

Articles

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Learning a skill, or learning to learn

Learning a skill, or learning to learn? Supporting teachers' professional development in music education technology

ABSTRACT

Music education technology continues to open significant possibilities for composing, improvisation and other creative music-making activities in school classrooms. However, these possibilities are not always fully realized in the everyday life of the school, often due to limitations in teachers' digital competencies. This article aims to examine the conditions necessary to facilitate continuing education that best supports teachers' professional development in digital technology-supported classroom composition. By analysing the data material collected during a development project *Future Songwriting* (2018–20), this case study examines how professional development in music education technology was enhanced or constrained by the project. *Future Songwriting* was a European cooperation project, co-funded by the European Commission under the Creative Europe programme along with seven consortium partners and designed to provide teachers in three European countries (Finland, France and Germany) with hands-on training to upgrade their skills and knowledge related to the use of music education technology. This article focuses on the activities that took place in Finland (five schools) and Germany (five schools) from March 2019 to October 2020. Although many elements

in the project promoted the participating teachers' skill development and knowledge acquisition, opportunities for the teachers to engage in critical reflection to develop capacity in learning to learn in digital environments were limited. The article discusses the possibilities of continuing education projects for enhancing teachers' digital identities.

Keywords: classroom musicing; composition pedagogy, DAW, digital identity, *Future Songwriting*, in-teacher training, music-making, TPACK

Introduction

In many countries, the importance of providing students with multiple opportunities to develop their creative competencies and versatile musicianship has become one of the central aims for music teaching in schools. In addition to offering opportunities for singing, playing instruments and moving and listening to music, teachers are expected to help students express and experiment with their own musical ideas. Creative music-making can take place in various ways, such as songwriting or participating in collaborative composition projects. Furthermore, the development and availability of technology continue to open ever-new possibilities for composing, improvising and engaging in other creative music-making activities. In school classrooms, music education technology offers numerous prospects for the teacher to facilitate creative music-making activities from sound explorations and remixing to songwriting and group-improvisation. Applying educational technology and digital music technology (such as digital audio workstations, digital instruments, modular platforms or multi-track audio editors) in classroom composition can be particularly helpful when teaching large and heterogeneous groups of pupils from diverse backgrounds and with varied competencies

in music. At its best, digital technology can provide vital possibilities for experiencing musical agency also for students with no prior knowledge of music theory or skills in playing a musical instrument, for instance (e.g., DeVito 2017; Godau 2018). However, these possibilities are not always fully realized in the everyday life of schools, often due to limitations in the teachers' competencies using digital tools for creative music-making (e.g., Partti 2016).

In this article, our overall aim is to examine the conditions necessary to facilitate continuing education that best supports teachers' professional development in digital technology-supported classroom composition. The case of this study, *Future Songwriting*, exemplifies recent development projects related to music education technology. We examine the possibilities and limitations of the project in supporting teachers' professional development in music education technology in Finland and Germany. We analyse the data material collected during the project activities, asking, *how was professional development in music education technology enhanced or constrained by the Future Songwriting project?* We use the case of *Future Songwriting* as an instrument (Stake 1995) to investigate the wider phenomenon of continuing education for music technology by making analytical generalizations (Stake 2000) with the awareness of the limitations of a case study approach regarding generalizability. Based on our findings, we discuss the possibilities of continuing education projects to contribute to the development of teachers' *digital identities* (Engeness 2021).

Technology in music (teacher) education

As information and communication technologies (ICT) continue to shape every aspect of society, the demand for schools and other educational institutions to equip children with

competencies to actively participate in digital society has become increasingly pressing (see, e.g., Council of Europe 2018). For example, in the Finnish National Core Curriculum for Basic Education (FNAE 2016) as well as in multiple policy documents in Germany (e.g., KMK 2012, 2016), ICT skills are counted among transversal competencies, which are expected to be integrated into all school subjects, including music. In both countries (see, e.g., FNAE 2016; MSW NRW 2012: 20) the use of technology in music instruction is also viewed as one way to promote the development of pupils' expression skills.

