2014). But still, well over half (64%) of respondents said they had no recollections of creative music education from their school days, which means that the curriculum demands were not fulfilled on that part.

Table 2. Improvisation and making up one's own songs before the intervention

Before intervention	Completely or almost same opinion
I find improvisation easy	52%
It is nice to make own songs	58%

Despite the issues discussed earlier, the respondents still found improvisation mostly easy, and they liked writing their own songs (see Table 2). This probably means that they had tried to devise their own songs outside the school because only every sixth respondent (6%) said that they had composed their own songs at school.

The change of attitudes during the intervention

The creative and productive music education intervention seems to have revealed a lot of new creativity and invention abilities in the respondent group, but also new courage to present their own ideas in the student group (See Table 3). Most of the respondents (92%) felt they had discovered new creativity in themselves and more than two-thirds (70%) felt it easy to invent musical ideas (melodies, lyrics, rhythms). Almost everyone (90%) felt it was easy to present their own ideas working in small groups. This type of musical creative activity requires a student to throw into, tolerate uncertainty, as well as trust the other members of the group to dare to bring their own ideas out. It also means stepping out of the comfort zone. The results show that the groups achieved a safe and confidential atmosphere and a positive emotional climate as required by all forms of creative musical activity (Muhonen, 2013, 2016; Karjalainen-Väkevä & Nikkanen, 2013). This may be because of the common feeling of being at the same level as most of the peers at the lesson, so that no one had to feel that they were coping less well than the others.

Table 3. Creativity and one's own ideas after the intervention

After intervention and in future	Completely or almost same opinion
I found new personal creativity during the course	92%
I found it easy to invent musical ideas (melody, lyrics, rhythms)	70%
I found it easy to present my own ideas in the group	90%

A pre-survey study showed that previous experiences of using music technology were sparse. Only one sixth (16%) of the respondents responded that they had familiarized themselves in some way with music technology mentioning the GarageBand app, which had come up in school music classes at some point during upper secondary school or in special music classes. Music technology was also positively viewed; 90% of respondents saw the use of music technology in teaching as a positive thing. Although only one in six respondents knew music technology before the intervention, nine in ten respondents had a positive attitude to music technology. The following quotations mirror the respondents' attitude and low level of experience in music technology:

- *We tried a little to use GarageBand.*
- *Sometimes we watched bands on YouTube.*
- *I used a mixer during upper secondary school and GarageBand in upper school.*
- *The lyrics were projected on the table…*
- *There was an electric guitar …if it is counted.*
- *Sometimes we watched Karaoke videos from an old TV and sang along.*
- *Once we tried GarageBand during upper secondary school, but we were not taught at all, just told to make a song out of nowhere…*
- *The most technological issue we used in my elementary school was listening to a CD record.*

The target group was heterogeneous, and they had no particular interest in music. The level of their interest and skills in music was highly variable. In our earlier article (Ahtola & Juvonen, 2021), we examined subject student teachers in music education who had a strong musical special orientation (Juvonen, 2000), as well as extensive musical skills. Everyone had a strong desire to improve from the professional music teacher's point of view. The situation in this second group is quite different concerning the development and especially about becoming and developing as a music teaching class teacher. This is probably because the teachers who teach at large schools have an opportunity to choose the subjects which they do not wish to teach as many teachers are willing to teach those subjects (for example, music).

After the intervention period, student teachers were asked if the music technological applications which were used and the creative tasks executed during the period had influenced their creative musical expression, attitudes towards music, and their competency to teach music in future.

Students training to be classroom teachers in music education expressed a strong need for this type of activity. Our study generated no ambiguity on this matter. The

teacher education students felt strongly that applications in music technology were facilitating teacher's work, as well as diversifying music education in general. Most respondents also felt that apps and creative musical tasks expanded their musical competence and brought certainty to their own music teaching. All 184 respondents intended to take advantage of the working practices and tools they had learned in their future working life.

Table 4. Attitudes to music technology during and after the intervention

During intervention and in the future	Completely or almost same opinion
The use of music technology makes music teaching more versatile	99%
Music technology makes the music teacher's work easier	95%
I like to learn using new technological applications and their use in teaching	97%
Learning and using new applications widened my musical abilities	98%
The learning and using a range of assignments brought more self-confidence to my music teaching	96%
I am going to take advantage of the tools I have learned for creative music education in the future in the work	100%

The variety of students and big, heterogeneous groups pose their own challenges for the teacher. For some, however, improvisation or musical invention may create feelings of anxiety and a chaotic environment in which the pupil does not know how to act (Kaikkonen & Laes, 2013a; Karjalainen-Väkevä & Nikkanen, 2013). Creative tasks with clear instructions and various technological applications diversify music teaching, as they provide the opportunity for a wide range of work in different groups and allow access to a pleasant-sounding musical outcome for all kinds of learners. Directing composing and other creative tasks always needs boundaries to work in the best possible way (Karjalainen-Väkevä & Nikkanen, 2013). Looking at the results, it can be noted that the tasks were clear enough in terms of guidance but did not limit the students' own creativity too much.

Before the period, only 16% of students had been familiar in some way with the music technology. After the period, most respondents (97%) felt that learning new technological applications and programs were meaningful and they liked to learn and use the applications.

Content like this had been the aspiration for student teachers in music education for almost twenty years, when music education students from several universities in Finland and Estonia were asked what their development needs for music education. It was widely hoped that music technology could support education through practical learning and creativity development (Juvonen & Anttila, 2003). Also, in special music education, creative musical activities, and music technology can allow a variety of learners to perform productive activity in a music class. As recently as eight years ago, a range of applications had been perceived as having limitations for longer-lasting teaching of improvisation and composing (Kaikkonen & Laes, 2013), but today the

applications have been developed well enough for extended working periods and it is possible to implement extensive creative projects using technology in school music classes, regardless of age, skill level and group size. Music subject student teachers felt that the intervention course with a variety of applications and creative musical tasks significantly increased their competency to supervise and teach composing, improvising, and arranging and other creative musical activities in the school class. These tools for productive music education were added to the other pedagogical material for students undertaking music education in 2019–2020 at the University of Eastern Finland (Ahtola & Juvonen, 2021).

After the period, students gave extensive feedback about using the technology applications in music teaching and their responses to how it diversifies music education and expands their competency in the subject. From the responses, we saw that the attitude of many students to the use of technology changed towards a much more positive direction during the period, when students realized that using a range of applications and music programs can facilitate the work of the teacher and offer new ideas in music education's working habits. It is also essential that the teacher knows how to take advantage of various creative tasks that are suitable for each age group in addition to using technological applications. Several music applications were used throughout the period, which were found to be suitable for a range of educational situations. Some of the applications are particularly planned to fuel creativity and are suitable for composing, recording and other creative activities, while one of the apps was a more functional tool for special music education, perceiving music or practicing co-playing.

Students' attitude and experiences with the music technology after the intervention

Students evaluated each of the music technological applications used in the intervention individually so that we could find out which applications were perceived as the most pleasing in terms of learning. The most popular of the applications was Incredibox (96% of respondents liked it much or somewhat; 3% absent). Incredibox was found to be the most accessible. The application was introduced at the beginning of the intervention to feed the creativity of students. The task was: select a self-pleasing genre, (e.g., Hip-hop, Latin etc.) and in a small group (3–4 people) create a short song with the use of loops that includes the beginning, a surprising element, and an ending. Finally, the songs were introduced to the group. The app features numerous high-quality loops that suit being played simultaneously always producing a good sounding outcome. However, there are many loops and musical genres in the application, which make each product sound different, even if the songs are made using the same genre and partially same loops. The app is easy to use, and suitable for all ages, starting from early years of primary school classes, but it equally inspires adults in creative work.

Of the other apps, GarageBand was also highly liked (92% liked; 4% disliked; 4% absent). GarageBand has the most versatile interface of the applications and enables a professional auditory outcome with its recording capabilities. The task was to compose a soundscape based on images shared to small groups. The images were from the book *"The Walkabout Orchestra"* (Perarnau, 2019). Images were large and colored, showing a wide range of events to inspire producing diverse sounds. Students used real instruments, but also the app's ready-made audio libraries in recordings.

They also learned to use an external microphone paired with an iPad to offer better sound quality. The students learned how to edit the tracks and combine intact and fine ensemble from several sections. In the end, the images were projected onto a big smart board and the groups presented their compositions to the others.

Similar feedback was received by Samplebot (79% liked; 11% disliked; 10% absent) and Launchpad (78% liked; 17% disliked; 5% absent). Samplebot is visually clear and colorful. The recording features are simple and therefore recording is successful after a short training session even for young pupils. When the application opens, a colorful grid appears, one in which it is possible to record a different sound, rhythm, or melody in each color box. After that, the boxes can be played by touching and thus record the desired auditory outcome. The task for small groups was to record a radio advertisement-style jingle with the themes *"New Year"* and *"Study Motivation"*.

Launchpad also offers ready-made loops, and the theme is very suitable for the DJ world. The main idea is that the application allows practicing DJ functions easily and simply. There are a limited number of musical themes, all of which are strongly connected to the electronic music world. The task was to choose a prepared poem from the given Internet site, which students used as a song lyric and on which they composed the background using the app. Several songs became rap style, as only a few groups interpreted the texts through singing. The songs were introduced to the rest of the group at the end of the session. The background that had been composed was played through the class sound system and one student acted as DJ with the iPad, with the rest of the small group performing the song singing or rapping through amplified microphones.

In addition to applications fueling creativity, during the intervention three applications that facilitate the work of a music teacher were introduced. These were UkeOke for playing ukulele, Rhythm Swing (74% liked), a musical game-style application designed to perceive music and especially for practicing time values of rhythms and notes, and Chordify, which facilitates directing playing music together in class. Both UkeOke and Chordify were highly liked and more than 90% of respondents responded with both of them that they liked the app. UkeOke and Chordify are similar in a certain way, as both are used specifically for training instrument playing skills, both applications make it easier to track chord signs and song structure and the app plays a background that makes the playing music together sound instantly good and all of the group members remain more easily in rhythm.

Conclusions

The results obtained in our former article *"Towards a Paradigm of Productive Music Education"* (Ahtola & Juvonen, 2021) with student teachers specializing in music showed that with this approach it is possible to diversify music education into a new direction: increasing the appearance of creativity and productivity in music education, as well as to increase the teacher's competency in the issue. The findings already gathered in our earlier research reinforced our assumption that through productive music education as a base of music lessons it is possible to facilitate the work of teachers of all ages and students at all levels.

Encouraging future teachers to engage in creative use of technology in music teaching is essential if we want to take advantage of informal learning as well. Informal learning takes place outside the walls of the school, when pupils can use their own creativity and technological know-how in creating, producing, and composing their own, new music using numerous applications and online platforms. This means also, that new, diverse, and different learning environments must be considered in a new way in teaching, learning, and evaluating music (Myllykoski, 2009; Vasil, 2019). While more and more music teachers start taking advantage of informational learning in how they teach music (Vasil, 2019), productive music education also enables it much better, and implementation does not depend on school resources.

Throughout the decades, music teachers have found it challenging to keep up with contemporary and up-to-date music trends, genres, and changing styles (e. g. Väkevä, 2006). This has even become more complicated and today it is almost impossible to be able to know all music styles and genres not to speak about all the artists.

Productive music education contributes to the fact that the teacher does not always have to be familiar with the latest hit songs, but the teacher offers the tools for pupils to create one. With music technology and easy-to-use applications, pupils can create songs of which they have an idea of by using advanced sound banks and, at the same time, they can develop and learn creativity, social skills from working together, perceive music through its structures, and evolve to become skillful and versatile users of the latest technology. When a pupil knows they are being skillful in some area, it lifts self-confidence, self-assurance, and finally strengthens the self-concept effectively (Hietanen, 2002).

Still, in music teaching today, the dominance of formal training is prevalent (Vasil, 2019). Older teachers have not received any specialized training in the use of music technology and teaching creativity in their work. That is partly because of the extremely fast development in technology and applications for the use of teachers, musicians, composers, and all kinds of music enthusiasts; the equipment just did not exist when older music teachers were educated. The creativity education as a concept is a newcomer, but it does not mean that there would not have been any creativity in music education earlier. Creativity has naturally been present all the time in all art and skill subjects. The way that creativity has been understood, taught, and carried out in the music education field have gone through a major change due to technological developments (which was exposed earlier in this article, see the section entitled: A Peak in creative and productive music education).

One solution to these problems is strengthening the offerings of Finnish continuing education, which would allow teachers with a traditional music subject teacher education to learn and understand and gain skills to enable them to use today's technology and opportunities. This is necessary, because not everyone has the motivation to learn new practices and to discover the use of ever-changing applications independently in their own time without any supervision.

In Finland, music teachers are highly trained in playing several instruments, music history and theory. They also have high level knowledge about the pedagogy of music. One key in jumping from traditional music teacher education to new ideas means letting go of the notes and unleashing creativity without the traditional way of

building the teaching and learning leaning only to the use of notation and traditional musical rules and aesthetics. Traditional music education must also be added with drama as a means of teaching because that is also a newcomer in the curriculum.

There has been a huge increase in the development of web-based music-making programs and applications over the past decade, which has led to the evident appearance of a paradigm shift. Technical problems, network slowness and files that take up too much space and their sharing, will no longer produce problems that were common even in the early 21st century. Online assisted study was predicted to grow in the future at that time, and this is exactly what has happened (Salavuo, 2005). However, innovative applications that develop creativity are not enough alone; already in teacher education, efforts must be made to find pedagogically functional applications that are as diverse and timeless as possible to work in future music education (Bondarenko, 2020).

Technology makes music lessons more creative, dynamic, interactive, and allows music lessons to have a more diverse content. It also offers the pupils more experiences of mastering and controlling their own work which strongly increases their motivation. Compared to traditional teaching methods (reproductive music education), using technology and creative tasks offer new opportunities to shape the lesson plan and more versatile classes for a bigger group of pupils. Through productive music education, it is possible to improve the quality of teaching while also increasing and strengthening the creative abilities and thinking of pupils, their self-confidence in music and motivation for learning or even having music as a hobby (Hernández-Bravo, Cardona-Moltó & Hernández-Bravo, 2016).

Compared to traditional music education, the creative and productive approach to music education seems superior in many dimensions especially in fostering creativity education on a much more solid base than earlier. This point of view is spreading rapidly in Finnish music education, but it does not necessarily demand extensive renovation of the curriculum. What it requires is offering traditionally educated music subject teachers an opportunity to get more education in the use of modern technology and music applications. This should be arranged so that it would not lead to costs or difficulties in their work at school.

A wide discussion about the importance of the changes which the ideas described here offer (creative and productive music education), is needed to spread the ideas, to make them more understandable, and maybe even talk about whether creative and productive music education may be seen as a new paradigm. Our opinion is that it suggests such changes in the practices of everyday music teaching in addition to old aims and targets of traditional Finnish music education including the praxial and aesthetic points of view that it could and should be called a paradigm change. We will research and report the issue more and deeper in our subsequent research.

The creative and productive music education also offer solution to the big problem about not being willing to teach music among the class teachers in Finland. This problem has been researched quite a lot (Juvonen, 2004b; Suomi, 2020; Mäkinen, 2021) and some progress has also been made, thanks to the changes in teacher education curricula. Still, the problem exists, and music seems to be a school subject which divides future teachers strongly. We can even talk of polarization in the issue: a

group of future teachers is eager to teach music and another group of them is not at all willing to teach the subject. The curriculum changes in the teacher education curriculum were made to make the classroom student teachers realize that they do not have to be skillful musicians or professional instrumentalists when teaching the pupils. What this means is that the ideas presented considering the creative and productive music educational approach, offer opportunities for future class teachers which enable music teaching without deep skills in instrument playing or knowledge of music theory. This should be one measure to solve the problem, and the student teachers should notice that it is possible to carry out good music education with lower-level skills in music itself. This is a fatal question for the future of music education which is carried out by classroom teachers and classroom teachers who have music as a minor subject as they actually carry out the most of music education in classes 1–6.

Another matter is the substance and content of music education. That is described in the teacher education curricula, and it is in the direct connection with the Finnish national curricula for primary schools. In this area the creative and productive music education presented also seems superior as it offers good opportunities for widening the content of music teaching significantly in the direction of the creativity. This is an important point of view, as the creativity is much more underlined in the last round of Finnish curricula for all school levels (from 2014, implemented from 2016). Creativity is also seen as being important for the development of the whole Finnish nation as mentioned in the Vanhanen's government program (2003–2007). Creativity was called for in the 'innovativeness' government program, obviously referring to new technological and economic innovation which could offer Finland a better future in the economic field.

The world is continuously in the middle of a rapid change, exclusively in the field of music, which is especially important for children and young people because music has a major impact on their identity and personality development, as well as the happiness of their future life gained through significant events and experiences. Therefore, the music curriculum should be renewed according to a quite fast schedule to keep up with the technological and other developments in music and the world in general. Creative and productive music education also solves this problem by offering pupils an opportunity to create just the kind of music which they happen to like at a certain moment without the teacher having to know all possible music genres, styles, and artists. This is a major change in a music teacher's work. It is certain that a music teachers' own musical worldview and musical taste are the issues which have a strong impact on their teaching and the decisions they make about what music styles and artists they use as examples to their pupils. The new ideas give the pupils a chance to control their own learning and make own choices which builds motivation much stronger than in teaching in which all decisions are made by the teacher.

The new ideas of the approach we have presented also give the teacher more time and freedom to stay away from sitting behind the piano (or other instruments) and to concentrate more on supporting the pupils' independent, voluntary learning. The teacher can act as an escort and supporter of learning as it is defined in the latest learning theories, including the social constructivist learning concept. This also makes the new ideas more suitable in the modern teaching-learning conceptions, superior when compared to traditional music education models.

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THE EXPERIENCES OF SISTEMA FINLAND THROUGH VANTAA TEMPO ORCHESTRA PARTICIPANTS

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Abstract

El Sistema, a social music education idea originating from Venezuela, has been active in Vantaa, Finland since 2009. Tempo Orchestra is the central tool for targeting musical and social goals. They include mutual partnerships between children of diverse backgrounds, as well as a good and meaningful life.

This study examines the experiences gained in Sistema Finland's Vantaa's Tempo Orchestra. The study is current and important as it explores "Finnish Model"-like, low-threshold goal-oriented leisure activities. In addition, the study provides information about the school system as a holistic and supportive context for pupils at increased marginalization risk. Sistema Finland's activities are supported by strong socio-cultural animation. This study examines the realization of sociocultural animation through participants' experiences.

