RESEARCH ON IMPACTS OF ARTS EDUCATION

GERMAN-DUTCH
PERSPECTIVES

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Contents

Preface

Research on arts education and the corresponding international scientific exchange are still underrepresented fields. To reduce both failings is an important aim of the Council for Arts Education [Rat für Kulturelle Bildung e.V.], which is promoted by seven German foundations (Bertelsmann Stiftung, Deutsche Bank Stiftung, Karl Schlecht Stiftung, PwC Stiftung, Robert Bosch Stiftung, Stiftung Mercator, Stiftung Nantesbuch). With this in mind, the German-Dutch Colloquium on research into the impacts of arts education, which was held from 6 April to 7 April 2017 in Amsterdam, was a perfect opportunity to support the bilateral scientific exchange on research results, ideas and pursuing questions which concern researchers in both neighbouring countries in the field of arts education. We especially would like to thank the German Federal Ministry of Education and Research [Bundesministerium für Bildung und Forschung, BMBF] that we can document the contributions of the colloquium with this publication.

Among the following articles, we are happy to be able to present two articles from within our ranks of projects funded by the Research Fund for Arts Education [Forschungsfonds Kulturelle Bildung], which is a project by the Rat für Kulturelle Bildung e.V., supported by the Stiftung Mercator. Namely 'JuArt' (Marina Stuckert, Ivo Züchner), which analyses educational processes in youth art schools, and 'MusiCo' (Sascha Schroeder, Lorenz Grolig), a project that evaluates the transfer effects of preschool musical training on language skills. Furthermore, this publication contains a retrospective article from Eckart Liebau, chairman of the Council for Arts Education [Rat für Kulturelle Bildung], another project by the Rat für Kulturelle Bildung e.V.

Through the international cooperation and dialogue between Dutch and German institutions and projects in the field of arts education, this publication, together with the preceding colloquium and possible future projects, aims at the enforcement of empirical research in arts education on an international level. We hope that further productive collaborations will follow!

WINFRIED KNEIP
Board Member, Council for Arts Education [Rat für Kulturelle Bildung e.V.]

Preface

Arts (or cultural) education is an important enabler of social participation and the strengthening of non-cognitive skills and as such fosters development of the individual. To succeed in this, arts education activities must be of sufficient quality. And in order to ensure and continue to raise the level of quality, excellent research on arts education is vital. Such research is also a key driver of innovation.

The Federal Ministry of Education and Research [Bundesministerium für Bildung und Forschung, BMBF] therefore provides targeted support for research on arts education. The BMBF currently provides a total of approximately 6 million euros each year under two funding calls, with more such calls to follow. The aim is to give research on arts education a prominent, established position in education research. Arts education research needs a high level of quality to attain the level of debate in other areas of education research and in the public discourse. The international dimension is an important factor in this context. The German-Dutch Colloquium, which was organized jointly by the Netherlands National Centre of Expertise for Cultural Education and Amateur Arts [LKCA] and the BMBF, provided important impetus. This volume is proof of the success of the colloquium and the fruitfulness of such international exchanges of views. It is also highly gratifying that excellent contacts were made which will lead to follow-up activities.

Arts education also helps us to understand our cultural references and our shared cultural heritage. International exchange and cooperation in the field of arts education not only serve to increase the quality of research but also to increase mutual understanding. Particularly at a time of increasing right-wing populism and nationalism, it is important to engage in a cross-border dialogue on arts education, about what it constitutes and how we can develop it further.

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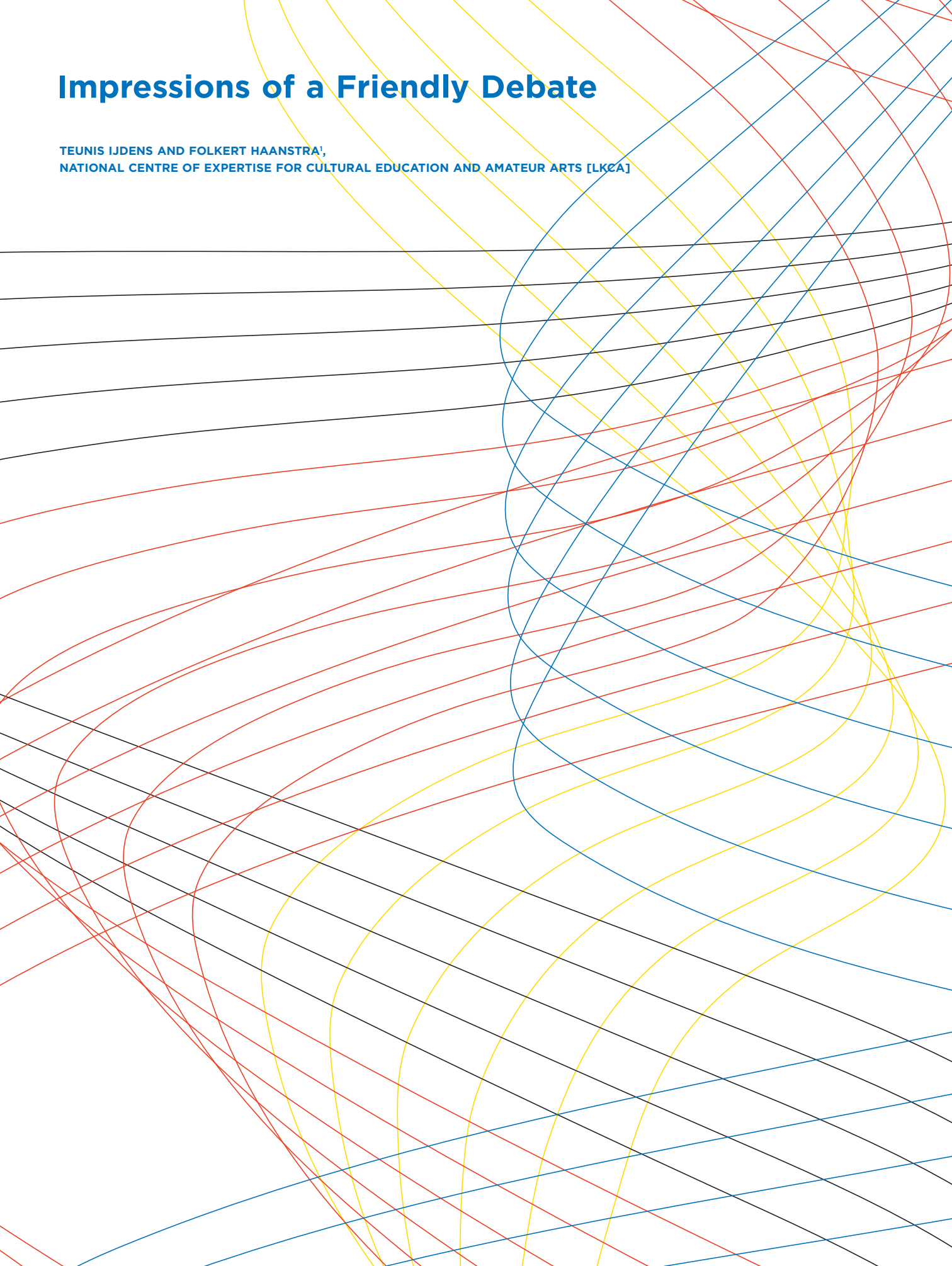
CHAPTER I
INTRODUCTION

Impressions of a Friendly Debate

TEUNIS IJDENS AND FOLKERT HAANSTRA[1],
NATIONAL CENTRE OF EXPERTISE FOR CULTURAL EDUCATION AND AMATEUR ARTS [LKCA]



INTRODUCTION

In April 2017 the German Federal Ministry of Education and Research [BMBF] and the Netherlands National Centre of Expertise for Cultural Education and Amateur Arts [LKCA], in close cooperation with the Mercator Foundation and the Dutch Ministry of Education, Culture and Science, organised a German-Dutch Colloquium on research into the effects of arts education. The aim of the Colloquium was to critically reflect and discuss research questions, concepts, theoretical assumptions, findings, and directions for further research in this area.

The Colloquium had its origin in a discussion following the presentation of preliminary findings of a number of research projects regarding impacts of arts education at the Research Conference 'From Myths to Insights?' [Von Mythen zu Erkenntnissen?] in Wolfenbüttel, October 2016.[2] The conference was organised by the Council for Arts Education [Rat für Kulturelle Bildung e.V.] in collaboration with the Network for Research in Cultural Education [Netzwerk Forschung Kulturelle Bildung] and the Federal Academy for Cultural Education [Bundesakademie für Kulturelle Bildung]. Some of the research projects received funding from the Research Fund for Arts Education [Forschungsfonds Kulturelle Bildung]. This Fund was established in 2015 by the Council for Arts Education [Rat für Kulturelle Bildung e.V.] and it is supported financially by the Mercator Foundation and additionally since 2017 by the Karl Schlecht Foundation. Several issues were briefly addressed at this conference: the advocacy context of the research; its theoretical and methodological qualities; and its value for arts education practice at school and in non-formal settings. Representatives of the BMBF, Mercator Foundation, and the LKCA who were present at this occasion agreed that it would be a good idea to continue the debate in a special German-Dutch Colloquium.

RESEARCH CONTEXT

Research into the impact of arts and cultural education can serve several objectives. First, it can provide practitioners and institutions in the field with insights into the effects of pedagogies and teaching methods, in order to improve or innovate practice. Second, impact research can be primarily theory-driven, e.g. exploring foundations of learning in the arts compared to learning in other domains in order to understand what 'learning' means. However, in the last decades both of these drivers of research into the impacts of arts education appear to have been eclipsed by advocacy needs of the arts and cultural education field. Assuming that the acquisition of artistic and aesthetic skills and knowledge is not enough to convince politicians, private donors and the public of the value of arts education, research increasingly focused on benefits *beyond* the unique qualities of arts and cultural education. The research programme of the Research Fund for Arts Education carries the traces of a mixed context, but the press release that called attention to its results clearly puts these in the advocacy frame: *'New evidence for positive impact of cultural education.'*[3]

Research presentations and discussions at the Colloquium reflected the mixed context outlined above. Two issues emerged as the most prominent: the motives,

methods, and merits of research into so-called transfer effects of arts and cultural education; and the uses of research for practice, i.e. the adaptation and incorporation of findings and insights into arts teaching and cultural education practice at school and out-of-school.

TRANSFER

Since Frances Rauscher and others coined the 'Mozart-effect' in 1993,[4] a wave of research for advocacy-purposes has swept the field, claiming various positive effects of arts education for individuals and society far beyond learning skills and competences in the arts. Transfer studies were critically reviewed in the OECD report 'Art for Art's Sake? The Impact of Arts Education' . It included research publications with regard to cognitive, motivational, creativity and social outcomes of arts education. The report found some promising results, but the overarching conclusion was that the claims about cognitive and social benefits of arts education far exceeded the available evidence. According to the authors, future research priorities should focus on better methodologies for impact studies and even more important, on developing sound and testable theories about why and how arts education would have an impact on various cognitive and social outcomes.

The authors also stated that arts education policy should not be based on instrumental non-arts outcomes of arts education, whether or not these outcomes can be demonstrated. They stress the need to distinguish between core justifications for teaching the arts versus ancillary instrumental reasons. Core justifications are about learning in the arts disciplines. Therefore, they further recommended to focus future research on examining the relative effectiveness of different kinds of pedagogies in different arts forms for the acquisition of artistic and aesthetic skills and knowledge.

The OECD review criticised the often insufficient theoretical and methodological quality of available empirical-statistical transfer studies. Christian Rittelmeyer has likewise criticised that many studies regarding transfer effects of arts education do not pay due attention to the phenomenon of aesthetic experience itself, and he proposed a phenomenological approach in order to overcome this. Rittelmeyer contends that 'probably all arts education implies a training of cognitive, social, emotional and bodily qualities that have a practical meaning far beyond the arts domain'.[6] In fact this does seem to come close to the approach of the Project Zero at Harvard Graduate School of Education.[7] This research also starts from careful observation of the sensory and cognitive aspects of actual aesthetic experience and artistic activity (e.g. listening, watching, concentrating, paying close attention, analysing sequences, comparing actual situations in relation to imagined results and vice versa, etcetera). Both the Project Zero team and Rittelmeyer draw attention to the plausibility of various so-called 'near transfer' effects: from drawing to understanding circuit diagrams, from drama to self-confidence and empathy, from dance to spatial awareness, etcetera.

At the Colloquium, three German transfer studies were presented: two of them funded from the Research Fund for Arts Education, the third by the BMBF. Sascha Schroeder and Lorenz Grolig studied how language skills can be fostered in pre-

school by comparing music training with a language programme. Marina Stuckert and Ivo Züchner studied the impacts of cultural education (fine arts, music, dance, theatre, and media) in youth arts school on personal and social development (e.g. perspective taking) through self-reports. Ludwig Stecher and Katrin Knoll studied the effects of arts education projects on secondary level students' creativity. Two aspects of creativity were measured: creative thinking through a standard test and creative learning style through self-reports.

The outcomes of these three studies are in line with conclusions of the OECD review regarding 'near transfer' effects. There is initial evidence of music education strengthening phonological skills and of theatre classes enhancing perspective taking. However, despite the general opinion that arts education fosters creativity, effects on creativity have not been clearly demonstrated in research. The OECD review notes that the limited way in which creativity has been measured—using general tests that do not differentiate between domains like (e.g.) arts and science, or between visual arts and music—may be a possible reason for this. Stecher and Knoll used a cross-domain instrument as well to measure creative thinking, and they considered this a possible shortcoming in their study. For research into the impact of arts education on creativity, the distinction between generic and domain-specific concepts and measurement of creativity is an important point of discussion.[8]

In the Netherlands, transfer studies have also received funding from non-academic sources, for instance the Ministry of Education and Culture, the Cultural Participation Fund, and the Amsterdam Centre of Expertise for Cultural Education (MOCCA). The latter co-funds a research project by Artur Jaschke who investigates the effects of music education on executive brain functioning with primary school children over a period of two to three years. Executive brain functioning underlies cognitive processes in learning mathematical and language skills. Therefore, if music stimulates executive brain functioning, it will contribute to these skills. This research into cognitive 'far transfer' typifies the neuroscientific turn in transfer studies. One of the issues discussed was whether transfer studies should take into account the specific content and pedagogy used in the arts activities. According to Jaschke, it is justified to study effects of musical activity (including any kind of music education) in general. Others reject this 'black box' approach because it does not help to improve teaching, and because they expect that different ways of learning and teaching (for instance improvisation, composition, or choir-singing) will make a difference.

In the discussion, a further question arose whether positive transfer results justify 'indirect' teaching: teaching arts in order to achieve effects in other domains. It was acknowledged that both in Germany and in the Netherlands policy makers have been strongly interested in non-arts benefits of arts education in the last decades. However, it was also believed that there is now a tendency to focus more on 'intrinsic' values of arts education. As far as teachers are concerned the opinions on instrumental effects of arts education differ. It was stated that teachers at youth art schools have an 'artistic self-perception'. They favour arts-related goals for their students and consider instrumental outcomes as possible side-effects. On the other hand, general teachers in kindergarten and primary schools consider the general development of their pupils as their main goal and the arts can be instrumental in this. So if music education is an engaging activity for children and has positive effects on language acquisition this is as important as improving musical skills as such.

DIFFERENT PEDAGOGIES: OPERATIONALISATION AND EFFECTS

Other studies presented at the Colloquium focused on arts teaching and learning and intend to contribute to improved and innovative practice, particularly through developing teachers' skills in arts pedagogy and pedagogical skills in teaching arts and in assessing their own and pupils' achievements. Michel Hogenes studied the effects of music composition as a classroom activity on engagement in music education and academic and music achievement. Marianne Boogard, Liselotte van Loon-Dikkers and Marieke Buisman take part in the Dutch contribution to the OECD project 'Assessing progress in creative and critical thinking skills in education', Andreas Lehmann-Wermser and Benjamin Weyel developed and tested a new (digital) feedback method for music teachers. Edwin van Meerkerk tried to capture how general primary school teachers reflect upon their skills in arts teaching through solicited log books.[9]

A crucial question in Hogenes' research was how classroom teachers and music specialists can discover, nurture, and stimulate musical talents of children by implementing musical composition as a regular class activity. Composing is rarely part of the regular music lessons. One of the reasons is that in the Netherlands few primary schools have music teachers or other music specialists. Hogenes developed a pedagogical model, based on Cultural-Historical Activity Theory, in which the concept of 'play' is a key element.[10] With this model, every primary school general teacher should be able to compose music with his or her students.

The OECD project 'Assessing progression in creative and critical thinking skills in education'[11] is concerned with the impact of mathematics and visual arts education on students' creative ability and critical thinking. Boogard, van Loon-Dikkers and Buisman are members of the research team at the Kohnstamm Institute, the OECD's Dutch partner in this project. It involves developing special lessons as well as rubrics (i.e. an assessment tool[12]) to monitor students' improvement in the intended skills. The title suggests a transfer study, but the emphasis is on how *teachers* can stimulate and assess creativity.

One question following this presentation alluded to the OECD's alleged 'neo-liberal' and economic approach to education: Were teachers critical and hesitant to cooperate because of this? According to the researchers, teachers were quite positive. 'They very much liked to participate in a visible platform and an international programme, and especially to share lessons through a database that will be accessible all over the world.' The applicability of the rubric for teachers was another point of discussion. The original rubric for assessing creativity was a generic, cross-domain tool (as in in the study by Stecher and Knoll) but teachers found it hard to apply. In education, there is too little transition from general skills to specific courses and learning domains. Therefore, the researchers decided to develop two domain-specific rubrics: one for mathematics, the other for arts. Lessons and the assessment instrument were developed more or less simultaneously. This helped the teachers to assess students' achievements and to explain to the students why they received a certain score.

Lehmann-Wermser and Weyel developed and tested a technology-based feedback system for teachers for the assessment of pupils' musical competencies. 'In more general terms the project was to research possibilities for implementing digital

media (tablets) in one sector of music teaching.' Questions about this project firstly referred to the applicability of the digital assessment tool for teachers, because it requires some technical and statistical abilities. The researchers acknowledged that they have 'certain unanswered questions' regarding the statistical literacy of teachers, their capacity to select relevant information from many data, and to integrate formative assessment results in subsequent teaching. 'We have always intended this as a practical tool to be taken into everyday/weekly teaching [but] problems and questions we ran into are much more complicated than we thought.' The assessment of different ways of music making, other than classical music, was another point of debate. However, the basic idea of the assessment tool is 'that to come to the point of lively music making and good "deviant" timing, you need to be able to be precise *before* that'. Their tool is not intended to train students in making good music 'but to provide teachers with a tool to help students on the way to good music-making'.

Van Meerkerk in his contribution states that professional development of general teachers, such as learning to teach arts, requires a transformation of their professional identity. Self-recording through logbooks is a way to reveal the development of the teacher's identity. General primary school teachers were trained in the arts as part of the policy programme Quality Cultural Education (QCE). Conclusions were that teachers handled the logbooks in different ways, rather strict or loosely, but that this does not affect their learning. A question was raised regarding the impact of the self-recording procedure: 'Could you tell from the log if a teacher was learning transformatively or not?' Van Meerkerk replied that 'the disappointing part was that there wasn't any transformative learning at all'. He thinks this had its origin in the first stage of the project: defining the problem. 'The QCE programme usually just came to a school, but the teachers weren't really aware of the goals.'

CONCLUDING REMARKS

In this contribution, we have given our impressions of questions and issues that were discussed at the Colloquium. The following remarks summarise our observations and our position with regard to research into the effects of arts education.

In our view, transfer studies too often arise from, or are embedded in, an advocacy context. The research is initiated and funded because it is supposed to possibly confirm various benefits of arts education. Advocacy-driven transfer research does not really start from the social, political, cultural or educational challenges and benefits that arts education is supposed to resolve and produce. The contested status of arts education is the real reason behind it. As a consequence, research questions start from assumptions regarding the impact of arts education on various desirable outcomes—never on possible negative outcomes—and not from an analysis of the problems and challenges that arts education is supposed to tackle. If the weak status of arts education is the problem, one should first need to know about its causes and investigate possible remedies, and then develop remedies that promise to raise its status. Research that confirms various non-arts benefits may be such a remedy. However, it should be noted that what is really at stake here is not

that arts education produces non-arts benefits, but that non-arts benefits help to raise the value of arts education.

Having said that, transfer effects of arts education are a challenging area of scientific research in its own right as long as researchers resist the advocacy context and focus on the conceptual, theoretical and methodological problems of transfer from one type of experience, activity, knowledge and skills to another. This certainly applied to the researchers who presented their projects at the Colloquium. Above we have given examples of general approaches to transfer issues that remain aloof from advocacy-interests: the Project Zero inquiries into artistic and aesthetic cognition, and Christian Rittelmeyer's phenomenology of concrete artistic and aesthetic experiences and activities. These approaches have in common that they start from the artistic and aesthetic (learning) activity and focus on generic sensory, cognitive and emotional skills that are involved in this activity and possibly stimulated by it, without taking these as desirable benefits that serve to justify the artistic and aesthetic activity. Neuropsychological transfer research can follow the same path. Yet, even when researchers are purely interested in theory and methodology, and stick to scientific procedure during the research and in presenting their findings and conclusions, the 'context of justification' explaining the applicability of research findings in the real world may degenerate into a 'context of advocacy' as communication specialists take over from researchers.

Next to the impact of arts education, especially music education, on executive brain functioning, the effect of arts education on creativity has become a much debated issue in arts education research. Here, the general discussion about transfer research applies as well: what is the real problem, and how does arts education relate to it? The OECD has a quite clear perspective on creativity as a core competency for innovation and on the need to promote creative learning in formal education.[13] Developing evidence-based pedagogies to stimulate creativity is part of its strategy, and the arts are included in the OECD's educational research programme because it is one of the domains where creativity is supposed to play an important role in learning processes and to be an important product of learning. Yet the impact of the creativity as a 'moral imperative' in late modern contemporary society also requires examination from another, critical perspective.[14]

A final remark concerns the so-called 'gap between research and practice'. Even though the presented studies on arts education pedagogies showcased promising innovations, there remains a gap between research outcomes and the implementation of new pedagogies in everyday practice. The simple Research Development Diffusion model, stating that teachers who are informed or taught about research findings will act accordingly, has proven unfruitful.[15] Teachers and researchers should cooperate, and strict boundaries between their professional roles should give way to a mixed zone of inquiry and learning.