Despite the creative potential offered by music education technology, the use of technology in European school classrooms often tends to be limited to consuming music (e.g., listening to music or watching music videos) rather than obtaining the full advantage of technology for enabling the collaborations among students in synchronous or asynchronous ways (Calderón-Garrido et al. 2020; Partti 2016, 2017). The disparity between curricular or policy aims and classroom reality is likely the result of multiple factors. First, different countries, regions and schools may have different possibilities and resources to equip classrooms with the state-of-the-art technology required for learning, interaction and networking. Second, even with advanced technology at hand, teachers might not have the knowledge and skills needed to integrate technology meaningfully into music instruction. This latter challenge, namely, the lack of *Technological Pedagogical Content Knowledge (TPACK)* for music (e.g., Dorfman 2017; Gall 2016), can at least partly be traced back to teacher education that does not yet fully recognize the significance of technology in musical learning and creative music-making activities. As pointed out by Väkevä (2017), in many music teacher education programmes, the

technological preparation of teachers is limited to one course. Unsurprisingly, teachers often feel that they have not been equipped with adequate competencies for using digital tools and teaching creative music-making, as indicated in surveys conducted in various European countries (e.g., Ahlers 2017; Gall et al. 2012; Partti 2015).

To address the need for teachers' professional digital competencies, it is crucial to develop music teacher education, understood in this article as not only the education of future teachers but also the professional development of teachers already working in the field. Importantly, rather than simply emphasizing the power of technology to facilitate more efficient music-making practices (such as responding to and learning about music, or performing well-established repertoire), music teachers are to be equipped with the ability 'to make informed decisions with regard to ICT applications in teaching and learning' (Leong 2010: 189). A central question in teachers' professional development thus becomes how to approach and examine technology through a wide enough lens. The main technological focus in music teacher education should be on critically studying 'what ends technical means serve in the context of learning that afford diverse meanings through diverse uses of technical innovations', as pointed out by Väkevä (2017: 592). The TPACK framework (Shulman 1987; Pierson 2001; Mishra and Koehler 2006) enables examinations of the complex interactions in processes of technology-based instruction including in music. In this article, we utilize the TPACK framework to understand teachers' professional development in music education technology in the *Future Songwriting* project. In her study of teachers' perceptions of their development in relation to TPACK in England, Marina Gall (2016) has further developed the original TPACK model. Among her various alterations of the TPACK framework for music

education is the inclusion of teachers' personal beliefs and values. We find this alteration helpful also in our study. Considering the rather significant autonomy that teachers enjoy in Finland and Germany when designing and conducting their teaching and the use of technology, teachers' beliefs and preferences can be expected to play a crucial part in their willingness and confidence to experiment with music education technology in their classrooms.

The case of the *Future Songwriting* project

Future Songwriting (2018–20) was a European cooperation project, co-funded by the European Commission under the Creative Europe programme along with seven consortium partners (Future Songwriting 2020; <http://futuresongwriting.eu/>). The project was designed to provide teachers in three European countries (Finland, France and Germany) with hands-on training to upgrade their skills and knowledge related to the use of music education technology. As is often the case with *music-in-education initiatives* (Kenny and Christophersen 2018), the *Future Songwriting* project followed the form of a musician–teacher collaboration. In the case of *Future Songwriting*, this collaboration was comprised of a group of three musicians/music producers who visited schools in the three countries to advise teachers on the use of the digital audio workstation Garageband and to provide students with opportunities for technology-based musical composition. The activities in schools were planned and led by the visiting musicians, henceforth referred to as the INTO Team.

For the purposes of this article, we focus on the activities that took place in Finland (five schools) and Germany (five schools) from March 2019 to October 2020. Due to the global COVID-19 pandemic, the project was postponed and implemented in

France in ways that significantly differed from Finland and Germany. We were therefore not able to include data from France in this article. Our data sources include,

1. individual teacher interviews (pre and post training) from Finland ($n = 7$) and Germany ($n = 10$),
2. teacher online surveys (post training) from Finland ($n = 24$) and Germany ($n = 13$),
3. semi-structured field notes written by the researcher team while observing the training activities in Finland and Germany.