The research question is: What experiences have Sistema Finland's Tempo Orchestra participants had in the Finnish school context? We used theme interviews with a retrospective approach as the research method. It was carried out one-on-one and in groups (N=21, 11–16 years old). The data content analysis was undertaken using a phenomenological approach, abductively based on both data and theory.

The results were mostly positive. The action brought enriching elements to the growth and development of participants. The realization of the more profound goals of sociocultural animation could also be found in some of the experiences of interviewees. One clear developmental task is to ensure continuity of operations more broadly for both the whole group and for individuals. According to this study, Finland's El Sistema is music education which functions well when properly funded. Based on this research it seems to suit Finnish society when carried out with "Finnish Model" of pursuits.

Keywords: *social music education, El Sistema Finland, sociocultural animation, partnership*

Background

Finland's El Sistema activities in the form of Tempo Orchestras began in Finland in 2009 in Vantaa as part of the *"Whole World in Suburb"* project. Since then, Tempo Orchestras have been established in Helsinki (in 2012) but have been in hiatus for several years for financial reasons. More recently, operations have begun in Oulu, as in Tampere, Polvijärvi and now Helsinki again.

The action is based on the principles of El Sistema, which spread from Venezuela, but the idea has been adapted to suit Finnish society. Finland's Sistema aims to increase contacts and interactions between immigrants and the population, and to promote partnership between children from different backgrounds also preventing racism while helping immigrant children and their families in integration to Finnish life.

El Sistema Finland is connected to Vantaa Music School, which enjoys municipal funding. The new "Finnish Model of Recreation" offers opportunities for Tempo Orchestras to start in connection with music schools (https://minedu.fi/ suomenmalli).

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In Finland's El Sistema Model, the field of education and learning meets with leisure activities, thus implementing the democratization of music by bringing the basic education of art managed by the music schools physically into the children's school day.

El Sistema Venezuela

José Antonio Abreu founded "The Venezuelan National System of Youth and Children's Orchestras", better known as El Sistema Venezuela's well-known music education program in Caracas in 1975 (e.g., Nowakovski, 2012; Tunstall, 2013). Above all, the objectives are social and equality-based (e.g., Tunstall 2013). The key concepts of El Sistema are reflected in the basic ideas:

- Child comes first – music is only content;
- Democratization of music and social change;
- Through symphony orchestra and choir instruments towards social order and social development (Pedroza, 2015);
- G. Dudamel's conductor of El Sistema as a beautiful model of society (Baker, 2014a).

However, according to Baker (2018), the concepts of 'poor' and 'social' were not involved from the outset in the rhetoric of El Sistema, with the goals initially being more purely musical.

El Sistema's "Child comes first – music is only content" thesis has been critically assessed, as the program cultivates citizens' loyal to authority rather than educating subjects who take an active part in democratic processes (Baker, 2016). El Sistema changed its name in 2011 to the patriotic "Fundación del Estado para el Sistema Nacional de las Orquestas Juveniles e Infantiles de Venezuela", (FESNOJIV) (English – "National Network of Youth and Children's Orchestras of Venezuela"). Since then, the system changed its name to "Fundación Musical Simón Bolívar" (FMSB), although it is still known by the acronym FESNOJIV, referring to the format "Fundación Músical Simón Bolívar" ("Simon Bolivar's Music Foundation" abbreviated as FESNOJIV). The change of name expresses the transition from the original individually centred activity, to working under the state power (Majno, 2012). The colours of the Venezuelan flag in uniforms worn by musicians refer to the motherland of the musicians (Shoemaker, 2012).

All children and youths in Venezuela have the right to participate in the activities of El Sistema (Driscoll, 2013). Of the approximately 28.6 million people in Venezuela, more than one million children, youths and young adults are involved in activities with more than 200 orchestras operating, offering free facilities, teachers, instruments, and uniforms (Nowakovski, 2012; Slevin & Slevin, 2013). The idea of insolvency and easy accessibility is to remove financial barriers to getting involved in the music hobby, and by extension, into society (Lesniak, 2013). Music education targeting the whole community also aims to secure the classical music audience of the future (Burton-Hill, 2013).

In addition to criticism of the philosophy of action and educational grip, it is clear that Abreu's music education program as such cannot work across societies and states (e.g., Lesniak, 2013; Sæther, 2017). Questions have also been raised about whether any music education idea can be called an El Sistema music education program. El Sistema Venezuela was established in a completely different social situation than where subsequent programs in different countries have been launched (Quinn, 2013; Puromies & Juvonen, 2020).

Finnish El Sistema's Practice and Educational Philosophy

By Sistema Finland, we mean El Sistema's Finnish operating model and organization in its entirety. The Tempo Orchestra is an outward form of activity in the Finnish program, an orchestra in which participant children and youngsters play and perform, and through which their practical activities take place. Of course, being part of the Tempo Orchestra also includes other dimensions, in addition to just learning and performing music; social relationships, community and cooperative activity are an integral part of activities which are therefore not weighted solely on performances. Players are selected for the Tempo Orchestra in partnership with schoolteachers, as they are assumed to know their own students and their life situations best. When choosing, the teachers consider the pupil's enthusiasm, the number of existing hobbies, the need for communal activities and family support. The participant distribution aims to be equal in favour of gender as well as Finnish and immigrant background.

Tempo Orchestral activities promote, according to their own statement, the well-being of children through music and develop life skill aspects such as concentration, attention, self-confidence, and appreciation of others (Antal-Lundström, 1996; Anttila &Juvonen, 2002; Huotilainen & Putkinen, 2008). The importance of schools as a learning environment for social skills is central in Finnish society (Sistemafinland.fi). The group dynamics created by playing music together promotes equality and attachment to the school community. The action itself is also intercultural pedagogy: an encounter between two or more people who perceive themselves as coming from different cultures (Gustavsson & Ehrlin, 2018).

Tempo activities are driven by the idea that every child and adolescent have the right to receive pedagogical support for their growing up and cultural development. The instruction works to make all players learn the pieces of music played together well. However, the technical development of instrument playing is not the most important of the goals, but rather that the child attends the common practice sessions and is engaged in communal pastime activities with other children (Sistemafinland.fi) (see Picture 1).

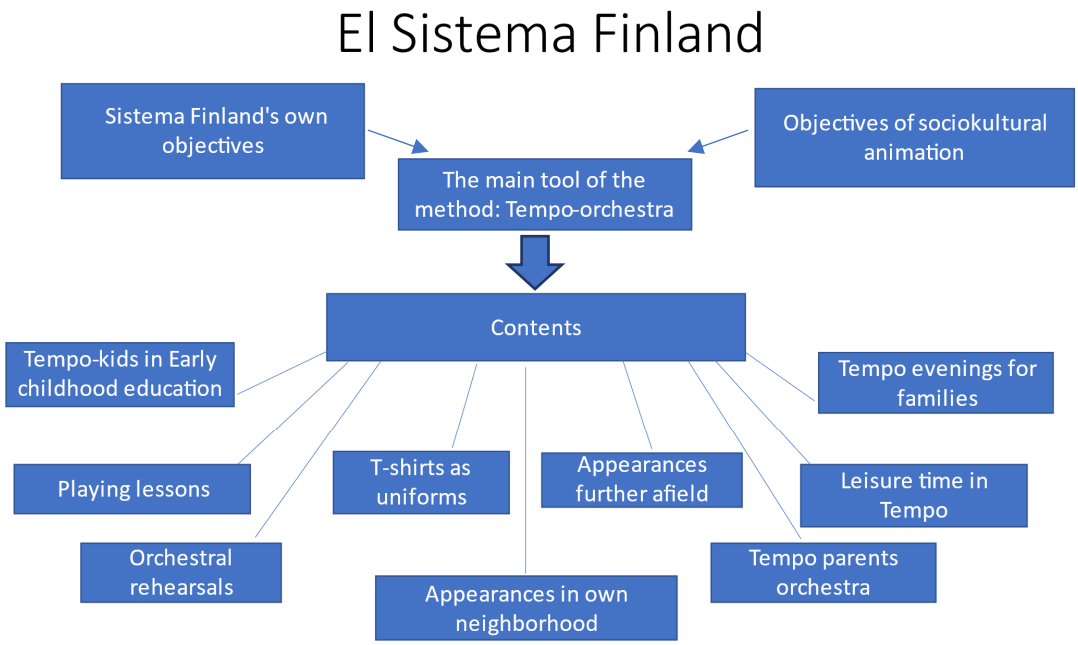

Figure 1. Aims, methods and contents of El Sistema Finland

Currently, Tempo Orchestras in Finland have about 130 players, with one orchestra being of ideal size – 24 players. There are schools from areas with much-needed low-threshold hobby opportunities which were selected to participate in the action.

Working Principles of the Tempo Orchestra

Abreu described El Sistema as being a variable system by nature, adapting to new conditions. It can be said that in equal measure Tempo Orchestra adapts to each school's own microcosm, seeking to reconcile its activities with the everyday life of the school. In the last two years, the Länsimäki School Orchestra in Vantaa, which we have

used as an example in this article, has been colored by the corona in all activities, the limitations, and exceptional conditions. The Tempo Orchestra has tried to run its activities despite the corona pandemic constraints. However, at least partly due to the COVID19 pandemic, participants have left the orchestra and the intensity and activity has significantly silenced compared to normal. Since autumn 2022, the Länsimäki School pupils have been able to choose the Tempo Orchestra as an optional subject. Instruction in the subject has been offered for 75 minutes per week. So far, no private instrument lessons have been offered to pupils. None of the interviewees in this study had yet participated in the "Tempo Orchestra as an optional subject" at the time of the interviews.

Usually, the orchestra's instrument instructors work in one school on two consecutive days a week. Each participant receives a 15-minute personal instrument playing class once a week. Each pupil's instrument learning occurs either during recesses or classes. In the event of class-based instrument learning, the school has been prepared to be flexible by allowing students to take instrument classes during the usual school hours. Each week, the Tempo Orchestra has two rehearsal sessions, one with a piano playing professional. Being accompanied by a pianist adds clarity of harmony and the right kind of feel to each composition. In addition, the playing becomes more engaging with an accomplished pianist backing the other players.

Teachers who give instruction in the Tempo Orchestra are either master's graduates, or graduates music educators and instrument teachers. There are also graduates of the Aalto Art University's Sibelius Academy. Teachers have thus also studied instrument playing education pedagogy and music education.

There are many ways to organize the teaching of different instruments. For example, the teacher of the viola also teaches violinists, and the cello teacher also guides the double bassists. This kind of practice is by no means strange compared with other institutions in the music sector, and the same is used in music schools and free education institutions, including teaching of woodwind instruments and brass instruments, in which one teacher takes care of the teaching of the entire group of instruments.

Usually, the day's instrument teaching hours can be held by 2:00 p.m.: orchestral exercises are positioned precisely at this point of day to avoid unnecessary waiting. Each player has two orchestral rehearsals per week. At 2:00 p.m., the so-called B orchestra is set at the beginning of the orchestral rehearsal, to refer to the orchestra of younger children, that is, the players who later began their hobby. They practice until 3:15 p. m. with warmup clips and songs. Then the A Orchestra starts, which is an orchestra of older and more experienced students. This practice also lasts for 75 minutes. Prior to possible joint appearances, the two orchestras rehearse together.

The Tempo Orchestra strives to perform at a lot of varied occasions, with an average of four of them each semester. Routine includes school concerts at Christmas and in spring for the entire school community. On top of that, Tempo receives invitations to perform and is happy to do so. The orchestra is an important activity demonstration channel for the city of Vantaa. It is invited to attend when ministers are present, sometimes down to foreign countries. Neighboring schools are also visited to perform.

Many of the interviewees had been participating in the *"Side by Side"* annual international festival in Gothenburg, which is a gathering of the El Sistema orchestras. *"Tempo Evening"*, an evening for Tempo families and musicians, meets once a semester in Vantaa. Swedish corresponding orchestral nights are celebrated once a week. The organization also runs the Tempo Parents orchestra, an orchestra for the parents of Tempo players, just for beginners. In the recent past, Sistema Finland has also started working with early childhood education. One kindergarten in Vantaa already revolves around an elementary orchestra and early childhood education workers are trained in El Sistema pedagogy. These will also be visited by the Tempo Orchestras of older schoolchildren performing and getting to know their smaller counterparts.

Previous Studies on the Subject

The El Sistema program has been studied from several perspectives. In their qualitative study (2016), Harkins, Garnham, Campel and Tannahill looked at the working of El Sistema in Scotland from a mental wellbeing perspective. The research setup was based on interviews, cartoons, and film making. According to the results, the activity improved participants' mental wellbeing in three areas. Getting involved in action and making music produced happiness and satisfaction. Being part of the orchestra created a sense of cohesion and security and produced interpersonal relationships that supported the action and its routines. The action was found to increase self-respect, self-confidence, and appreciation for being able to learn challenging musical skills and receiving plaudits for demonstrating his competence in orchestral appearances. The effects of operations were strongly linked to several factors, including conditions, program planning and quality of staff operations (Harkins et al., 2016).

Krupp-Schleußner and Lehmann-Wermser (2018) studied the long-term effects of expanded music education in German primary schools in grades 1 to 4. According to the results, children's attraction to music and its importance are more important to them than other factors in learning instruments and dedication to music. The program makes children more easily choose music-oriented classes and instrument instruction than their socioeconomic background would otherwise require (Krupp-Schleußner & Lehmann-Wermser, 2018).

Baker (2014b) is probably the leading El Sistema scholar and makes constructive criticism stating that the program does not actually do music education work, but instead teaches participants mainly to play the newly selected songs: it does not make musicians but players, participants become performers and as rulers of technology, not artists.

Rimmer (2018), meanwhile, longs for the children's own voice to be heard, which he considers having been completely overshadowed by other activities. Specifically, more attention should be paid to children's own experiences, according to him.

According to Hollinger (2006), the self-efficacy beliefs of children with the lowest socio-economic background conditions improved significantly with orchestral activity. Shoemacher (2012), meanwhile, noted in his study that social music education activities through orchestras (OrchKids and El Sistema) improve living conditions for

participants and their families by providing them with a strong sense of identity and belonging to the community. Each orchestra teaches children a sense of responsibility and a sense of belonging to a large international music community. Shoemacher (2012) notes, that teachers in the United States come from higher social classes than the participants, while Venezuelan teachers and students represent the same social class.

The Two Pillars of Socio-cultural Animation: Cultural democracy and cultural democratization

According to our main theory of socio-cultural animation (Kurki 2000; Lahti 2014) the general concept 'culture' has various semantics and can be roughly divided into three meanings:

- Elitist, for the few, high culture, civilization. A certain upbringing and education can open a door for becoming a cultural person;
- Each nation's inner-born own culture. The full scene of people's lifestyle, which makes all people civilized. Each cultural way of living separates people from other peoples;
- The culture that we create together. The initiative comes from the people. People take responsibility for their own lives and civility manifests itself creatively in living in their own humane existence, now and in the future.

Culture, in this case playing in the Tempo Orchestra, is not just a high-cultural privilege of the few and the chosen. From Tempo's point of view, music belongs to everyone, and everyone who wants it is given the opportunity for musical expression (Tempo Guide, 2021).

Cultural democracy reflects an individual's involvement in the production of culture. The aim is to increase cultural participation so that participants act as cultural producers. Cultural democracy is seen as an advanced view of culture. It means that culture is not just an embellishment of life or art of beauty, but specifically a structure of human behaviour. Therefore, all actors in sociocultural animation activities have a vocation to participate in it from the planning of the action until its implementation. Participation is therefore considered to be one sign of achieving cultural democracy. Cultural activity is primarily a tool to improve human conditions (Kurki, 2000).

Cultural democratization, on the other hand, aims mainly for the emergence of cultural dialogue. Cultural inspirers act as intermediaries between art and people with the aim of allowing as much of the people as possible to enjoy the products of culture. It is intended to reduce the gap in the population caused by different groups having different opportunities to gain access to education and culture. Cultural democratization has also been seen as a necessary step in moving towards cultural democracy (Kurki, 2000). Authors of this research reflected sociocultural animation and its occurrence in light in Figure 2.

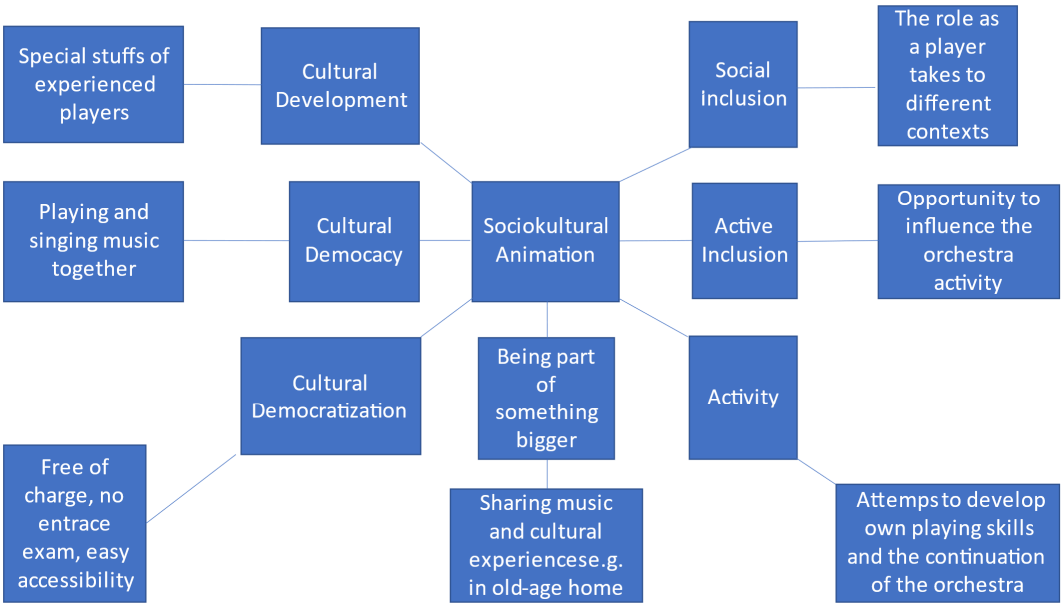

Figure 2. Socio-cultural animation and its occurrence considering this research's results

Social Pedagogical Starting Point in the Background of El Sistema

In social pedagogy, the subject of review is the social nature of individual growth and man as a social being. Social pedagogical theory combines the educational and social science perspectives by placing the focus of thinking on the examination of the overall situation of an individual or group. The goal is to integrate individuals and groups into society, to find their own place in society. The aim is to confront the grievances of society, to help the underprivileged and promote welfare, justice, social balance, individual freedom, social responsibility, experience, and inclusion of community, and prevent exclusion and becoming stigmatized (Hämäläinen & Kurki, 1997; Latomaa, 2007; Úcar, 2012). Social pedagogy defines education as a wide-ranging activity: the processes of civilization and socialization, and support for identity building. Social pedagogical thinking and activities live and evolve continuously within the sphere of influence of various concepts of human, social, morality and science and it can be seen as a social movement, scientific pedagogy, or independent scientific doctrine (Hämäläinen & Kurki, 1997; Nivala & Ryynänen, 2019) (see Figure 2).