CHAPTER II

RESEARCH PROJECTS

Fostering Language Skills in Preschool Using Musical Training: Opportunities and Challenges

SASCHA SCHROEDER, LORENZ GROLIG

INTRODUCTION

Listening to music and making music are two very popular activities for children and adolescents. For 87% of adolescents in Germany, listening to music is important or very important and about 25% are musically active in a choir or band.[16] Thus, music activities are among their most popular leisure time activities. Moreover, a recent study shows that about one third of adolescents nominate music education as their favourite school subject.[17] From a pedagogical perspective, music education is often seen as beneficial for pupils' development. Early music education is for many children the first setting in which they make music in interaction with peers. For many children, this is the starting point for the acquisition of more advanced music skills. In addition, early music education fosters the ability to perceive and enjoy music with all senses. Thus, early music education is also fundamental for the participation in cultural practices.

However, the assumption that early music education has positive effects in non-musical domains has not yet been backed up by sufficient scientific evidence.[18] To date, there are only a few studies which investigated empirically how early music education affects cognitive processes. In particular, there is not much evidence concerning positive transfer effects on non-musical domains, as for instance language and reading development. Several studies point to the possibility of such transfer effects.[19] However, it is unclear which language and music abilities are possibly involved, and what the underlying mechanisms could be.

In order to close these research gaps, we conducted two studies which drew on concepts and methods of developmental psychology, musicology, and linguistics. Our guiding research questions were:

1) Are language and music abilities interrelated in early childhood?
2) Is there a causal connection between early music education and the development of language and reading skills?

To answer the first research question, we conducted a pilot study with 44 children. The children were five to seven years old and were assessed in a broad range of music and language tasks. We were interested in the relations between the different music and language measures and in age differences. Additionally, we tested 20 adults with the same measures as a comparison group. To answer research question two, we conducted an early music education intervention study.

METHOD

202 children participated in the first measurement point of the intervention study. Children were in average five years and four months old (range between four and six years). We recruited the participants from 15 child care centres from all over Berlin. These child care centres did not have a special focus on fostering language or music abilities. Apart from the early music education group, there were two control groups which allowed us to differentiate between developmental and intervention effects in this longitudinal study. Each child care centre was assigned to one of three conditions before contacting them: early music education, emergent

literacy intervention (active control group), and no additional intervention (passive control group). By this randomisation, we made sure that there were no systematic differences between the experimental groups prior to the study. Thus, the expected differences between groups could be attributed to the specific interventions. We included an active control group because previous studies have shown that any additional activities can have a positive effect, regardless of the specific programme contents.

Contents and Implementation of the Intervention Programmes

Both intervention programmes were based on established concepts and materials which have been in use for many years in the fields of early music education and language intervention[20], respectively. The early music education programme encompassed a selection of exercises which aimed to foster the perception of sounds, rhythm and melody skills, and synchronisation to music. The language programme combined language games (e.g. rhyming, phoneme discrimination) with dialogic reading. It aimed to foster precursors of reading (e.g. phonological awareness, vocabulary).

Both the early music and the language programme took place in small groups (3 to 12 children) twice a week for six months, each session lasting for 45 minutes. Interventions were implemented by advanced students of music pedagogy and primary school pedagogy which had acquired some relevant pedagogical experience before joining our study. In order to ensure that the programmes were implemented with an adequate degree of standardisation, we developed an intervention manual according to which each session was conducted. The manuals contained instructions for the realisation of the exercises, descriptions of the exercises, and schedules for the whole programme. Prior to the starting of the interventions, the teaching staff participated in a workshop during which the intervention concept was explained and questions were answered. In order to ensure a high quality of the intervention sessions, we visited several sessions, answered questions, and provided feedback to the teachers. For the evaluation of the implementation quality, teachers filled out a brief questionnaire about the attendance of children, their individual participation (quantity and quality), and the subjective quality of training session implementation.

Assessment of Musical and Language Abilities

There were two measurement points: One right before the start of the interventions (Pre-Test), and a second shortly after termination of interventions (Post-Test). At each measurement point, there was an extensive assessment of language and music abilities. Concerning language abilities, we assessed phonological processing (rhyming, phonemic awareness, verbal short-term memory), vocabulary, syntactic integration, and narrative comprehension. Regarding music, we also assessed different abilities which corresponded to the language measures, namely discrimination of single notes and timbres, discrimination of melodies, harmonic integration, reproduction of rhythms, and synchronisation to excerpts of music pieces. The selection of experimental tasks was based on the hypothesis that early music education first benefits precursors of reading (e.g. verbal short-term memory, phonological awareness, and syntactic integration) which in turn results in a more favourable development of reading acquisition. This could explain the positive correlations

between music education and reading development in previous studies. Importantly, this would allow to draw causal inferences which are precluded by correlational study designs. In order to test potential long-term transfer effects, the children were invited to participate in a third testing session which took place a few weeks after their school enrolment. To eliminate the possibility that third variables cause differences between the experimental groups, parents answered questions about the socioeconomic status, the home literacy environment, and the home music environment.

RESULTS

Relations between Musical and Language Abilities

In our pilot study, we found that five to seven-year-old children have already developed remarkable musical abilities during the transition between kindergarten and primary school.[21] We employed musical and language tasks which corresponded concerning the processing unit, ranging from very small units (e.g. sounds or phonemes) to large units (e.g. excerpts from musical pieces or short narratives). Analysis of interrelations showed that the magnitude of the correlations was in particular strong if the task aimed at the same level of processing. We found statistically significant correlations between the reproduction of rhythms and syllables, and between harmonic and syntactic integration. Based on these results, we selected the test inventory for the intervention study. One aim of the intervention study was to test whether fostering certain musical abilities (e.g. melody discrimination) coincided with beneficial effects on the corresponding language abilities (e.g. phonological awareness).

Effects of Early Music Education and Language Intervention Programme

In a first step, we were interested in identifying whether the intervention programmes had an impact on the development of the children. We tested whether music and language abilities improved between Pre- and Post-Test, and whether the growth in the respective domains was significantly stronger in the specific intervention groups in comparison to the other experimental groups.

Early Music Education

As expected, all children that participated in our intervention study showed a positive development in all musical and language abilities. Moreover, children who had participated for 6 months in early music education showed a significantly stronger development in music abilities than the children from the two other groups. Differences were evident in competencies that were emphasised in the music programme, namely the discrimination of melodies and reproduction of rhythms. Figure 1a illustrates the average development in rhythm reproduction ability for the three experimental groups.

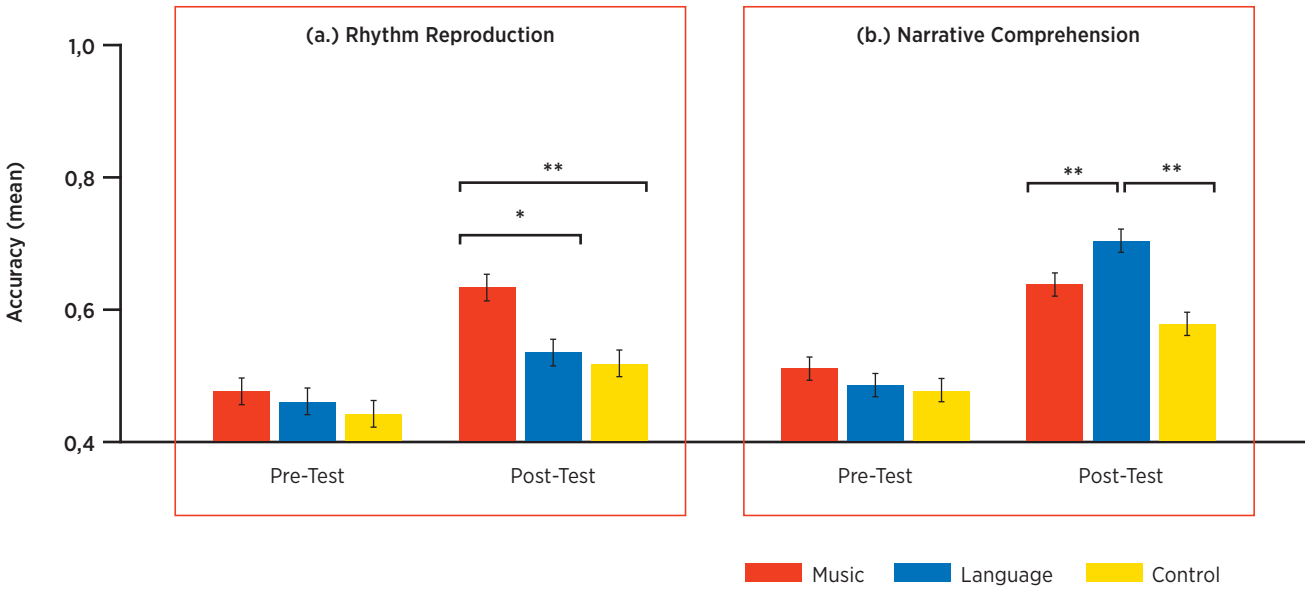


Figure 1.
Effects of the music intervention on rhythm reproduction (Fig. 1a) and effects of the language intervention on narrative comprehension (Fig. 1b). Significant means differences are indicated by ** = p < .01 and * = p < .05. Error bars indicate +/- 1 standard error.

Language Intervention

Similarly to the results of the music programme, children benefitted from the language programme. They showed a significantly larger improvement in competencies on which the programme focused on, namely phonemic and phonological awareness, vocabulary, and narrative comprehension. Figure 1b illustrates the average development of narrative comprehension. Overall, the results indicate that the implementation of the programme was successful in fostering the focal music and language abilities.

Transfer Effects of Early Music Education on Language Development

One main aim of our study was to investigate transfer effects of early music education on the development of reading precursors and identify third variables which could explain this relation. Analyses of the Pre-Test and Post-Test data suggest that there are some transfer effects of early music education on language abilities, particularly in the domain of auditive discrimination (melodies and rhymes)[22]. In both intervention groups, children benefitted similarly concerning their phonological awareness and melody discrimination ability (→ FIGURE 2). The music intervention group showed a significantly larger improvement in melody discrimination ability in comparison to the control group. Children in the language intervention group benefitted similarly (→ FIGURE 2A). Crucially, children which participated either in early music education or language intervention both showed a significantly stronger development in phonological awareness than children in the control group (→ FIGURE 2B). Whether the effects of early music education will also impact reading acquisition can only be determined after our Follow-Up data collection at the end of grade 1.

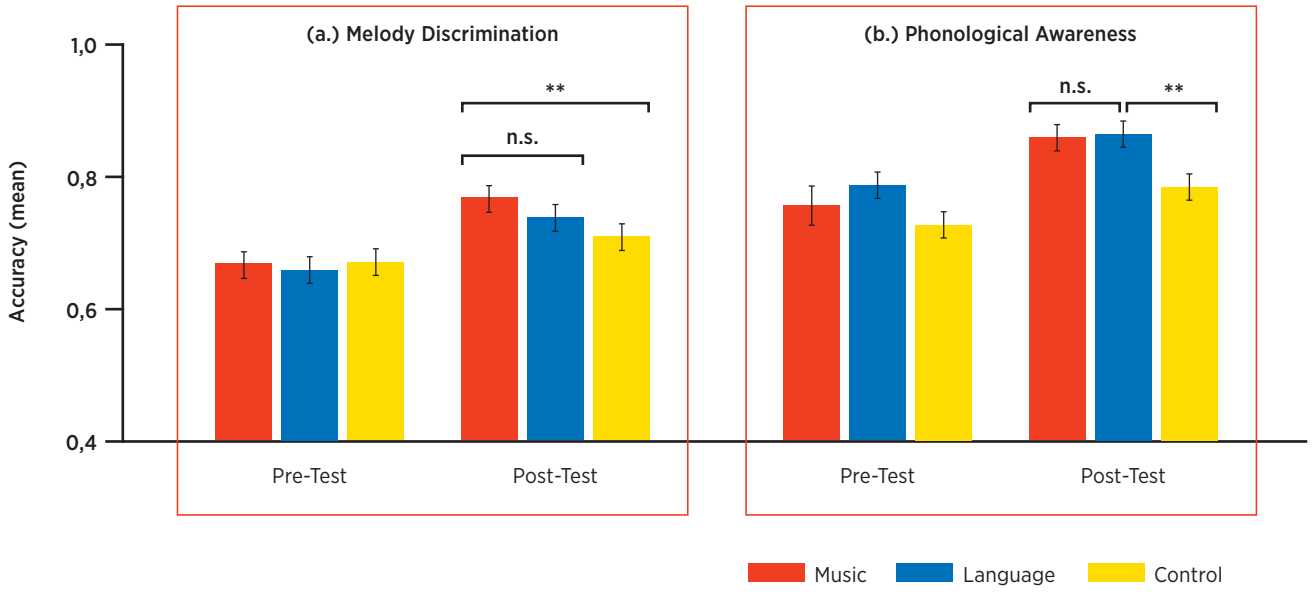


Figure 2.
Effects of the music intervention on melody discrimination (Fig. 2a) and transfer effects of the music intervention on phonological awareness (Fig. 2b). Significant means differences are indicated by ** = p < .01 and * = p < .05. Error bars indicate +/- 1 standard error

DISCUSSION

In our studies, we investigated the relations between preschoolers' musical and language abilities and how early music education can benefit the development of language abilities during the transition from kindergarten to first grade. The results suggest that music and language abilities are significantly interrelated at preschool age (research question 1). Moreover, we found transfer effects of early music education on phonological awareness (research question 2). In the last phase of our longitudinal study, we will analyse whether there is also a long-term transfer effect of early music education on reading development.

At present, we can conclude that children benefitted equally from early music education and the language intervention concerning the development of phonological awareness. This result opens up perspectives for formal and informal educational contexts. Early music education is for most children a very engaging activity, and it appears to be about as effective as established language intervention concepts. However, there are limitations to our intervention study. The participants of our study were children without developmental language disorders. On the basis of our study, it would be interesting to investigate effects of early music education on groups of children with different needs, for example children with specific language impairment, or children that learn German as second language.

The evaluation of the intervention implementation quality is a strength of our study which has not often been taken into account in other studies. Both programmes showed positive effects which were expected based on their respective contents. However, it is not clear why some expected effects did not show (e.g. the

effect on syntactic integration). This could be due to the conceptualisation of the intervention programme or due to some age-related developmental constraints in the sample. For instance, results of previous studies suggest that children acquire syntactic abilities both in the language and the musical domain only during primary school.[23] Thus, a long-term perspective is needed for the exploration of potential transfer effects on higher cognitive processing levels like syntactic integration. It is only then possible to infer whether delays in transfer effects are due to developmental patterns, or whether new elements should be added to the music programme in order to foster specific abilities. In addition, long-term effects of early music education on the motivation for musical activities and on musical interest would be informative regarding the versatile effects early music education might have on children's development. Reports by the music teachers during our intervention study suggest that the children not only participated with high motivation, but also that they shared their musical experiences with their peers and families. We are also interested in investigating this dimension of possible transfer effects in order to test empirically whether early music education is a pivotal activity regarding the musical-cultural participation.

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Music Composition in the Primary School

MICHEL HOGENES

INTRODUCTION

Only a limited number of schools include music composition as part of their curriculum. Although observations show that students like to sing and play music composed by others, it is questioned whether music composition can be seen as a meaningful and productive context for music education.

Music education is doing well in the Netherlands. Never before, music teachers had access to such an enormous arsenal of teaching materials, handbooks, and journals. Moreover, music as a human phenomenon gets much attention by Dutch neuro-scientists such as Dick Swaab, Eric Scherder, and Henkjan Honing who make themselves heard on the influence of music on the brain and the importance of music as a school subject. Even Queen Máxima is committed to a project called 'Meer Muziek in de Klas' [More Music in the Classroom], which has given music education in primary schools a substantial impulse both in terms of content and finances in the past three years.[24]

In view of these developments, but also the introduction of '21st century skills', as well as the follow-up to 'ons onderwijs2032': 'curriculum.nu', it is important to continue to think critically about music education. A crucial question here is how classroom teachers and music specialists can discover, nurture, and stimulate musical talents of children.

Play and development of (young) children are inextricably linked with each other.[25] Children playfully make their way into the world around them. Driven by the natural urge to explore this world, they explore things in a playful way. Imagination and ingenuity, skills that are of great importance to artists, play an important role in this.[26] Within play, children are discoverers, researchers, artists, entrepreneurs, and scientists who need to be given space to play with all their senses in a playful way.[27] Adults, parents/caretakers, and teachers can create rich learning environments for children and, together with children, take part in activities in a playful way and promote the development of children's play.[28]

MUSIC EDUCATION

Dutch music education has a long tradition. Ever since the eighth century, when the first monastic schools were founded, singing has been part of the school curriculum. Besides singing, children nowadays also listen to music, play instruments, move/dance, use forms of music notation, and talk about music. Despite developments in cultural education, music education at Dutch primary schools still focuses mainly on the reproduction of music. Children take part in activities where song repertoire is sung from their own and other cultures. Undoubtedly this approach succeeds in revealing and stimulating talent, but in general it must be concluded that music education is not very successful in stimulating musical development of children that is not based on unplanned growth in the bio-neurological system or incidental moments of development based on experiential learning in daily practices.[29]

Many school subjects have been innovated in recent decades. From a reproductive approach, a step has been taken towards a more productive approach in which

children are actively involved in the construction of content that is relevant within these school subjects. For mathematical education, mechanistic calculation has given way to realistic calculation.[30] This way of productive arithmetic education is now a common practice in most Western countries and is successful in developing mathematical thinking.[31]

Similar steps towards productive involvement have been proposed and researched for music education in the past decade.[32] Nevertheless, important steps could be taken to innovate music education by using these acquired insights. According to Niland[33], primary school teachers and professional music specialists have traditionally focused on offering children activities aimed at developing their musical skills. Although these teachers often acknowledge that it is important for children to experience making music as pleasant, music education for children is still mainly based on learning by song repertoire selected by teachers, which is also structured around specific behavioural outcomes.

MUSICAL BEHAVIOUR

As mentioned earlier, play and development of young children are inextricably linked.[34] Looking specifically at music, it can be said that music is primarily and universally regarded as an activity of play. In many languages, such as English, Russian, German, French, and Dutch people say that one plays music or plays an instrument. Someone plays drums, or plays in an ensemble. The question is whether this is about the same verb 'to play' or not. Does the verb 'to play', in this case, refer to a deeper connection with a psychological action similar to playful activities with which children seemingly entertain themselves purposelessly and in which they learn?

Research on musical play raises the question of what is meant in theory with musical play and what the required conditions are for its occurrence. Moorhead and Pond[35] published a study on spontaneous music of young children and sketched one of the first ideas with regard to creative music and musical play of young children. They indicated that children, irrespective of their level of experience or talent, were able to think creatively musically. This happens as long as they are in a rich, musically stimulating and supportive environment. If children are given the opportunity to play with musical materials, such as musical instruments, sound objects, and toys, and the conditions for playing are optimal, they will explore the possibilities of these (musical) materials within the scope of their interest and abilities. According to Niland, children have a natural inclination to sing and play. These activities form a vital part of their musical development. Campbell concludes that children play together and dance in everyday practices.[36] They develop their own repertoire of songs that are influenced by the world in which they live. Adults are often unaware of the complexity, values and varied forms of musical play of children.

From a developmental perspective, Greenfield states that play is fun with serious consequences.[37] Play, and musical play in particular, is a form of human behaviour that emerges after birth and remains visible throughout the life of a human being. This is why composers and music educators, such as Carl Orff and Zoltán Kodály,

used play-based instruction methods and learning strategies in their music education approaches.[38]

To emphasise the active nature of involvement in music, Small proposes to interpret the word 'music' as the verb 'musicking'. Musicking refers to the active involvement in musical activities (listening or making). Small describes musicking as: 'To music is to take part, in any capacity, in a musical performance, whether by listening, by rehearsing, or practicing, by providing material for performance (what is called composing), or by dancing'.[39] In other words: the activity of really 'doing' music through active involvement. Playing the piano and setting up a CD are both musical activities that can be interpreted as musicking.

As described above, there is a lot of discussion about what can be considered play and what its relevance could be for musical development of children and young people. From the point of view of Vygotsky's Activity Theory[40], play can be regarded as a special way in which human activities can be performed. Within this interpretation, all cultural practices (and activities) can be performed in a more or less strict (= playful) way. For music education, composing is a practice in which children and young people produce their own music (that is, playing the role of composer), which lends itself well to being performed in a playful manner.

MUSIC COMPOSITION AS REGULAR CLASSROOM ACTIVITY

Composing music can be a meaningful activity for children. Given the Dutch situation, in which only a few elementary schools have music teachers or other music specialists, the question is how to implement composing as regular class activity by teachers?

In education based on the Cultural-Historical Activity Theory, the broad development of students is central, along with the development of specific knowledge and skills that are necessary for making or understanding music. Broad development stands for broad personal development, which leads to increasing self-reliance of a participant in cultural practices. When composing music as an activity, students brainstorm (in groups and individually), write rough designs, edit and revise them and create final products that they can present. This allows music education to take a step from a reproductive to a more productive approach. Class observations by Perlmutter[41] confirm this. He notes that students like to create and be involved in improvisation activities. Composing and improvising help students to discover which musical concepts and knowledge from the music lessons they understand.

A model was taken as the starting point for music composition, which schools for Developmental Education already use for the domain of reading and writing. Students learn how to deal with the meaning of important concepts and learn how to sequence, classify, and categorise.[42] This three-step model has been adapted for composing music:[43]

1. **Creation of a common basis**
2. **Generating ideas and writing the composition**
3. **Presentation and publication or recording**

Below is described how this model can be implemented in music education.

Step 1: Creation of a Common Basis

Based on the concept of 'common knowledge'[44], the first step is to create a common basis. Common knowledge refers to knowledge construction as an essentially social process. Analogous to writing texts with children, it is important for children to know the usefulness and necessity of writing a music composition and to have an idea of how to write this composition.