The 7–52 min teacher interviews were conducted in the teachers' native language (Finnish or German). The interviews were audio recorded and the recordings were sent to be transcribed and translated into English to allow for analyses by any member of the researcher group. Similarly, the online survey was conducted in both languages and later translated into English for data analysis. The field notes were written in a shared online document in English by the authors of this article along with a fourth researcher. The data obtained through interviews and observations along with answers to the survey's open questions were analysed utilizing qualitative content analysis (e.g., Miles and Huberman 1994).

Starting points for the project

In both Finland and Germany five primary and/or secondary schools (students' ages varying between 7 and 18) participated in the project. The schools themselves decided how to recruit teachers for participation. *Future Songwriting* teacher training then took place during normal school hours and most often in the school premises where the teachers worked. It was strongly recommended by the project leaders that the

participating teachers be exempted from their teaching responsibilities while participating in the training. In some cases training included teachers from only one school, while in others there were teachers also from (an)other nearby school(s).

The *Future Songwriting* training provided by the Finnish INTO Team was at the core of the pedagogical development project. This training aimed to provide teachers with ideas, skills and confidence to begin and/or continue using technology as part of their music teaching. In each school, the activities were conducted over several weeks comprising approximately three training packages (see [Table 1](#)), although the structure and timeframe of the training varied slightly from school to school.

Table 1: Structure of the *Future Songwriting* training.

Training Package 1	Day 1: Teacher Workshop 1 (5–6 h)
	Day 2: Teacher Workshop 2 (5–6 h)
	Day 3: Student Workshop 1 (4–5 h)
	<i>Independent work (teachers working with their students)</i>
Training Package 2	Day 4: Teacher Workshop 3 (5–6 h)
	Day 5: Student Workshop 2 (4 h)
	<i>Independent work (teachers working with their students)</i>
Training Package 3	Day 6: Student Workshop 3 (4–5 h)
	Day 7: Project Closing Ceremony

Each training package included workshops for teachers and for students. The three *Teacher Workshops (TWs)* consisted of face-to-face teacher training provided by the INTO Team for five to fifteen teachers. Between the second and third TWs, the participating teachers worked independently with their students for several weeks. The three *Student Workshops (SWs)* consisted of face-to-face music-making sessions, (usually) facilitated by one of the teachers participating in the TW along with the INTO Team. In addition, there was a Project Closing Ceremony on the last day of the training

package for all participating teachers and students. The Project Closing Ceremony was often organized as a bigger event – a kind of a final concert – providing the school community, parents and invited guests with an opportunity to hear the musical compositions made by the students during the project.

Altogether 36 teachers in Finland and eighteen teachers in Germany participated in the TWs. According to the data collected via online surveys most of the participants (67 per cent) were female. In both countries, participants were rather experienced teachers, although their background and training in music varied significantly. There were music subject teachers as well as general classroom teachers among the participants. Despite their educational background and current teaching position, all participants were expected to teach music in their classrooms.□

Teachers' previous experience

In the survey, we asked the teachers about their previous experience with creative music-making with and without the use of digital technology as well as their experience teaching this in a classroom. The amount of experience was measured using a 5-point Likert scale, with 1 signifying 'no experience' and 5 signifying 'experience to a large extent'.

Table 2: Teachers' experience prior to the *Future Songwriting* project (per cent of respondents).<?Double?>

	Not at all/to a small extent	To some extent	To a moderate/large extent
Experience teaching	61 (FI)	26 (FI)	13 (FI)
creative music-making and composition	67 (DE)	22 (DE)	11 (DE)
	78 (FI)	17 (FI)	4 (FI)

Experience using digital technology in teaching musical composition	89 (DE)	0 (DE)	11 (DE)
Experience using digital technology in teaching music in general	38 (FI)	26 (FI)	35 (FI)
	44 (DE)	22 (DE)	33 (DE)
Experience composing my own music	43 (FI)	17 (FI)	39 (FI)
	67 (DE)	33 (DE)	0 (DE)
Experience using digital technology in my own music-making	52 (FI)	17 (FI)	30 (FI)
	78 (DE)	11 (DE)	11 (DE)