Socio-cultural animation is a trend in social pedagogy that combines educational, social, and cultural activities, incorporating theory, ideology, methodology and practice. It has a long tradition of inspiring minority cultures in Central Europe and Latin America (Karppinen, 2005). Inspiring can be carried out with the help of various activities. Sistema Finland's music education and other activities are strongly motivated specifically by socio-cultural animation. The activities of orchestras, like all socio-cultural animation and motivation, are oriented towards increasing cultural democracy (Tempo Guide, 2021).

The cultural understanding of animation is broad: it includes elite culture as well as people's various cultural lifestyles, but in particular it emphasizes people's own cultural creativity in their own everyday life. Through their choices and activities, people create and develop their culture and their own future while living in and

operating in everyday life. Culture, in this case playing in the (Tempo) orchestra, is not only the high cultural privilege of the few and chosen – but music also belongs to everyone, and everyone willing is given the opportunity for musical expression (Tempo guide, 2021). We didn't directly ask our interviewees for development ideas, – we reasoned these ourselves. Social pedagogical research involves research-based development of social pedagogical activities.

The Research Question and Sub-questions

The main research question of our study is: *What experiences have the children and youngsters participating in El Sistema in Finland and playing in the Tempo Orchestra gained in terms of its different dimensions?*

To this main question, we are looking for answers using the themes which were picked up for the interviews as sub-questions. These included: a) the overarching memories of playing in the Tempo Orchestra, b) instrument playing lessons, c) appearances, d) family attitudes, e) freedom to choose self about their participation, f) interaction, g) mates, coping and managing, h) discontinuation of participation in the orchestra, i) cultural democratization, democracy, and development, j) being a part of something bigger – community, k) social inclusion, active inclusion, and activity as a continuation of community, l) music educational model or not? and m) negative dimension. The structural elements of socio-cultural animation described by Kurki (2000), and El Sistema Finland's own stated operational descriptions and objectives are mirrored through interview questions using the following perspectives: line of music education offered, community, sociality relevance.

Sample and Participants

In this article, we explored first-hand experiences of the action by children who played in the Tempo Orchestra. In addition, we examined the perspectives of the three structural components of socio-cultural animation in the implementation of Sistema Finland. According to Kurki (2000), they are philosophical-ideological roots, a methodological-strategic framework growing from them, and practical activities using a wide range of methods.

Method

The approach of this study is empirical: we interviewed the children who participated or had participated in the activity and analysed their interviews to outline their experiences. Our research is a qualitative case study in the frames of a phenomenological approach. As an ontological and epistemological pre-understanding, we believe in this study in human change and the power of intervention. Our method of collecting material was a retrospectively themed interview.

The target set of our research consists of children attending primary school (N=18) and three young people who have already left the primary school (N=3). Of those interviewed, 18 were of first- or second-generation immigrant backgrounds. There

were 17 girls and four boys. The age spread was from 11 to 16 years, meaning those attending school were 5th to 8th graders. The sampling corresponds to Vantaa Tempo's reality in terms of both immigrant background and gender distribution. For practical reasons, the interviews were carried out as group interviews and individual interviews. Some of the interviews were conducted face-to-face in attendance and some remotely via the Internet (see Table 1).

Table 1. Execution of interviews and number of interviewees

Interview Number	Present/Remotely	Number of Interviewees
1	remotely	3
2	remotely	1
3	remotely	1
4	remotely	1
5	present	3
6	present	5
7	present	1
8	present	4
9	present	2

Some of the interviews were carried out according to research authorization granted by the City of Vantaa and some according to the research permission provided by parents and guardians of Tempo pupils. Guardians of pupils aged 15 and over were informed of the study, when the youngsters themselves showed their willingness to participate in the research interviews.

We estimate that 21 interviewees are a particularly good number and the sample also representative (Nummenmaa, 2009); the interviewer (M.P.) felt that the material was already saturating at certain point. It is difficult to estimate the size of the whole population: from two to three hundred Tempo-players, approximately.

The interviews were carried out during a distance education period of primary schools and hobbies. From the music school in Vantaa, we received a list of players from the Tempo Orchestra and their guardians over the years with out-of-date contact information. Students who had already left primary school were selected from the list and all (guardians and youngsters) received an informative request for participation in an interview. As a reward for participation, a cinema ticket was promised. Eventually, 11 interviewees were found with help from two school principals and the interviews were conducted in a school setting. Six interviews were conducted in conjunction with the Tempo Orchestra gathering.

According to Eskola and Suoranta (2000), the group interview is suitable for use as either complementary or substitute interviews with individuals. A group interview is a good form of data collection when themes touch common experiences even in some respects (Sulkunen & Egerer, 2009). The issues under investigation are discussed with the interview team and with the interviewee at the same time speaking to several members of the group, but in between directing their questions to the individual participants. Pair interviews and punctual group interviews were also read as covered by group interviews (Hirsjärvi & Hurme, 2001).

In group interviews, interest may be oriented towards comments made by individual interviewees or the collective, jointly produced speech, reminiscence or meaning of the group. It is well suited for being the method used in the context of the study at hand. This type of reminiscences can be used, according to Hirsjärvi and Hurme (2001), when examining a thing or phenomenon that has happened in the past. Group interviews can be used to establish a common view based on what kind of speeches they use and justify their positions.

A traditional themed interview body is suitable for implementing a group interview, the themes of which the interviewer takes care of and considers that all areas are going through discussing. The use of a structured form is not suitable for this type of interview situation, as the conversation should be a free form. The size of the group should be carefully considered, as too large a group will complicate recording and may complicate the discussion. There may also be more than one interviewer, allowing the atmosphere to be more relaxed (Eskola & Suoranta, 2000).

In a group interview, participants may remind each other about certain topics or issues, contributing to obtaining the information provided by the interview. In the group, information is also obtained from many participants at the same time. If the group spirit is good, it may also contribute to supporting and encouraging more active participation in the group interview.

The method we use can be called 'Individual interview in a group situation' (Valtonen, 2005). We did not study the interplay between participants, group dynamics, or other similar phenomena in it. We brought children together primarily because we hoped they would be more courageous together to express themselves and help each other remember things that were experienced together.

It is possible to implement an interpretive, phenomenological objective in a situation that has been reassured only for the purpose of that discussion. In between, the interviewer played the role of an empathetic observer, in between becoming more actively involved in guiding the group more keenly in conversations (Moilanen, 1995). In the conducted interview situations, the raising of themes was natural and conversational, however, taking place under the direction of the interviewer. Dominance of strong personas in groups was avoided by starting shifts sharing (Kananen, 2008).

The themes changed to questions were presented as clearly as possible, based on a shared understanding and a world of experience. The concepts were defined well enough to find consensus. The scope of interpretation and its potential require a qualitative research strategy in this study (Sulkunen & Egerer, 2009). We evaluated the questions and themes of the theme interview to be validated in content, reaching the meanings that we seek to find with our research design (Hirsjärvi & Hurme, 1982).

The interviewees' experiences corresponded closely with the official descriptions of Tempo activities: ideal and practice seemed to meet, except for the cessation of activities at both individual and community level. The orchestras met twice a week, as soon as possible after the school day. Playing lessons were in the middle of the school day in between or during orchestral rehearsals, before or after.

Analysis as a Framework for Data

In the transcription of the recordings, the convention was to use a lexical and colloquial formulation (Kananen, 2008). The transcripts were initially read by the informant and several times. First, the data were thematised, i.e., raw analysis, which is a rough, thematic division of the data that outlines the overall picture (Ruusuvuori et al., 2010). At this stage, the Word text editor provided many good tools.

The next step in the analysis was a more detailed analysis that broke the boundaries of the original theming (Ruusuvuori et al. 2010, 18). Interesting metaphorical nodes were extracted from theories of socio-cultural animation and from the action goals stated by the Finnish El Sistema, to which this data could respond. At this stage, the Atlas.ti analysis software was of great help in managing and analysing the 228.7 KB of data.

The interviewees here were primarily children, and adolescents. But also, players, participants, and experts as well as witnesses (Alastalo & Åkerman, 2010). As researchers, we approached our research data with the understanding that every sentence produced by children and young people is important and significant. With such a small number of interviewees, it was not appropriate to produce quantitative or other statistical results. The content of the interviewees' quotes that are sampled by the reader are either truly general statements that synthesise all the responses, or they are particularly significant or exceptional.

Results

Here we review the results of our research through sub-questions, to perceive larger entities and answer our main question in as diverse way as possible. To begin with, we will look at the issues raised in the interview from the following perspectives: the overarching memories of playing in the Tempo Orchestra, instrument lessons, performances, family attitudes, freedom to self-choose about their participation, interaction, mates, stature, and cessation of participation.

A. The overarching memories of playing in the Tempo Orchestra

The overhead memories of those interviewed seemed positive. Young people spoke about their playing lessons, rehearsals and assortment of songs, particularly frequent appearances, and especially the journey taken together. Acting in an orchestra seemed to some at first nice and later boring.

> *"It was pretty nice at first. But finally, I don't know what, but it started to get a little more boring."*
>
> *"The best part was that trip to Sweden… when there were so many of us there. Other countries became those guys involved, then it was so funny."*
>
> *"At the top, I must have thought of the exercises."*

Based on what was said during the interviews, peer collaboration and togetherness played an important role in orchestral activities. Performances and tours clearly strengthened them.

> *"I thought it was nice when we were there for 'Side by Side'. It brought wonderful feelings to be with everyone. And travel because I've never travelled with friends, but I've travelled."*

> *"Our performances and we had a really good group spirit that everything got along really well with each other, that it was really nice."*

Naturally, the togetherness mentioned by many interviewees is likely to lay the groundwork for friendships and their emergence, one of El Sistema's original goals on the road to preventing exclusion.

B. Experiences of instrument playing lessons

Based on interviews, participants liked instrument lessons, and felt they learned a lot there, despite only fifteen minutes elapsing. The teacher taught new pieces, but often also the technique of the instrument, as well as the theory of music.

> *"It's something like 15 minutes, but you learn a lot during it."*

> *"The most in it is played and at the same time Anna shows us the techniques for playing the violin."*

> *"When you have your own class, you'll learn a little more, when it takes more attention to you, the teacher that it knows how to help you if you get a little wrong."*

> *"We went through notes and how to play it. Juha taught the technique, because that bow goes a little to the side and there, there is no sound, so Jari was in it, learning how it happens."*

Many of the interviewees compared their own learning in private lessons to learning in an orchestra and felt they learned more easily and more in private teaching because the teacher had more time to focus on each player in person, which is impossible when playing in an orchestra.

> *"When there is an instrument lesson, the teacher notices and shows how to play it better. It's been easier to play in the orchestra when you've got private lessons in instrument."*

> *"Solo playing was easier when you got more support from the teacher. Jari was able to help me more if I played wrong and we were able to start it again. In a big crowd, it was a bit harder."*

> *"I liked to focus on a single thing, which in the orchestra didn't necessarily work. But, as a whole, it was a nice experience for me."*

What's clear is that you learn more in private lessons than you do by playing in an orchestra. In fact, it is not very common for the beginning of the instrument playing hobby to even attempt orchestral play in a serious sense. In Suzuki and Kodaly teaching, group playing has been carried out with very small pupils with good success, but this approach involves co-playing and performing perhaps even more emphatically.

C. Experiences of appearances

Appearances are an important part of the pedagogy of the Tempo Orchestra. They increase the training motivation of players as well as their self-esteem (Tempo Guide, 2021). The musicians consistently felt the many performances in Tempo Orchestra had made them ready to perform and more audacity in other than Tempo contexts. Individual and communal experiences of success in appearances create a positive circumference that always encourages in new appearances.

> *"I have become even more daring, and I still want to perform in more places and it's nice to present to other people and I want to do more of it."*

> *"In a way when you learn, you feel so brave that you're doing it. There's going to be good self-esteem when you can call."*

> *"At the beginning, I can remember the first appearance, and it was pretty exciting because I had never been on stage or anywhere. But after that it started to become more fun when I got used to playing."*

When asked, we used the words shy and bold about the performances. They seemed to resonate, as the responses showed the causal relationship: shy at first, finally much bolder – as appearances became more familiar.

> *"Well, I don't know. At least you get the courage because if you're pretty shy, and there are a lot of people out there and you have to play, then that's why you get quite a bit of courage to do that."*

> *"I don't remember the name of the place, but I guess it was some school, and we got on the stage, and we played. And I have this kind of fear, and I don't dare appear before everyone, I feel a little bolder, I feel brave because I have that creep. Good for my creep. I felt that my social status was lifted, as we could later talk about prestigious appearances, when at the Music Hall, when in Martinus Hall or other such well-known venues."*

> *"It's hard to imagine if it hadn't been when it's been such a big part of my life. But I'm sure I have gained some self-assurance, so that it probably won't be as thrilling when I go and make other appearances."*

Being in a large orchestral line-up was safer than even in the Tempo Quartet. But it is an exciting and accurate work to play in the orchestral composition, especially with the claims of classical music and uniform playing. On the other hand, a good rehearsal with your own orchestra leads to a good performance.

> *"It was nice when we started performing, but I got scared if something went wrong. When you've done quite a lot of performances for lots of people, I start to freak out if I'm doing something wrong in it, some notes, because there are quite a few notes that I should practice. I don't know how the appearances affected me."*

> *"I feel brave to perform in front of people these days. But still, I'm scared that I'm playing the wrong notes, or starting wrong."*

The fear of playing wrong seemed to play a pretty big role in the pupils' speech, so it seems that the importance of playing correctly has been particularly targeted in rehearsals.

D. Role of the players' families

Tempo also aims to activate the participant's families and help them integrate into society when there is a need to do so. This is the question the children of their families answered both as experiencers and experts.

Family support was perceived as being important, and the musicians enjoyed it. The support received is not play-technical, as this sample of respondents did not show the musician parenting which is typical for instrument players. Support takes the form of encouragement, participation, buying a music stand and transporting the children to and from rehearsals (as instructed by the Tempo Guide). Both parents and children feel conscious about the non-aesthetic benefits of playing. The action has clearly activated families and created networking opportunities for those who crave such. Grandparents' involvement is also mentioned. The action traditionally reflects a good childhood. You can find experience respectful to Tempo from interviews.

> *"My family came on some evenings when they have something to do and stuff. And they encouraged me to continue in Tempo program much longer. And they support me and everything. My cousins were there, and when my parents were there, they hung out with the others."*

> *"My father always came to our concerts to listen and see. And this Tempo... this Tempo has brought like, for example, me and my brother sometimes play songs together and my father sometimes listens to it. The family went to "Tempo nights", they almost always visited then. Father got a couple of new friends when they started talking there and we played and sometimes they just started talking together."*

> *"In a way, my family likes when I play. Because the brain develops, and it helps a lot with things. And I learned more things. And itis also nice, for me."*

> *"Yeah, my parents supported me in the violin playing, but they didn't go to those "Tempo evenings" whenever my grandma and grandpa go there."*

E. The freedom to choose for themselves about their participation for the day's activities

The model of socio-cultural animation (Kurki, 2000) supports people's freedom and self-initiative at individual and group level. Based on interviews, children and youngsters seemed conscientious. Tempo seemed to have succeeded in its goal of acting as a regular hobby in the child's everyday life. Children are also motivated by feeling important: the task in the orchestra waits and obliges in a positive sense. Based on the interviews, orchestra staff was visible during the school day, which also motivated going on with orchestral activities. The motivational activities of the action supervisors were noticed, and they seemed to work well.

> *"It was somehow, like you got used to it and that you had to go there and didn't feel like obligatory to go there, but it was my own will, and that it was really funny to see guys and all this stuff."*

> *"Sometimes it was the case that when the Tempo starts like at three o'clock, the school days ended at two o'clock. I was so much like tired, and I couldn't go, but I still went because I remembered that I learned new things. I'm gonna play my instrument and I have to be brave."*

> *"If I'm tired, I'll still go to Tempo. I'm not gonna go to Tempo when I'm sick. But I try to go to Tempo even if I am tired."*

F. Interaction between Tempo actors and participants

Tempo adults were generally considered to be more relaxed and comfortable compared to adults at school. The necessary maintenance of order at Tempo was also successful.

> *"Those adults out there were really supportive and motivational; it was really nice to play together when we had that good group spirit."*

> *"They're calm, but it depends if you run around too much and you don't focus on playing, even if you wanted to come there in the first place. And sometimes they do not speak normally, but they try to help you, so that it is worth focusing on music this time. But they are otherwise calm."*

G. Social skills and mutual partnership between children of multiple backgrounds

No bullying occurred during Tempo action. The structure of the action was also nice, as everyone could participate. Many friends of the players have followed their example with enthusiasm to try playing in an orchestra but were not permanently involved in the activity. Continuing participation requires a strong commitment. Committed players also received certain respect as orchestral instruments are demanding instruments.

> *"At least I got some friends. I'm still on such terms with some people that I'm talking to them. Those of my own friends who didn't play in the orchestra wanted eagerly to come along and play. They came along sometimes went to practice, but they never became permanent members."*

Almost all interviewees reported finding new friends from Tempo – or at least getting to know new people. Playing together and sharing experiences forms a large part of orchestral activity.

> *"I have not got friends from Tempo, but I've gotten to know people there that through Tempo."*

> *"Friend stuff is going pretty well. There have been a lot of friends; at least almost all Tempo members are my mates. There have been no nasty comments from others, everyone is friendly at Tempo."*

If no attention is paid to the structure of the group, the environment may become harmful for someone in a solid community may experience being closed out (Salminen, 2021). Tempo starts at the same time for everyone in autumn and children come from the same annual level, and from the same school. In that sense, too, the system is a little peculiar.

H. Discontinuation of participation

After finishing elementary school, continuing to play in the orchestra has proved impossible for many. Many of them had a desire to continue, but it was not possible to organize rehearsals. Many respondents said they wanted to continue but had been left waiting. For some, the music playing could go on continuing in the secondary school, for some it was not possible.