To get children started to compose their own music, they need input. Just giving them a composition assignment is, in many cases, not enough to get them started. There must be an incentive to start. The development of a common basis around an interesting theme in which children feel the need to compose and write their own music is therefore important. Ways to realise this are listening to a sound recording, studying a score, or performing a drama activity. Other possibilities are the use of stories, photographs, paintings, poetry, listening or talking about aspects of sound and aspects of form, such as repetition, contrast, variation, ostinato, etcetera. Aesthetic ideas such as density, texture, tension and relaxation can also be good starting points.

Step 2: Generating Ideas and Writing the Composition

The second step focusses on providing opportunities to explore and discover sound, form, and meaning in the composition process and links between them. Children develop routines in exploring music within a safe pedagogical climate, leading to optimal production of music and sounds. The teacher participates in the process of composing and helps children to orientate; to improve and deepen the activity; broadening skills and ideas; to add new action potential; and to think about the music composition. If this process goes well, the next step is to write down the composition. This can be done with traditional staff notation, but also with forms of graphical notation or images.

The role of the teacher in this process is to support students to come to a concept version of their compositions. The teacher is the students' more knowledgeable partner in their creative process and gives impulses by, among other things, posing questions and creating needs for new action potential (the zone of proximal development).

All children contribute to the music composition process. They can take different roles, such as the role of composer, musician and critic. An optimal composition activity originates when students learn to fulfil relevant roles in cultural practices (so-called imitating participation), and adopt means and rules necessary for those roles.[45] Some students prefer the role of composer, others prefer musician, conductor, recording technician, or provide their computer skills to record music through a computer, or notate and publish music. This way, all students can work on music composition as meaningful activity. Of course, students should not only do things they prefer to do from what they are already good at. Roles must circulate, in order to broaden and deepen the students' knowledge, skills and attitudes. Students become aware that all roles are important to make music composition a success. They are therefore motivated to contribute to the music composition process in different roles.

An important part of this second step is the revision phase. This phase aims at making students reflect on their compositions and helps them to improve the concept version of their composition. The revision can take place both individually and in a group as a whole. In the latter case, all students get a photocopy of the composition, and the composition is performed live, or listened to from a recording. The revision takes place in three rounds, in which the teacher has a leading role by posing critical questions, which children will do more themselves at a later stage. It is important to emphasise here that the more knowledgeable adult should not affect the playful nature of the composition activity.

The first revision round concerns the ideas of the composer and the content of the piece. Does the music sound as intended? There might be differences between experiences of the composer and those of the audience or musicians. All participants are asked for their experiences. If the music sounds different than intended, students can explore possibilities to revise the composition in such a way that it meets its original intentions.

The second round of revision looks at the structure and style of the piece. Central are the technical aspects of a composition: Which musical form has been chosen? Does the piece have a logical structure? What instruments can the composer use to make the music sound, for example, more cheerful? And is it possible for musicians to play what the composer has come up with? Questions like these help students to think about the structure and style of their compositions.

The notation of the music is central to the third round of revision. Musical notation is a means and not a goal in itself. Possible questions are: Can other people perform the piece based on what is written down? Are there any better ways to notate the music? And can you show how a classical composer would have noted these cadences?

The teacher leads the revision by asking specific questions, regulating questions from other students and creating a safe pedagogical atmosphere, within which students ask questions and answer each other. This process leads to a final version of the music composition.

If music composition is a meaningful activity for students, they are motivated to learn and willing to improve their composition on the aspects mentioned above. The teacher ensures a good balance between creating meaningful activities and realising the lesson objectives. Music composition is not only a challenging activity; it is also an activity in which children acquire their own musical concepts and skills. To become a good composer, a lot of practice is needed. The role of the teacher is to motivate, stimulate and facilitate processes that lead to music compositions that students are proud of.

Step 3: Presentation and Publication or Recording

It is easier for students to see the usefulness and necessity of composing music if there is an audience for whom they compose the music. Enduring eagerness to produce music and improve the composition will be difficult without guarantee that someone will listen to their music and talk about it. Live performances of compositions are very motivating for (young) composers. With electronic equipment, it is also possible to publish or record music. Both scores and recordings can be easily distributed digitally. Many children in the higher classes of primary schools have

mobile phones with a recording option. Of course, there is also more advanced equipment to record music with better sound quality, but equipment like that is mostly not available at primary schools.

CONCLUSION

According to the Cultural-Historical Activity Theory, the pursuit of creative involvement of students in cultural practices lies in the desire of children to be part of the world of adults. This is an important stimulus for development and learning. Play offers people the opportunity to participate in practices in their own way, through various degrees of freedom. The activity format of play offers people of all ages the opportunity to participate in imaginative situations and gain intense experiences.

Based on these theoretical principles, music composition is explained here as a playful cultural practice in which participants follow musical rules, but within which they can afford a certain freedom and show a lot of personal involvement. With playful participation in composition practices with experts, young composers can develop relevant knowledge and skills. From this perspective, music composition is conceived as a planned and consciously creative process with a new piece of music as outcome.[46] Pedagogical implications of music composition as regular classroom activity are that the participating and accompanying adult should never compromise the quality of the playful activity. This means that he or she must adhere to the characteristics of the activity format of play: use of rules, various degrees of freedom for the players, and intense involvement and experiences. A pedagogical model that is consistent with this play-based approach is the three-step model in which step 1 is the creation of a common basis, step 2 consists of generating ideas and writing the composition, and step 3 involves the presentation and publication of a composition. An important part is the revision phase in step 2, in which students think about and improve their compositions.

With this model, every teacher should be able to compose music with his or her students. It provides teachers with tools to motivate, stimulate, and guide students in working on challenging assignments, gaining insight into musical concepts, and developing musical knowledge and skills. The presumed strength of this pedagogical model is that it can strengthen meaningful musical learning among primary school students.

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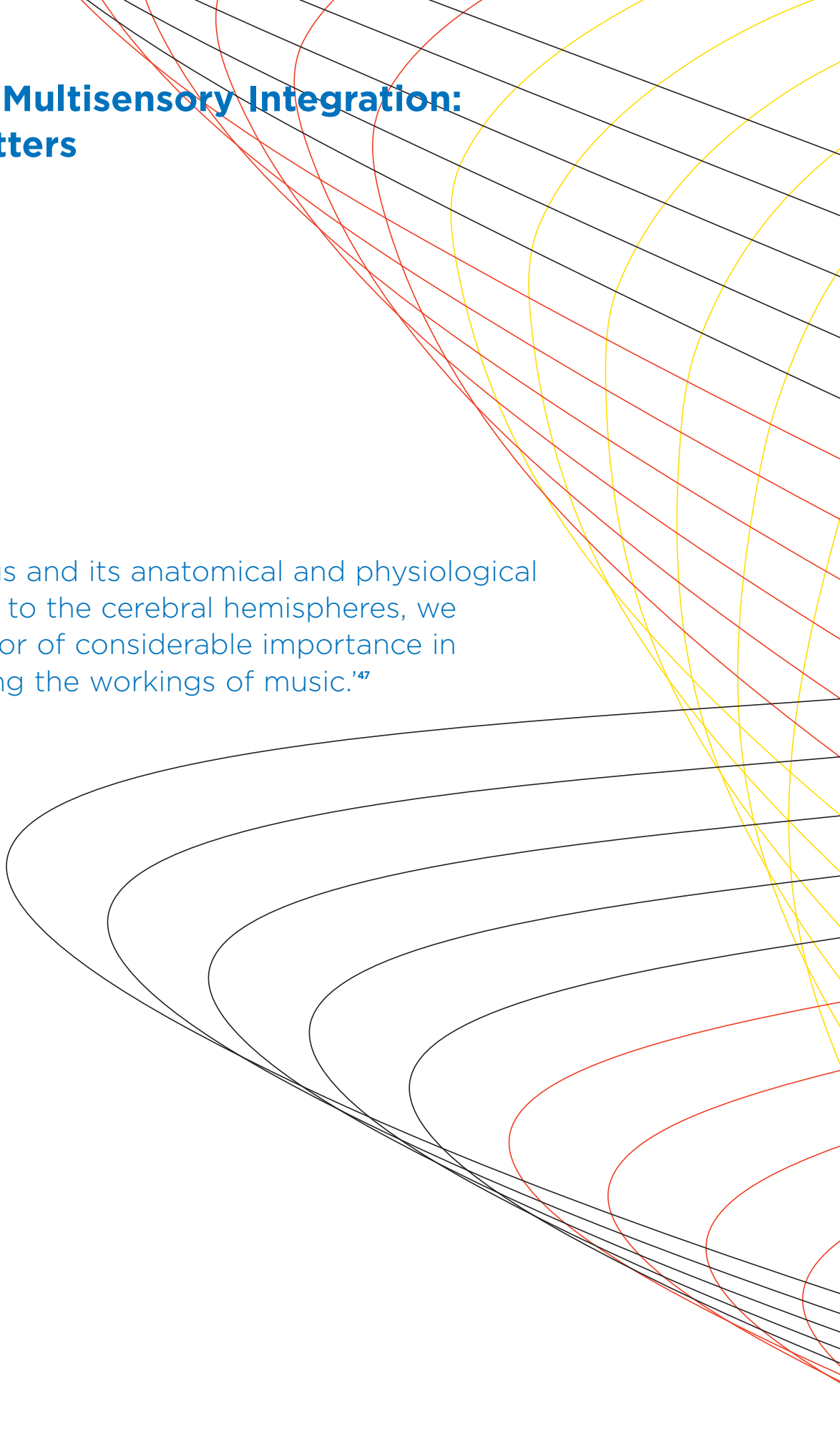
Thalamic Multisensory Integration: Music Matters

ARTUR C. JASCHKE

‘The thalamus and its anatomical and physiological relationships to the cerebral hemispheres, we feel, is a factor of considerable importance in understanding the workings of music.’[47]



INTRODUCTION

Understanding the complexity of the perception, processing, and production of music has reached way beyond the realm of storytelling in the past decades.[48] This complexity emerges from the varied understanding of music and the similarities it shares with other entities such as language. This has evolved into four hypotheses: the neural identity hypothesis, the neural sharing hypothesis, the neural overlap hypothesis, and the neural dissociation hypothesis[49] as well as neuroscientific models such as the arousal mood model or the plasticity model. Music is made up from several sub-components or dimensions; these being melody, rhythm, beat, timbre, harmony, pitch, spatial acoustics and the combination of these. All of these sub-components make music, what we understand music to be from a listener's point of view. Additionally, music has the ability to induce emotions and enhance our wellbeing, which adds another layer to the already complex term of music. Because of this variety in terms of listening and inducing, the brain needs multiple networks and regions to make sense of music. This intricate network overlaps with networks necessary for everyday cognitive activities such as planning, working memory, attention, inhibition, the so called executive functions. These executive sub-functions underlie most cognitive processes and therefore play a crucial role in education. The main question remains: is a far transfer effect possible from music to academic achievement?

Therefore, the goal of the present review is to introduce a neural network model of music perception (→ FIGURE 1) to understand the working of the thalamus with regards to sub-components of music as well as executive functions in the context of music. Thalamic multisensory integration (tMI) will serve as initial point of departure to shed light onto this apparatus. Finally, tMI will be integrated into a recently finalised longitudinal research design, investigating the role of music education on cognitive development, executive functions and academic achievement.

MUSIC AND THE NEURAL NETWORK MODEL

Music activates a wide array of brain areas and networks while perceiving, processing or even reproducing music.[51] Understanding these areas therefore gives immediate applications into the use of music related interventions (educational as well as therapeutic) in a wide array of clinical and non-clinical populations.

Brain imaging techniques such as functional magnetic resonance imaging (fMRI) and diffusion tensor imaging (DTI), have already strengthened insights into this functionality and the inter-connectivity of involved brain areas.[52] Engaging the brain with music activates responses beyond the auditory cortex in the temporal lobe, which is associated as the main processor of auditory stimuli.[53] Other brain networks encompass four main global systems (frontal, temporal and parietal lobe, and the pre-motor and motor cortex) together with individual regions, such as the anterior cingulate cortex, the nucleus accumbens, the insula, anterior superior temporal gyrus, the superior temporal sulcus, the hippocampus, amygdala, cerebellum and the brainstem. These can be connected accordingly with the thalamic nuclei as

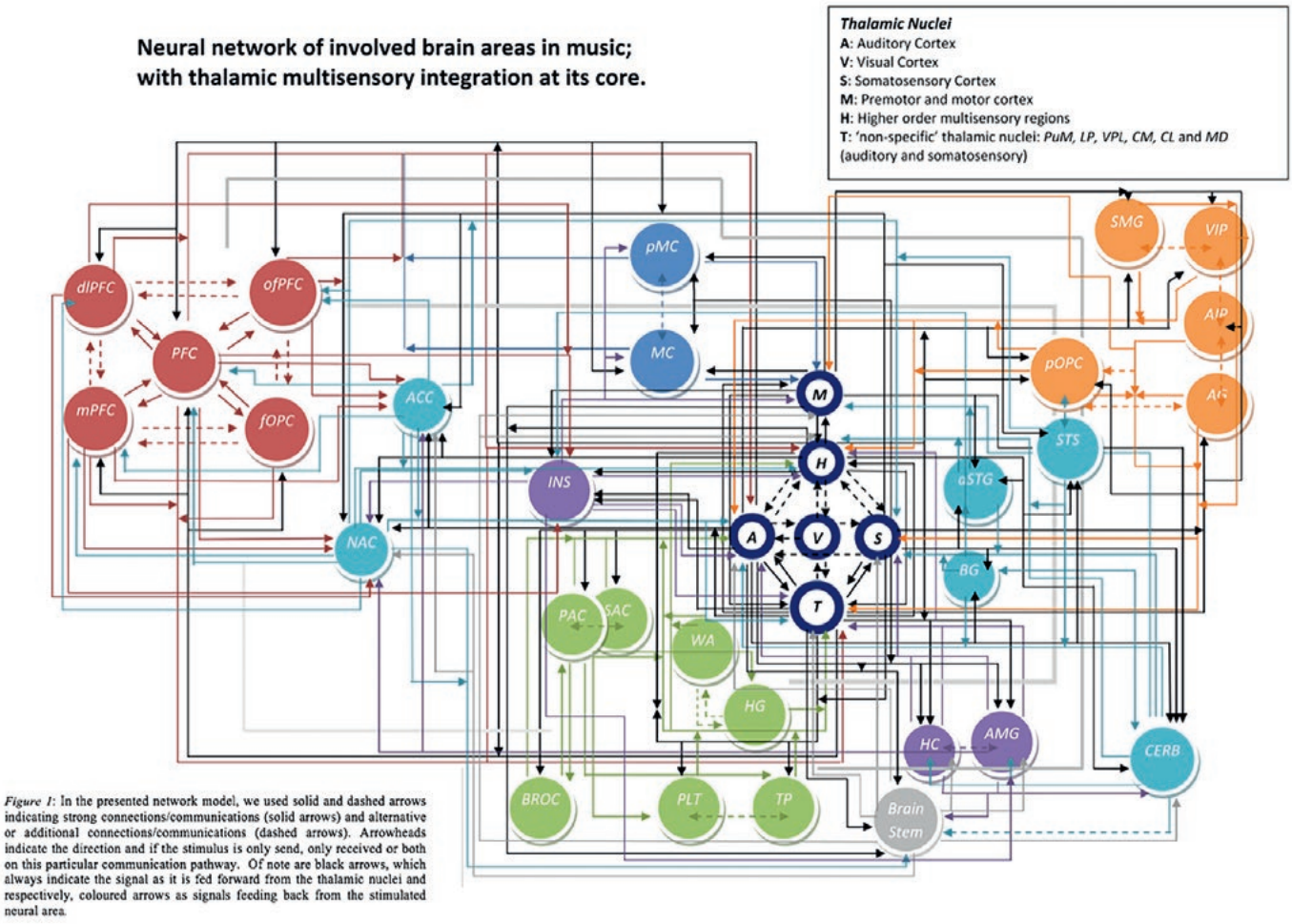


Figure 1: Neural Network Model incorporating thalamic multi-sensory integration.[50]

shown in Figure 1.[54] The thalamic nuclei are communicating and interacting through individual anatomically identified pathways.[55] These thalamic pathways have been mainly understood as relay pathways coming from the thalamic nuclei. A recent study, however, has reported that the thalamic nuclei with their respective networks serve additional roles in the thalamo-coticao-thalamic loop of incoming sensory stimuli to, for example, the prefrontal cortex.[56] The authors argue that the role of the thalamus with regards to cognitive functions such as executive functioning, which are highly active during music related tasks, has been underestimated and have shown thalamic control of cortical connectivity outside of its relaying function, questioning the role of the thalamus in general.

THE THALAMIC NUCLEI

The thalamic nuclei are subdivided into specific auditory, visual, somatosensory and motor nuclei with additional nuclei sending and receiving stimuli of higher order multisensory regions and so-called 'non-specific' thalamic nuclei. These 'non-specific' nuclei create additional connections and docking points for auditory and somatosensory information through the medial pulvinar nucleus (PuM), lateral posterior (LP), ventral posterior lateral (VPL), centro medial (CM), centro lateral (CL) and medial dorsal (MD) nuclei.[57] Connections between the auditory, visual, motor, somatosensory and higher order regions are given through the 'non-specific' thalamic nuclei. These connections are further strengthened through interconnectivity of the here-described individual nuclei, creating an intriguing and complex web. This thalamo-cortical network has been researched in animal models, whereby stimuli were projected from the thalamic nuclei to other brain regions in order to map functionality in spatial navigation or multiple relay projection to cortical areas as well as in hearing research.[58] The role of the thalamic pathways to auditory input stimuli of sub-components of music, however, has not been researched in light of its role in neural connectivity and therefore the understanding of either the whole experience of music as a complex cognitive task or tone, rhythm, beat, melody, timbre, tonal relationships, intensity, etcetera.[59] The involvement of these different sub-components as well as the overall experience of music makes music a multi-sensory stimulus, as it requires multiple cortical and sub-cortical areas to be able to process this auditory stimulus. As the information is fed forward and fed back in-between the cortex and the thalamus, the input stimulus (here music) is not only identified and relayed, but in its own right 'pre-processes' the thalamo-cortico-thalamic loop, appealing to cognitive or in more detail, executive functions, to make sense of the incoming multisensory stimulus.

It is this 'intimate and close relationship between the thalamus and the cortex'[60], which only now[61] begins to emerge in terms of the underestimated role the thalamus plays to music cognition.

> *'Branching input is identifiable on thalamic input, and we have seen this is a very common feature of many inputs to first order thalamic relays [...]. New questions arise about the precise content of the message that the thalamus is passing to the cortex [...],'*[62]

[...] and in how far there is a decoding and encoding process of the incoming musical stimulus prior to its interpretation in the cortex.[63]

MULTISENSORY THALAMIC INTEGRATION AND THE PERCEPTION AND PROCESSING OF MUSIC

Following recent trends in tract tracing studies, increasing evidence supports the view of multisensory processing of incoming stimuli especially stimuli involving complex auditory information.[64] Complex auditory information requires, next to

activation in the auditory cortices, multiple brain networks to be able to process and interpret the stimulus as, in this example, music.[65] Music, with its different facets, therefore can be seen as a multisensory stimulus in light of the above-mentioned diverse response related activations in the brain. When this musical stimulus is traced from the cochlea to all involved brain regions, neural networks lead exclusively through the brainstem and the thalamic nuclei.[66] Even though research has identified these pathways,[67] the role of each subcomponent of music, read melody, timbre, rhythm, etcetera, has not yet been viewed in light of thalamic multisensory integration.

As the musical stimulus is split into multisensory levels of perception in the auditory field, but also in several additional areas, it requires the placement of thalamic multisensory integration at the centre of the perception of music. It is this interaction of several cortical and sub-cortical networks as mediated by the thalamus pathways before the signal can be interpreted by us as music. Acknowledging music as multisensory therefore moves away from a reductionist point of view, and through identifying the intricate network of involved brain areas in the perception of music, it quickly becomes clear, that understanding this stimulus requires simultaneous multiple cognitive and integration processes.[68]

WHERE THEORY MEETS THE CLASS ROOM

Understanding this complexity of music, one can turn to the class room and investigate whether this knowledge can be translated into a direct transfer effect from music to cognitive enhancement. A recent research has investigated 149 primary school children in a single-blinded block randomisation trial. Participants were randomised into four groups: music, music +, visual arts, and no arts control.[69] The music groups were split, as there were children which have experienced a musically enriched environment and received music lessons prior to the offered music intervention. The music interventions were composed of lessons in a school setting, in a structured manner, so each child received one to two hours of music each week. Offering music lessons as part of the normal curriculum and following these children over a three-year period, allowed to minimise external factors such as frequency of the lessons, socio-economic influences (children from less fortunate families would not be able to uphold a weekly class financially) and peer-to-peer interference.[70]

The researchers have analysed these children on a multitude of neuropsychological tests as well as verbal IQ. Prior to the intervention, a base line measurement investigated whether a musically enriched environment can predict better verbal IQ scores for these children than for children who have not been exposed to such a surrounding. After following these same children for three years, children enrolled in structured music lessons performed better on tasks encompassing verbal IQ, planning and inhibition when compared to controls during four follow-ups.

Of note, the VISUAL ARTS group outperformed both music groups on the visuospatial working memory task.

Furthermore, inhibition, planning as well as verbal IQ have been scored higher over time by the two music groups as compared to the visual arts and no arts control

groups. A mediation analysis has indicated a possible far transfer effect of executive functions as subfunctions for academic skills as measured by the CITO scores from baseline to last measuring moment. This indicates an effect of the intervention over time, which can be further supported by the time needed to consolidate neural network connections, before they can operate on a far transfer level.[71]

The present results have eliminated multiple social and personality traits through a longitudinal design, as well as offering music intervention as part of the regular school curriculum. Making a structured music programme part of the school curriculum therefore reaches every student regardless of social, ethnical or economic background, and thus strengthens cognitive networks necessary for the execution of academic tasks such as language and arithmetic across the pupil-span.[72]

DISCUSSION

Music touches us quite literally: through the eardrum, the ossicles, which translate a mechanical stimulus into an electrical signal and by passing through the cochlea and auditory nerve to be interpreted in the brain. Understanding the cognitive building blocks of music, however, allows the tracing of the stimulus throughout the brain and enables individual approaches to both therapy and education. This understanding will, to put it simply, help to comprehend what effects music actually has on our neural physiology beyond the existing psychological and neuroscientific models.[73] Tracing the musical stimulus from the auditory nerve to the thalamus and further to the involved brain areas, the superior temporal sulcus (STS) and the superior temporal gyrus (STG) receive direct multisensory input from the thalamic nuclei and are known to be key areas in multisensory processing.[74] Each of the regions includes its own interpretation of the task at hand and therefore stimulates these increases more than the actual understanding of the task, and can be transferred to other mental exercises such as increase in empathy or working memory, which share overlapping regions.[75]

Music is not just rhythm, or just melody; it is the delicate combination of all the parts music consists of, which hold the potency discovered in music therapies and education.