As shown in [Table 2](#), most participants in both countries had no experience teaching composition and an even larger number had no or little experience teaching composition using digital technologies. Using digital technology in music instruction, however, was not completely foreign to the participants: approximately one-third of respondents claimed to have used it to a moderate or large extent. This result is in line with previous research conducted in Finland ([Partti 2015, 2017](#)), according to which teachers tend to use music technology to facilitate such activities as learning about music (e.g., by searching for music-related information from the internet), listening to music (e.g., audio or video recordings) and playing and singing musical compositions (e.g., notation software), whereas the opportunities provided by technology for enabling creative musical processes are rarely utilized within classroom music teaching. In the following, we describe what the participating teachers expected from the training.

Teachers' expectations

According to the interviews, the teachers from both countries seem to have come to the workshops with general, rather than specific, expectations: 'I've been open-minded and excitedly expectant', as one Finnish teacher (T5, FI) stated. As described by a music

subject teacher in Finland, all ideas, tools, ‘tips and concrete exercises’ (T3, FI) that could assist in better utilizing technology in composition pedagogy were welcome. A classroom teacher similarly addressed the need ‘to learn new approaches of using technology so that I can bring different experiences to the students’ (T4, FI). This teacher, as many others, explained that although they already had taught composition before the project, they considered their available (digital) tools and skills to be too limited. The project was therefore expected to offer particular technological skills as well as experience using technology to broaden the participants’ pedagogical approaches in music instruction:

I don’t have any expectations per se. Maybe it’s more that I hope that the project will give me tools that I can use as a teacher to get more out of Garageband and encourage the students to create their own material more. And maybe also somehow support music as a hobby.

(T5, FI)

Enablers of teachers’ professional development in the project

For the most part, the participating teachers’ feedback on the *Future Songwriting* project was exceedingly positive. In the survey and interview data from both countries, teachers highlighted various aspects of the project that developed their competence in the area of digital-technology supported composition. We refer to the factors which can be understood as contributing to the participating teachers’ professional development as ‘enablers’. These enablers range from aspects related to *attitudes and beliefs* to the *structural and content-related features* of the project.

Attitudes and beliefs

Teachers' personal attitudes and beliefs can have a significant impact on the development and perception of their technological, pedagogical and content knowledge. As pointed out by Gall, a positive attitudinal change within teachers who initially might have lacked confidence and/or competence using technologies can lead to an awakening awareness 'of the potential positive affordances of technologies for music learning and teaching' (2016: 10) and further encourage teachers to integrate digital technologies into their classroom practice. Also, a recent study conducted among Chinese music teachers (Zhang et al. 2021) suggests a strong connection between teachers' individual beliefs and their technology acceptance and technology use behaviour. Such a heightened sense of confidence and courage was elevated by the *Future Songwriting* project, as can clearly be seen throughout the data.

I probably wouldn't have dared to do it myself, if I hadn't known that I would have someone at my side during the first two days of the project, who would be able to help me in an emergency if I didn't know what to do with this app.

(T6, DE)

This teacher's choices of the words 'dare' and 'emergency' are interesting and revealing. They appear to reflect that the teacher was embarking on a particularly risky pursuit, relieved only by the awareness of an outsiders' help in the possible case of disaster. It would be difficult to imagine a music teacher worrying about an emergency in the context of choir practice or musical analysis, for instance. Indeed, and as discussed by Holdhus et al. (forthcoming), bringing technological devices into a school music classroom is often anything but simple, leading to complex entanglements of social and material dimensions brought forth by, among other things, the unpredictability of software and malfunctions of hardware. The teacher's word choice also highlights the

importance of offering support to those overcoming their fears and negative beliefs. The INTO Team itself was a crucial factor appreciated by the participating teachers, including their personalities, enthusiasm and ways of communicating with the teachers. This could be seen in descriptions by teachers such as: '[t]heir [the INTO Team's] enthusiasm for the topic has spilled over to all of us, including to the students' (T5, DE); and: '[e]specially the warmth with which we were welcomed, I liked that very much, so you always felt you were in good hands. Even with your "NOT-knowing" [laughs], you never got the feeling, man, you should know that' (T3, DE). In the project workshops, this attitude could particularly be seen in the ways the INTO Team used very affirmative language, abstained from critique or direct suggestions for changes, and celebrated even the smallest achievements. Overall, the ability of the team to create an atmosphere of enthusiasm appears to have encouraged the teachers to overcome their uncertainties, immerse themselves in activities and, in turn, gain confidence and develop their TPACK in music.