> *"The reason I had to quit was that I left primary school and there was no longer that opportunity in middle school. As I remember, I still asked the instrument teacher if it was possible to get to play when I was in 7th grade, but he said that all the places for players had already been taken at our school and that he couldn't really help. He said that he would call if there was a place for me, but I never heard anything from him. But I'd love to play music if I could, but..."*

In some cases, the action of an entire orchestra ended for some reason.

> *"I didn't really want to stop playing, I didn't stop it, but because all the other players stopped participating in the Tempo, program and then there were only me and two others left. The teacher came to tell us that we would not be able to play anymore, because there were so few of us left. And then we stopped doing it to it. This happened this year, in the sixth grade."*

Sometimes it took so much time to undertake other hobbies that there was no room for orchestral activities. For some pupils, participation was complicated for schedule reasons, which is understandable when a secondary school student tries to participate in the elementary school orchestra. Also, school homework became more difficult and took time, such as studying one's mother tongue was mentioned. This is particularly bad, as it is for students from multicultural and multi-background pupils and to promote the opportunities of their lives that Tempo has been established for.

> *"Now in COVID-19 times, I only play in private. I don't get instrument lessons. There is no organized orchestral activity now. And I should stop because I've been playing too long, and it takes too much of my studying time. Still, quitting feels a little strange, because I've been playing for so long and I've got used to it. It's weird when you give up something. It depends on the age. I've just played too long. The teacher gave me a lot of time to play there and now I've done it a long time. And now it, it goes over my studies, there are going to be too many tests, and I don't think I'll have time to continue playing anymore."*

> *"It was like…that… it was nice, but it wasn't my thing, because I had other stuff anyway, I had to study a lot. And I wanted to get home earlier, so music playing me wasn't really my thing."*

Orchestral activities carried out remotely during the COVID-19 period took the base from playing together and the motivation from future appearances. Although the operators of Tempo managed to carry out the operation during the pandemic period as well as possible, even this form of animation could not prevent those who were dropping out of action due to the exceptional period.

I. Cultural democratization, democracy, and development

Tempo represents the democratization of art and other animation activities in its purest form when it provides the participants with a unique opportunity to do something, join something, and enrich their leisure time with something which is perceived as being important, and receiving significant experience from it.

> *"It was a nice and interesting experience because I had never played anything in my life, so it was a new thing to start. The trip to Sweden was the best experience."*

> *"Lovely hobby and good that it's free and that everyone can participate."*

> *"I played for six years; it began at the same time with the schools starting. I went to Tempo as soon as I started school. I left it after the sixth class. Now I'm in high school. Middle school went without Tempo, so there was no orchestra with which I could have gone to play."*

Instrument playing as a hobby without the context that Tempo brings doesn't really seem to stay constant. This is one of the reasons which makes Tempo a unique base for a hobby.

> *"Well now I don't play anything, but I listen to music. But I might play later, I'm not sure, but I just might play a little as an adult, but I'm not sure. It depends on my school and so… But just now I don't plan on playing or anything."*

The parents and guardians of respondents seemed to be happy considering their children's experiences that their child is engaged in playing an instrument in an orchestra. A big appreciation of the hobby opportunity appears through children's perceptions.

> *"It was just a big thing for them that I started playing something and started a new hobby because it's not such an easy thing to start a new hobby. Music playing was a big thing for my parents."*

> *"Yes, my family came to my concerts and that way they tried to encourage me. They always said I should play cello, but I didn't practice much."*

The encouragement and other motivation of instrument teachers was shown in the responses of interviewees, playing music is one way for art to reach every one of us.

> *"They always tried to motivate us. They always said positive things, so they motivated and encouraged us, and then yes it all went better this way."*

The music school was known to be a little bit different from Tempo as the entrance was not free. In fact, the cost was quite high.

> *"My teacher said that if I want to continue playing in the junior high school, then I should move to a music school and it is subject to a charge, which makes it a different matter."*

> *"If your parents can't afford to take you to hobbies, then Tempo is one to which parents can take their children for free."*

Audience education is also a part of the democratization of art.

> *"I think that all our gigs were really nice. Often, we played only for our own school, but sometimes we made trips to Helsinki, somehow a little bit bigger journey. I think it brought up this orchestra in a nice way. At least I didn't know what this orchestra was like before, and many of my friends had never heard of it before I told them about it and participated in Tempo program myself. I thought it was nice to get visibility for our orchestra."*

> *"It was pretty nice to play with friends. In rehearsals everything was played and sung. And then we always went to play for others, to another school and show people how we can play."*

Based on this research material, it can be stated that Finland's El Sistema is at the stage of cultural democracy in cultural development (Kurki, 2000). Music is played (and sung) together as a solid group. It means not only giving and getting a taste of something sublime and beautiful coming from above, but also implementing culture with strong participation. The next step in this continuum is to create one's own new unique culture together – cultural development.

J. Being a part of something bigger – community

From point of view of an adult, community is one goal of socio-cultural animation, being connected to something bigger (Kurki, 2000) can appear in something as insignificant as visiting another school in rehearsals. However, for a child it can be a big leap and practice to how making music can open doors.

> *"I played as long as my friend did. The last time I played was maybe a year and a half ago in Tempo Orchestra. I'm now in the first class of high school. I played at the same school with some primary school kids. We owned something significant that we could carry forward."*

> *"The old-age home concert stuck to me because the listeners were happy, and they also felt good when we played there."*

> *"I thought the funny things at shows were nice, especially when we went to perform somewhere, because we are children, so somehow that childlikeness brought it more to the fore. And those songs, then they were more aimed at children. It was nice to bring some vivacity into it, that it wasn't just that playing. That brought something extra into it."*

Appearances differed from a wider inclusion in society. After an appearance, an opportunity is sometimes offered to get to know the context more deeply and it is appreciated. In those situations, the participants experience community spirit, there is something special taken and given.

> *"Was it in Heureka Center? Yeah, and Martinus Hall. When we performed in Heureka, we got free tickets to go in Heureka and we all went there. In the Martinus Hall we went many times to play when people come and go all the time, so we played the same at a concert several times. And we were videotaped, and pictures were taken. We got some good cake."*

The feeling of being a part of something bigger than just a physical space, was also observable, including a contact with other languages and cultures. And the idea of being united in one's own language and culture, united with other countries and everyone's former or other homelands could be sensed in many interviews as well.

> *"We had the Dear-Jaakko song, which was old and known everywhere. Then we also used different languages, for example, Turkish and Russian, in songs like Uskudara and Katjuysha. And we also sang during our performances."*

The community singing builds togetherness and cohesion in a group of people. Estonia's independence and South Africa's breaking away from racial segregation policy are good examples (Salminen, 2021). When mere joy of singing together has such impact, we may ask what could be achieved with deliberate sociocultural motivation.

K. Social inclusion, active inclusion, and activity as a continuation of community

Interviewees raised things such as music participation, facilitated arrangements as needed and above all when they requested it. They could also participate better when they got personal assistance in music playing.

> *"Also, it depends again if you suggest you would like to play something easier. Sometimes those kids who have just started are given an easier version of the music, and then they learn to play it too."*

> *"If I ask teacher if we can play something he easily finds something to be played. Or if you don't know how to play a song, then he will make you an easier version of it. Then it is not too difficult to play."*

Courage, such as traveling without a family for the first time to another country, represents an active grip on life.

> *"I thought it was nice when we were in the Side by Side gathering. It brought wonderful feelings to be with everyone. And travel because I've never travelled with friends, but I have travelled."*

During the playing season, Tempo teachers do not give homework, but they recommend playing at home and it also happens. The participants recognize the benefits. This can be considered to represent activity and commitment to the hobby.

> *"I'll play between a rehearsals (at home), that's why I'll learn a little more to play."*

Interviewees might have recommended Tempo as a hobby that adds both learning and activity to life. They are also glad about the whole achievement to be free of charge. The respondents have also understood that what is needed is a real interest in music, too.

> *"If you are interested in music and musical instruments, then it is worth coming to Tempo."*

One player of the orchestra, which ended its activities because of the lack of participants as they went into higher grades at school, tried to entice his quitting buddies along so that the orchestra could continue. Unluckily she failed in it.

> *"I tried so much that I could get those who quit starting playing in an orchestra again. I tried to create a good feeling for them to come. I told the teacher that I would love to continue playing, but he could not help with it because there were too few players. If I wanted to continue, I would be alone, and all the rest would have quit."*

Activity in terms of playing may also be increased by a sibling still playing in Tempo Orchestra or having at least one parent active in music in some way. Also, having your own or a sibling's orchestral instrument borrowed from Tempo would increase the playing activity. Of course, the decline in a playing skill in case of playing a demanding instrument was noticeable, which weakens the activity in playing at home.

> *"I quit because I'm focusing now on school and football, and we only have one violin at home and it's my little brother's. I tried to play it a month ago, but my skills were lower."*

> *"... Me and my brother sometimes play songs together and my father listens to it. The family came to Tempo nights almost every time they were organized."*

Tempo has also successfully motivated its players to the education offered by music schools – playing has continued when support has continued. This shows that it is possible to move into music education and even start playing other instruments applying the basic skills gained in Tempo Orchestra.

> *"I'm trying to go to music school. I've done the entrance exam, but the answer has not yet come back. I am waiting for the answer. If I can get there, I'll probably finish playing in Tempo, but I'm not sure. The entrance exam went well, yeah."*

> *"And we played Beethoven. Once I played for Elise on the piano."*

> *"Oh, you can play the piano too. Yeah."*

Participants who have already ended their careers at Tempo Orchestra are sometimes asked to join in random Tempo appearances. The message which is being passed on is probably: you have the skill and now you are needed, which means you still belong to this crowd.

> *"When I had already left, I was invited to play in one of the orchestras."*

> *"I played the double bass. It was when we had a Christmas show at our school, then someone had to play bass, and I played it then. But since that I have not played anything. I sometimes went to listen to Tempo at school."*

Salminen (2021) reflects on choral pedagogy with 'new eyes', aiming for inclusion and artistic quality, balance between choral activity and empowerment, a sense of communality and belonging, together with security and strengthening cultural capital

in continuing harmony between related endeavours. The constant balance aiming to spiral the growth lies in between the above objectives.

In the responses, the pleasure of being able to participate in the selection of the song to be played and performed was highlighted. However, the flip side of the phenomenon is that only a small, extroverted group is usually involved in the selection of songs. This group gets through their own favourite songs. How do the quieter ones feel about the situation? We may ask if cultural capital and having a sense of security disappear from them. Also, the use of a common limited time requires balancing and ingenuity between management and inclusion.

L. Music educational model or not?

The lines and features of educational pedagogy and thinking behind the Tempo Orchestra activities can be picked up from the stories of respondents, when analysing their experiences of activity practices. El Sistema orchestral activity cannot clearly be defined as a music educational or pedagogical system or model. Still, it has certain elements which justify calling it an activity which has a social education approach in music. Pedagogy used in Tempo Orchestras contains dimensions and targets of social education, which seem quite suitable for Finland and in this case, Vantaa.

When conducting interviews for this research, Tempo's distance learning time was fresh in the minds of the interviewees. Still, our goal was to perceive an image and conception of on entire Tempo period, including pre-corona time when analysing and interpreting the respondents' answers. During the remote activity time, private instrument lessons were offered remotely via social media. In place of orchestral music making, the time meant for playing together was spent learning music history and theory (oral comment of Juha Ahvenainen 5 January, 2021). The practices of the derogation time also reflected in the respondents' comments.

> *"This year, some of individual lessons were held using Zoom. Some pupils had their lessons in the middle of the school lessons and some during the breaks. There we played alone with the teacher."*

Both orchestral rehearsals and personal playing lessons focused heavily on the pieces of music played in the next performance. The performance experience is harmonizing and forward-looking when the musician knows the song to be presented by heart. In such a case, the appearance can be enjoyable also for the performer. The time for a guided training in Tempo activity is limited and the procedure is not based on training a lot at home. The participants understood this too, though practicing the same pieces of music week after week may have been boring.

> *"In principle, the rehearsals were a little difficult, because every time we rehearsed the same piece of music and some of us didn't have the strength to do it, but we have to learn it and play it well enough to perform."*

> *"If you've played normally and regularly in your orchestra and you're going to play in the concert, then you feel OK, there's nothing serious about it or anything to be afraid of. If you have been practicing and you can play your part well, then it's all right. Yeah, and if you are playing for the first time in a concert, then it's going to be serious and you are afraid of everything."*

In El Sistema orchestras, it is customary for instrument instructors to accompany the children in rehearsals according to the situation, and often in appearances. Music making must not be too exciting or frightening. The experience should be positive, successful and the situation safe. Interviewees unanimously perceived this as a good practice. The orchestra playing together compared to solo performance was also perceived as an empowering factor.

> *"It's nice when the teachers are playing together with us."*
>
> *"I felt more supported when I saw some friends playing with me too, I wasn't feeling lonely."*

According to responses, the program for the concert performances is carefully learned by heart. It is built in such a way that it operates on both in national and international contexts. Older players or children who have played longer can also express an interest regarding the program to be played. It is a natural trajectory from the elementary level to continuation.

> *"And when we were older (we could hope for the songs), so teacher's brother made us some arrangement from a song that we had hoped for ourselves. I thought it was a good song. What song was that? I don't remember its name."*

The basic idea of Tempo Orchestral work and the whole activity around El Sistema is built on a joint and solo playing; they are the elementary and most important starting points. Without the participants' own instrument playing lessons, no orchestra would work. Instrument lessons were perceived as being very important in supporting the joint orchestral playing in the background.

> *"I also liked how I could focus during personal lessons on a single issue, which we didn't necessarily have time enough to look at in the orchestra. But individual lessons were a nice experience for me."*
>
> *"Those private instrument lessons were good, because then that teacher had more time to advise and learn, and it left us with good vibes. Still, quite rarely, they were perceived as being heavy or dull."*
>
> *"I didn't like playing classes when they were pretty boring."*

Baker (2014b), in his study *"El Sistema Orchestrating Venezuela's youth"*, criticized the way El Sistema Venezuela embodies musical education as being equal to rehearsing the works performed in an orchestra.

This is one of the reasons why El Sistema cannot be called a defined music educational system, but rather a way to carry out social education aimed at integrating immigrants into Finnish culture and way of life, and to prevent the marginalization of certain children and youngsters. Through the experiences of the interviewees, we surveyed whether the same phenomenon and basic problem of learning only the pieces of music which are performed also occurs in El Sistema in Finland. We found that, to some extent, music education also takes place, especially during the COVID-19 distant education period when the orchestral rehearsals could not be held. The instrument

lessons also included other ingredients in addition to music, which was played at performances, that is, rehearsing the piece to be performed.

> *"We practiced technical solutions and right finger positions too. Also, how to hold the violin properly so that the left hand goes to the right point. We also practiced new stuff, and we weren't just practicing one piece of music in the practice lessons."*

> *"Mostly we played and at the same time the teacher showed the techniques of how to play the violin. I always try to use the right technique when I play, as it helps me to play violin the right way."*

The fact that the young player is told about the piece of music which is to be played is an elementary music education, putting it on a music-historical map and opening eyes to the internal events of the music. Still, the total number of hours spent on parts of music education (like music history, music theory or music analysis) other than the instrument's basic technique (like how to hold the instrument, the position of hands and fingers, and other basic elements) are represented too poorly to describe the Tempo Orchestra activity as a general music education model.

> *"At least in my opinion, before we started playing, we were told a little bit about the piece of music we were about to play. And then we practiced, sometimes with the teacher individually, sometimes all together as an orchestra. We didn't get a lot of information about everything we played, but sometimes something was explained to us."*

> *"Sometimes we were told about a song, something specific and so. But I don't think much was explained about every song."*

Sometimes, the meta-level of the orchestra and the repertoire were learned by players in the appearances when explanations about the songs and the orchestral instruments were given to the audience. Of course, this is positive and can be strongly supported as an idea, but it does not meet the requirements of a model for music education on the whole.

> *"During the lessons we were told that this and that song are going to be played at that concert. Then we just rehearsed them properly to be able to play them well at those concerts. The audience was told where and by whom the music had been composed."*

Tempo Orchestra playing is an activity that is complementary to the elementary school curriculum of music education and basic knowledge of music eras in Western art. The foundations of music theory and the music of different cultures can be assumed to be obtained from school. Only limited time is available for the social music approach represented by Tempo activity in the Finnish school context. Still, there has been extensive research which has shown that pupils in the Finnish elementary schools do not acquire these mentioned basic elements of music (or music education) during school time. This means that Finnish teenage students still lack a lot of musical knowledge (Huhtanen & Hirvonen, 2013; Kosonen, 2009; Vesioja, 2006).

Sometimes the music pedagogy offered in Tempo also seemed to be personified by the conductor or the instrument teacher, which is quite natural. Hsu (2017) highlighted this in his study *"El Sistema USA: An exploratory study of the pedagogical approaches in beginning violin classes the lack of clear uniform string instrument pedagogy in El Sistema applications in the United States"*. Everything depends just on the teacher (that is technology, theory, or playing guidance).

> *"The first two teachers taught me only the songs we were going to play or perform, but then my third teacher, sometimes taught me not only the songs that we were going to performance, but sometimes also the technique of violin playing. That is, a little more technique and note reading and a little more theory stuff and things."*

Among other things, Hsu recommends a carefully and professionally prepared method of peer teaching, alongside the Classroom Assessment Techniques (CATS method) as single uniform violin pedagogy. The CATs method includes the following:

- The Background Knowledge Probe (a short, simple questionnaire to students at the start of a course designed to uncover students' pre-conceptions);
- The Minute Paper (this asks students *What was the most important thing you learned during this class?* and *What important question remains unanswered?*);
- The Muddiest Point (ask students *What was the muddiest point in teaching*);
- The What's the Principle? (this asks students to define the principle that best applies to each problem);
- Defining Features Matrix (use the matrix to identify which characteristics are giving your students the most trouble).

N. Negative dimension

A small number of interviewees brought to light the unease that occasionally occurred during rehearsals, which resulted from the participants' fatigue. The players just were not able to concentrate, and then Tempo teachers had to raise their voice or otherwise show their harshness to normalize the situation. These statements were uttered in an understanding atmosphere towards the teachers.

> *"It was just one of those days when you were too tired and couldn't learn new songs and everyone was restless and feeling uneasy, but it was just a couple of times, not very often."*

> *"Those Tempo teachers are calmer than the usual teachers at school. They are also kinder and don't shout that much. A couple of times the teacher had to shout because almost no one listened as everyone just spoke, and it went on and on."*

Booth (2011) names as one of the cornerstones of El Sistema's idea of "Sustaining the dynamic tension between polarities", the extremes being order and chaos. Maybe this illustrates the situation which the pupils described in their last few comments.