> *'Imagine that all musicians playing in an orchestra are connected with thousands of wires, through which, even though they are not speaking to each other, are exchanging signals in all hidden ways (as musicians in an ensemble do), to create a unified sound out of the cacophony of the individual parts. The mapping in our brain works similar to this, with signals traveling back and forth in-between, with a conductor holding it together.'* [76]

At the end, understanding a complex stimulus such as music and the workings of it in the brain will make the mind susceptible to further questions and will answer several in its path nonetheless.

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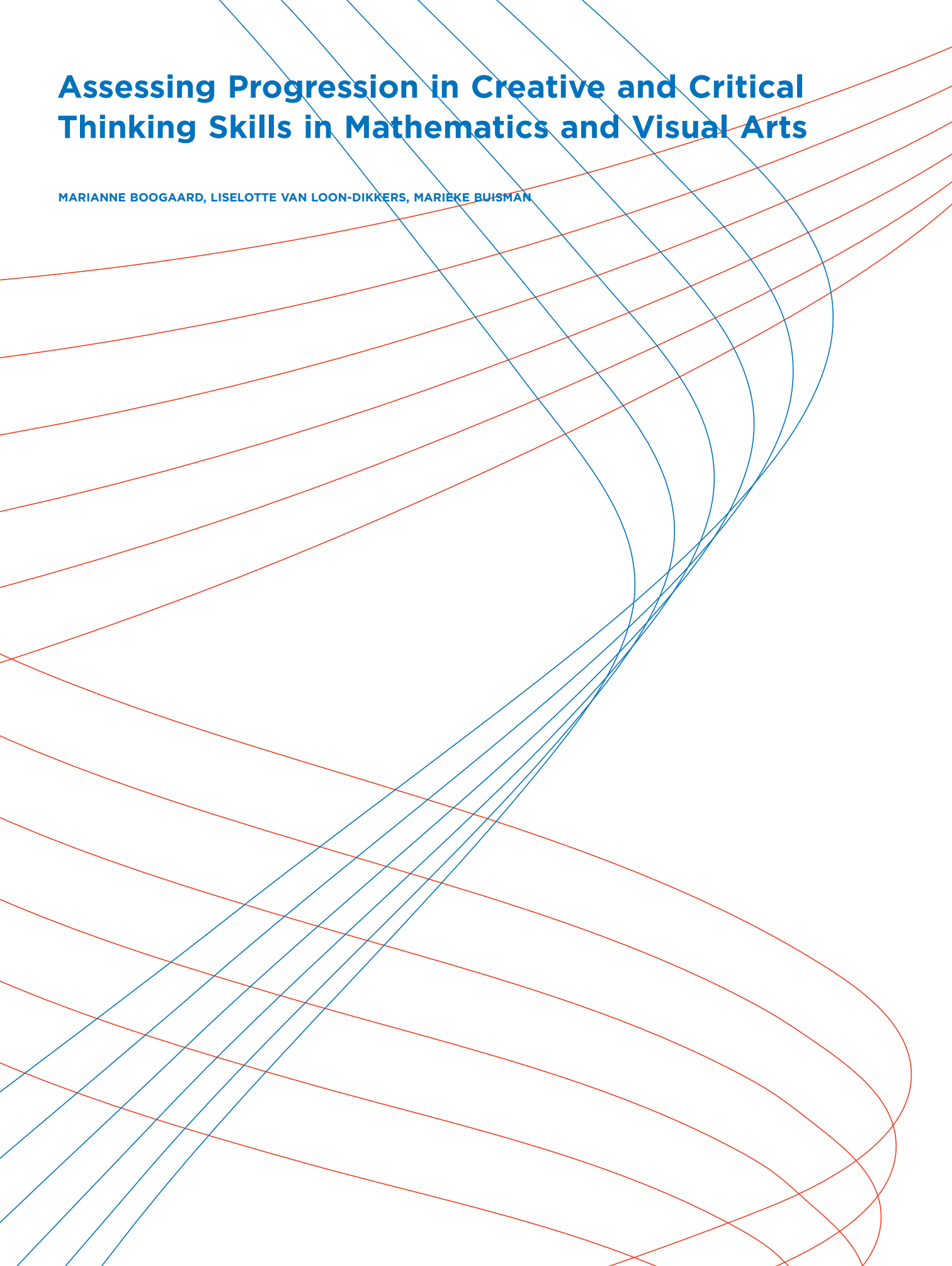
Assessing Progression in Creative and Critical Thinking Skills in Mathematics and Visual Arts

MARIANNE BOOGAARD, LISELOTTE VAN LOON-DIKKERS, MARIEKE BUISMAN



INTRODUCTION

Both teachers and students are accustomed to exercises that have one correct answer. Teachers or textbooks only incidentally leave space in lessons for diverse solving strategies, or to elicit questions about the process of tackling a problem. However, the 21st century learning perspective also requires educational designs that encourage pupils to find different approaches to solving a problem and stimulate their curiosity about questions like: why does this work this way, and does it always work like that? I.e. educational designs that stimulate the development of creative ability and critical thinking in students. In the Dutch part of the OECD project 'Assessing progress in creative and critical thinking skills in education' teachers and researchers worked together to design educational tools and instruments for (formatively) measuring pupils' progress in creative ability and critical thinking. In this article, we shortly report on our findings during this pilot study.

KEY PRINCIPLES AND CONCRETE EXAMPLES

Divergent thinking (having multiple ideas, finding solutions and alternatives) and *convergent thinking* (combining multiple ideas and alternatives in one solution) are known from theory as important features of exercises that stimulate creative ability and critical thinking.

Divergent and convergent thinking skills will help students to be more free-thinking, to come up with more creative and less cliché ideas. In an educational context, it is important for students to be able to experience that their first ideas might not always be their best ideas. As students will not always understand or practice divergent or convergent thinking spontaneously, it is useful when teachers explicate creative processes. It is also useful to make up exercises that support them in using these ways of thinking, step by step, in an open, inquisitive environment where mistakes can be made.

Also, some other key principles seem to be important for changing regular lessons into lessons that appeal to the creative ability and critical thinking, for instance in mathematics or visual arts. These include principles like:

- *A new didactic contract.* Usually in classrooms teachers ask questions to which they already know the right answers. Students have to answer those questions, and they know the teacher does not ask them because he/she is curious about the answer, but only because he/she is curious to see if the pupil knows the answer. In an educational environment that focuses on the development of creative ability and critical thinking, this contract is different, because of the following principle.
- *Both asking questions and arguing about the given answers* are more important than the correctness of the answer, sometimes no answer is given. For instance when students have to guess about the weight of the teacher and have to give arguments for their answer, the correct answer is not as important as the goal of giving arguments.

→ *Multiple answers are possible and acceptable* (see for example Figure 1).
→ *Applicability in practice and working together* in solving problems are important aspects (see for example Figure 2).

THE OECD PROJECT

In the Netherlands, as well as in other countries, discussions take place about the future of education. Will students be flexible and adaptable enough within changing job markets with their current education? Commissioned by the Ministry of Education, Culture and Science in the Netherlands, the Kohnstamm Institute participated in the OECD project 'Assessing progress in creative and critical thinking skills in education'. The focus in this project is on the development of an international framework to improve and measure creative ability and critical thinking in students from 8 to 15 years of age. 21st century skills such as creative ability and critical thinking are a frequent issue for research and debate. The background to this attention is that these skills help students to be flexible and resilient in a fast changing society. A more practical question is: how can teachers focus on these skills, and help pupils to develop them through their lessons? And how can they monitor their students' improvement?

The project builds on earlier research of Spencer et al.[77] and Lucas et al.[78], who developed a model to assess the creative ability of students. They define creative ability as 'coming up with ideas and solutions' and critical thinking as 'asking questions and evaluating ideas and solutions'. In short, Spencer et al. and Lucas et al. state that: creative ability and critical thinking are complex skills, that are necessary to be successful, that can be developed, have levels, and are influenced by context.

In the OECD project creative ability and critical thinking are both divided into three main concepts: to inquire, to imagine and to share/do. To inquire includes: to explore, seek and generate ideas, and to understand the context and boundaries of a problem. To imagine means: to make connections, integrate other disciplinary perspectives, or to challenge assumptions, check accuracy, and analyse gaps in knowledge. To share and do includes: elaborating ideas into designs or assessing the opinions or ideas of others in a well-reasoned way and sharing them with others.

GOALS AND DESIGN

The first goal of the project was to develop lessons that improve creative ability and critical thinking in mathematics and art. These lessons will be placed in an international database, in order to make them available to everyone. Also portfolios of students elaborating on these lessons were collected. The second goal was to develop a (formative) measurement instrument, usable in different countries.

There were experimental and control groups, questionnaires for all teachers and pupils, and pre- and post-tests to find out if students made progress in their divergent and convergent thinking skills. Part of the questionnaires and tests were developed by OECD, part of the tests came from TIMMS and PISA, all were translated into Dutch.

Create different sums that fit this picture:
Possible answers are, for example:

1) 1 parasol + 1 parasol = 2 parasols
2) 20 euros + 20 euros = 40 euros
3) How expensive is a holiday?
4) Can you pay with euros in all countries that you go to on holiday?

Figure 1: Example of a math assignment with multiple answers (based on a lesson of Maarten Molenkamp)

Can you measure without a ruler or measuring tape?

In one of the Dutch primary schools in the OECD project, the students and teacher devised how to estimate several distances. Together they discovered that a nail is about an inch, a step is a metre, and the distance to the gym of the school is one kilometre.

Figure 2: Example of adapting a math assignment to show applicability in practice (based on a lesson of Marc Visscher)

The Netherlands took part in the developing phase of this project for one year (2015/2016). Twelve countries participated in this first phase, for instance England, USA, Brazil, India, and Israel. In each country, at least ten schools from primary and secondary education were involved, with a total of at least 800 students (400 of these students received the intervention, and 400 students participated as a control group). Age groups were: in the Netherlands fifth grade in primary school and second grade in secondary school, these students are 8/9 and 13/14 years old.

RUBRICS

The international conceptual framework i.e. inquire, imagine and share/do was used as a base principle for the development of lessons in visual arts and mathematics, helping teachers to realise which aspects of creative and critical skills they wish to stimulate, and which didactic working forms are suitable for this purpose. The framework was also used to develop a measurement instrument (i.e. rubrics) to monitor the improvement students made on the intended skills on four levels.

Rubrics turned out to be useful tools, enabling formative as well as summative evaluation, by teachers and by students themselves. Rubrics also seemed useful for assessing skills on diverse quality aspects, since (parts of) skills are described using development levels that build on each other. Each level describes concrete behaviour that belongs to (parts of) the indicated skill, so working with rubrics can make progression clear both for teachers and students, and can help them to choose new learning goals.

In the Netherlands, as well as in several other countries, it was decided to work with two domain-specific rubrics (developed by researchers and teachers working together), instead of a domain-general rubric. This choice was made because in education too little transition seems to occur from general cross-sectional skills to specific courses and learning domains.[79] Moreover, domain-specific rubrics will offer teachers concrete examples of attitudes and behaviour that fit within the context of a course.[80]

THE DUTCH APPROACH OF THE PROJECT

In the Dutch research design teachers in primary schools participated in the mathematics part of the project, and teachers in secondary schools participated in the visual arts part of the project as well as in the mathematics part. For the remainder of this article we will focus on the mathematics results in primary schools and on the visual arts results in secondary schools. There were 15 fifth grade classes from thirteen primary schools who took part (six classes were in the experimental group and nine were in the control group). And there were 14 second grade classes from seven secondary schools recruited for participation in the study (seven classes were in the experimental group and seven in the control group).

Teacher Support

Teachers from the intervention classes were supported by an expert in mathematics[81] and visual arts education[82] respectively, and they worked together in developing new lessons (and corresponding rubrics). Teachers were stimulated to share their experiences in meetings as well as online, and they received online feedback on their lessons by the experts. All teachers had access to a digital platform called Basecamp. On this platform documents and pictures were shared, lessons were uploaded and discussions took place as within a professional learning community.

During the project, there were two collective meetings for all teachers participating in the experiment, conducted separately for mathematics and visual arts. In the first meeting, one of the experts provided a training to support teachers in their focus on stimulating the process of creative ability and critical thinking in their lessons. These complex skills can be developed in pupils within different contexts. The importance (and possibilities) of divergent and convergent thinking as basic skills within the creative process was brought to the attention of the teachers. The aim of the second meeting was to learn to develop (and work with) rubrics. Both the development of lessons and of rubrics were carried out in three rounds.

The programme included for example the following activities for mathematics:

1) Changing traditional lessons into lessons that have a stronger appeal to creative and critical thinking skills: teachers were asked to change assignments in a way that several answers are possible, instead of only one correct answer.
2) Developing a lesson on a shared topic: all teachers developed a lesson on the topic 'money' which needed creative ability or critical thinking. Working on a collective topic promoted discussion and exchange among teachers.
3) Developing one ideal lesson to stimulate creativity and critical thinking skills. In this round, teachers were free to choose their own mathematical topic.

In each round, teachers were asked to also design a (formative) rubric matching the goals of their lessons and assignments.

For the visual arts, we followed a similar but slightly different procedure. Since teachers in visual arts do not work with a standardised curriculum or with traditional method books, this intervention group started off with a common lesson plan based on a broad theme (*Let's space*), developed by the expert. This series of lessons zooms in on two specific aspects of creative ability: being inquisitive (exploration and divergent thinking) and being imaginative (making connections between ideas and combining them into an end product). Teachers could adapt this lesson plan to their own needs and available time.

An additional focus for the visual arts part of this project was having clear lesson goals and structure. This was accomplished by focusing on the steps that can be used to direct pupils towards creativity, and to make them apply their higher-order critical thinking skills, such as learning through dialogue, observing (see for example Figure 3), reflecting, and giving attention to experiencing the emotions or feelings evoked by visual arts.

Figure 3: Example of one of the arts assignments (based on a lesson of Marjolein Stoep)

Pre- and Post-Tests and Questionnaires

In January and June, all teachers and their students took part in tests and questionnaires. Some of them were also interviewed by the researchers on their experiences.

RESULTS

Results on pre- and post-tests are not yet available, since international scaling and analysis is still a work-in-progress, but we can report some results based on the questionnaires and interviews. It is important to keep in mind that this was a pilot project, taking place during a period of only five months, in which educational tools and measuring instruments were developed and tested.

Students' Experiences

A total of 365 pupils in primary education and 367 pupils in secondary education filled in a pre- and post-questionnaire. In primary education, there were only two significant differences found between the intervention group and control group: (A) students in the intervention group indicated an increase in working together in projects, whilst students in the control groups indicated a decrease, and (B) students in the intervention group indicated a decrease in one of the divergent thinking indicators ('In math lessons I have to search for different ways to explain something'), whereas students in the control group indicated an increase in these kinds of questions. This seemed to be a surprising finding.

Also, some interaction effects were found between (mainly) pedagogical-didactical approaches of teachers and intervention effects. For example, when teachers made a connection between daily life in their mathematics lessons more often, students reported using more fantasy in mathematics lessons.

In secondary education, there were also three significant differences found between the intervention group and the control group. Students in the intervention group indicated less decrease in two discussion statements (A) 'In this school subject I have to use my imagination', and (B) 'In this school subject I have to think critically about my ideas and assumptions.' They also (C) feel less fearful/anxious in visual arts classes than students in the control group.

Focus groups with three to five students for each intervention group were held. These interviews revealed that students felt their teachers taught differently than normal.

Reports from Primary School Pupils about their Math Lessons

Pupils reported that they were accustomed to first getting an explanation, after which the weaker calculators received additional explanation, whilst the other pupils worked on the exercises individually and independently. In the new approach, explanation was given to the whole class, and all pupils started working on the same assignment together or in small groups. Many students found their teacher more flexible and less strict. Moreover, students noticed that they had to use their imagination more often.

For pupils it was not always evident that lessons from the intervention period were actually math lessons and for many of them the teaching methods are independent of mathematics. They experienced this, although the assignments were different than usual, and the emphasis was more on collaboration and research (on the computer or outside the classroom).

Reports from Secondary School Pupils about their Visual Arts Lessons

Pupils indicated that the lessons challenged them to think divergently: 'The lesson is a little different: you have to make more drawings and sketches. And you dare to think more out-of-the-box, you dare to keep going further, and learn to think outside the norm. Normally you just do the assignment and search for some pictures.' They also recognise this helps them to apply new, original ideas: 'In these lessons you have to be creative and come up with lots of ideas. I understand the benefit of this: your first idea is often cliché. Now you come up with a lot more ideas, and also more original ideas that you wouldn't have had in the beginning. It's different

from normal, and was enjoyable to do. My first ideas were simple; later on you are able to make more connections.' However, not all pupils find this to be useful, and some indicate that divergent thinking can be difficult.

Pupils also recognised and predominantly appreciated the more activating teaching methods and the freedom this brings: 'Nothing was right or wrong.' Pupils do not like more structure per se, and some of them found that this undermines creativity: 'You have to meet many requirements: make five sketches, choose one of them, then, from that, you have to create something further ...' But according to their teachers, this is useful for the learning process and makes pupils work harder.

Teachers' Experiences

A total of 27 teachers filled in our questionnaires (primary school teachers and secondary school teachers). Their answers show three important effects experienced in their teaching practice: teachers feel they have a better understanding when it comes to what is needed to stimulate creative ability and critical thinking in students, they show more consistent attention to creative ability and critical thinking in their lessons, and somewhat more in the design of their lessons and in their assessment of pupils.

Math Teachers in Primary Schools

In the interviews we conducted with primary school teachers, they indicated that changes took place in their maths lessons. They found rubrics difficult to adapt and work with, but in their math lessons they were able to focus on the process of creative thinking. This means they were more often able to ask open questions and questions about how to deal with an assignment. They also offered students room for research and for working together, and they put more emphasis on linking maths to practical applicability, such as building bridges or planning an affordable school trip. And last but not least, they taught their students that mistakes are part of a learning process. Teachers did not restrict their new insights to their math lessons, but also used them to change their lessons on other subjects in the direction of creative and critical thinking.

According to the interviewed teachers their new teaching methods increased students' involvement in the lessons, and made them more active learners: pupils were enthusiastic and needed less encouragement. However, the interviewed teachers experienced that students had to get used to the new approach: some pupils were insecure at first and found it annoying that there were no clear answers to some questions. These students had to let go of the type of learning they were accustomed to.

Teachers differ in their opinion about using assignments that stimulate creative ability and critical thinking when it comes to students who are either weak or strong calculators. One of the teachers stated it to be important to make sure that students first master basic rules and concepts of an assignment before starting more 'free' assignments. Other teachers had different experiences. One of them thought strong calculators would be better in these kind of assignments, but experienced that the weak calculators showed more progress. A third teacher did not see any differences between strong and weak calculators in both critical thinking and creative ability.

Teachers virtually saw no difference between boys and girls, although some of them had the impression that boys liked the assignments more because they could discover and move about (outside the classroom). One of the teachers felt that boys more often started to try out solutions, while girls first thought and kept to the plan they were implementing. Another teacher found boys stronger on creative ability and critical thinking, because they dared to let go a little more and they applied it better.

Arts Teachers in Secondary Schools

In the interviews, all arts teachers from secondary education indicated they felt the lesson series they developed for the project to be clearly different from the lessons they normally gave. Firstly, the lessons offered more milestones, a greater variety of methods, and they were thereby more activating. The structure of the lessons was experienced as being more scholarly (in the beginning) than what teachers are used to: there is more time available for introducing a theme before pupils get to work, many concrete examples (visual stimuli) are given and there is more attention given to theory and explicit explanation about the skills that are central to this project. Besides more structure, the lesson gave pupils more freedom in the opinion of the teachers: the assignments were less closed than usual and offered more space for exploration and experimentation.

A number of teachers indicated they found the structure of the lesson (i.e. detailed introduction, getting pupils to generate ideas under time pressure, thereafter combining and carrying out ideas) to be an eye-opener. The example lesson series gave teachers more insight into which didactic methods are suitable for developing specific skills, and made them focus more on the creative process (being imaginative, being inquisitive), whilst normally they would be looking more towards technical skills and the end product.

Most teachers indicated that after the intervention they were able to make learning results more explicit in advance of the lesson, to build in more milestones, and to better guide pupils in reaching these milestones. All teachers focus more on divergent thinking in the process of preparation for an assignment. One teacher indicated: 'I have more insight into the benefit of making the learning process explicit for the development of creative abilities. I am more aware now that you should not presume that pupils combine divergent thinking or ideas of their own accord. Pupils have to become conscious of that process (why is it useful?) and learn to do so step by step.' Gradually structuring assignments makes pupils more conscious of their own learning process.