Structure and contents

Another enabler of the development of teachers' competence using technologies had to do with the structure and contents of the project. The project design was simple, reduced to a particular way of making a song using a given chord progression (rather typical for mainstream pop songs) and following step-by-step instructions on the use of the application (the songs were mainly based on the available loops found in Garageband). This hands-on approach focusing only on one application allows the maximum amount of time to be used for testing and exploring the given technology. Consequently, the participants were able to learn by doing without first having to understand the logic of the

technology in theory. By the end of the first hour of the first day, every teacher had already completed a short song with four instruments and a vocal track – regardless of whether they had used Garageband prior to the project or not. Words such as *quick*, *easy*, *clear* and *practical* are mentioned multiple times in both the teacher interviews and surveys. Among teachers – many of whom had come to the workshops with the expectation of gaining practical ideas on how to utilize music technologies in their own teaching – the opportunity to learn an approach that could be put straight into practice was regarded as extremely rewarding:

For me personally, among the most useful things in the project was [learning] how to approach the making of songs in a systematic way with my students. I haven't previously been able to initiate, continue, and conduct projects as well as I feel I am able to do now.

(Teacher survey, FI)

The project was designed in a way that enabled the participating teachers to put their newly acquired skills into practice immediately. On the day following the first TW, some of the teachers continued their teaching and learning with the INTO Team by facilitating technology-supported composition with their own students. Most teachers considered this drop in the deep end to be extremely helpful, as it allowed them to apply their new skills and ideas while still fresh in their memory. Some other teachers, however, hoped for more time to digest the large amount of new knowledge before enacting it in their teaching.

There were three additional structural aspects mentioned by the teachers as enablers of their professional development. First, the fact that the project took place in the participant's school (or a nearby school) made it easy for teachers to participate. The teachers considered it important that they were released from their other teaching

obligations during the project, as this allowed them to devote themselves fully to the training. Second, the teachers considered it important that they completed the training with their colleagues. According to the teachers, this strengthened collaboration within their (local) schools. Finally, the chance to collaborate within a rather large international project was viewed as a highly motivating factor among teachers and students, especially in Germany, where the visits of the Finnish team made the international context obvious. Some teachers indicated that they would like to see such international exchanges more often.

Impediments to teachers' professional development in the project

While the *Future Songwriting* project was warmly welcomed by the participating teachers and succeeded in supporting their professional development in the use of music education technology in multiple ways, the project also had factors that can be viewed as limiting opportunities for the development of their competencies in the area of digital technology-supported composition. In what follows, we examine these 'impediments' following the same order as the 'enablers' discussed above.

Attitudes and beliefs

Although the affirmative feedback had a positive impact on teachers' attitudes and beliefs, the lack of constructive and critical feedback sometimes resulted in bypassing the issues and mistakes and hence did not give teachers enough opportunities to develop their musical and pedagogical knowledge and learn how to identify and address problems in their own composition or the composition activities of their students. For instance, in one of the TWs, a musically untrained teacher presented a song in which several different chord progressions overlapped resulting in a rather chaotic-sounding song. This problem,

however, was not addressed by the INTO Team in any way. The teacher appeared somewhat confused, as they could clearly hear that something was wrong with the piece but could not identify the problem, let alone fix it. Later, as this teacher continued working with their students, it became apparent that they still did not understand the problem and thus could not help their students become aware of or correct it either. This description, based on our observation material, reveals a challenge for continuing teacher training in music education and sheds light on the importance of the quality of feedback in this and similar projects. Although affirmative and positive, the feedback during the TWs often failed to support the teachers' professional development at the subject-content level – the aspect Gall (2016), in extending the TPACK model, refers to as music skills and content knowledge. This was particularly noticeable with general classroom teachers and other teachers with little or no previous training in music. The tendency to focus solely on positive aspects can also be viewed as emphasizing the success of the final product rather than the learning process. As the educational ideals or aesthetic criteria were not openly discussed, the 'problematic' songs, meaning the songs with unresolved issues or major mistakes, were silently marginalized as the focus turned towards the 'successful' songs, meaning those with no major technical or musical issues.