Conclusion

Most statements about the Tempo Orchestra were positive or neutral in nature. The objectives of the action were reported to be bringing out good points of view about the growth and development of participants. The practical solutions of El Sistema in Finland work mainly according to the plans. Similarly, the elements of socio-cultural animation can be mirrored in El Sistema in Finland. There were inconsistencies and clear places for improvements in Tempo Orchestra's practices and ways of working, especially in the various processes leading to stopping participation in orchestral work. A range of resources, both financial and mental, should be adequate for both individually controlled starting to play the instrument as well as concluding with the orchestral performances.

Reflection

We will consider the reliability of the research including the significant experiences obtained and believe that the interviewees, knowing that the researcher knew the teachers and other staff of the Tempo activity, had no impact on their comments and their reliability. The first author's (M.P.) position as an interviewer (Pöysä, 2010) was not to be seen as an ally of the director of operations, but sooner as a friend of the Tempo Orchestra. We also believe that conducting some of the interviews at school did not produce any negative effect. This is because some of the interviews took place without any institutional context, and some of the students are no longer involved with Tempo, so there was no need to speak more glowingly about Tempo than what is true (Cocks, 2006; Ruusuvuori, Nikander & Hyvärinen, 2010).

The interviewees representing different ages made the data rich. Due to the temporal perspective, the depth of responses was more specific considering older respondents compared to younger ones. The younger respondents offered a fresh and unfiltered point of view on their experiences, and although the interviewer tried to keep up a positive atmosphere during the interviews, she still verbally confirmed the importance of speaking about all kinds of experience. There were no right or wrong comments in the interviews. The only clear development target according to the results was ceasing to play in the Tempo Orchestra. When children are offered an opportunity to take part in such a large, expensive and demanding program with personal and social targets, an adult must bear the responsibility until the end of the whole activity.

There must be enough resources for Vantaa's flagship Tempo Orchestra and every participating child's needs for playing a musical instrument must be satisfied. Social pedagogical research always strives for solutions and at least for the development of issues. Next, we present a list of things for the development of which an immediate solution should be found, so that to make the Tempo activities more functional and more effective:

- Easy versions of pieces of music should be used in all children's and youngsters' orchestras to make it possible for every child to participate in a common music making in an orchestra. They should experience the joy of playing music together at the level which their skills allow at that moment. The

same should also be possible for those who start instrument playing in an older age. This idea works nicely in the Tempo Orchestra;

- Tempo's solutions at the time of COVID-19 isolation were inventive, creative, and aimed at music educational targets. The children in the orchestra didn't feel abandoned;
- Problems caused by the school's schedule were mentioned as making the continuation of playing in the Tempo Orchestra difficult and among other things, participants' own native language classes were mentioned (problems were also caused by special education lessons, Finnish as the second language, and lessons in the pupil's own religion). In the Vantaa Tempo Orchestra participation is one of the optional school subjects. Then it would be a pupil's own choice, and not as an obstacle to any other important school subject. This is already working as an experiment in one of the comprehensive schools in Vantaa;
- Running an orchestra for a heterogeneous group of children requires a lot of adults, not just instrument teachers and music educators. The employment of workers such as school counsellors and practical nurses would be appropriate, for the start, end, and transition of orchestral activities, for breaks and for travel to performances. The individual needs of participants, both as players and as participants in general, would thus be better considered. Tempo could serve as an internship for social work students. This is already in the process of being done.

The student lists of art focusing high schools contain names of native-born Finnish pupils. The path from baby music schools to art focused high schools and universities is not available to everyone in the same way. This obstacle is the gate which the adults in our mainstream population should be trying to open. Children with immigrant backgrounds showed great motivation to learn and develop in this study, also enjoying great support from their families. The school as an institution was also appreciated and not taken for granted. The orchestra could gain added value when operating in a school context, but it was still based on voluntariness.

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SKILL LEARNING DURING AN ASYNCHRONOUS MUSIC E-LEARNING MODULE

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Abstract
Learning musical skills is often associated with face-to-face teaching. Few studies on musical skill learning through asynchronous e-learning have been conducted; however, the demand for e-learning has increased due to multiform learning and individual education paths, unrestricted by time and place. This demand is the basis of this research. The focus of this study is Finnish classroom teacher students' skill learning, learning processes, and learning experiences, while studying music independently through e-learning. The research method is an intensive case study with six students. Their learning diaries were analysed using a data-driven content analysis.
Background factors were musical interest, skill, education, and attitude. During the research, a hypothetical cyclical model of the skill-learning process was created. The assumptions are: Knowledge of music theory improved singing and playing skills. E-learning supported the pedagogical readiness for teaching music. Joy of learning, positive experiences and impacting the learning of oneself reinforced the students' self-esteem, belief in their abilities and excitement for lifelong learning. The knowledge gained can be applied for developing similar study modules, recognising processes guiding skill learning, creating strategies for guiding learning, and for developing methods for skill creating.
Keywords: *Classroom teacher education, e-learning, music education, self-regulation, skill learning*

Introduction

The number of students enrolling in online modules has increased (Seaman, Allen & Seaman, 2018), indicating a need for interest in e-learning. E-learning has been studied, for example. In relation to adult pedagogy (Ikävalko & Raiskio, 2019; Immonen & Veinio, 2019; Rautiainen at al., 2021), it has particularly been utilised in blended learning, along with face-to-face teaching (Hubackova & Semradova, 2016; Dziuban et al., 2018). The demand for e-learning increased during the COVID-19 pandemic, creating challenges in organising and implementing university teaching.

During this time, students experienced great changes in their lives and learning structure. The ensuing restrictions resulted in teaching and encounters becoming increasingly web-based (Daubney & Fautley, 2020). The restrictions, the increase in distance teaching and the hybrid methods enhanced the challenges related to organising instruction, and were damaging to the welfare of teachers (Holzer et al., 2021; Mäkikangas et al., 2021; Thorgersen & Mars, 2021).

Guiding music learning processes via e-learning are challenging (Daubney & Fautley, 2020; Shaw & Mayo, 2021). The learning of skill occurs through the experiences and learning processes related to the different phases and repetitions of practicing (Ahonen, 2004). In addition, creating music is often associated with communal activity and interaction (Pääkkönen, 2013). The pedagogical skills of a music teacher impact the students' learning results and development of social relations (Bastian, 2000). Similarly, motivational teaching methods improve students' commitment and success (Cents-Boonstra et al., 2021). Therefore, new pedagogical modelling is also needed in areas that seldom engage in e-learning. In this study, a novel way of evaluation skill learning has been created in which the guide of the learning process was also a learner using the e-learning material for music.

This study examined the experiences reported by students while using a newly developed music e-learning module. The study's focus was restructuring a music class based on face-to-face teaching (2 ECTS = European credit transfer and accumulation system) into an asynchronous (100% independent) music e-learning module. For *asynchronous* e-learning modules, it is distinctive that the learners work in a self-regulated manner, discovering and analysing information. The studying can be done anywhere, and learners and teachers may never encounter one another in real life (Belanger & Jordan, 2000; Haavisto, Kivipensas & Tervo, 2012; Allen & Seaman, 2014). According to Ruippo, (2003, 2006), asynchronous learning is seldom utilised in music because creating music is naturally done in communities, and improving skill learning is generally socially guided. Contrarily, during *synchronous* e-learning, the teacher and students can model and imitate each other, share videos and other materials and discuss current issues in real-time (Belanger & Jordan, 2000).

The goal of the e-learning module was to improve the students' knowledge of music theory and instrumental playing, such as using the piano, the ukulele, the guitar, the bass, the drums, and vocals. Because this is the first time an e-learning module has been implemented in the Department of Teacher Education, there was no prior material available. Thus, the e-learning material, containing video samples, texts, pictures, and web links, guiding the learning process, was created with Moodle chosen as the learning platform.

The module was implemented for the first time during the summer term of 2021 and after completing the module; students uploaded video samples of their singing and instrumental playing, and completed a test on music theory administered via Moodle. Six classroom teacher students were chosen as the study sample and they provided informed consent to participate in this study.

The objective of this study was to gain knowledge of Finnish classroom teacher students' experiences in related to skill learning, learning processes and learning outcomes while completing a music e-learning module. The research questions are based on the constructivist learning phases outlined by Tynjälä (2004): a) *background*

factors, b) *learning processes*, and c) *results*. From this perspective learning is an all-encompassing process during which these phases merge with one another to impact learning (Tynjälä, 2004). Learning processes describe learners' actions and learning. This process is influenced by the learner's background factors and the interpretations made based on the learning environment. The third phase involves evaluating the knowledge and skills acquired through the learning process. Learning results vary from shallow memorisation to deep understanding and creating something new. Learning can be tested by evaluating, the students' performances and learning portfolios (Tynjälä, 2004). The main research questions and sub-questions were narrowed down while analysing inductively the material as is typical for an intensive case study (Stake, 1994).

During the first phase, the research question focused on the *background factors* of skill learning.

1. How well-acquainted with music are the students and what are their attitudes like before the module?
    1.1. How long have they had music as a hobby?
    1.2. What kind of knowledge, playing and vocal skills do they have?
    1.3. Where (and how) have they studied music?
    1.4. What are their attitudes and experiences regarding music?

During the second phase, the questions elicited more information about the students' experiences related to *learning processes.*

2. What are the students' learning and skill-learning processes like during the e-learning module?
    2.1. What is required for practicing the skills and for the learning process?
    2.2. What are the phases of the skill-learning processes, and what are they like?
    2.3. What kind of pedagogical observations do the students make while practicing the skill?

During the third phase, the question focused on the self-evaluations the students made regarding their own *learning outcomes*.

3. What goals did the students report to have achieved through the module?

Skill Learning

During the learning process, previous experiences and perceptions of one's knowledge and skills are moulded and refined as the basis of new knowledge (Tynjälä, 2004). Suitable feedback and guidance direct skill practicing towards greater efficiency. This is achieved through plentiful and versatile practice (Hofer & Bonhoeffer, 2010; Kumpulainen et al., 2015). According to Ericsson et al. (1993), purposeful practice must include certain factors, such as a difficulty level suitable for the individual, feedback and corrections, and conscious self-reflection. A connection has also been discovered between playing skill and the amount of time spent practicing. The research group of Debatin et al. (2021) argues that practice can also result in failure, such as through over practicing.

During the learning process, terms such as *learning style* and *learning orientation* are applied. Learning style refers to a feature characteristic of the learner utilised as a study habit (Tynjälä, 2004). This style is an inherent feature, with which a student naturally approaches to learning (Green, 2010). Learning orientation can be divided into: a) meaning, b) repetition, and c) achievement. Out of these, the meaning orientation is the most effective for learning because it requires that the learner searches for and evaluates connections in a critical manner and has intrinsic motivation for learning. For the repetition orientation, the learner is motivated by external factors, or waits for precise instructions. Achievement orientation concerns motivation to achieve goals (Tynjälä, 2004).

Strategy refers to the manners of approach with which the learners plan to achieve their goals (Green, 2010). Learning strategies are modified by the learners themselves or based on feedback from the environment (Suonperä, 1992; Tynjälä, 2004). In conventional education, a teacher guides the learner to make relevant observations and orients them towards a deeper level of learning (Suonperä, 1992). Skilled players have been found to use more advanced practicing strategies (McPherson & Zimmerman, 2002; Debatin et al., 2021). Skill learning is also associated with problem-solving, suitable practice assignments, structured practical planning in an optimal learning environment, and the achievement of learning goals (Debatin et al., 2021).

Self-regulation and Experiential Learning

Zimmerman (1990, 1998, 2000) defines self-regulation as a context-specific process, in which the learners control their behaviour, environment, and cognitive and affective states.

1) In the first phase, the learners perform a *task analysis*, which includes goal setting and strategic planning. In addition, the learner has self-motivation beliefs, such as expectations regarding the results, intrinsic interest, and self-efficiency;
2) During the performance phase, the learners utilise *self-regulation* and make observations of themselves and their actions;
3) During the last phase, a *self-assessment* and *self-reaction* are performed, orienting the learner's thoughts, feelings, and behaviour for the upcoming learning situations (Zimmerman, 2000).

Ryan and Deci (2000) have studied the impact of self-determination theories in maintaining learners' self-regulated motivation (see also Chang et al., 2017). The significance of self-regulation has also been studied in meta-analytic research. Learners' performance, self-regulating strategies, and motivation can be improved through teaching that reinforces self-regulation (Dignath, Büttner & Langfeldt, 2008).

According to Tynjälä (2004), *metacognitive* skills are related to self-determination. These skills include goal setting, strategy choosing, methods of self-regulation, and adjustable ways of working, utilised by learners while playing an instrument or singing. Contrarily, beginners' focus during a performance can be unorganised. For example, they may focus on self-defence reactions and defining their abilities (McPherson & Zimmerman, 2002). With metacognitive regulation, beginners can

regulate their learning in terms of planning, goal setting and strategy selecting. While studying, the learners observe and, if necessary, change their strategy, ultimately evaluating their learning. The fewer metacognitive skills the learners have, the greater their need for outside guidance. In such cases, learning is guided from the outside, and the learner has to follow the guidance (Tynjälä, 2004).

According to Ikonen (1999), *experiential learning* arises from interactions with the environment. The objective is to make the learner learn independently, slowly shifting the responsibility of learning to the learner (Ikonen, 1999.) Similarities exist between experiential and constructivist learning as both approaches steer learners towards independent information-processing and thinking, but constructivism emphasises the importance of the learner's reflections (Rauste-von Wright & von Wright, 1994).

The importance placed on reflection is also observed in Kolb's (1984) cycle of experiential learning. Kolb (1984) divided the learning process into four parts:

1) *Active experimentation* involves practical experimentation and influencing;
2) *Concrete experiencing* consists of the learner's experiences and feelings;
3) *Reflective observation* occurs when observations and experiences are evaluated;
4) *Abstract conceptualization* is achieved through systematic thinking and problem-solving.

The learning process is a cyclical construction because after the four phases, the learner will put their skills to the test (Kolb, 1984). The objective is to become more familiar with guiding one's learning and to function in a self-determined manner (Rauste-von Wright & von Wright, 1994). This allows the learner to influence the learning objectives and content. According to Moore (2010), experiential learning commits and motivates the learner to attach their actions to practical learning experiences. Thus, the experience of influencing one's learning is achieved.

Collecting the Data

Similarly, to phenomenological philosophy, the students' learning experiences were considered their personal manifestations in this study. Learning was evaluated as an authentic, meaningful and dignified event, when the subject is encountered without expectations (Varto, 1992; Anttila, 2000). An intensive case study was conducted with a focus on examining the experiences and meaning-making processes of the subjects (Travers, 2001; Eriksson & Koistinen, 2014). The aim was to gain deeper insights into students' ability to cope with the new e-learning conditions.

Data were collected as learning diaries because the focus was on the experiences occurring during the learning process. In the diaries, the learners describe and reflect on their learning and experiences (Lindblom-Ylänne, Levander & Wager, 2003). Thus, interviews, the music theory exam and students' video playing samples were ruled out as a data collecting method. The students' task was to use the learning diary to monitor and reflect on their own development and the building of skills and knowledge throughout the study period. In the learning diary, the students had to deal with their own learning goals and expectations for the course and to evaluate their own starting levels. The aim was to analyse and structure observations and

experiences from their own skill learning processes and to evaluate their achievement of the goals. Students were allowed to decide how and to what extent they dealt with these contents.

At the end of the online course, the students returned the learning diary in digital form to the Moodle return box. The diary was about seven A4 pages long. In addition, their task was to keep a training diary when, and for how long and what they had practiced. The task of the exercise diary was to help students with schedule planning, to monitor the progress of studies and the workload and to evaluate the progress of the skill-learning process. The students did not highlight factors related to learning a skill in the exercise diary; rather, the names of the songs played and sung as a whole for a few weeks and the exercises done were marked on them. Consequently, exercise diaries were not used as research material.

Following ethical principles, informed consent was provided by the subjects (including the privacy policy and consent for scientific research). Names and other identifying factors were deleted before analysis. As no personal data were collected for the study, it was not necessary to seek for ethics approval.

The Analysis and Reliability of the Data

The method used was an inductive content analysis, the phases of which were reduction, clustering and abstraction (Tuomi & Sarajärvi, 2009). First, original expressions were selected from the data, and the message conveyed was simplified. The simplified expressions were grouped into main categories and subcategories. Finally, a synthesis category was formed. The presentation of the results was divided into three parts in accordance with the main themes of the study that is a) background factors, b) learning processes and c) results.

In the analysis, the points of view raised by all students were taken into account. In addition, the students' observations were combined into a uniform guideline. They describe the requirements of learning a musical skill (see Figure 1), and the progress of the learning process of the musical skill on a timeline (see Figure 2) as well as they embody the cyclical process of learning the skill (see Figure 3).

Case studies as a scientific method need to be clarified and justified. Flyvbjerg (2006) has summarised in five misunderstandings related to case studies:

1) General, theoretical (context-independent) knowledge is more valuable than concrete, practical (context-dependent) knowledge;
2) One cannot generalize on the basis of an individual case; therefore, the case study cannot contribute to scientific development;
3) The case study is most useful for generating hypotheses; that is, in the first stage of a total research process, whereas other methods are more suitable for hypotheses testing and theory building;
4) The case study contains a bias toward verification, that is, a tendency to confirm the researcher's preconceived notions;
5) It is often difficult to summarize and develop general propositions and theories on the basis of specific case studies (p. 221).

According to Flyvbjerg (2006), a case study can provide reliable information about a broader class. The case study produces a type of context-dependent knowledge from learning. This helps people to develop from beginners to virtuoso experts. In the study of human affairs, the possibility of theoretical construction can also be achieved (Flyvbjerg, 2006).

To enhance the reliability of this study, the results are reported in a meticulous manner (Yin, 2014). Furthermore, the theoretical reliability was evaluated based on the accuracy of the concepts used. The result of abstraction refers to the theory or model created (Syrjälä & Numminen, 1988), thus, adding a deductive component.