FINALLY

Through the project 'Assessing progress in creative and critical thinking skills in education' teachers learned how to design lessons that focus on improving creative ability and critical thinking in students. Lessons relating to 21st-century skills have been developed, and can inspire other teachers. These lessons (from all participating countries) will be published online by the OECD. Moreover, a pilot version of

a measurement instrument has been created to assess creative ability and critical thinking in students. This rubric will be improved further in the continuation of the OECD project. An international report on this project will be published by the OECD. This project will possibly contribute to the development of a module on creativity for PISA 2021.[83]

PARTS OF THIS ARTICLE HAVE BEEN PUBLISHED IN:

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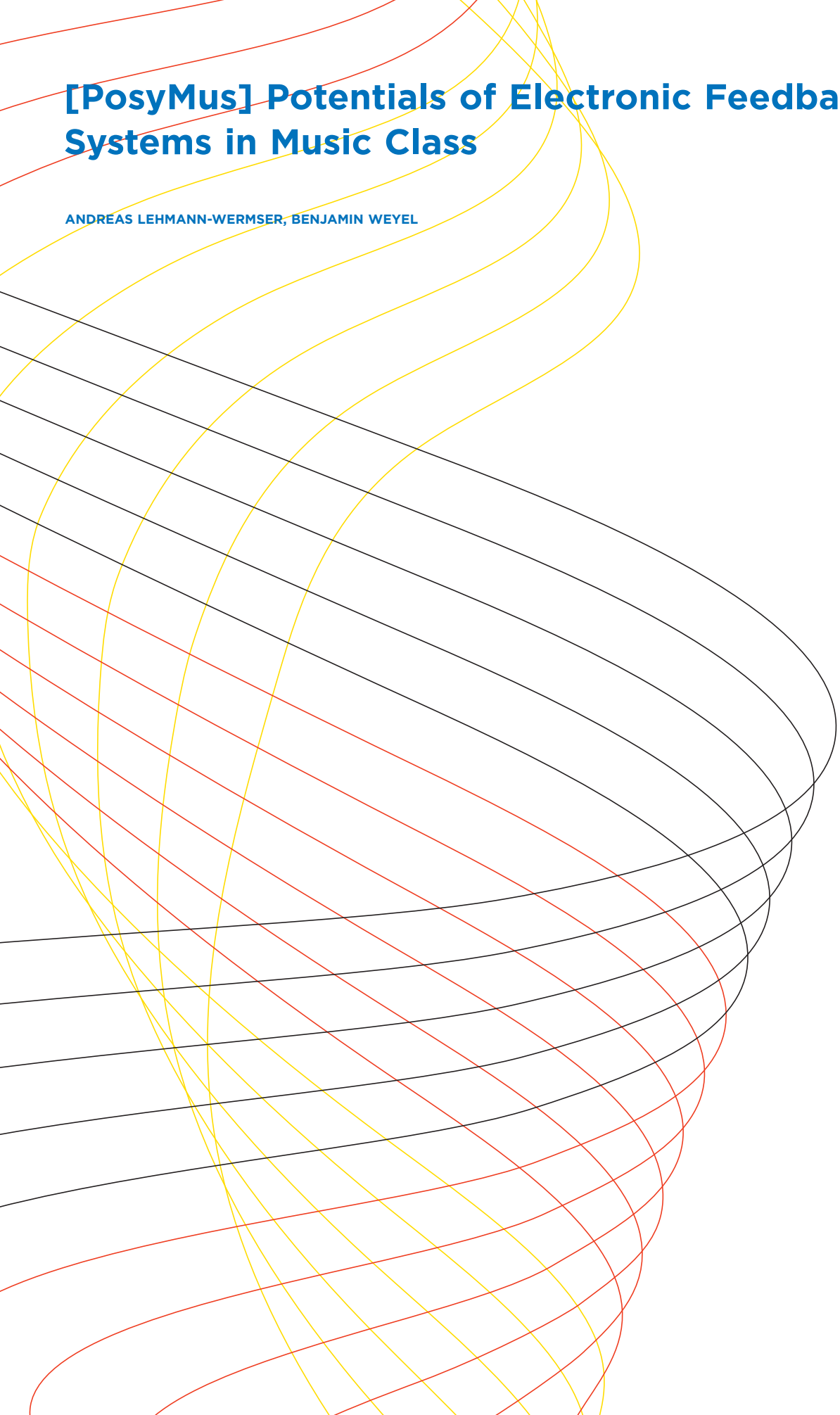
[PosyMus] Potentials of Electronic Feedback Systems in Music Class

ANDREAS LEHMANN-WERMSER, BENJAMIN WEYEL



INTRODUCTION

Since the millennium, the implementation of innovation in teaching in terms of methods and psychological foundations has received equal attention as the further development of administrative structures. Several fields have turned out to be of special interest. Among them are the development of a culture of feedback in the classroom and the use of digital media. The first one mentioned is of major importance for improving learning. This applies to the teachers who need detailed feedback about their students' achievement in order to design the next steps for their lessons. Feedback here serves as a diagnostic tool in an encompassing process of formative assessment. It also applies to the students for whom periodically given grades without the chance to change are not helpful. Instead, they should receive feedback informing about late progress and mistakes made and, in return, offering some sort of help for designing the next steps in the learning process. To build a corresponding culture of errors and feedback therefore plays an important role in current studies.[84]

Concerning the latter one, it has been stressed that digital media are not used in schools the way and to the extent they should; this is a major point in the current public and political discourse.[85] Their use in schools would not match their importance in the spheres of economy and industrial production. There are, however, differences between the subjects in school. In music, digital media are widely used especially in the field of popular music. Even without evidence on a broader base, one can assume that playing and saving audio-files, that are stored locally or in the cloud, happen often. However, it is difficult to estimate whether or not music production by means of digital media like apps is common practice.

Thus, the [PosyMus]-project is linking two important fields of music education research and practice. The objectives were to develop test items from existing assessments of music specific competency on a technical basis adapted to tablets, to test the ecological validity in class room situations, to develop a feedback system for the results adapted to teachers' needs and abilities, and to check the applicability in everyday use in schools. In more general terms, the project was to research possibilities for implementing digital media in one sector of music teaching.

CONDITIONS FOR IMPLEMENTATION

In order for an e-assessment tool to be profitable for music teaching, its implementation should be straightforward and intuitive. This applies to implementation processes of digital media in school in general.[86] In addition, the use of new technologies in any school subject should not require additional investments from the schools' tight budget. A solution based on technology already available in schools would therefore be desirable. Thus, a focus on the conception and technical realisation of the system was to develop an easy-to-use solution for common devices like mobile tablets and consumer PCs. In case of a successful development, music could be potentially included in international large scale assessments, contrary to the present state.

The conceptual design and the technical development of the e-assessment tool can be divided logically into two main areas. Firstly, a test system had to be created to test the competences, secondly, a feedback system which visualises the data recorded by the test system. The former was developed platform-independent; this way, it should be ensured that it could run on existing hardware, whether it be iPads, Android tablets or MS Surface devices. This goal was accomplished by a network- and browser-based test software. The core element of the system is a standard consumer PC which acts as a server, delivers the individual tasks to the equipment of the participants, and collects the results. Participants receive the test tasks via wireless local area network. Standard web technologies such as HTML5 and JavaScript are used for the item construction. The whole server-client system is based on an open source assessment software called TAO.[87] Theoretically, the only prerequisite for this is an up-to-date browser, but in practice it was shown that different browser engines interpret the code of the test web pages differently, resulting in unequal representations and malfunctions. Since all participating schools incidentally owned iPads including Safari browser, the [PosyMus] team could optimise the code for this browser.[88] The client-specific hardware requirements were a touch-screen and sound output via headphone jack, in order to be able to process the music-practical test tasks.

INTERVIEWS ON DIGITAL MEDIA IN MUSIC LESSON

Complementary to the development of the test and feedback system, structured interviews with those music teachers who took part in the test and feedback evaluation were conducted. Additionally, teachers who did not participate were interviewed to broaden the sample and to include contrasting views. The focus of these interviews was on teachers' beliefs about e-assessment and ICT in music lessons, especially its assumed usefulness and their personal reasons for using or not using ICT for learning, as it is generally agreed that questions of acceptance, usability and statistical literacy play a major role. Interviews were analysed according to grounded theory methodology following Straus & Corbin (1996)[89].

Regarding ICT use in general, the interviewed music teachers used a broad variety of digital media for their teaching practises. The tool used the most by the teachers in our sample is a widely accepted video platform. Teachers used it mainly for listening purposes like playing pieces of music to the class. Some teachers also described that they let the students watch instructional videos and tutorials, e.g. on music theory, that were uploaded to YouTube. Other tools mentioned were e.g. Wikipedia as information resource or Apple Keynote for presentations in class.

All tools mentioned have this in common: they are not music-specific, they are mainly intended for a receptive use, and they are conventional information sources. Students can listen, watch, and read but cannot interact. Seldom teachers described the usage of productive music tools such as software instruments or digital audio workstations. When it comes to playing in music lessons, they often focus on 'traditional' i.e. non-digital instruments and singing. There are two main reasons for that

described in the interviews. Firstly, the majority of the interviewed teachers think that it is a huge effort to set up computers or tablet devices for music making, secondly some of them belief that electronic instruments lack some sort of physical experience and emotional abilities which, in their opinion, are essential for making music.

On the other hand, a few teachers seem to use digital media in a music practical way: for instance, the iOS-App SoundPrism[90] was mentioned in the context of music playing in class.

CHANCES AND PROBLEMS OF E-ASSESSMENT

Teachers can imagine a broad variety of advantages of an e-assessment system for music classes. One aspect concerns the rapidness of electronic competency measurement and feedback:

Well, I think that digital media are really helpful in the field of diagnosis, because I can let them do the input within a test instantly. And the software can evaluate these inputs instantly regarding musical competencies and maybe give some sort of protocol instantly to the teacher, so that the teacher can, at best, get an instant overview over the musical competencies *(secondary school teacher 'A' from Lower Saxony).*

This quotation shows that this teacher is well aware of the possibilities of an instant feedback, which can be useful for his teaching conception. An overview of the competencies of his students, measured at the beginning, could bring, in his view, advantages in planning and conception of his everyday work.

In contrast to that, teacher 'B' sees no advantage in e-assessment systems for the subject of music, mainly because assessment in general is not important in music classes:

I rather trust my gut feeling when assessing students [...] assessing in general is rather secondary in the subject of music *(secondary school teacher 'B' from Lower Saxony).*

CONNECTIONS BETWEEN PRIVATE AND PROFESSIONAL ATTITUDES

Analyses also revealed a strong connection between affinities to technology in private surroundings and attitudes towards ICT as a useful medium in schools. Not surprisingly, the interviewed teachers who described themselves as 'tech-savvy' had more positive attitudes towards the use of ICT, but also towards e-assessment in schools. And, with no exception, every teacher with such positive attitudes reported that he or she had started using ICT for private reasons even before his or her career as a teacher begun. Thus, they seemed to adopt their technical affinities from their private lives to their professional roles. Figure 1 is based upon the statements

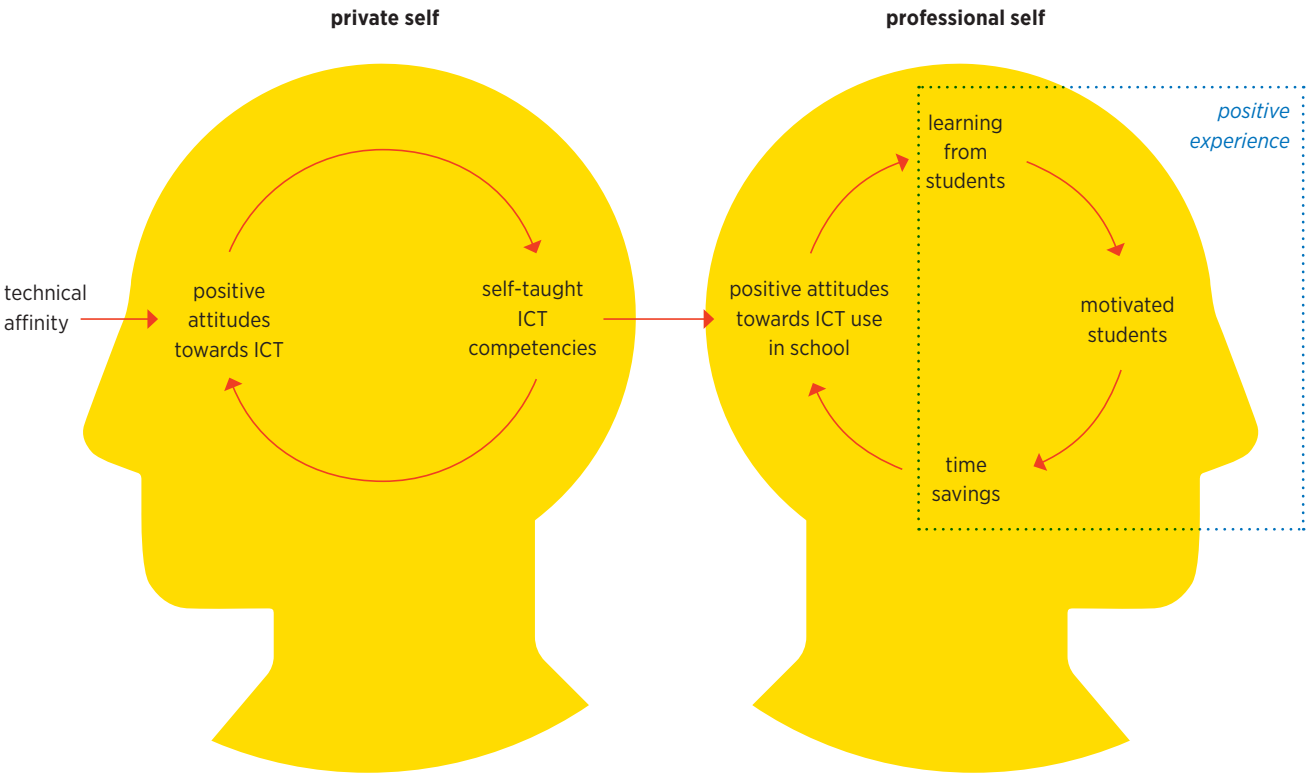


Figure 1: Model of the development of positive attitudes towards ICT use, based upon statements of interviewed teachers

of one tech-savvy teacher and illustrates that reciprocal process of transferring competencies and attitudes from private to professional spheres. Figure 1 does not mention, however, several factors that assumingly have an influence on attitudes and motivation, such as hardware provisions in school or support behaviour from the administration. It is also unclear if and how attitudes towards electronic assessment techniques and digital devices are linked. But it seems to be interesting that the origin of a positive attitude for whatever kind of ICT use derives from private circumstances.

Further investigation will also hopefully answer the question why and how positive private attitudes find their way into teacher's profession. Thus, we can hope to find answers on further questions, i.e. which role the academic teacher training can play on cultivating positive (and maybe negative) attitudes towards ICT and e-assessment.

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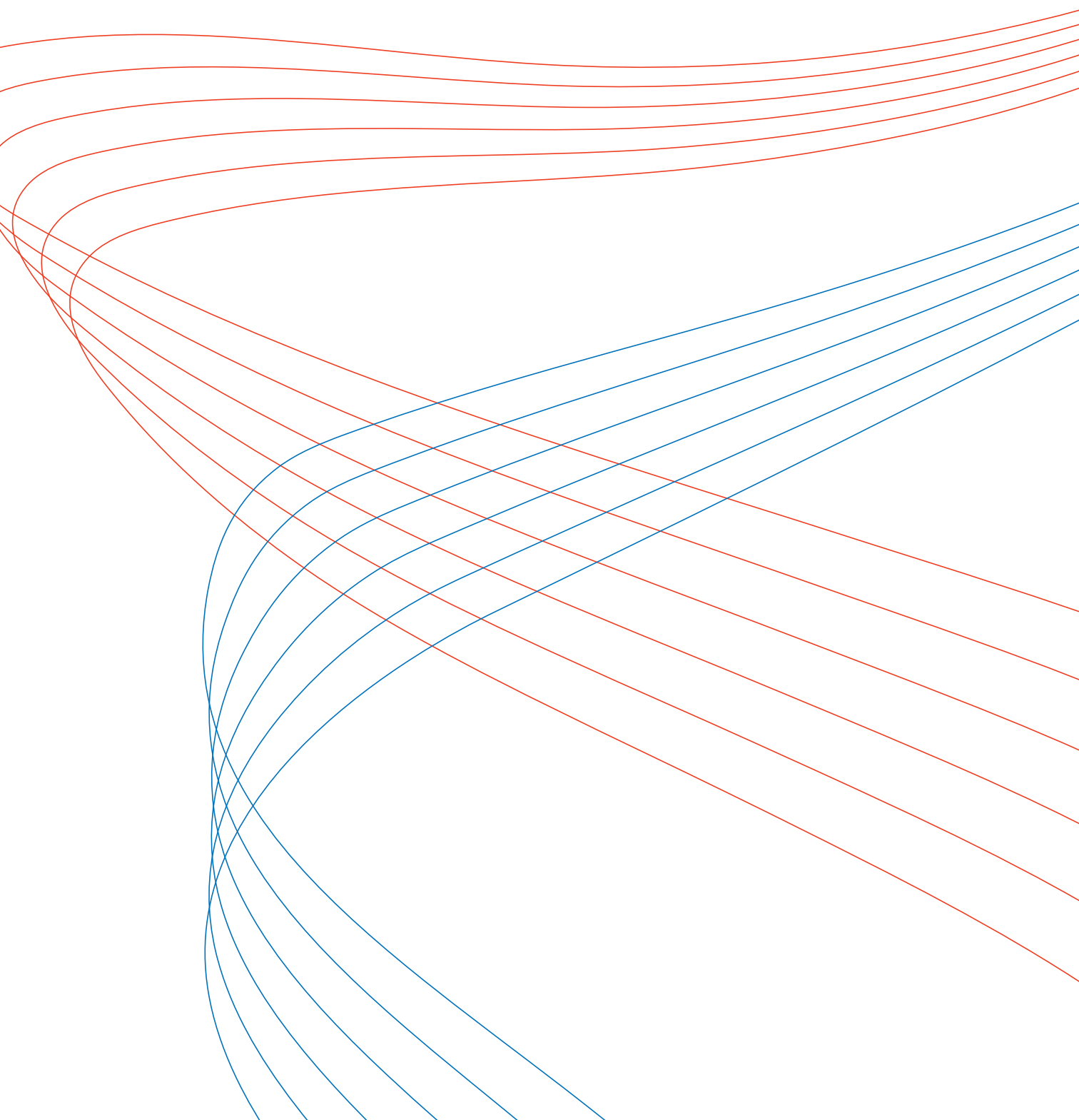
The Voice of the Teacher. Using Research Solicited Logbooks as a Research Tool in Arts Education

EDWIN VAN MEERKERK



INTRODUCTION

In primary schools, generalist teachers are responsible for arts education. For this, they may work together with professional arts teachers, use handbooks or other published teaching methods, yet they will also have to rely on their own competencies in the arts. This paper describes the use of Research Solicited Logbooks as a tool to describe and understand how generalist primary teachers deal with teaching art subjects and working together with specialised, out-of-school arts teachers.

Previous research has pointed out that professional development, such as learning to teach a specialist subject, requires a transformative process. In this process, the professional identity of, in our case, the teacher, undergoes a change. This change results in different classroom behaviour and a different conceptualisation of the knowledge and skills that are seen as part of the subject's teacher identity (inside knowledge), and those that are not (outside knowledge).[91] Teacher identity is seen as a subjective, dynamic, and narrative concept.[92] In order to bring to light changes in this professional identity, it was necessary to find a methodological tool that allowed a form of self-recording which would reveal the development of the teacher's identity. This form was found in the logbook.

THE PROGRAMME

In 2012, the Dutch ministry of Education, Culture, and Science launched the programme Quality Cultural Education (QCE), a programme aimed at stimulating the quality and sustainability of arts education in, mainly, primary schools. The programme consisted of four pillars: the development of more coherent instruments for the assessment of arts education, the development of 'lines' connecting the arts education for children from four to twelve years old, the improvement of the competencies of generalist primary teachers in the arts, and, finally, the strengthening of the collaboration between schools and their cultural environment. The programme was aimed to last for four years, and was continued for another four in 2017, while remaining an explicitly temporary measure, aimed to improve the quality of arts education in such a way that schools and their cultural partners would eventually be able to sustain it.

While the programme was funded nationally (the budgets were matched by cities and provinces), it was intended to be organised from the bottom up. This article is based on a four-year research into the QCE programmes taking place in the province of Gelderland, in the central-eastern part of the country, with 1.4 million inhabitants outside the larger cities, which had their own programmes. The provincial programmes were coordinated by Cultuurmij Oost, the provincial centre of expertise for arts education and amateur arts.

After an initial round of interviews with project coordinators and staff from participating schools and arts centres, a research project was created that focused on the learning process of the generalist teachers. The central role of the teacher was obvious in all projects, as well as within each of the four pillars discerned by the programme. The reason for this is twofold. First, every aspect of the programme ultimately aims at improving the situation in the classroom. Second, being a tem-

porary programme, the effect in the long run must be visible in the everyday reality of the classroom, given the fact that professional art teachers are by and large absent from primary schools. This first finding was also the greatest challenge of the programme: how to support generalist teachers in developing towards this goal, regardless of the context, their professional background, or their personal talents and ambitions?[93]

THEORY AND METHODOLOGY

In order to understand the challenge posed by the QCE programme for teachers, a conceptual framework had to be chosen that would provide insight in the key elements of the process of change the teachers were facing. Transformation Theory, originally proposed by Jack Mezirow[94], describes the learning process of adults, mainly in professional contexts. This process, in order to be successful, has to start with a dilemma that challenges the beliefs and practices of the professional.[95] The teacher faces a situation that motivates, be it by push or pull factors, him or her to change everyday practice, and to question the beliefs underlying this practice. In the QCE programme, the generalist teachers are confronted with the professional identity of art teachers. This confrontation with a different professional identity[96] might, it was hypothesised, trigger such a situation. This situation can subsequently lead to a process of trial and error in acquiring a new set of competencies, and, finally, a new or at least fundamentally changed professional identity. From the vantage point of Transformation Theory, the process of change intended by the QCE programme is an individual process, thus requiring a methodology that would enable to capture the teachers' learning process, their dilemmas, doubts, trials and errors.

Several research methods in use provide the necessary insight in this individual process. Several tools have been developed over the years to record the personal perspective. There are three general types of self-recording methods: personal diaries, professional or educational logbooks, and research solicited diaries or journals.[97] Personal diaries are used most often in historical and biographical research. Professional or educational logbooks are kept for the sake of work or education, and may be collected afterwards by the researcher, who had no say in the format being used. This is only the case in the last type, the solicited diaries, journals, and logbooks.