Structure and contents

In terms of the structural and content-related features of the project, the simple project design served, on the one hand, as an enabler by providing opportunities for a hands-on approach to the use of digital technology in musical composition. On the other hand, however, the reduced model of composing can be seen to have offered, perhaps, a too simplistic and narrow idea of the creative opportunities in music instruction. This can be

seen particularly clearly in the data concerning the German teachers with no or very little training in music. The project seemed to be based on an assumption according to which the training approach would work equally well for all teachers, regardless of their educational background. As discussed earlier, however, there were significant differences between the prior experiences and competencies of teachers in teaching music and musical composition in a school classroom. While many music subject teachers may have taught creative music-making in various ways prior to the project, this was not the case with the most general classroom teachers. Consequently, teachers' post-project understandings about the pedagogical and musical possibilities of classroom composition varied according to their educational background and prior experiences: for music subject teachers the project offered one more approach in their pedagogical toolbox, whereas for many of the non-specialized teachers – even those who benefited from the hands-on approach – the project led a much narrower understanding of composition pedagogy. In the post-project interviews some teachers considered the approach introduced in the project as the *only* possible way of teaching composition – to the extent that some of the teachers did not even view it to be possible to teach musical composition without the use of digital technology: 'I think new media gives you this opportunity [to compose in the classroom]. I don't think that was possible before' (T5, DE). This shows how providing a simple method of teaching (musical composition) might be counterproductive by reducing creative music-making to a series of narrowly defined skills and technological tricks, an issue we will address later in the Discussion part of this article. Also, it risks teachers considering Garageband, for example, as a synonym for composing and musical

creativity as inevitably bound to technology and specific tools and brands (e.g., Apple products).

As mentioned before, participants' prior knowledge and experience with Garageband varied from no experience to broad knowledge of the tool. Teachers' prior knowledge and needs were not, however, taken into account systematically in the delivering of the workshops, and this was reflected in the way some questions posed by the teachers were addressed by the team. For example, in our observation data there is an account of a teacher who told the team about some concrete difficulties they had faced when recording students' songs. Rather than addressing the problem and discussing possible solutions with the teacher, the problem was brushed aside with an assertion that students always manage to solve these problems and the teacher should simply trust them. In the interviews, some teachers articulated reservations about the project's approach and its limitations and particularly about the use of Garageband and the possibilities it offers (or denies) in advancing student agency and ownership. Teachers were concerned, for example, that the support and influence provided by adults would eventually limit children's own expression and that the use of Garageband loops would make all the songs sound the same. According to our observations and analysis, there was not much space and time during the training for teachers to voice and discuss these concerns; instead, when such questions were brought up by the teachers, they tended to be quickly passed over in the TWs.

Finally, while being part of a larger project had many advantages, the teachers also reported that it was often stressful to be beholden to a schedule that was neither decided nor controlled by themselves, especially when this schedule conflicted with other

school activities. Particularly in Germany, the participating music teachers were able to implement the project in their classroom activities in a shorter period of time than the general classroom teachers. The classroom teachers needed a lot of support from the INTO Team and the German researcher (who assisted in facilitating the workshops) to complete the students' compositions in time for the final concert. In addition, elementary school students needed significantly more support in recording the songs than older secondary school students. Consequently, elementary school teachers needed more time to help their students work on and record the songs in preparation for the concerts. Naturally, the time required also depended on the size of the class and the number of songs per class. These factors and preconditions, however, were not discussed with the participating teachers prior to the project and therefore caused unnecessary extra work and inconvenience among the participants.