Findings

A. Background factors

The background factors of the study are musical a) knowledge, b) skills, c) education and d) attitude prior to the study. All students had practiced music outside of basic education for several years. Consequently, they had a foundation in musical skills and knowledge prior to their online studies. In their learning diaries, the students also described how long they had been playing music and when they had had breaks in the hobby. Some of the students had music as a hobby throughout their lives. Some had longer breaks from music: *"As a child, I took piano lessons and played the piano for fun. After that, I had a long break from it. I didn't play for 10 years".*

Students' estimations of their skills were divided into three categories: a) good skills, b) little or poor skills and c) no experience with some of the instruments in the course. When describing their musicianship, some students estimated their piano playing skills were rather good; however, the playing material had varied. During piano lessons, some had only played classical music: *"During upper comprehensive school, I played only classical compositions, particularly film scores from Harry Potter and the Pirates of the Caribbean".* One student had also played children's songs with basic chords. In addition, the skill of accompanying with the piano had been utilised in teaching. Some students estimated their playing skills to be poor: *"I was very lazy about practicing and as a result, my playing skills are bad".* Being able to accompany with the piano or the ukulele was not common. Some of the students were unfamiliar with the band instruments and the ukulele, tablature, and accompaniment in general: *"I had zero prior skills of playing the band instruments".* There were also variations between the students' skills with different instruments. For example, some had excellent piano playing skills but no experience with band instruments, while some had equivalent exposure to different instruments. A similar kind of variety was reported for the use of vocals. One student stated that skills regarding the use of the voice are mostly related to the importance of warming up and trying to avoid coughing: *"Regarding the healthy use of the voice, I mainly remembered before the course, that it's not good to cough while singing, but rather to drink water. I also remembered the importance of opening the voice".* For others, singing felt natural, or they had earned a degree in singing.

The students reported to have gained their music skills through independent practice or classroom teaching lead by a teacher. To learn to play the guitar, ukulele, and piano independently, video recordings found on the Internet had been used. In addition, one

student had been taking some private lessons from friends. Hence, being able to read the notes and building chords had developed along with the playing. The students stated that independent study had left gaps in music theory. One student had developed incorrect interpretations of musical concepts. The music lessons at school had created a basis for self-study. Some students were motivated to self-study to impress their friends: *"All the instruments I know I started playing as a kind of a "party trick" – surprising my friends by playing a well-known piece".* Amongst those who had received an education, studying music had been a part of their vocational degree in educational studies. They had learned the basics of playing the piano and the guitar. For the degree, music theory had been included in the playing lessons. Music had also been studied at music schools, conservatories, and other types of music education environments. One student had even earned a degree in music: *"I have a degree in singing, and I took singing lessons for several years".*

The students described their relationships with music in four ways categorized as a) positive relationship, b) being nervous about learning new things, c) change of attitude, and d) unpleasant experiences. At the beginning of the semester, some students had positive expectations about the e-learning module: *"However, I was excited about this module to begin with, since I knew that I will be able to go back and practice playing the piano again, and learn about some instruments that are completely foreign to me".* For these students, taking an e-learning module course was unfamiliar, and they felt it was intriguing. They were also excited to learn how to play different instruments. Some of the students were nervous about the unfamiliar instruments, such as the drums: *"I am the most nervous about the drums. I do not understand how it is possible to combine playing with both your hands and feet".* Some students had unpleasant memories related to some instruments. These experiences caused the students to feel insecure about trying to play new instruments. Thus, the negative experience of playing the guitar had on effect on playing the ukulele, for example. There were also some unpleasant memories related to singing; being forced to sing in front of other pupils had created humiliating and negative memories for some students in the past: *"When I was at the school, the singing tests were held in such a way that you sang in front of the whole class. Those were such moments of humiliation".* These negative experiences made them fearful and anxious, and they reported this to have caused problems when learning new skills; however, students reported to being conscious of their bad experiences and wanting to change their attitudes: *"I find it difficult to play the guitar. During this course, I will try and change my attitude towards a more positive one".*

B. Learning processes

Skill-learning processes. As a result of the analysis, the criteria and requirements for skill-learning processes were divided into seven factors. According to the students' diaries,

- A starting point for learning is open-mindedness and positive attitude;
- For skill practicing it is important to identify the suitable learning styles and strategies: 'Everyone is also creating their own study habits and means for learning';
- While practicing, should be patient and persistent because learning a skill requires many repetitions (metacognitive skills, self-regulation);

- Realistic goals are set, and skill practicing progresses slowly;
- From the beginning of practicing, one must practice correctly, as this will accelerate future learning;
- Should recognise development and the skills acquired and pride oneself in achieving mid-way goals;
- Gradually, the number of goals is increased.

Due to practicing, the skill becomes better: 'A skill can develop a lot and quickly when the level of practice is adequate, and the motivation for learning exists'.

Some of the students reported that they started with the **music theory** section. They felt that it supported playing and singing, or they had set themselves the goal of thoroughly studying music theory. One student described the music theory section as heavy, requiring a lot of effort and time: 'I got all sweaty, thinking I'm not going to make it through this. But I was determined, and decided I would not give up, but really invest my time into this part. I went through the PowerPoint slides multiple times'. While completing the theory portion, some students had even noticed that they had misleading perceptions about music theory, formed during independent practice before the studies: *"Somehow, I had been under the impression, that if the head of the note is hollow, it means the note has either been sharpened or flattened"*. In contrast, some of the students delved into music theory later. For these students, the theory materials functioned as a recap and provided a re-evaluation of their skills. Some had even detected shortcomings in the more challenging materials: "The material for the music theory part of the e-module focused on familiar things at first. I thought, I am well-versed on theory. As studying continued, I noticed my knowledge was inadequate about the more challenging parts, and I felt like I hadn't even heard of all the concepts before".

Students reported that during the e-module they started to focus on the 'right things'. For example, as their knowledge of music theory improved, their note-reading quickened. In addition, students emphasised the importance of music theory in improving playing skills: *"Being able to read the notes is also related to the process of learning to play the piano"*. One student expressed that note-reading could be strengthened by following the notes of a familiar piece while playing, or by following a video about practicing playing skills.

The online module also included a theory exam. The students took the exam either at the end of the module, or both at the beginning and the end. Thus, they could see their improvement: *"After all, I wanted to take the exam and see how my skills were at the start of the module. The exam didn't probably go too well! I took the exam again at the end of the course, and I believe it went better than on my first try"*.

The stages of the music theory learning process were created as a result of analysing the students' descriptions. The following is a summary of music theory learning processes:

1. Scanning through the material, getting a first impression;
2. Starting the studying process with a goal, or taking a theory exam to determine one's skill level;
3. Evaluating and identifying one's skills while studying;

4. Completing small practice tasks in different sections of the module and applying music theory to one's playing skills;
5. Re-reading the e-module material several times;
6. Comparing the e-module material with the theory sections of one's old schoolbooks, if necessary;
7. Taking the music theory exam.

Students' learning processes for **playing the piano** were diverse due to different skills, progress, study habits and goals. The students with less playing experience reported to have placed more importance on playing independently with either their left or right hands. They reported that only after such practice did they play with both hands simultaneously: *"As I was playing the piano, I noticed how important even for an adult learner it is to first learn how to play with your right hand, then with the left, and only then to slowly combine the two".* The same method was used when practicing accompaniment without melody. Here, the chord is divided into left and right hands, which are rhythmised in a way that suits the style of the song. According to the students, it was difficult to sing along with this style of accompaniment because the piano did not follow the melody. 'Playing from the notes', in which the notes for the left hand were in the f-key and the notes for the right in the g-key, was new, and some students said they had not practiced it for a while: *"Playing notes from the f-key has always been difficult for me. It's hard for me to figure out the note positions because the g-key note positions are so strongly in my mind. The most I practiced was playing the notes of the F-key and playing the changing bass".*

The students reported that filming the sessions supported piano playing skills. They deemed it beneficial for learning. This was especially needed when detecting one's progress was difficult. The videos helped students realise how much progress had been made even after little practice, or since the previous session: *"When watching the videos, I noticed that even though I had felt like my skills in some areas were not improving, I had actually gained more speed and fluency even after a short session. The next time I played, the practice had clearly worked its magic".*

Many students mentioned that their skill learning occurred in instalments, especially with playing the piano. At first, practicing required a lot of directing one's learning. Practicing progressed from learning the basic notes of a chord to their counterparts. The chords then became more varied and corresponded to the rhythm of the pieces. Finally, the skills were used to accompanying new pieces.

Students' learning experiences playing **the guitar, the bass and the drums** varied. Playing these instruments was either easy or difficult, or their perceptions on the instruments were changed: *"My memories were related to playing drums: how hard it was to play the rhythms. Now, I noticed that I was learning them in a reasonable amount of time as well".* Students compared their experiences playing the ukulele with playing the guitar. The amount of practice was also related to the fluency of playing and the experience of its ease or difficulty. Even the attitudes regarding playing the ukulele became positive during the e-learning module. While practicing accompaniment, the challenges were up keeping the tempo, and combining singing and playing. When practicing playing a new instrument, it was reported to be helpful to initially choose easy pieces at first, so the basic playing technique and rhythm became more effortless. It was then easier to play more demanding pieces. After some students had learned

the basics of the ukulele, they chose to play more difficult pieces. The chords of these pieces had been partially simplified to provide new challenges for skill learning. Thus, by guiding their own learning, the students had created motivational mid-way goals: *"The accompaniment and the chords were easy to learn. So, I wanted to challenge myself a little, and I practiced doing a modulation for the piece I filmed. After the modulation, D-chord should have followed, and it is very difficult to play. Despite the practice, my fingers would not bend. In the end, I only played the D-chord with two strings".*

The following learning process below contains students' descriptions related to playing the ukulele:

1. Tuning the instrument with the piano or a tuner;
2. Becoming familiar with the instrument: *How does it differ from the guitar?*
3. The parts, strings, chords and playing technique for the instrument;
4. Starting with easy pieces with simple chords;
5. After mastering the change of chords, adding a base beat;
6. Combining singing and playing.
7. Choosing a new piece with familiar chords and possibly a new one. If necessary, the chord can be simplified.

The students completed **use of voice exercises** amid playing practice. This was done before the playing practice, during which they were supposed to sing: *"Hence, I always performed a warm-up in one way or another before I started singing".* This student's use of voice exercises became a natural part of the module. During use of voice practice, the students focused on their singing posture, breathing technique and warming up. The technique for deep breathing had been practiced, for example, while performing everyday chores.

***Pedagogical skills of music teaching*.** Based on the e-learning material and their experiences, the students had also reflected on the questions of teaching music. The **e-learning material** for independent study also gave the students **ideas** for utilising similar exercises in their future work: *"In the e-learning material for music theory, there was an app with the help of which students can easily make their own compositions".* Thus, the experiences gained during the module inspired students to use new learning strategies in their future work.

The students also reported how important it is for the teacher to choose meaningful exercises and to create the **feeling of joy while creating music**. Finding this joy was deemed more significant than playing ability. According to the students, creating with others and participating in different experiments helped to build a positive atmosphere for the classes: *"Practice is supposed to be enjoyable for the students, and as teachers, we are responsible for that. How can we enable the students to discover the joy of music while we're teaching? I think it is important to make time for experimenting, enjoying music and playing together".*

The students placed importance on the teacher having **the necessary skills for teaching music**. Mastering different instruments is helpful in **guiding skill learning**, as the teacher has undergone the same phases of learning and has experienced similar challenges as the students: *"When I practice on that (instrument) myself, it will be easier for me to support my students".* In addition, mastering different instruments enables one to accompany music in diverse situations and to use the new skills in

future work: *"I fulfilled my goals and am very satisfied with the skills I learned. I will surely use them in my profession".* The acquired skills motivated the students to adapt and to utilise them in their future work.

The students highlighted the significance of **lifelong learning** in skill practicing. They hoped to continue learning while working. Skill learning can also involve the students teaching new things to the teacher: *"On the other hand, it (practicing) can be also done together with the students. And what's best, there are always bound to be pupils who can play during class. They can function as assistant teachers, teaching the rest of the class and perhaps even the teachers themselves. In my opinion, those are the best moments".*

Mastering **music theory** was associated with teachers' pedagogical skills and considered a necessary basis for teaching music: *"I think it's important for a classroom teacher to have pedagogical knowledge of music theory – it creates a foundation also for teaching music in primary school".* According to the students, it would be beneficial to know more about music theory than is expected in their education. It benefits the teachers and the work they do by being able to make personalised exercises for more skilled students.

Students also emphasised the importance of the correct **use of voice** for singing and speaking. They explained that the voice must remain healthy throughout the career and afterwards: *"The lessons on use of voice made me think about how I can ensure my voice remains healthy during my career and after it".* Different exercises related to use of voice during the e-module provided tips on how to ensure voice health. Students observed that the exercises could also be done with their future students. The students found it important to encourage all their future students to sing, even if their own voices were not pure in its quality.

C. Learning results

At the end of the e-module, the students reflected on the goals they achieved. They were content with their learning results. The students reported that they **achieved** their **objectives** and those of the module. In addition, they learned new skills and gained confidence. E-learning was found to be pleasant, and during it, the joy and enthusiasm of playing and making music had been discovered: *"I was also pleased with the pleasure, joy and enthusiasm that I gained while practicing playing different instruments".*

The students agreed that practicing music theory supported the development of their singing and playing skills. The significance of music theory was particularly associated with the development of playing skills: *"Thus, I gained important theoretical knowledge, which helps a lot with playing and understanding the pieces".*

The students estimated they had gained **good accompanying skills** on the piano. In addition to having reviewed what they already knew, they had learned **new playing techniques and notations**, making their playing more diverse and enhancing their confidence. Furthermore, playing skills for band instruments added to their knowledge of different instruments and to their confidence in accompaniment: *"I am also happy I learned to play other instruments besides the piano, and now, I might even dare to accompany with them (the band instruments, ukulele)!"*

The e-module material had also helped in achieving the goals set for the **use of voice**: *"I wanted to learn how to use my voice correctly, and the materials gave me a lot of tools for that".* The students had come close to achieving their goals of maintaining a healthy voice and practicing their singing, e.g., by combining deep breathing techniques with use of voice; however, one student expressed the need for personal guidance with use of voice to obtain the desired results. Still, during the e-module, basic skills had been achieved: *"I don't feel like I've developed in terms of singing technique. – I do dare say I've gotten better with the "basic things".*

At the end of the module, students turned in the **samples they filmed** of themselves singing while playing the piano, the ukulele, the guitar, the bass, and the drums. Thus, they were allowed to choose the pieces they performed and their level of difficulty. As the evaluation was only based on these samples, students chose the pieces carefully. Hence, it was beneficial that the pieces varied in genres (e.g., pop, tango, musicals, folk, and children's songs), providing a good overview on their skills. The students believed they had done this successfully.

The module inspired the students to keep practicing their singing and playing skills after the studies. **Lifelong learning** is an important aspect of professional development. It seems that the experiences and materials of the e-module gave the students the needed tools to further develop their skills. A comprehensive school syllabus and pedagogical exercises were **left out** of the objectives of the e-module. Therefore, the goals set by the students were not fulfilled, as they were not a part of the objectives of the module: *"…the curriculum terms were not mentioned in the material became an issue".*

Results and Conclusions

The results suggest that the students' previous musical hobbies, skills and education did not have a remarkable impact on their performance during the e-module. The students were excited about e-learning, or they were aware of their negative experiences and wanted to turn them into positive ones. Instead of these *background factors*, students' *criteria for skill-processes and self-guiding skills* became more relevant. The amount and quality of practice also seemed to impact skill learning (see also Ericsson et al., 1993).

The progressive nature of the criteria for skill-learning processes is depicted in Figure 1, and the lowest level consists of the prerequisites of the next level. In the triangle, the criteria and requirements progress step-by-step towards more demanding prerequisites.

The *learning processes* for musical skills varied between individual needs and personal goals. These descriptions regarded music theory knowledge are an important part of skill learning. Music theory created a basis for developing playing skills. It made the reading of notes, the forming of chords and playing easier. Elliot (1995) also highlights the importance of familiarising oneself with the elements of music. According to praxial music education, knowing music elements and their applications is needed to understanding music in new situations, such as practicing new pieces (Elliot, 1995). The descriptions of learning processes include seven phases, which in Figure 2 using the learning process for playing the piano as an example.

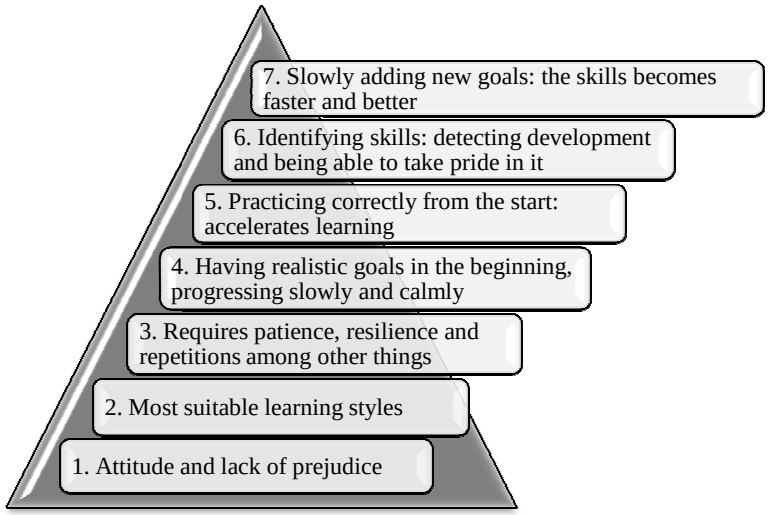

Figure 1. The criteria and requirements for skill-learning processes during music e-learning are formed in a step-by-step manner

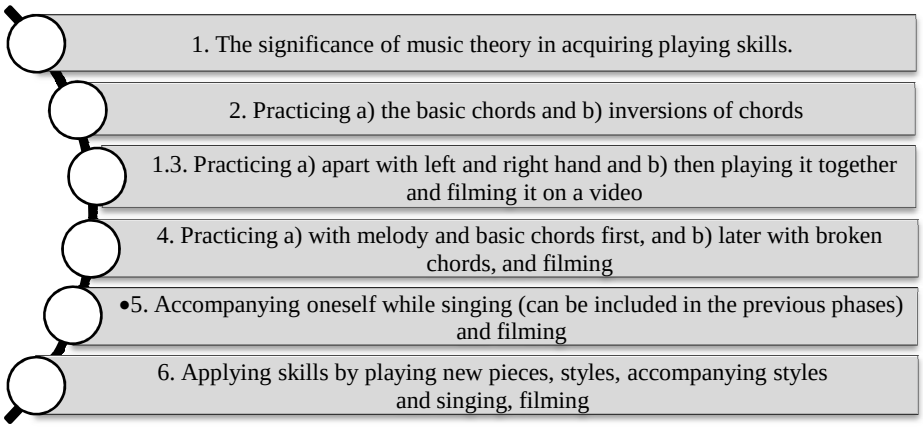

Figure 2. An example of the learning process of piano playing phases during the e-learning module

In this study, a task analysis was conducted at the beginning of the module, as goals were set. The students' self-regulation was supported by the opportunity to influence the content of the module. They were also intrinsically motivated to complete the module. During the course, they focused on building and following the phases of the learning process and regulating their own learning. After practicing, the students completed a self-evaluation form, based on which they changed their plans or exercises if necessary. To assist them with the learning process, they filmed themselves. Thus, they were able to detect skill development even after a short session. Identifying development and new skills motivated the students to continue practicing. This is similar to the self-regulation (forethought, performance and self-reflection) defined by Zimmerman (1990, 2000) and Kolb's (1984) cycle of experiential learning (experimentation, experience, observation and conceptualisation). In this study, the learners were guided towards independent information-processing and thinking, similar to experiential and constructivist learning (also Rauste-von Wright & von Wright, 1994; Ikonen, 1999).