The solicited log has several distinguishing characteristics that have made it a relevant tool for this research project.[98] Because the researcher is absent, he or she cannot influence the data or disturb the context of the experiences being recorded, thus allowing for more personal narratives in the logs. Furthermore, earlier research has shown that solicited logs, like professional diaries, often reveal routine processes, which are generally overlooked in interviews. It may thus shed light on meaning in the making. An additional benefit of solicited logbooks is that they serve as a reflective tool for the subject, documenting not only what happened, but also how the subject looks back on the event.[99]

In diary or journal forms, three basic perspectives may be discerned: interval-contingent, signal-contingent, and event-contingent records. The chosen perspective of the research was interval-contingent. In this case, the participating teachers received

on-the-job training, workshops, and guest lessons from art teachers. They were asked to hand in a log before and after each event, rather than keeping a log on a regular basis or when prompted by the researcher. The resulting event-contingent logbooks offered a perspective on the events that was close in time to the events, thus allowing for little reflection or the evolvement of memories. Earlier research emphasises this as a benefit of solicited logbooks, as they offer details that tend to disappear from personal accounts taking place longer after the events described.

The logbooks were pre-formatted, to create a basis for the teachers in their logs, as well as to ensure a basic comparability in the data. All the while, the teachers were encouraged to deviate from the format, and/or add texts or images whenever they felt inclined to do so. This was regularly done, thus adding a more personal touch of each teacher to the data. The degree to which the teachers personalised their logbooks varied, however. This variance in the use of the logbook format is indicative of the professional identity of the teachers,[100] as will be discussed in more detail below. An independent coder tested the coding of the logs. The agreement in the coding was 20% (0.35 for Cohen's kappa), which is relatively low.[101] This is most likely to be caused by the way the teachers filled in their logbooks.

RESULTS

Of the ten teachers who agreed to participate, only seven saw the project to completion. Illness and work overload caused three of the teachers to stop contributing. The logs that were sent in were 291 words on average. The whole data set was 16,618 words, which were analysed using Atlas.ti software. In addition to the logbooks, the teachers, as well as some of their colleagues, school board members, art teachers, and pupils, were interviewed. The interviews with the children lasted 16 minutes on average, those with other teachers and members of the school management teams 32 minutes. Taken together, the interviews lasted 9 hours, 22 minutes and 58 seconds. The information from the interviews served as background information for the analysis of the logbooks.

The format for the logbooks consisted of two parts. The first part focused on the period preceding the event, prompting the teachers to look back on the previous days or weeks depending on the interval between the training sessions, workshops, or guest lessons. The teachers were also asked to make note of their expectations for the upcoming event. For the second part of the logbook, the teachers were asked to describe what they had done and with whom, as well as to describe the roles of all participants. In addition, they were asked to reflect on the events, noting what they found easy or difficult, and pleasant or unpleasant, as well as what they planned to do with the things they learned.

The teachers each chose, either consciously or unconsciously, his or her own way in writing their logbook entries. Consider this example from a teacher's logbook:

Introduction of the chimes. S. [the music teacher] had brought a whole bag full of it, so every child could play along often wonderful! Did many activities with these instruments and a nice accompanying song. (Log entry, 23 April 2015)

Like many of her colleagues, this teacher responded to the format of the logbook by sticking to its systematic nature with every entry. If asked what had been done, and with whom, that was exactly what she did. Despite several judgements and emotional terms in the description, the logs remained strictly within this format. 19% of the logs were filled in in the exact format that was given to the teachers, and an additional 52% used an adjusted format. These logbooks were sometimes explicitly accompanied by an expressed urge to 'what was intended', as one teacher wrote. In the emails with which the logs were handed in, the teachers asked this despite the fact that in the instructions for the logbooks the teachers were explicitly encouraged to deviate from the format, to change or add items reflecting the events or how they felt about it. Apparently, the teachers felt the need to follow the format and were uncomfortable with doing otherwise.

There were also logbooks with a different perspective. These were structured around the nature of the events, rather that the format of the logbooks. In these, rather meandering, logs, the course of events, and the associations the teacher had formed the core of the entries. At first sight, these logs seem to indicate a more intense learning process from the part of the teacher, such as in the following example:

We have found out that we have too little time, the mill being only one part of the project and there is so much to tell about it. […] In preparing the lessons I am learning stuff myself, and have found out that the mill is a belt mill and after googling it I know what a belt mill is, too.

After analysing the logbooks, it turns out, however, that there is no great difference with regard to the teachers' learning process in connection to the way they handled the logbook format. There is a parallel between the use of format and the prior engagement of the teachers with the arts. Those who, both in their logbooks and in the interviews, expressed a strong commitment to the arts were more likely to deviate from the format.[102]

A second division can be discerned in the logbooks. This pertains to the authorship style of the log entries. In this respect, the teachers took three perspectives: an individual perspective, a professional perspective, and a team perspective. The former is marked by the use of the first person singular in connection with explicit reflections on the personal connection to the subject. One teacher for instance wrote:

S. knows how to motivate me. I feel more competent and less ashamed for my singing (because S. thinks I sing well).

Other logbooks take a more professional perspective. In these, the events are described in terms of their relevance in class, like in this case:

Regarding the music lessons: see what I can hold on to and record for my own use in class. How does she present notation, how does she handle singing etc.

Two of the teachers, who also acted as team leaders in their school, sometimes took the perspective of their team rather than their personal point of view or the

professional relevance. One team leader wrote, reflecting on a training session he had had with his team:

The remainder of the session is devoted to the lessons we have to develop ourselves. I notice how one of my colleagues worries about the assignment. Together we discuss what it is we have to do.

It is important to note that this team perspective did not result from the fact that the workshop was a team effort, since in all participating schools the team shared the entire process of the QCE programme.

CONCLUSION AND DISCUSSION

In conclusion, it can be affirmed that the semi-open format of the log allowed for personal differences between the teachers. Moreover, the form of the logbooks reveals much more than their literal content, when we look at the logbook typologies and the typology of authorship, which reflect the attitude and professional identity of the teachers. An interesting parallel can be seen between logs in which a personal perspective was taken, and the passing of (artistic) judgements on the events described. It is assumed, though further research is needed on this matter, that this connection affirms the division between inside and outside knowledge. Teachers presumably continue to see art as something outside their professional domain, and therefore are inclined to take a personal rather than a professional view.

The teachers' tendency to stick to the format of the logbooks serves as a warning against an isolated use of logbooks in research. The information has to be supplemented by interviews and observations, to ascertain the validity of the findings. Especially in the case of primary school teachers, the tendency to stick to the protocol may be relatively great, as was suggested by earlier research.[103] Moreover, this indicates how difficult it is to create a truly transformative learning process with this specific subject group.

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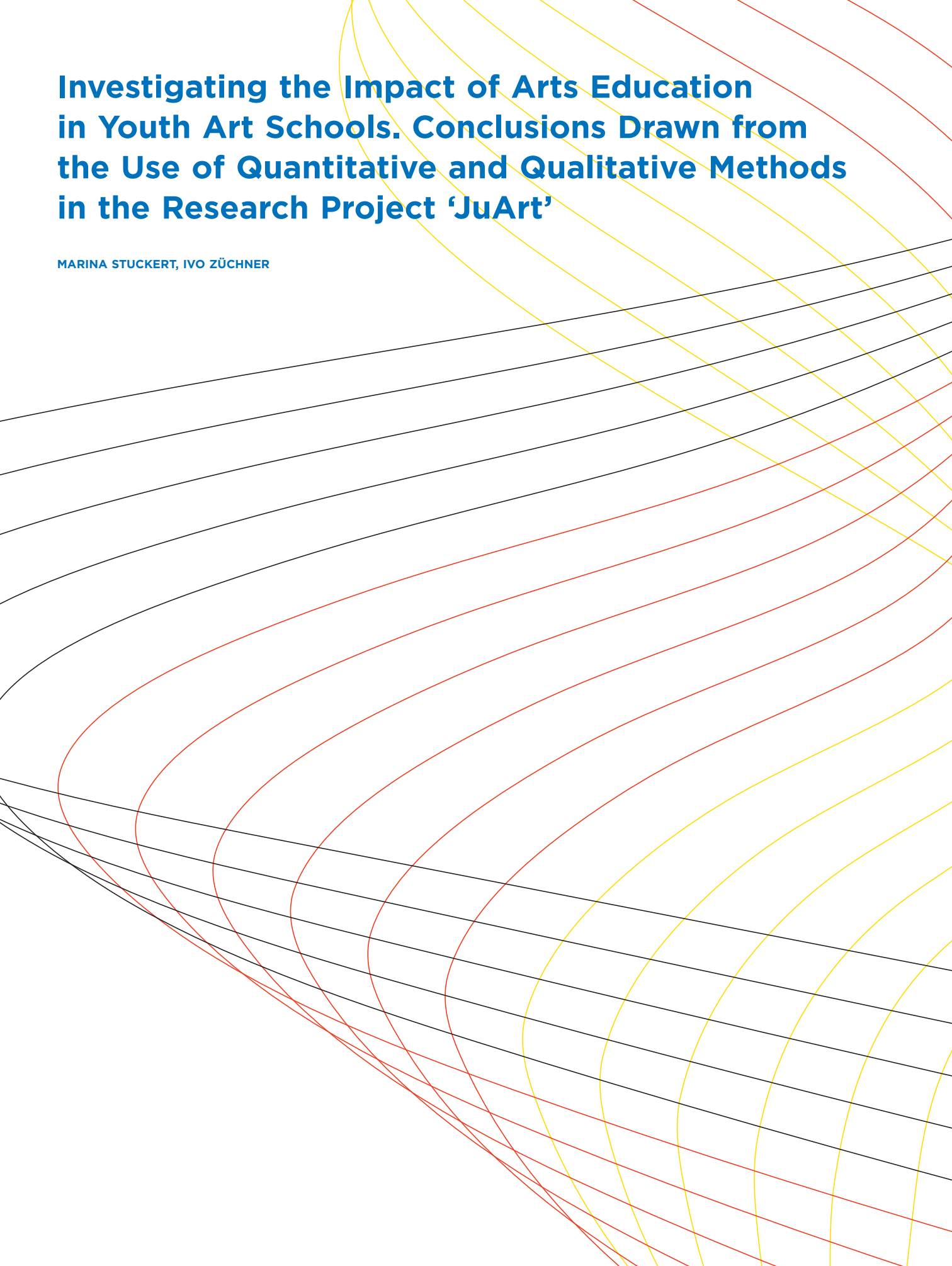
Investigating the Impact of Arts Education in Youth Art Schools. Conclusions Drawn from the Use of Quantitative and Qualitative Methods in the Research Project ‘JuArt’

MARINA STUCKERT, IVO ZÜCHNER



INTRODUCTION

The cooperative research project JuArt, which is conducted by the University of Kassel and the Philipps-University of Marburg, analyses effects of youth art schools. The aim of this paper is to present the methodical approach of the study. To analyse the outcomes of offerings in youth art schools, quantitative and qualitative methods were used: On the one hand, a standardised longitudinal questionnaire survey was conducted with 989 participants aged between 9 and 19 years who were involved in courses and vacation projects. The paper presents analysis of the obtained data, consisting of measurements of changes in participants' self-assessments and personality traits within the cultural-aesthetic domain. On the other hand, data was gathered with ten focus groups of participants. The underlying research question in this part of the study was how latent group orientations and their development have an impact on educational processes. The analysis aims at making a contribution to basic research in the area of arts education.

FIELD OF RESEARCH: ARTS EDUCATION IN YOUTH ART SCHOOLS

Youth art schools are institutions of extracurricular cultural-aesthetic education. They form the field of research of the study JuArt. There are about 400 youth art schools in Germany today. They are part of the broad field of arts education with different offers like weekly courses or projects (especially in holidays) in the fields of arts, music, theatre, dance or media. Most of the institutions are part of the German Children and Youth Care System and are at least partially funded by local authorities.[104] Youth art schools have two main *goals: supporting the development of personality and social learning as well as the development of interests and competences in selected fields of arts.*

STATE OF RESEARCH

In Germany, there is little research on effects of youth art schools or arts education outside from schools. In the school context, findings on arts education refer to the ability to communicate and to make decisions, building identity, development of fantasy and self-expression as well as empathy.[105] These school based findings support the idea that taking part in offerings of arts education can foster competences in the field of arts (techniques, ability of self-expression) as well as personal and social competences.

APPROACH OF JUART

The research project JuArt[106] is funded by the Council for Arts Education [Rat für Kulturelle Bildung e.V.] for three years (2015-2018). This joint project by the University of Kassel and Philipps-University Marburg uses quantitative and qualitative methods.

The intention of JuArt is

A) to gain more knowledge about youth art schools (structures, functioning and perspective of adolescent participants) and

B) to investigate the effects of arts education on children and youth and to understand the underlying processes. Concrete research questions are: how and to which extend do youth art schools support the development of *skills* in the aesthetic fields (fine arts, music, dance, theatre, media), influence the *artistic self-concept* or support *self-development* respectively the development of *competences to relate oneself to others* (communication, perspective-taking).

METHODS

In the quantitative part of JuArt, a longitudinal study with three measurement points was conducted to analyse changes in personality traits and competences in selected fields of arts. The data is gathered via standard questionnaires, asking for self-reports of the participating children and adolescents.

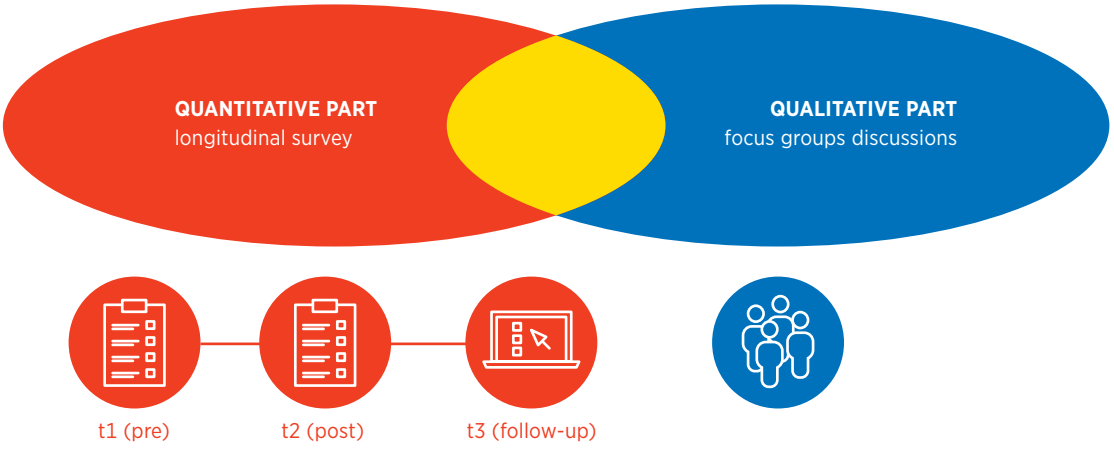


Figure 1: Model of the JuArt-Study

In the qualitative part of the study, the researchers collected information about participation and learning in youth art schools based on focus group discussions. These analyses are conducted using the documentary method via comparative reconstruction of elements and social configurations which show to be of importance for the learning process.

The following remarks focus more on the quantitative approach. Insights of the qualitative part will be provided shortly, because the analyses here are still in progress. Gaining findings with a mixed method approach is also planned (→ FIGURE 1).

Longitudinal Self-Reports with Questionnaires

The centre of the quantitative study was a questionnaire-based longitudinal survey. The survey was performed within the field of youth art schools in weekly courses (with a duration from three to six month) as well as vacation projects (with a duration about four to ten days). The first test (t1) took place at the beginning of the offer, the post-test (t2) at the end or after sixth month within the long-term courses. To control long-term effects, a follow-up-test (t3) was conducted in the form of an online-survey. The participants were children and adolescents in offerings of fine arts, music, dance, theatre or media. This distribution allows to compare the groups of participants and to treat participants from different offerings as control groups.

Following the Model of Organized Activities as Developmental Contexts[107], the analysis focuses on different influences on the development of dependent variables like artistic self-perception or personality traits during the evaluation period (→ FIGURE 2).

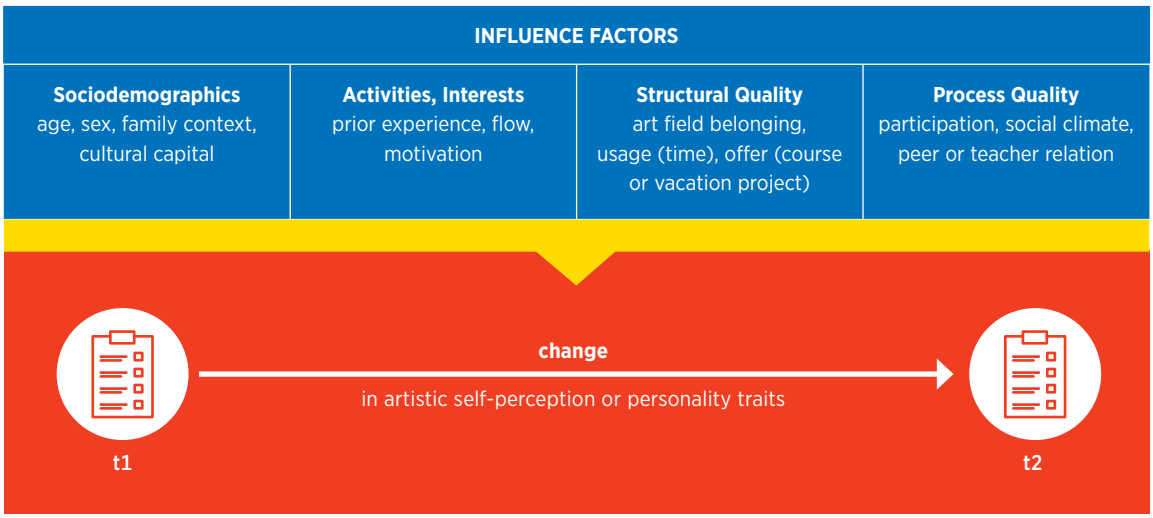


Figure 2: Study design following Mahoney, Larsson & Eccles, 2005[108]: examined influences (independent variables) on development (dependent variables)

To gain more information about the structures and the process quality of the offerings, the associated tutors were surveyed during the second wave (t2) about their courses and their professional background.

Instruments

The measurements of the quantitative study are self-reports with existing as well as in house developed scales. Regarding the personality traits or social behaviour, different self-reports like the Perspective-Taking Scale[109] were answered by the par-

How would you describe yourself? Please select to what extent the statements below apply to you. *Please mark only with one tick per line.*				
t1: *n*=805; *M*=2.88 ; *SD*=.62; *α*=.70; t2: *n*=692; *M*=2.92; *SD*=.59; *α*=.69	does not apply at all	does rather not apply	largely applies	fully applies
I try to look at everybody's side of a disagreement before I make a descision.	○	○	○	○
I sometimes try to understand my friends better by imagining how things look from their perspective.	○	○	○	○
I believe that there are two sides to every question and try to look at them both.	○	○	○	○
Before criticizing somebody, I try to imagine how I would feel if I were in their place.	○	○	○	○

Table 1: example measuring tool: perspective-taking (personality traits)

ticipants. To present an example: According to Davis[110], the construct of perspective-taking is defined as 'the tendency to spontaneously adopt the psychological point of view of others'. The subjective ability is established using a four-point Likert-Scale range from 1 = 'does not apply at all' to 4 = 'fully applies'. This measuring tool shows an adequate degree of reliability (→ TABLE 1).

Sample

The whole sample contains 989 participants. Approximately one quarter of the respondents were participants of vacation projects (duration: one to three weeks, full time) and the others were visiting weekly courses during the survey period. Data from the first two data collection points is used in the present contribution.

As Table 2 shows, almost two thirds of the participants could be interviewed again at the second measurement point. A look into the sample shows that over 60% of the respondents are participants of the offerings in the fine art sector (which in itself is heterogeneous: the offerings have a range from activities in construction workshops to fashion courses and classical drawing lessons). Regarding the gender distribution, the sample shows that about two thirds of the respondents are female (both at projects and courses and during the survey waves). And the average of the HISEI (highest international socio-economic index) shows that the participants in our sample have a high socioeconomic status (compared to the national average of youth in Germany with about 50). So in conclusion the sample of the study is a highly specific sample, but in line with research results on participation in the field of arts education[111]: The distribution of art sectors, the gender distribution, and the high socioeconomic status in the sample reflect the current situation within youth art schools.

***n* (total)**	**989**		
	t1	**t2**	**t2 (new)**
***n* (wave)**	839	549	150
***n* (art)**	537	452	114
***n* (media)**	53	34	2
***n* (dance)**	74	49	14
***n* (theatre)**	141	93	20
***n* (music)**	34	26	–
sex	*f* = 685 (70%); *m* = 293 (30%)		
age	*M* = 13.26 (*SD* = 2.29)		
SES (HISEI)	*M* = 63.4 (*SD* = 19.3; *n* = 643)		
youth art schools: *n* = 36		offerings: *n* = 147	

Table 2: Sample of JuArt at the first measurement points (t1 & t2)

Statistical Analyses

The following analysis steps are based on the construct of 'perspective-taking', in order to illustrate the approach of gaining knowledge about educational processes in youth art schools within the longitudinal access. The assumption at this point is based on the consideration that participants within youth art schools, especially in theatre offers, have a higher development in perspective-taking. There exist some examinations referring to the relation between drama and perspective-taking or empathy. So there are some hints that drama contributes to improvement of perspective-taking.[112] But the findings have not always been consistent.[113]

For the following analysis, a change model is used, which builds on the contributions of Steyer, Eid and Schwenkmezger (1997)[114]: A structural equation model is specified with a latent variable that indicates the intraindividual change scores between two measurement points. This allows to explain interindividual differences in intraindividual change and to include predictors to check different influences. The empirical example with data on perspective-taking (→ FIGURE 3), assessed on two measurement points, illustrates the approach.