Discussion: Towards a digital identity in music teacher education

In this study, we have used the case of the *Future Songwriting* project to examine the ways a continuing education project might advance and/or limit teachers' professional development in music education technology. Based on earlier research and the experiences of the teachers participating in the *Future Songwriting* project, there is a great need for supporting teachers' digital competencies in music education, especially regarding creative music-making, such as facilitating musical composition in a school classroom.

Designing and implementing a project that would cater to the needs of every teacher is challenging, particularly due to the significant variability in educational backgrounds and expertise. Those teaching music in schools range from music subject

teachers with a lengthy and versatile education in music and strong musical identity to classroom teachers who have completed (at worst) only one mandatory course in music during their teacher education and thus lack pedagogical content knowledge and confidence implementing the music curriculum (see also, e.g., Suomi 2019). Similarly, teachers' experience and expertise in (music) education technology vary substantially. The varied needs of teachers (and their students) highlight the importance of not assuming one size fits all. Instead, teachers could already be included in the planning of the aims, activities and timetables. This would have served in ensuring the relevance and individual needs and teachers' ownership to the training as well as minimized the unnecessary hassle brought about by conflicting expectations or schedules. As emphasized by Kenny and Christophersen, musician–teacher collaborations should aim towards a *collegial approach* based on 'open communication, shared extensive planning, flexibility, ongoing support, and cooperation' (2018: 6) while recognizing the knowledge and perspectives of both the teacher and the visiting musician(s). At its best, this kind of partnership between teachers and visiting musicians may advance professional development for both parties (2018: 6).

While the *Future Songwriting* project may not have completely succeeded in utilizing the experiences of teachers and considering their needs when planning the project, it did demonstrate a beneficial way of advancing teachers' expertise through active engagement during the training. Teachers were encouraged to immediately apply their newly acquired skills and formal knowledge, 'knowledge-that', in their teaching and were offered immediate support and assistance from the visiting musicians. Rather than merely providing teachers with descriptive knowledge and facts *about* how to use

technology in teaching creative music-making, teachers were given the opportunity to practice *how* to apply these new skills in practice; in other words, to form procedural knowledge (e.g., Tynjälä 2004), ‘knowledge-how’, in the area of digital-technology supported classroom composition. A further component of expertise needed by professionals, such as music teachers, pertains to their capacity to be aware of, critically reflect on and regulate their activities and cognitive processes (see Tynjälä 2004). This component of expertise is often referred to as metacognitive knowledge, as it is closely related to self-awareness, self-regulation, self-assessment, self-reflection and intuition (Tynjälä 1999; Paavola and Hakkarainen 2008). Such metacognitive knowledge, which is not explicitly referred to in the TPACK model, allows teachers to, for example, find innovative strategies to solve problems, develop their practice, make autonomous decisions, take risks and persevere through failure. Critical reflection plays a crucial role in the formation of metacognitive knowledge, as it enables teachers to recognize the various factors influencing their thinking, assumptions, actions and attitudes (Dewey 1933, Brookfield 1995). Through these critically reflective processes teachers can ‘form new knowledge constructions and new behaviours or insights’ (Shandomo 2010: 101). Teachers can, in other words, find their own ways of navigating in digital learning environments and pedagogical situations (Rolle 2017).

Based on our analysis of *Future Songwriting*, the project provided only limited opportunities for teachers to engage in critical reflection through which to form metacognitive knowledge. While the project successfully offered teachers an opportunity to learn (a) skill(s), it failed to enhance their agency and capacity in learning to learn in digital environments due to the absence of reflective discussions of learning strategies,

thinking skills, motivation and contextual elements. The lack of opportunities to develop metacognitive knowledge in the project can also be understood as problematic from the perspective of developing teachers' *digital identities* (Engeness 2021). As pointed out by Engeness, fostering teachers' professionalism entails nurturing their professional identities as digitally agentic and competent teachers who can 'create meaningful learning experiences that [...] enhance their [students'] development as learners' (2021: 99). Understanding the development of teachers' digital identities as an ongoing and active process in which teachers construe and critically examine 'the beliefs, values and educational experiences in light of new contexts and frames of relationships' (2021: 98) in digital learning environments emphasizes the centrality of engaging teachers in the design of those environments instead of merely training them to become users (or consumers) of specific educational technologies. With a focus on end-products (the finished compositions), the *Future Songwriting* project provided a fairly simplistic conception of digital technology supported creative music-making (i.e. a stereotypical pop song composed following prescribed instructions and using ready-made loops in a particular software). There were only few opportunities to critically analyse and discuss the limitations of and possible ways to expand this conception. In the project, this could have been done by, for instance, encouraging teachers to consider opportunities beyond the specific method, musical genre and technological tool.