During this study, the skill of self-regulation was observed in the student reports as their ability to regulate their learning and strategy selection. The students showed an increasingly awareness of their meta-cognitive knowledge and skills (see also Young & Fry, 2008). In addition, they determined their goals and solved the problems arising while practicing (see also Debatin et al., 2021). Similar to the findings of Dignath, Büttner and Langfeldt (2008), self-regulation increased study motivation and skill development for the students. Moreover, the students' learning orientation was aimed at accomplishing their goals. A meaning orientation was created to internally motivate the students to study and to critically assess their learning processes (see also Tynjälä, 2004).

The module also helped to indirectly develop the students' pedagogical competencies in teaching music. When students are more competent in making music and defining its terminology, they have a better basis for skill teaching (see also Vesioja, 2006). The e-module material helped to visualise the significance of goals and different forms of practice in the skill-learning process. Use of voice was also considered as a pedagogical skill. Teachers use their voices as an instrument of interaction, simultaneously providing an example on use of voice for the pupils (de Oliveira Bastos & Hermes, 2018). The students viewed this as the reason that the correct use of voice is important.

As the last step of the inductive content analysis of this study, a model was developed from the empirical data, presented in Figure 3. This figure is based on the theoretical reflection of the reports provided by the students. The criteria and processes of musical skill learning (see Figures 1–2) created a basis for developing a model on the skill-learning process (see Figure 3). The model encompasses the *learning results* of the third main research question.

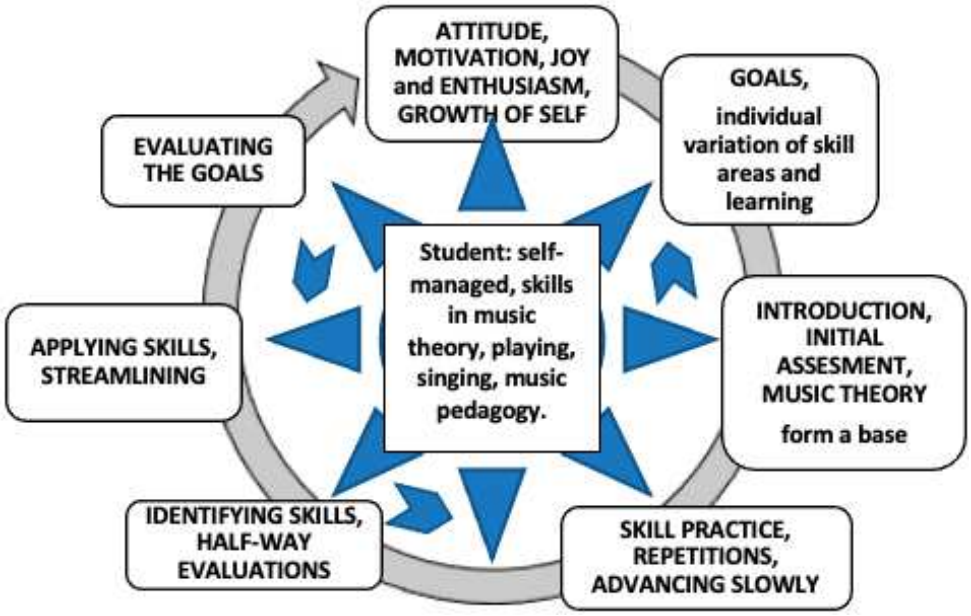

Figure 3. The skill-learning process which students go through during the music e-learning module

The skill-learning process is conceived as a cycle. If necessary, the students returned to the previous exercises, or they were practiced in parts. Skill learning was affected by students' emotional experiences regarding being successful, while students' understanding of the meaning of the learning criteria was highlighted. Skill practice requires time, repetitions, practicing partial goals, identifying skills, and applying skills in practice. Reaching goals and gaining successful experiences of success lead to joy and belief in one's skills, and motivation for skill development. Simultaneously, reaching goals enhance the commitment and the joy of making music and experiencing flow, which is included in the basis of praxial musical education (Elliot, 1995).

The students gained meaningful experiences in their growth through the skill-learning processes (see also Regelski, 1992). Simultaneously, these personal experiences helped to construct and strengthen the students' pedagogical music teaching skills, professional know-how and lifelong learning. In this study, experiential learning engaged students in their learning process as meaningful actors (see also Moore, 2010).

According to the results of this study, self-regulative learning strengthened students' motivation and feelings of success when the objectives were suitable, and studying was done through one's mid-term goals towards the main goals. Holzer et al. (2021) report similar findings in their studies on the impact of distance learning in which the well-being of university students was remarkably influenced by the experience of autonomy and self-regulative learning during distance learning. Similarly, according to Ruokonen and Ruismäki (2016), the use of IT and communicative technology encouraged students to independently practice music skills. Thus, it seems that *students' ability to impact* and make decisions related to the matters of their studies *increased their motivation for self-regulation* (see also Ryan & Deci, 2000; Chang et al., 2017). Furthermore, in this study, learning components *amplifying self-regulation* were used to influence the students' performance, self-regulation strategies and motivation (see also Dignath, Büttner & Langfeldt, 2008). In particular, this manifested as *skill-learning processes* and *actions guiding learning* amongst the students. The processes guiding learning formed during this study can be utilised in upcoming e-modules to support self-regulative learning (see also Hirsto et al., 2022).

The case study has received criticism for among other things the generalisability of the results (Quintão, Andrade & Almeida, 2020). Therefore, its status in the study has potentially been questioned. It is typical for an intensive case study to carefully analyse a number of individuals based on a variety of data (Stake, 1994; Eriksson & Koistinen, 2014; Yin, 2014). Flyvbjerg (2006) argues that case studies produce context-dependent knowledge, which is necessary for improving our understanding of new e-learning conditions. With e-learning, students can develop from being a beginner to being an expert. In addition, in this study, the importance of professional development and teaching development takes centre stage. In addition, Flyvbjerg (2006) points out that there seems to be only context-dependent information in the study of human affairs: this would exclude the possibility of epistemic theoretical construction.

Students' experiences were analysed based on their learning diaries. The study could have gained additional value from conducting interviews. Other possible research

topics could, for example, alternate between asynchronous and synchronous e-learning or could compare the learning processes of learners with different skill levels while also using interviews for data collection.

The aim of this intensive case study was to identify internal 'legalities' in learning processes, which could be used to find a broader meaning and even transferability to a larger group. The results can be utilised for developing the e-learning of music and recognising the processes guiding skill learning. Dividing skill-learning processes into phases (see Figures 1–3) allows guiding students towards using well-developed strategies for skill practicing. At the same time, it can encourage the development of self-regulation skills.

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THE ACOUSTICS OF CHOIR REHEARSAL ROOMS

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Abstract
The study investigates choir rehearsal room physical and acoustical parameters. The reverberation time measurements (T30) were carried out in twenty choir rehearsal rooms. The measurements were provided according to ISO 3382-1:2009. Based on acquired T30 and room volume, the lower and upper limits of T30 and sound strength G were estimated (ISO 23591, 2021). Six out of 20 rehearsal rooms had T30 sufficient for requirements specified for quiet acoustic music. T30 and sound strength G values allowed us/me to model the optimal acoustical environment for choir rehearsals according to the number of singers and choir type.
Keywords: *choir, rehearsal rooms, reverberation time, sound strength G, choral acoustics*

Introduction

The study on choir room acoustics completes a series of articles written on the project *"An Investigation of Vocal Load in Choral Conductors in the Context of Voice Ergonomics"*. The first paper investigated voice ergonomic factors in choir conductors (Trinite, Blauzde, Paipare, Valce, Barute, Ivane & Sleze, 2021). In this research, data was obtained by surveying a representative sample of Latvian choir conductors. The second paper was written based on the interviews given by six choir conductors. Their answers reflected both individual and empirically approved approaches to singers' voice preservation in the voice ergonomic context (Valce, Blauzde, Paipare, Trinite, Barute, Sleze, Ivane & Kruza, 2022). In both research studies, whether in anonymous surveys or face-to-face interviews, the significance of room acoustics for choral singing became quite evident.

Research on the reverberation time measurements in rehearsal rooms is rare and the author of this research is not aware of any such research being conducted in Latvia. Although choir singing is one of the most frequent musical activities, studies about room acoustical influence on choir performances are rare. Moreover, there are few

studies where the interaction between voice and room has been analyzed from the singers' perspective (Fischinger, Frieler & Louhivouri, 2015).

In 1637, the first ticket was sold for an opera performance in San Cassiano, Venice. This occasion changed the existing music culture in closed spaces. The opera house was open for everyone who could pay for a ticket. Previously, musician's and singer's performances were available only for a narrow circle of aristocrats – in kings' residences and houses of wealthy citizens, also held in the opera house, which was a favorite place of entertainment for rich people. Usually, music was performed in small rooms and for a small audience. When music became available to a broader audience, there was a necessity for larger halls. Consequently, instruments had to be played louder, and singers had to master other singing techniques appropriate for the bigger size of the performance rooms. At this historic crossroad, a singer's voice or musical composition performance was closely knitted together with the acoustic properties of space, i.e., unconsciously, the room's acoustics became an essential factor for performance quality.

Historical studies provide scholars with information that composers were acquainted with the acoustical features of the locations in which their music was performed. For instance, Renaissance polyphony was composed to avoid stylistically unsuitable dissonance that could occur due to long reverberation time in churches or cathedrals (Fischinger, Frieler & Louhivouri, 2015). In the late Renaissance and early Baroque periods, composers created compositions for several choirs (polyphonic school of Venice), where two or more choirs (It. *chori speccati*) performed Psalms singing in turns. The arrangement of choirs in different places allowed using spatial effects related to church acoustics (Jaunslaviete, 2021). Historical records tells us when W.A. Mozart, in writing a mass for the cathedral of Salzburg, envisaged not only a particular composition of the orchestra, but also the arrangement of musicians and singers (of soloists and choirs) at this cathedral. In *"The Technical Recommendations"* for the composition performance, the composer's father, Leopold Mozart indicated, which musicians should be in the cathedral's rear and which should stand at the altar, or on the balcony (Cassel, 1985).

Professor Sten Ternstrom of the Stockholm Music Acoustics Group introduced the term 'choir acoustics', which includes the acoustics of voice production, the acoustics of rooms, and psychoacoustic properties of the auditory system (Ternstrom, 1991). One of the parameters characterising the room acoustics is reverberation time (T). Reverberation time is defined as a measure of the time after the sound source ceases that it takes for the sound pressure level to reduce by 60 decibels (dB). The length of reverberation time depends on room volume, form, sound absorbing or reflecting properties of the surfaces, and how full the room is. Room reverberation time determines the sound of a composition. The choir's sound becomes unclear and muddy if the reverberation time is too long. However, too short reverberation time makes the sound 'dry', and the timbral nuances get lost (Rindel, 2014). As previously mentioned, reverberation time may impact the perception, transmission, and production of performance (voice). In this study, the author will focus on the interaction between reverberation time and voice production.

The changes in voice production, which take place in different acoustic environments with various reverberation times, have attracted the attention of several researchers

(Ternstrom, 1991; Fischinger, Frieler & Louhivouri, 2015; Bottalico, Lastowiecka, Glasner & Redman, 2022).

The purpose of this study is to investigate physical and acoustical parameters of choir rehearsal rooms.

Question of the study: *Do rehearsal rooms meet the acoustic requirements necessary for choir singing?*

Background

A. Reverberation time and merging of the singer's voice with the sounding of the choir

A steady, homogenous merging of voices characterises good choral singing. Not to stand out among others, choristers must constantly adjust their voices' loudness, pitch and timbre to those of other singers. This implies that choristers are supposed to hear their own (self) and other singers' voices simultaneously. Airborne and bone-conducted parts of the auditory system contribute to hearing the self-voice. The perception of other singers' voices is determined by the spacing between singers and the amount of reverberation in the room (Ternstrom, 2002). If the spacing between singers is larger, the voice of the singer next to you is less audible. In rooms with a long reverberation time, the loudness of other singers' voices suppresses your own voice, and to hear yourself, you sing louder. Such a way of singing involves the risk of voice overloading. Reverberation time can be corrected by extending the room's absorbing surface area (Ternstrom, 1991). For example, in singing within a hall the rehearsal may differ from singing at the concert because at concert, there are listeners in the hall who absorb the sound in the hall. For the choir sound at the concert to be the same as at the rehearsal, the reverberation time in the rehearsal rooms must be shorter than in concert halls of the same size (Rindel, 2014). Ternstrom (2002) maintains that the conductor can control the reference or choral sound by changing the spacing between singers and choosing a suitable room for rehearsals.

B. Reverberation time and choir rehearsals

A long reverberation time in the room promotes the merging of choir sounds, which makes it difficult to hear the contribution of each singer. This is why the conductors sometimes prefer rehearsal rooms which absorb sounds well because it makes hearing each singer's voice easier (Ternstrom, 1991). The same observation was heard from Latvian conductors during interviews. The conductors said that at rehearsals, they did not like to work in rooms with excellent acoustics because it is impossible to hear individual singer's voices (Valce, Blauzde, Paipare, Trinite, Barute, Sleze, Ivane & Kruza, 2022). Studies testify to the fact that singing in rooms absorbing sounds, choristers sing in higher voices (Ternstrom, 1991). The rise in the pitch of the voice is related to changes in the position of the larynx, e.i., the larynx is in a higher position and the vocal tract is shorter. Under such conditions, cervical muscles of a shoulder zone get additionally tensed. Singing long in acoustically inadequate rooms creates vocal effort.

C. Reverberation time and intonation, timing and rhythm of singing

Fischeringer, Frieler & Louhivouri (2015) had recorded voices of 23 mixed choir singers who performed the mass *Locus Iste* by Anton Bruckner (1824 – 1896) in three different acoustic environments. The aim of the research was to elucidate whether reverberation time makes impact on the intonation, timing and rhythm of singing. The research outcomes showed that it was the easiest for singers to sing in a room with 1.87 s long reverberation time. With regard to objective measurements, the research demonstrated that the tempo of singing increases slower in bigger rooms with a longer reverberation time. And on the contrary, reverberation time has almost no impact on the intonation of singing or expressiveness, which from an acoustic aspect is characterised as changes of a fundamental frequency (F_0). The increasing length of T did not make any impact on parameters of a vocal pitch (Fischinger, Frieler & Louhivouri, 2015). Similar results were obtained from research during which 18 conductors carried out vocal loading assignments in acoustically different spaces for choir rehearsals. Neither the size of rehearsal rooms nor the length of reverberation time impacted the vocal fundamental frequency as well as other acoustic parameters of the voice (*jitter, shimmer, CPPs, SD CPPs*) (Trinite, Barute, Blauzde, Ivane, Paipare, Sleze & Valce, 2022).

D. Interrelations between reverberation time, sound strength, volume and absorption

In this research concerning choir acoustics, attention should be paid not only to the reverberation time, but also to sound strength (G). Sound strength is a sound amplified by the space. The strength is the sound pressure level in the room relative to the sound pressure level in a free field in the distance 10m from the same source, which must be omni-directional (Rindel, 2014). For example, if the sound strength in the room is 0 dB, it implies that the sound strength created by the same sound source in a free field in 10 meters' distance from the source is the same as in the room, i.e., the specific room does not amplify the sound. If the sound strength is 20 dB, then in a free sound field, a sound of the same loudness will be heard in 1 meter's distance. Sound strength is related to room volume and reverberation time (ISO 23591, 2021).

Room volume and absorption coefficient are architectonic parameters of the room, but reverberation time and sound strength are acoustic parameters. The interaction between all four parameters determines the sound of the choir. Reverberation time influences the entire sound, while sound strength impacts the dynamics of the sound. If the sound strength is too large, the singing of the choir will be explicitly loud, but in case of a small strength, it will be too low. In turn, if reverberation time does not correspond to the physical parameters of the room, the sounding will be unclear or dry. As Rindel (2022) states, to find balance between reverberation time and sound strength in order to counterbalance sounding and dynamics of singing is a big challenge. In small rooms with a lasting reverberation, the sound is explicitly strong and may become unpleasant. In big rooms with a short reverberation time, choir sounding is too faint (Rindel, 2022). In both cases, singers will attempt to adapt themselves to the existing room conditions by singing softer or louder. However, it is possible to try to affect the quality of the choir sound by influencing the acoustic properties of the room. For example, by extending the area of absorbing surfaces by drawing curtains or blinds, and thus reducing reverberation time of the room in this

way. In rooms with a larger volume and longer reverberation time, the sound strength is smaller.

E. Acoustic requirements for choir rehearsal rooms

Both soloists and choristers routinely adjust their vocal techniques and loudness of singing to differing acoustic environments to become acclimated to variations, and if need be, adjust their performance to their physical environment (Ternstrom, 1991; Bottalico, Lastowiecka, Glasner & Redman, 2022). Taking into consideration the significance of room acoustics for voice sounding, and the fact that such an acoustic parameter as the length of reverberation time may change if the area of absorbing surfaces is increased, it must be understood that the conditions between a rehearsal and a concert are quite different. Therefore, in working with choirs, rehearsal rooms should differ from performance avenues. For example, rehearsal rooms are smaller in size than concert halls and sometimes there are fewer musicians or singers in them (some vocal or instrumental groups) (Rindel, 2022).