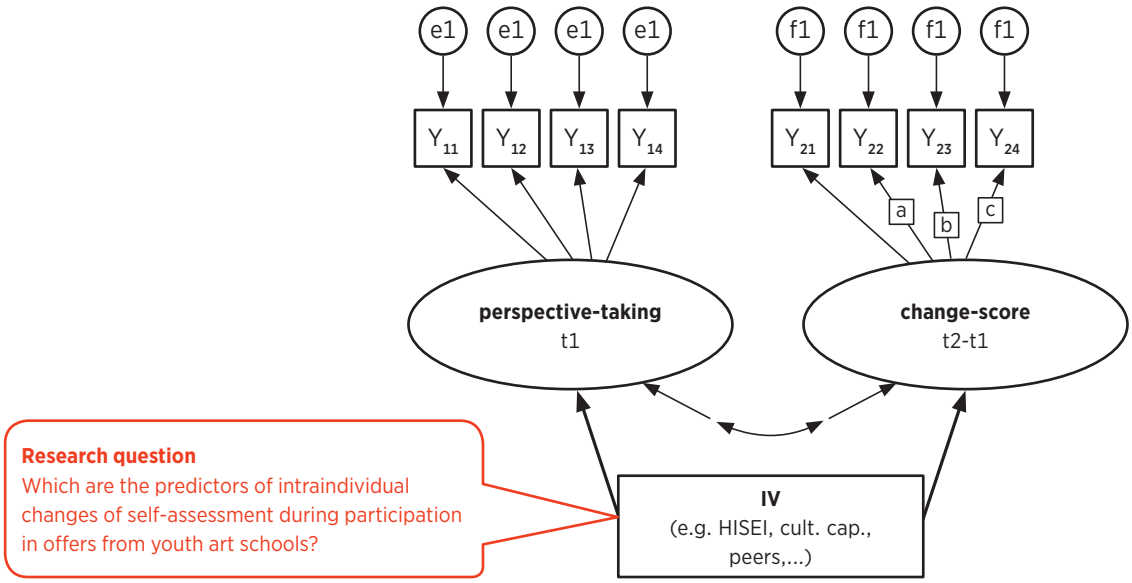


Figure 3: Latent Change Model to measure changes in the self-perception of participants; here: perspective-taking

invariance	SB-χ^2 (*df*)	AIC	BIC	CFI	RMSEA	SRMR	ΔSB-χ^2 (*df*)	ΔCFI
configural inv.	13.580 (15), *p*=.558	12792	12933	1.000	.000	.017		
weak factorial inv.	21.909 (18), *p*=.236	12796	12923	.997	.015	.035	8.329 (3), *p*=.040	-.003
strong factorial inv.	24.742 (21), *p*=.259	12792	12905	.997	.014	.039	2.833 (3), *p*=.418	.000
strict factorial inv.	31.353 (25), *p*=.178	12792	12885	.995	.016	.036	6.611 (4), *p*=.158	-.002

Table 3: Testing measurement invariance

To conduct the analyses measurement invariance has to be checked: By controlling whether factor loadings, intercepts and residual variances are equivalent in a factor model at two different time points, one can conclude if comparisons of the latent variable are valid across time (→ TABLE 3).

As one can see in Table 3, not only the strong and the strict factorial invariance can be assured but also the fit indices of this model indicate a good fit. Consequently, valid inferences about the differences between latent factor means in this model can be made.

Focus Groups: Sample and Approach

In ten focus groups of two vacation projects and eight weekly courses, a total of 58 children and adolescents were reached, who also participated in the longitudinal survey (20 in fine arts; 15 in fashion; 5 in graffiti, 8 in theatre; 5 in dance and also 5 other adults, who participated in different arts fields of vacation projects). To give a short insight into the topics of qualitative approach, we can show the five identified main dimensions for the process of comparative reconstruction:

These are

1. access and motivation,
2. gained experiences during the projects/courses and the handling of them,
3. understanding of what it means to be a community,
4. dealing with difference and maybe in some facts with diversity and
5. conformity vs. individuality.

In the analysis, the mentioned elements will also be linked to the performative levels during the conversation of participants, like types of addressing specific topics, social orientation, positioning and communicative behaviours. Therefore, it is important to focus not only on the individuals but also on the relevance of the social climate related to the examination of educational processes. The research question here is how learning environments are established in the field of youth art schools and which impact could be assumed referring to the group. The assumption is that the social framework creates potential for learning and educational spaces during projects and courses. Significance is attributed to structural framing: atmosphere, working climate, and the organisation of the offerings.

RESULTS

As the questionnaire survey of JuArt includes a wider range of dependent variables that belong to artistic self-perception[115] as well as to personal traits[116], the following example with the analyses on the construct of perspective-taking shall be presented as a prototype of the analyses.

	DV	perspective-taking (n = 663)			
	IV	influence IV on			
		t1		change-score (t2-t1)	
		b	*SE*	*b*	*SE*
	constant	1.357**	.44	.428	.42
Sociodemographics	sex (1 = male)	-.335**	0.06	.140*	0.06
	age	.043**	0.01	.000	0.01
	low cultural capital	-.114*	0.06	.001	0.06
	self-efficacy	.293**	0.05	-.026	0.05
Activities, Interests	leisure activities in literature	.185**	0.05	-.062	0.05
Structural Quality	art field: theatre (average time duration)	-.119	0.09	.077	0.08
	art field: theatre (high time duration)	-.236*	0.10	**.287****	0.07
	mixed age	-.150**	0.06	.107*	0.05
Process Quality	possibility to experiment	-.175*	0.08	.030	0.08
	discipline	.005	0.07	-.099	0.07
	social orientation	.293**	0.11	-.150	0.11
	peer-relationship	.163*	0.07	-.157**	0.06
	good rating	-.127	0.10	.158*	0.08
		b		*SE*	
	intercept	.309**		.03	
	slope	.148**		.03	
	intercept*slope	-.086**		.02	
	χ2 (df)	**CFI**	**TLI**	**RMSEA**	**SRMR**
	111.668 (101), p=.22	.993	.990	.013	.026

Table 4: Latent-Change-Model-Results for perspective-taking. Notes. DV = Dependent Variable; IV = Independent Variable; t1 = first wave (initial value); change-score is based on difference between t2 (second wave) and t1; *p < .05; **p < .01

Self-Reports: Example for Personality Focus (Development of Perspective-Taking)

To test the assumption that (and to which extent) the theatre offerings have an impact on perspective-taking, the following structural equation model (latent change model from first to the second measurement point) was estimated (→ TABLE 4).

One can see that self-assessment of perspective-taking is in line with the expectations: the participants on *theatre-offerings* show significantly stronger gain in perspective-taking in comparison to self-report of the group who participated in other art areas.[117] Furthermore, other independent variables, following the Model of Organized Activities as Developmental Contexts (→ FIGURE 2), have an influence on the starting point (signifying that there is a different initial value concerning these factors) or the change score (signifying that there is an impact on the development):

- *Sociodemographic factors:* Females, elder adolescents, participants with a higher cultural capital and self-efficient participants start with a higher initial value in perspective-taking at the first measurement point (t1). Of these sociodemographic factors only sex has an impact on the development (t2-t1). Males are the ones who show significant stronger growth in perspective taking.

- *Activities/Interests:* Similar findings can be seen in this area: leisure activities in literature are related to the initial values but not to the change in perspective-taking.

- *Structural Quality:* There is an effect of the theatre offerings with long time duration (above 30 h during maximum half a year) on the development of perspective-taking. Besides there is also an impact of a work with mixed-age-groups on the change. These factors have to be interpreted with regard to the initial value. So the participants of the theatre offerings with a long time duration as well as participants in mixed-groups have shown lower perspective-taking-ability at the first measurement point (t1) but have afterwards gained ground with a significantly higher growth in their self-perception.

- *Process Quality:* The estimate of a possibility to experiment during the offering shows a relation to lower ability of perspective-taking at the beginning of the offering. Also, a high social orientation concerning the tutor has a correlation with the initial value. Participants who indicate a high approval regarding the opportunity to build new relationships among peers start with higher perspective-taking-values but then have a lower development in comparison to those with lower need for peer-relationship. Moreover the adolescents in offerings expressing a desire to participate again or to recommend the offer to a friend show a higher increase in perspective-taking.

Especially the findings in the last two areas link the analyses to the qualitative approach.

group		educational access & experiences...		
		... individual motivated	... motivated through the group	... isn't a subject of disussion
communication process...	... about aesthetic-cultural learning areas			
	... about the social peer-interactions			
	... does not succeed or aren't discernible			

Table 5: Matrix: evaluation & comparison of assessed qualitative data

Focus Groups

Based on the findings of the longitudinal quantitative approach, the earlier basic assumption that the social framework is of major significance for educational access and experiences can be supported for perspective-taking. Accordingly it should be tried to establish relationships between social processes and educational experiences, because this could mark the way to search for similarities and uniqueness and afterwards portray them successfully. The matrix shown in Table 5 gives a first outlook on how the project will gain more detailed knowledge referring to social constellation and its importance for educational development in the field of extra-curricular cultural child and youth work.

CONCLUSIONS

There are at least three conclusions which can be drawn from the findings about the question why some participants have a stronger development on perspective-taking than other ones.

1. Impact of the offerings: Taking into account the different fields of art, the findings support former research results that participation in theatre strengthens the ability of perspective-taking.

2. Impact of structural level: The group-composition (e.g. mixed age) appears to play an important role for the development of perspective-taking.

3. Impacts of the pedagogical concepts of the offerings: The findings underline the importance of the 'others' (peers or pedagogical framework of tutors) for the educational process.

As analyses in other domains show, these aspects are also of importance for artistic self-perception or personal and social traits.

The second and third findings underline that social learning seems not only to be linked to the art fields but also to the structural and pedagogical framework. This insight supports the assumption that extracurricular offerings of youth art schools have an effect not only on the artistic skills but also on general personality development of young people. On this matter, further reconstruction of the qualitative data from the focus groups will give deeper insights.

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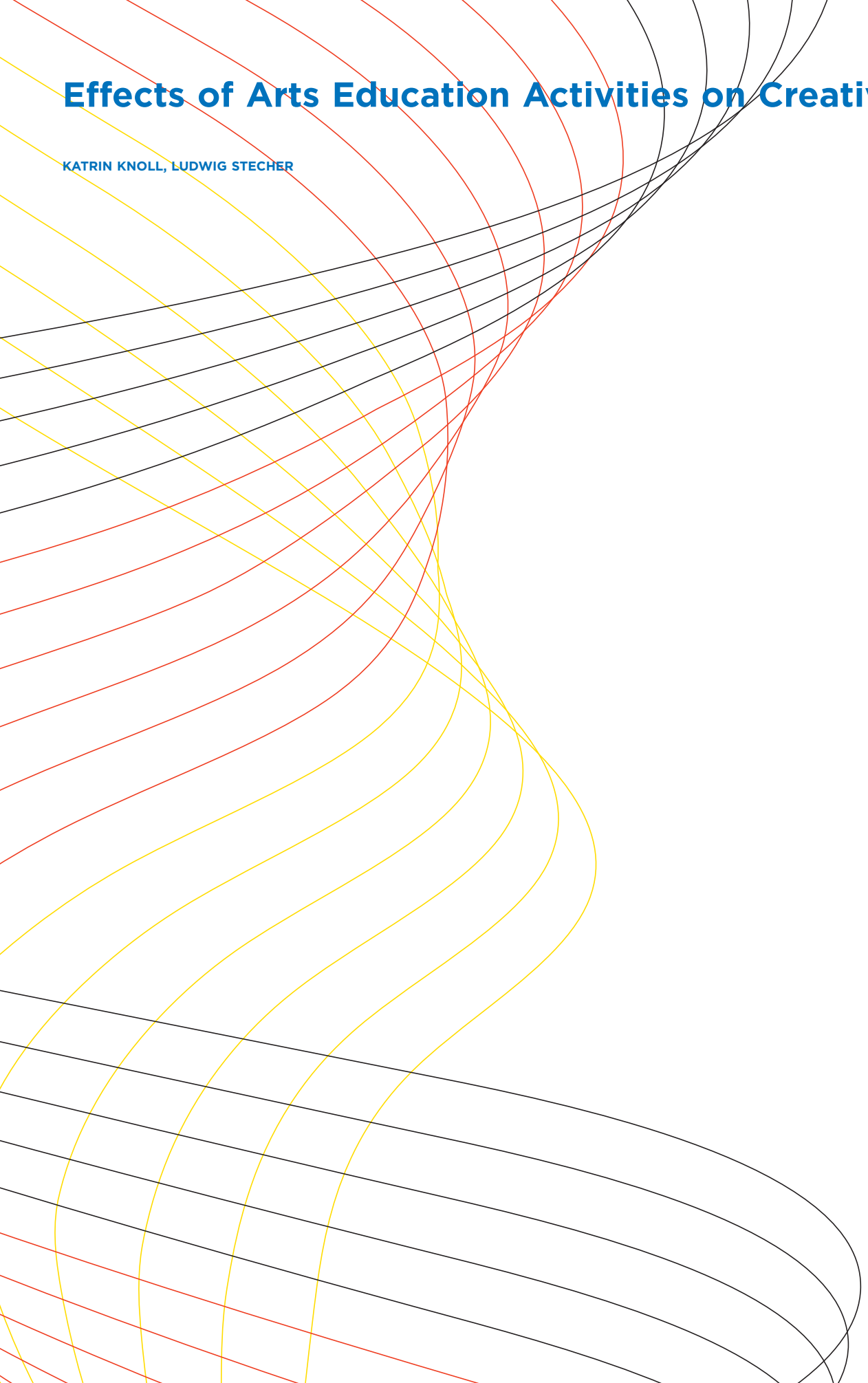
Effects of Arts Education Activities on Creativity?

KATRIN KNOLL, LUDWIG STECHER



INTRODUCTION

In recent years, arts education in Germany has gained more and more significance, both seen from a public as well as from policy-makers' perspective. For example, the German Educational Report 2012, which focusses on cultural and arts education, points out that arts education is just as important as academic core subjects.[118] This does not only mean that arts education is an indispensable component of a comprehensive education but also that arts education should be integrated in school curricula to reach all children and adolescents.

A significant difference of arts education compared to school subjects like math, sciences or foreign languages is that there are various demands to arts education that exceed the mastering of arts-related (subject-related) skills. Many people believe that arts education has positive effects on various other competences, mental abilities and human skills outside arts ('transfer effects').[119] Research findings indicate that students do generally better in school when they are highly involved in arts education courses.[120] Though this finding is supported by other research, it is hard to say whether the students do better in school *because* they participate in arts courses or if it is the other way round. Up to now, experimental studies that give evidence of a causal relationship between arts education and creativity are rarely available.[121]

One of the desirable effects of arts education is creativity.[122] Aside from the expectation that arts education does foster creativity and some research findings that give reason to hope that these expectations can be met (see the following section), arts-related effects on creativity seem to be rather neglected in research. This holds in particular for research that relates the effects to the *pedagogical quality* of these activities. In empirical educational research, it is taken for granted that lessons, projects and activities have to be designed in a specific pedagogic way to support learning processes in a broad sense and to meet the expectations connected with these activities (effectiveness perspective). It is a surprising fact that arts education research usually neglects the pedagogical quality of arts education. A pedagogical view on arts education would link creativity outcomes with aspects of pedagogical quality that stimulates creativity. 'This [Educational Research, author's note] may be one of the most important areas for research because there are serious concerns about the impact of education on creativity.'[123]

In the research described below, we focus on the question how participating in arts education activities (at school) affects the development of creativity considering the pedagogical quality of the activities.

CREATIVITY AND PEDAGOGICAL QUALITY IN ARTS EDUCATION

Studies researching the relationship between arts education and creativity are rare. On the one hand, they are often based on the conviction that both aspects are rather similar and that therefore effects on each other are expectable.[124] On the other hand, there are studies that define creativity as a broader concept not only adaptable to arts and arts education but to other areas of life as well. From this broader view, creativity can be seen as a kind of transfer effect of (effective) arts

education.[125] With regard to empirical research on both creativity and arts education, the findings are mixed. The study of Rogh et al.[126], for example, documents a more positive development of creativity for students with a higher exposure to arts education activities. Moga, Burger, Hetland, and Winner[127] show that there is all in all a relationship between arts education and creativity. The study is based on a meta-analysis. However, the inconsistent results Moga et al. are reporting with regard to the single studies included in the meta-analysis indicate that there might be other causal factors responsible for the development of creativity than arts education, too.

Despite mixed research findings with regard to the view that pedagogical quality is an important prerequisite of effectiveness, the pedagogical quality of arts education programmes and activities has to be a serious concern to educators in arts education as well as to researchers.[128] The problem is that there is no universal instrument to *measure* the quality of arts education. Though there are many different rather heterogeneous checklists to describe quality in arts education[129], there is no standardised instrument to measure pedagogical quality in arts education that is clearly connected to and focused on effectiveness. This holds in particular with regard to the development of creativity.

Taking into account this shortage, in our research we resort to concepts and instruments of pedagogical quality well established in school effectiveness research[130] and in research on the effectiveness of extracurricular activities.[131] This is in line with what Amabile states: 'Of all the social and environmental factors that might influence creativity, most can be found in some form in the classroom. Moreover, not only is the incidence of such factors perhaps highest in educational environments, but it is probably easiest to control them there, as well.'[132] From the perspective of this research, effective educational activities must fulfil three main characteristics to enhance learning processes. They have to provide

- a highly structured learning environment, no matter if this involves school lessons or out-of-school pedagogically designed leisure-time activities, 'providing, for example, safeness, stability, or clarity of rules to the learner' [*Structure Dimension*];
- a learning environment that enables 'positive emotional relations to peers and adults [...], understanding, feedback, support for autonomy and competence and social embedding' [*Support Dimension*];
- a learning environment that provides 'tasks that are not too demanding but also not too simple to be solved by the learner, thus leading her or him to a "zone of proximal development"' [*Cognitive Activation Dimension*].[133]

Studies adapting these three dimensions of pedagogical quality to educational research outside school[134] show that in particular the *support dimension* is kind of a universal prerequisite of effective learning environments. In our case of fostering creativity, based on this perspective we can expect that support of ideas and trust, openness, and respectful relationships constitute a climate that fosters exploration behaviour, tinkering, and ways of creative problem solving.[135] Additionally, we expect that the activities must have a specific arts education related structure that provides a wide array of different ways to work artistically. This structure is characterised by a lack of strict planning and timelines creating what we could call a 'creative climate'.

METHOD AND STUDY DESIGN

Our study is based on a students' survey in the context of the pilot programme 'cultural agents for creative schools'.[136] In this programme, 46 cultural agents coached 138 schools in five German federal states for four years. The cultural agents are in charge of supporting the schools in

1) developing a specific school profile in arts education and
2) cooperating with artists and arts institutions outside the school (external partnerships). In the context of these partnerships, teachers and artists develop arts projects for and with students in class as well as in extracurricular activities.

The students' survey took place before and after participation in the arts projects based on a questionnaire and a standardised drawing test in grades eight to ten. Simultaneously a comparison group generally from the same grade (at the same school) participated in the survey. Overall, 1,153 students answered the questionnaire before and after the projects, 626 students out of them (54.7%) were participants in arts education projects.

Measuring creativity as an outcome is challenging considering the various aspects and dimensions of creativity. For this study, we chose a standardised drawing test: the Test for creative Thinking-Drawing Production (TCT-DP[137]). The test is efficient in time as well as in effort and widely independent from verbal skills: for this reason, it is deployable for a wide range of age and educational levels.[138] It consists on qualitative aspects of creative thinking e.g. imagination, unconventionality and border transgression, etcetera.[139]

However, this encompasses only one aspect of creativity: to capture a broader view on creativity we chose an additional instrument. One of the dimensions of self-estimated learning styles developed by Deakin Crick and others[140] refers to what she calls a creative learning style. Learners who show a high level of creativity in learning are affected easily by new ideas and make use of visual media or stimuli for learning. Those learners succeed also with unstructured studying techniques.[141] These two aspects—creative thinking and creative learning style—were measured at two time points: before participating in the project and after that to analyse changes.

Construct	Item description/ Example	Source
INDIVIDUAL AND STRUCTURAL INFLUENCES		
Dosage of participation		
Survey period	Time between two measurement points [11-433 Days]	—
Regular participation	'Did you attend regularly?' *Answer options: 1='only on a few dates', 2='at about half of the dates', 3='yes, on most dates', 4='Yes, on all dates'*	—
Individual predispositions and cultural capital		
Cultural capital	Possession of arts/cultural related things at home [classical literature, instruments, artwork, Score: 0-3]	Reduced/adapted Kunter et al. (2002)[142]
Cultural activities	Score of leisure time activities in arts, e.g. drawing, playing an instrument, etc. [Score: 0-11]	—
Quality aspects		
Idea time [9 items]	'I had enough time to try different ideas and options.' *Answer options: 1='does not apply', 2='rather not true', 3='rather applies', 4='true'.*	Developed after Isaksen (2010)[143], wording partly adapted after Kunter et al. (2002)[144]
Support from artists [6 items]	'I felt taken serious by the artists.' *Answer options: 1='does not apply', 2='rather not true', 3='rather applies', 4='true'.*	
OUTCOMES		
Creative outcome: standardised test		
Creative thinking	Total value of 'Test for Creative Thinking - Drawing Production (TCT-DP)' [0 to 72 points]	TCT-DP Urban & Jellen (1995; 2010)[145]
Creative outcome: Self-assessment of learning style		
Creative learning style [5 items]	'I get my best ideas when I just let my mind float free.' *Answer options: 1='does not apply', 2='rather not true', 3='rather applies', 4='true'.*	Translated/ adapted: Effective lifelong learning inventory (ELLI), Deakin Crick (2007)[146], Deakin Crick & Yu (2008)[147]
Self-assessed change as a result of participating in arts projects		
Art-related changes: Improved creativity [8 items]	'By taking part in the project, I got to know my own creativity better.' *Answer options: 1='does not apply', 2='rather not true', 3='rather applies', 4='true'.*	Own construction, wording partly adapted after Quellenberg (2009)[148]
School-related 'transfer effects': School commitment [9 items]	'As a result of taking part in the project I feel like making more of an effort at school.' *Answer options: 1='does not apply', 2='rather not true', 3='rather applies', 4='true'.*	

Table 1: **Operationalisation**

To get a broader view of potential outcomes at the end of the project, the students were asked if they perceive any changes due to participating in the project with regard to art-related aspects and school-related transfer effects (→ TABLE 1).