In 2021, the ISO standard 23591 was published and it extensively outlined the physical and acoustic parameters of rooms used for music rehearsals. The previous standard was known as the Norway standard NS 8178 (2014), which was devised to improve the unsatisfactory acoustics of rehearsal rooms for learning music, and holding rehearsals of amateur groups (Rindel, 2014). The Norway standard emphasized that an artistic performance can be qualitatively achieved if the room acoustics is adequate for the performed music, type of ensemble, and size of the room. In turn, ISO 23591 (2021), refers to rehearsal rooms that differ according to their role. That is, what kind of music will be performed in them, their size and the correlating number of singers. This necessitates that room parameters must correspond to the music performed in them. For instance, when special requirements are used for rehearsal rooms where the performed music needs electro-acoustic tuning, or for rehearsal rooms that utilize instrumental music ensembles and symphonic orchestras. Further still is when choirs, vocal ensembles, and string ensembles perform quiet music, and hence, the requirements for rehearsal rooms need of these groups are different.

General requirements imposed on choir rehearsal rooms demand that their size must comply with the number of singers, and they must have a definitive ceiling height and the reverberation time must correspond to the size of the room. Sound reflection and dispersion must be controlled, and the level of background noises must be low. For the rehearsals of small groups or voice groups in choirs, small rooms are characterised by the following parameters: height of ceiling (h) ≥ 3.5 m and volume (V) up to 300 m, are sufficient. Rooms of average size are good for 13 – 30 singers (h > 4.5 m, V = 300 – 750 m). Large rooms are necessary for choirs consisting of more than 30 singers (up to 80 – 100) (h > 5 m, V = 750 m) (ISO 23591, 2021).

Research Methods

To carry out measurements, 20 rooms, where the choir rehearsals are held, were selected in Liepaja and in Liepaja region. In these rooms, measurements were made, and their volume was calculated, and acoustic measurements were carried out by professional acousticians. Reverberation time (T30) was measured in empty rooms

using omnidirectional dodecahedron loudspeaker GSR as a sound source. Reverberation measurements were carried out in compliance with ISO standard 3382-1, 2009. A sound source was denoted as a 'pink' noise in the range of frequencies from 88 to 5657 hertz (Hz). The mean reverberation time was calculated in 500 and 1000 Hz frequency. Depending on the size, there were two or three locations of a sound source (S) and microphone (M) determined in the room: S1M1, S1M2, S1M3; S2M1, S2M2, S2M3; S3M1, S3M3. The location of a sound source and microphone corresponded to the location of the conductor and choristers during the rehearsal. Reverberation time was measured with a handheld acoustic analyser XL 2 (NTi AUDIO) and microphone M4261 (Class2/Type 2, sensitivity 15.2 mV/Pa).

The upper and lower limits of reverberation time T30 for rehearsal rooms were obtained through calculation (ISO 23591: 2021) by applying the formula:

$$T_{0.5\text{-}1kHz} = a \times \lg(V) - b \text{ (s)} \quad (1),$$

where V is a room volume; a is the constant of the lower limit of reverberation time for rooms where quiet acoustic music is performed; b is the constant of the upper limit of reverberation time where quiet acoustic music is performed. In rooms with the volume up to 3000 m^3 a = 0.55, b = 0.45. In rooms with the volume over 3000 m^3 a = 0.75, b = 0.65.

Sound strength (G) was obtained by calculations (Rindel, 2014, 2022), using the formula:

$$G = 31 + 10 \lg \left(\frac{4(1-\alpha_m)}{\alpha_m S}\right) \text{ (dB)} \quad (2),$$

where S is a mean area of room surfaces, α_m is a mean factor of sound absorption which characterises the factor describing the acoustic absorbing efficiency of a material (NS 8178).

The mean area of room surfaces was estimated by using the known room volume (Rindel, 2014, 2022):

$$S = 7.36 * \left(\frac{V}{1.28}\right)^{2/3} \text{ (m}^2\text{)} \quad (3).$$

The mean factor of sound absorption was estimated (Rindel, 2014, 2022):

$$\alpha_m = \frac{0.161 * V}{T * S} \quad (4).$$

Results

The acoustic measurements were carried out in ten small rooms (> 300m^3): one room of average size and in nine large rehearsal rooms (> 700 m^3). The characterisation of rehearsal rooms is given in Tables 1 and 2.

There were seven halls with stages. The area of the stage in one hall (No 20) was larger than 70 m^2. The small and average size rooms were predominantly classrooms, but there were larger rooms that had stages or platforms. Walls were decorated mainly with painted plaster, but the floors were primarily parquet in nature. The ceilings were also mostly painted plaster (n = 11), and the drop ceilings (n = 8). Only

one room was completely empty with no furniture (No 6). In the remaining rooms there was sufficient furniture functional for the purposes of the room (chairs and benches for listeners), and in all of the rooms there were pianos.

Table 1. Characterisation of choir rehearsal rooms

Room No	Stage	Walls	Floor	Ceiling	Other
1	No	Wallpaper, one window with blinds	Parquet	Plaster	A classroom. There are a lot of books, notes, concert costumes in the room
2	No	Painted plaster, windows with blinds along one wall	Linoleum	Drop ceiling	Painting studio and music classroom. There are materials for painting (paper, easels, exposition vessels) in the room
3	No	Painted plaster, windows along one wall, a thin curtain, wooden door	Painted boards	Concrete	Music classroom. There are desks, chairs, musical instruments in the room
4	No	Painted plaster, windows along one wall, roller blinds, wooden door	Parquet	Drop ceiling, painted plaster	A meeting-room. A big wooden table in the middle, round it – chairs upholstered with leatherette
5	No	Painted plaster, windows along one wall, drawn roller blinds	Laminate	Drop ceiling	A classroom. There are wooden desks and chairs in the room, and built-in closets at the end wall
6	Is, without a curtain, height 0.6 m	Painted plaster, windows along one wall	Linoleum	Painted plaster	Music school hall. There is no furniture in the room
7	No	Painted plaster, windows along one wall, thin curtains	Parquet	Painted plaster	Choir rehearsal room. There are wooden closets, upholstered chairs in the room
8	No	Wallpaper, windows along one wall, fabric blinds	Linoleum	Painted plaster	A classroom. There are desks and chairs with soft upholstering in the room
9	No	Painted plaster, windows along one wall, fabric blinds, a textile décor at the back wall	Painted boards	Painted plaster	A classroom. Desks in the room are arranged on steps
10	Is, without a curtain, height 0.7 m	Painted plaster, windows along the side wall and wall opposite the stage covered with blinds, wooden door	Painted boards	Drop ceiling, painted plaster	A primary school hall. There are wooden tables and chairs with a soft upholstering in the room
11	No	Painted plaster, windows along one wall, with both fabric roller blinds and thin curtains. Wooden door	Parquet	Drop ceiling, painted plaster	A culture house hall. Upholstered metal chairs along the walls of the hall.

Room No	Stage	Walls	Floor	Ceiling	Other
12	No	Painted plaster, decorative fabric elements at one wall, windows along two walls, light curtains	Parquet	Painted plaster	A culture house hall. Two columns in the middle of the hall
13	Is, curtain, wings, thin fabric hangings along the back wall, the height 0.4m	Painted plaster, windows along one wall, covered with light curtains	Parquet	Painted ceiling with decorative wooden beams	A music school hall. A grand piano covered with a thick cloth in the middle of the stage
14	Platforms at the sides of the hall, no curtain	Painted plaster, sound muffling panels, opposite the stage big windows with blinds, glass doors at both ends	Parquet	Drop ceiling	A secondary school hall. There are desks and chairs in the room
15	No	Painted plaster, windows with thin curtains along two walls	Parquet	Drop ceiling painted plaster	A culture house hall. Three columns in the middle of the room
16	Is, curtain, the stage partly covered up with a screen. Stage height 0.9m	Painted plaster, windows along two walls, windows are partly covered with roller blinds and thin curtains	Laminate	Drop ceiling	A secondary school hall. Rows of sot chairs along the walls
17	Is, without a curtain	Painted plaster, big windows along two walls, without curtains	Parquet	Painted, slightly bent ceiling with decorative elements, several big chandeliers	A university hall. Soft chairs
18	Is, a curtain, stage height 1m	Plastered walls, plaster panels at a height of 2.57 m from the floor. Windows along two walls of a hall	Parquet	Painted plaster with decorative beams	A secondary school hall. A balcony opposite the stage
19	is	Painted plaster walls, big windows behind the stage and along one wall of the hall, a big wooden closed door opposite the stage which connects the hall with another room. Big paintings on the walls.	Parquet	Painted plaster with decorative elements, chandeliers	A secondary school hall. A balcony opposite the stage
20	Is, with a curtain, stage height 1m	Painted plaster, big windows along one wall, partly covered with blinds	Parquet	Wooden, with decorative elements, big chandeliers	A culture house hall. There are upholstered chairs in the room

Table 2 shows measurement data (*h*, V, T30), which are supplemented with data obtained by calculations (S, a_m. G). The data obtained in calculations comply with the criteria established by the ISO standard for choir rehearsal rooms with regard to the duration of reverberation time and sound strength (G).

Table 2. Choir rehearsal room height (h), volume (V), average reverberation time (T30), field of surfaces (S), average sound absorption factor (a_m), room strength (G) and upper and lower limits of reverberation time established by the standard ISO 23591 (2021)

Room No	*h* (m)	*V* (m^3)	$T30_{0.5\text{-}1kHz}$ (s)	*T30 (ISO 23591:2021)* (s)		*S* (m^2)	α_m	*G* (dB)
				Lower limit	*Upper limt*			
1.	3.5	70	0.53	0.56	0.73	106	0,20	23
2.	2.6	112	0.59	0.68	0.89	145	0,21	21
3.	3.0	127	0.8	0.71	0.93	158	0,16	22
4.	3.5	129	0.9	0.71	0.93	159	0,14	23
5.	2.8	158	0.44	0.76	1.00	182	0,32	17
6.	2.8	188	1.76	0.80	1.06	205	0,08	24
7.	3.4	189	0.84	0.80	1.06	206	0,18	21
8.	3.4	200	1.11	0.82	1.08	214	0,14	22
9.	3.9	214	1.53	0.83	1.10	223	0,10	23
10.	3.5	251	1.13	0.87	1.15	248	0,14	21
11.	3.4	437	1.66	1.00	1.33	360	0,12	20
Room No	***h* (m)**	***V* (m^3)**	**$T30_{0.5\text{-}1kHz}$ (s)**	***T30 (ISO 23591:2021)* (s)**		***S* (m^2)**	**α_m**	***G* (dB)**
				Lower limit	***Upper limt***			
12.	3.9	742	1.88	1.13	1.50	512	0,12	18
13.	4.5	790	1.67	1.14	1.52	534	0,14	18
14.	5.2	1021	1.02	1.20	1.61	633	0,25	14
15.	3.7	1091	2.04	1.22	1.63	662	0,13	17
16.	4.7	1181	0.86	1.24	1.65	698	0,32	12
17.	5.3	1389	1.57	1.28	1.71	777	0,18	15
18.	6.6	1778	2.48	1.34	1.79	916	0,13	16
19.	8.2	2138	3.25	1.38	1.85	1036	0,10	16
20.	7.5	3299	1.96	1.61	2.19	1384	0,20	12

The average height of ceiling in the small rooms was 3.2 m (SD 0.4 m, range 2.6–3.9 m), in rooms of an average size – 3.4 m, in big rooms – 5.5 m (SD 1.6 m, range 3.7–8.2 m). The average room volume in the small rooms was 164 m^3 (SD 55 m^3, range 70–251 m^3), in the rooms of average size – 437 m^3 and in large halls – 1492 m^3 (SD 815 m^3, range 742–3299 m^3). The average reverberation time in small rooms was 0.96 s (SD 0.43 s), in rooms of average size – 1.66 s and in larger ones – 1.86 s (SD 0.72 s).

The upper and lower limits of room reverberation time were obtained by calculations. One rehearsal room (No 20) satisfied the criteria for concert halls established by ISO 23591 (2021). Therefore, the upper and lower limits of reverberation time for this room were calculated by using other coefficients. The average reverberation time $T30_{0.5\text{-}1\ kHz}$ of six rooms (No 3, 4, 7, 10, 17, 20) complied with the limits established by ISO standard 23591 (2021).

The average area of room surfaces and sound absorption were obtained by calculations, and then were used to estimate the strength of sound amplification of the room. The average area of surfaces increased with the increase in room volume and, respectively, in small rooms it was 185 m^2 but in larger ones 794 m^2. The coefficients of sound absorption in small and larger rooms were similar – 0.17 and 0.18, respectively. Smaller rooms amplified the sound stronger than the larger ones, 22 dB and 15 dB, respectively.

Discussion and Conclusions

This research characterises acoustic properties of choir rehearsal rooms in one city and region. Though the measurements were not carried out in all rooms where the rehearsals took place, the sample of rooms are sufficient to represent the locations normally allotted for choir rehearsals. This sampling is representative not only for previously described city and region, but also for Latvia in general because places chosen for choir rehearsals are the same over the country – halls and music classrooms of education institutions, as well as bigger and smaller halls of houses of culture. In some individualized cases such as room No. 2 that was used as an example, the choir rehearsal rooms were shared with other interconnected educational activities.

Within the framework of this research, the physical parameters and reverberation time of rooms were measured, while the rest of the data examined sound strength, area of surfaces, coefficients, and the matter of absorption obtained by calculations. It is essential to emphasise that sound strength (G) obtained in calculations complied with G values established in ISO standard 23591 (2021_ with regard to room volume and reverberation time.

Usually, a choir or ensemble chooses rehearsal rooms according to the number of singers it is comprised of. Larger choirs rehearse in bigger rooms and smaller choirs, or voice groups hold their rehearsals in a smaller space. More than likely, for the conductors the height of ceiling does not serve as an important criterion in selecting rooms. Our research indicated that the height of ceiling in the rehearsal rooms under study did not correspond to the height indicated in the [ISO] standard. Thus, in small rooms, the height of the ceiling must be above 3.5 meters. However, only four rehearsal rooms (No 1, 4, 9, 10) satisfied this criterion. Similarly, in larger rehearsal rooms, only in 5 out of 9 rehearsal rooms the height of the ceiling reached the height established in the standard (≥ 5 m).

Our research shows that halls or rooms, where the height of ceiling is sufficient, are situated in buildings that were built during the pre-war or post-war period of WWII. It should be mentioned that rooms No 7 and 11 are also located at the Liepaja Latvian Society building that was built in 1934. However, it is surmised that the architect of this building did not plan to have choir rehearsals in them. This observation leads us to the conclusion that many other rehearsal rooms have not been selected by purposely taking into consideration the specific requirements of choir rehearsals, but have been used and adjusted to the needs of choirs. The height of rehearsal room ceiling influences sound quality, a balanced coloratura, by reflecting from the surface (Rindel, 2014).

Knowing the acoustical parameters of rooms, we may try to model different situations for choirs of different compositions. For instance, we will want to find out how large, and with what reverberation time rehearsal room will be necessary for a women's choir with 32 singers (sopranos and altos), so that the loudness of singing at singing *forte* would be with 85–90 dB intensity. The sound in this space should be neither too diffused nor dry (this is determined by the optimal reverberation time), and the singing should be neither too loud nor too quiet (this is determined by the amplification of room or sound strength). According to Rindel (2022), choir singing will be the best under conditions where reverberation time is in balance with sound amplification of the room.

To meet these requirements, it is necessary to know the loudness of the specific women's choir sounding or sound power level (L_w) at singing *forte.* L_w characterises the sound strength produced by the choir, taking into consideration the environmental factors. For this purpose, the applied formula (Rindel, 2014) will be:

$$L_w(f) = 90 + 10 \log \# n_s k_s + n_a k_a \text{ (dB)} \quad (5),$$

where n_s is the number of sopranos (n = 16), n_a is the number of altos, k_s is the sound power level for sopranos (constant value 5.0), k_a is the strength factor for altos (2.0) (ISO 23591, 2021).

The calculations show that the sound produced by a choir singing loudly corresponds to 110 dB. Further, it is necessary to elucidate what conditions, and which hall are the best for this choir to have their rehearsals so that its sound would correspond to 85–90 dB of intensity – diapason. If the limits of sound pressure level (L_p) and L_w value are known, the necessary sound amplification of the room can be calculated by applying the formula (Rindel, 2014):

$$L_p (f) = L_w (f) + G - 31 \text{ (dB)} \quad (6).$$

The final result of this research shows that in singing loudly, this women's choir will reach the sound pressure level of 85–90 dB, if they have rehearsals in halls where the sound is amplified within the limits of 6 to 11 dB. Such optimal dynamic sounds can be achieved by choosing rooms for rehearsals which are no smaller than 3000 m^3 and have at least 2 s long reverberation time. Of all the halls included in our research, the most adequate for this choir would be hall No 20 whose size is 3299 m^3 and T30 – 1.96 s. Singing in this hall, the choir sounding at singing *forte* would be close to 90 dB. Singing in larger halls, sound pressure level perceived by the listeners would reduce to 85 dB.

If the above choir rehearsed in hall No 17, whose volume is 1389 m^3, T30 is 1.57 m and sound strength is 15 dB, the sound pressure level L_p (f) produced by the choir would be 95 dB. If the sound level at singing *forte* is higher than 90 dB, this implies that at singing *fortissimo,* the sound level will reach beyond 100 dB, which might involve risks of auditory impairments. The dynamic range of choir singing (from *pp* to *ff*), the sound level at singing *fortissimo* including, depends on chorister's professional preparedness, the number of singers and room acoustics (Ternstrom, 1991). One of the ways how to reduce loudness of singing in hall No 17 might be the enlargement of the area of absorbing surfaces, thereby decreasing reverberation time and sound strength G (Rindel, 2014). However, the duration of reverberation time should not be shorter than the lowest limit indicated in standard ISO 23591 (2021), since this study

concludes that if a singer sings in space with an explicit absorption, the position of the larynx and technique of singing changes, which might cause damage to the singer's vocal health (Ternstrom, 1991). If the conductor chooses to reduce the number of singers in the choir, this would not produce essential changes in the joint sounding of the choir, since a double reduction of the number of singers will decrease the sound level only by 3 dB (Ternstorm, 1991). The third variant is to improve choristers' ability to manage the loudness of their voices by using various vocal techniques. In this case as to avoid strenuous vocal efforts, ergonomics of voice should be taken into consideration.

In conclusion, the author of this study wants to emphasise that space is an essential factor where the sound created by the choir lives and meets its listeners. The life of the song performed is short. It lives until the last note, until the singer's voice dies away, and it disappears with the last vibration in space. What remains is elusive sensations and emotional experience left upon the listeners by the compositions, which later transform into memories about what has been heard. Space with its acoustic properties, is a song's way to a listener. Hence, conductors should pay attention not only to the choice of compositions and the professional preparedness of singers, but also to the essential, and crucial, factor of the choice of adequate rehearsal and concert rooms, the arrangement of choristers in the room, and length of reverberation time.

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