With reference to potential influences on development of creativity, we included two aspects of participation, 'dosage' and individual preconditions regarding cultural capital and leanings. Referring to the quality of activities, we also included two aspects of pedagogical quality which are suitable to describe a supportive and also creativity promoting climate (→ TABLE 1).

FINDINGS

If we compare results from participants and non-participants, at first sight we could not find any significant differences with regard to the outcomes: creative thinking (measured by the standardised creativity test) and the creative learning style.

Though the mean test scores of creativity rise slightly from measuring time point 1 (before participating in the arts education project) to time point two (at the end of the project), this difference is not statistically significant. Additionally, there are so significant differences between participants and non-participants with regard to creative learning style measured at the beginning and at the end of the project.

		N	Mean value	Standard deviation
Creative thinking (Measuring time point 1) [0-72]	No participation	671	18.06	8.26
	Participation	748	18.48	8.80
Creative thinking (Measuring time point 2) [0-72]	No participation	556	18.27	7.84
	Participation	674	18.90	8.42
Creative learning style (Measuring time point 1) *1=does not apply to 4=true*	No participation	644	2.97	0.62
	Participation	726	2.94	0.59
Creative learning style (Measuring time point 2) *1=does not apply to 4=true*	No participation	542	2.92	0.64
	Participation	645	2.89	0.64

Table 2: **Descriptive analysis of participants and non-participants**

Outcome Variables	Model 1: Creative Thinking (TCT-DP)	Model 2: Creative Thinking (TCT-DP)	Model 1: Creative learning style	Model 2: Creative learning style
N	457	461	450	453
Corr. R^2	.207***	.218***	.255***	.250***
Level of the dependent variables at time point 1	.388***	.387***	.458***	.460***
Survey period [11-433 days]	-.019	-.018	.023	.015
Regular participation [1-4]	.089*	.079	.015	.001
Cultural capital [0-3]	.094*	.095*	.080	.086*
Cultural activities [0-11]	.104*	.106*	.021	.024
Idea time *1=does not apply to 4=true*	.006	—	.118**	—
Support from artists *1=does not apply to 4=true*	—	.071	—	.092*

Table 3: **Regression analysis: Influence of quality aspects on creative learning style and creative thinking**
(*significant p ≤ .050, **significant p ≤ .010, ***significant p ≤ .001.)

In the next step, we include the students' background variables and the two quality rating variables (model 1: Idea time; model 2: Support from artists) as explaining (independent) factors into regression models (auto-regression models taking into account the level of the dependent variables at time point 1 (→ TABLE 3).

The findings show that duration of participating in the various activities (short or long projects) and regular participation (participation rate) do hardly show any effect on changes of the creativity outcomes. Cultural capital and cultural activities in leisure time have a small but significant influence on creative thinking and to some degree creative learning style. Referring to quality aspects of cultural activities, there is also a significant finding: Students rating the quality aspect 'support' of the project higher than other students (model 2) or perceive more time for developing their own ideas (model 1) show a significant increase in creative learning style. This also applies under consideration of the level of the creative learning style at the beginning of the project. However, there is no effect of the pedagogical quality on the standardised creativity test scores.

If we take the additional two outcome variables based on the self-estimated changes (→ TABLE 4), the findings show that self-assessment of art-related effects and self-assessment of transfer effects are to a high degree influenced by students' rating of the quality of the activities. Students' feeling that there is a lot of time for thinking creatively in the projects (model 1) and that they are supported by the artists during the project (model 2) say to a higher degree than other students that they learned a lot about creativity (art-related effects) and that they are committed to school (school-related transfer effects).

	Model 1: Art-related effects	Model 2: Art-related effects	Model 1: School-related transfer effects	Model 2: School-related transfer effects
N	572	570	571	569
Corr. R^2	.393***	.349***	.138***	.130***
Cultural capital [0-3]	.072*	.103**	.042	.062
Cultural activities [0-11]	.022	.013	-.059	-.057
Idea time *1=does not apply to 4=true*	.615***	—	.372***	—
Support from artists *1=does not apply to 4=true*	—	.575***	—	.356***

Table 4: **Regression analysis for self-assessment of effects**
(*significant p ≤ .050, **significant p ≤ .010, ***significant p ≤ .001.)

DISCUSSION

The research described here focused on the question how participating in arts education activities affects the development of creativity taking into account the pedagogical quality of the activities.

All in all, our findings show only little effects of participating in arts education provisions per se on creative outcomes. There is hardly any difference between participants and non-participants in creative outcomes. Considering structural and individual influencing parameters, there are findings that are more specific. While dosage of participation seemingly does not play any role, we found small effects of cultural capital and cultural activities and noticeable effects of quality aspects on creative outcomes. In particular, we see effects of idea time and support by the artists on the improvement of creativity and commitment to school as rated by the students themselves. Taking these last findings into account, our research shows that there are arts-related effects as well as transfer effects of arts education, if the pedagogical quality of the project is positive.

To discuss our findings adequately, we have to take into account some shortcomings of our research.

For our study, we used a cross-domain instrument to measure creative thinking (TCT-DP[149]). The benefit of this approach is the comparability of effects in different arts courses. A drawback of this approach is that only cross-domain effects are getting visible. Hence, changes in creative outcomes are hard to find.[150] Another question refers to the quality of arts projects. As with the instrument chosen to

assess creativity, we took a cross-domain perspective on pedagogical quality with regard to specific aspects of a creative climate. A more specific instrument suitable for art branches might measure distinctive aspects of creativity promoting aspects in educational contexts.

Creativity might be promoted by arts education activities in school. Besides individual predispositions of students (e.g. cultural capital), our findings show that the perceived pedagogical quality of arts education is a relevant criterion that has to be met to foster creativity, at least as far as we look at the perceptions of students themselves.

FURTHER READING:

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CHAPTER III
PERSPECTIVES

Research on Arts Education. Experiences and Perspectives

ECKART LIEBAU, CHAIRMAN, COUNCIL FOR ARTS EDUCATION [RAT FÜR KULTURELLE BILDUNG]

THE STARTING POINT

The public debate about arts and cultural education (in the following all assumed under the term of arts education) in modern societies was normally focussed on the side effects of arts education activities. For a long time, politicians as well as journalists, scientists as well as administrators, economists as well as school headmasters asked for the transfer-effects of arts education, may it be music, dance, theatre, visuals arts, literature, media or other fields. They were mostly interested in the effects on general personal or social competencies like creativity, intelligence, cooperation, communication, empathy, strong working attitudes. And they were interested in the effects on academic subjects, especially on mathematics. For about forty years, there have been numerous more or less elaborate studies on these side effects, especially on the side effects of musical education.[151] However, this kind of research was not as successful as was hoped for. Nowadays this strategy seems to come to an end. Besides, it was often meant as a strategy of advocacy, to give scientific support to arts education. But that did not really work. The results were not specific; one could have the same results for the side effects on social and personal competencies, if one asked for the side effects of team sports or of crafts or of volunteering. In the last decade, though, you can find that the scientific attentiveness was gradually transferred to the more specific topics of education in the arts, to the arts and through the arts. Even if the general questions are still dominant in the public and political debate, the scientific developments tend to take a different, more specific direction. And this is a very good finding, because it indicates a turn of research about arts education from advocacy to science. The German-Dutch Colloquium is a good example: the research strategies found here do not focus on the general side effects any more, but look for the details.

Like in any other field of research, the very first target has to be the production of new knowledge and new questions, thus developing the scientific discourse. There are a lot of questions to be answered, for example: What do we know about the special practices and the special needs of the different fields of arts education: music, dance, literature, the visual arts, theatre, media-arts and so on? What do we know about the teaching situations and their frames? And even more important, what do we know about the practices and interests of the learning pupils? What do we know about the relations between the productive and the receptive approaches in the different fields? And what do we know about the relevance of the artistic quality of processes and works? What do we know about the outcomes of arts education in the different fields in the different phases of life? What do we know about adequate pedagogical and didactical approaches in the different sections of art, the different socio-cultural groups, the different sexes, religions, ethnical groups, etc.? What do we know about the relations between arts education in the formal, the informal and the non-formal sectors of life? This list is obviously expandable: The open fields of scientific research in arts education are numerous.

THE STATE OF ARTS EDUCATION IN GERMANY

In Germany, the discourse situation about arts education is highly developed, but the research landscape is so far still under-developed. The situation of research on arts education in Germany in particular has been investigated in a research project funded by the Federal Ministry of Education and Research [Bundesministerium für Bildung und Forschung, BMBF]: the results were quite sobering.[152] This study is also the background of the following short contribution.

A key result is that, still, a sufficiently differentiated, methodologically well-founded and significant, publicly communicated and accessible scientific base is missing, which could underpin an evidence-based policy in the fields of arts education in a plausible way. A broad, systematic survey of the field lacks, like a map, which would allow for an assessment of the potentials and shortcomings of German research on arts education. And of course such a map should be updated continuously: there is a lack of a regular national education report on the arts education. Nevertheless, arts education wins increasing attention not only in practice and politics, but also in the relevant scientific disciplines. Most attention is paid to approaches which concentrate on the fields of the arts and their mediation and which show, however, very significant sector-related differences. And that seems to be the case not only in Germany, but all over the Western hemisphere, if not world-wide.

Musical education dominates well ahead of the other arts, followed by research contributions to the teaching of dance, visual arts, literature, new media, and theatre. Contributions to the teaching of film and photography are comparatively rare. Research on the teaching of architecture, design, digital games, game and circus is exceptionally to be found; also, research on cross disciplinary activities is rare. At this point, the intrinsic heterogeneity of arts in arts education must be highlighted, which urgently requires further research, because the substantial and the qualitative variety of arts education is huge even in each of the individual arts: For example, it ranges from elementary musical literacy (singing, rhythm experience) to musical performance promotion on the highest level (federal competition 'Jugend musiziert'): music is by no means = music. And musical education is by no means = musical education, neither in content nor in the views of the educational quality of the mediation. Bad music teaching has put off countless children![153] Cultural incompetence and lack of interest, whether concerning individual arts or the artistic expressions as a whole, are mediated by arts education, too; but about these phenomena one has learned almost nothing from the research so far. Doing exactly this kind of research at the highest standards would be very relevant for practice.

Despite positive developments in the field of research activities, the field overall is so far characterised by extreme heterogeneity. The numerous differences in research priorities, perspectives and methodologies make it clear, that the field appears less as a research field of arts and arts education, distinguished by a common discourse and common scientific goals, but more as a conglomeration of individual, rather unconnected art-related research areas and actors. It lacks an organising centre. There is no central scientific institute, no central scientific journal.

Against this background, a higher systematic promotion of the field of research seems necessary. The further development and establishment of research standards, the general raise of the methodological consciousness, and the development of in-

tradisciplinary relations are necessary for finding synergistic options and for closing research gaps.[154] Such a development would produce a broad research-induced reaction on the practice field of arts education. It would help by raising professional standards and by implementing an upscale culture of evaluation (and research). And, at the same time, it could become the basis of competent and sustainable effective policy advice.

NEW DEVELOPMENTS, RESOURCES, AND QUESTIONS

Arts education enjoys without any doubt a rhetorical and political boom. However, the question still remains whether and to what extent the empirical developments correspond to this boom. Strong reservations are only reasonable. You can have significant doubts with regard to both quantitative and qualitative aspects if you take into account, for example, the studies of the Council for Arts Education [Rat für Kulturelle Bildung].[155] Other studies about inequality could be named. Research and discourse about inequality and the deficits of the educational system are not in the least new; there has been a relevant and ongoing debate about the related issues for more than a century. But until about 2010 you can rarely find a focus on arts education. Thus, these new studies have revealed, how big the research and development needs really are. Against this background, it is gratifying that appropriate initiatives have led to a greater attention; not only has the discourse about the research significantly intensified, but also the research itself has reached a wider level. Initiatives such as the creation of the Research Fund for Arts Education [Forschungsfonds Kulturelle Bildung] by the Mercator Foundation (located now at the Council for Arts Education [Rat für Kulturelle Bildung e.V.]), the establishment of the Network for Research on Arts Education [Netzwerk Forschung Kulturelle Bildung], the publication of the promotion directives 'Research on Arts Education' and 'Research on Digitalisation in Arts Education' of the BMBF, the creation of the International Network for Research in Arts Education (INRAE) with UNESCO-oriented efforts to strengthen the research to arts education constitute important milestones. In 2017, INRAE was succeeded by the UNITWIN-Network Arts Education Research. In 2016, a European research and development network was formed under the name of ENO (European Network of Observatories in the Field of Arts and Cultural Education); worth mentioning is also the EERA (European Educational Research Association) network 29 Research on Arts Education.

The most important research fields with regard to structures and processes of arts education are:

- → Theoretical and historical hermeneutic foundation of basic terms and key concepts, not at least to the enlightenment and understanding the myths of arts education.[156]

- → The development of a national and international indicator-related monitoring approach that, empirically informed, allows regular and regionally differentiated

reporting to the discursive and, in particular, the practical developments in the central fields of arts education. A regular national and international monitoring of arts education would be extremely desirable. A first step to an international monitoring was initiated by INRAE in 2016 with the project MONAES (Monitoring National Arts Education System). It is carried out by a Dutch-Belgian-German group. The central results will be published in summer 2018.[157] Only on such a basis of empirical findings, a reliable picture of the situation can be drawn. For an evidence-based policy such information is absolutely necessary to identify the needs for further development.

→ The question of access and participation, their requirements and their consequences. A cultural-sociological information about actual access possibilities and actual forms of participation in the different fields of arts education is essential: formal, non-formal and informal education must be linked in a social-spatial perspective.[158]

→ The subject-specific special forms of teaching, mediation and appropriation in the different fields and sectors of arts education have to be seen in the light of the special features of the different artistic objects and processes. In this respect, a biographical perspective is of special interest, as it can highlight the development of interest or, just as important, the lack of interest.[159]

→ Political and economic research on political decision-making in the field of arts education with regard to economic, social, cultural and symbolic resources, institutions and participatory processes are essential.[160]

→ Scientific examination of the consequences of social, particularly of demographic change (age structures, generation and family, migration, etcetera) for arts education.

→ Scientific examination of the consequences of the dynamics of transformation for arts education, in particular by globalisation, mediatisation, digitalisation, and migration.[161]

This kind of systematic theory, empirical research as well as historical and comparative research has to be done at the universities and the respective research institutions. In developing their scientific questions, methodologies and practices of research they must be as free as possible. It is interesting that empirical research on arts education often requires new methodologies of observation. How can you form an idea of what pupils really do and what possibilities of learning they really have in the lessons of arts education? Asking them by a questionnaire may be necessary, but evidently is not enough. But even if you take videos, you cannot see, how and what they learn. You cannot observe the mind, even if the modern neurosciences sometimes claim the opposite. But what you can observe, are the processes of action and interaction with their included chances and obstacles for learning. And sometimes you can observe the outcome, the images, the literary texts, the performances. This kind of basic research gives us a better understanding of what happens

and why things are how they are. We need this knowledge not only for scientific reasons, but also for practical ones. Without a better understanding of the reality of arts education it is hard to find good arguments for its further development.

But there is another kind of research that has at least the same relevance on the field of arts education. That is the pragmatic, the applied research, aiming at the development of good or, to say it a bit more carefully, better practice in the different fields of arts education. Pragmatic research can be developed as action research or as formative evaluation. But it always includes the necessity of cooperation between theory and practice, scientists and practitioners (teachers and artists) and the pupils, on all levels. It opens the door to improve their experiences with arts education. This is a strategy which is at any rate necessary both for the development of new and for the transmission of experienced approaches: 'You do have to do something new, if you want to see something new', Georg Christoph Lichtenberg, the famous physicist and philosopher from Göttingen in the times of enlightenment, said. He was right.

APPENDIX

Endnotes

1. We thank our colleague Evert Bisschop Boele, who chaired the Colloquium, for his comments on the first draft of this text, and Estelle Papadimitriou and Zlil Busnach, who kept the minutes of the Colloquium.
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8. cf. several contributions in Villalba, E. (Ed.) (2009): Measuring creativity: proceedings for the conference 'Can creativity be measured?' Brussels, 28-29 May 2009. Luxembourg: Publications Office of the European Union.
9. Two presentations are not included in this publication: the research of Jaco van den Dool into embodied learning in the acquisition of musical knowledge and skills; and the presentation by Ulrich Frick and Susanne Weiss of a psychometric approach to measure visual competencies derived from the Common Framework of Reference for Visual Literacy (cf. Wagner, E. & Schönau, D. (Eds.) (2016): Common Framework of Reference for Visual Literacy. Münster.).
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Institutions

RAT FÜR KULTURELLE BILDUNG E.V.

The Council for Arts Education [Rat für Kulturelle Bildung e.V.] with its head office in Essen (Germany) has been established by an association of seven foundations: Bertelsmann Stiftung, Deutsche Bank Stiftung, Karl Schlecht Stiftung, PwC Stiftung, Robert Bosch Stiftung, Stiftung Mercator, Stiftung Nantesbuch. These foundations share an esteem for aesthetic experience as well as artistic forms of work and expression as an essential part of education. The union, as an alliance for arts education, enables the foundations to give important impulses for the further development and implementation of this part of education in our society. At present, the association realises its non-profit aims on two levels:

Discourse Policy

Through their publications and analyses, the thirteen members of the independent Council [Rat für Kulturelle Bildung] act in building theory on arts education, and give scientifically justified and qualified impulses for the development and promotion of arts education into the fields of politics, practice and research as well as into the association of the foundations.

Research

The project Research Fund for Arts Education [Forschungsfonds Kulturelle Bildung] is funded by the Stiftung Mercator and additionally since 2017 by the Karl Schlecht Stiftung. The fund aims at the wording of scientifically supported reasons for the recognition of arts education as an equal part of general education. For the next three years the research focus will be on the quality of educational opportunities in the field of arts education.

www.rat-kulturelle-bildung.de

LANDELIJK KENNISINSTITUUT CULTUUREDUCATIE EN AMATEURKUNST (LKCA)

LKCA is the Netherlands National Centre of Expertise for Cultural Education and Amateur Arts. It is a state-funded organisation, employing 66 people. It has three broad tasks: to collect and disseminate information about issues and developments in the field of arts and cultural education (at school and out-of-school) and amateur arts; to support the professionalisation of everyone who is working in these fields; to stimulate, initiate, and conduct research for policy and for practice in these fields.

Information and Professionalisation

Everyone working in or involved with arts and cultural education and amateur arts can benefit from the expertise and opportunities for knowledge exchange that LKCA offers. They include arts teachers, culture coordinators in schools, education officers within cultural institutions, policy officers, politicians, researchers, school managers, and administrators in the education sector and in umbrella organisations for the amateur arts. Volunteers working in areas such as the amateur arts can also consult LKCA for information.

LKCA regularly organises conferences and network meetings on specific topics and brings professionals, policy makers, and administrators into contact with each other. These meetings are publicised through a number of channels. The LKCA website provides independent information on cultural education and participation in the broadest sense of the term. This includes the latest news from the sector and reliable information on a wide range of issues relating to cultural education and participation. The website has various platforms for sharing knowledge amongst visitors.

Stimulating, Initiating, and Conducting Research

LKCA stimulates and initiates research into issues and developments in arts and cultural education and amateur arts. It publishes the research journal *Cultuur+Educatie* on various topics in formal and non-formal arts education and on informal learning in arts and culture. LKCA also conducts research for policy and practice itself, for instance about participation in non-formal arts education and amateur arts. It carried out the international research project Monitoring Arts Education Systems (MONAES) in close collaboration with the UNESCO Chair for Arts and Culture in Education at the Friedrich-Alexander University Erlangen-Nürnberg. LKCA is a founding member of the European Network of Observatories in the Field of Arts and Cultural Education (ENO), linked to UNESCO that has its registered office in Utrecht.

www.lkca.nl

https://www.lkca.nl/~/media/downloads/publicaties/2017/en_nmak%202017.pdf
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BUNDESMINISTERIUM FÜR BILDUNG UND FORSCHUNG (BMBF)

In the fast changing world of today, we need strong foundations that we can build our future upon: research and innovation. These principles are reflected in the areas of activity pursued by the German Federal Ministry of Education and Research [Bundesministerium für Bildung und Forschung, BMBF]. The tasks we are challenged with in the fields of education impact all stages of life: from helping the development in early childhood to formal education in school and university to lifelong learning. Whereas the German Federal States are each responsible for their schools, high schools, and universities, the Federal Government, too, makes important contributions in this field.

Promoting arts (or cultural) education is one of the important aims of the BMBF, with our engagement focussing on three main areas of arts education:

→ **Improving Educational Opportunities and Facilitating Integration**
Since 2013, the BMBF has been promoting arts education for educationally deprived children and adolescents by means of extracurricular programmes, namely 'Kultur macht stark. Bündnisse für Bildung' [The Strength of Culture. Alliances for Promoting Education]. At the beginning of 2018, the second funding phase started. 'Kultur macht stark' is the most important German programme for promoting arts education.

→ **Quality Assurance and Merging Social Discourses**
Research activities in arts education drive innovation in arts education and improve the quality of the offers. Within two different frameworks, the BMBF provides funds for research projects focussing either on the effects, transfer, and offerings in the area of arts education or investigating the consequences of digitalisation on arts education. The BMBF is planning additional funding announcements with respect to arts education.

→ **Identifying and Promoting Talents**
The BMBF has granted funds for ten different federal competitions aimed at children and adolescents and at students of different arts such as dance, drama, music, and literature. These competitions are characterised by competitive components on the one hand and, on the other hand, by offers in vocational training for attendees and creative people involved in culture and arts as well as for lecturers.

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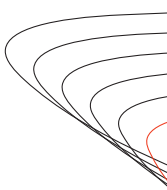

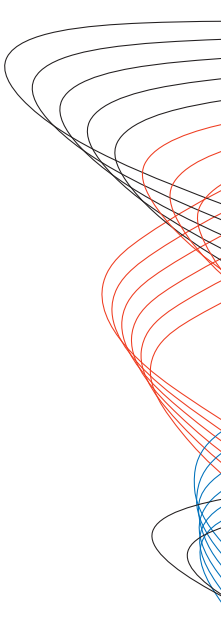

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