Finally, the development of teachers' digital identities and professionalism are largely enabled in peer networks within which it is possible to engage in collaborative problem-solving, learning, identity construction and reflection (see, e.g., Eteläpelto and Vähäsantanen 2008; OECD 2016). Music teachers often experience isolation and suffer

from a lack of collegiality especially if working as the only music teacher in their school (Muukkonen 2010; Burnard 2013). Moreover, classroom teachers may consider their musical and didactic skills to be insufficient and therefore struggle to implement the curriculum in music teaching (e.g., Vesioja 2006; Suomi 2019). A continuing education project like *Future Songwriting* therefore has the potential to offer remarkable possibilities for teachers to form *task-based learning communities* (Riel and Polin 2004) to support the formation of their metacognitive knowledge and digital identity. The *Future Songwriting* project succeeded in supporting the establishment of such peer networks by bringing together teachers from the same or local schools. Future projects could better make use of the opportunities provided by digital technology to support teachers – perhaps, also including pre-service teachers (see Luik et al. 2019) – from different schools, regions and even countries in working together. This could take place by making collaborative digital compositions in synchronous and asynchronous ways, for instance, thus allowing the participants to engage in collaborative problem-solving and mutual learning (Partti and Westerlund 2013) during which it would be possible to reciprocally benefit from different areas of expertise and knowledge within the learning community.

Despite the limitations of the *Future Songwriting* project, we consider it crucial to support both pre-service and in-service music teachers in developing critical digital identities and therefore view collaborative projects, such as *Future Songwriting*, as an exciting way for teachers to transform their practice for the benefit of their students.

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<http://futuresongwriting.eu/>.

References

- Ahlers, M. (2017), 'Digitale Medien im Musikunterricht', BertelsmannStiftung, https://www.bertelsmann-stiftung.de/fileadmin/files/Projekte/Musikalische_Bildung/MuBi_Expertise_Digitale_Medien_im_Musikunterricht_Ahlers_01.pdf. Accessed 1 September 2021.
- Brookfield, S. (1995), *Becoming a Critically Reflective Teacher*, San Francisco, CA: Jossey-Bass Publishers.
- Burnard, P. (2013), 'Introduction', in E. Georgii-Hemming, P. Burnard and S. Holgerson (eds), *Professional Knowledge in Music Teacher Education*, New York: Routledge, pp. 1–15.
- Caldéron-Garrido, D., Gustems-Carnicer, H. and Carrera, X. (2020), 'Digital technologies in music subjects on primary teacher training degrees in Spain: Teachers' habits and profiles', *International Journal of Music Education*, 38:4, pp. 613–24, <https://journals.sagepub.com/doi/abs/10.1177/0255761420954303>.
- Christophersen, C. and Kenny, A. (2018), 'Alteration, disruption, or reharmonization? Pathways for musician–teacher collaborations', in C. Christophersen and A. Kenny (eds), *Musician–Teacher Collaborations. Altering the Chord*, New York: Routledge, pp. 233–44.

Council of Europe (2018), 'Digital Citizenship Education Project (project plan)', **Council of Europe**, <https://www.coe.int/en/web/digital-citizenship-education/digital-citizenship-education-project>. Accessed 1 September 2021.

DeVito, D. (2017), 'Technology and music collaboration for people with significant disabilities', in R. Mantie and A. Ruthman (eds), *Oxford Handbook of Technology and Music Education*, Oxford: Oxford University Press, pp. 404–12.

Dewey, J. (1933), *How We Think: A Restatement of the Relation of Reflective Thinking to the Educative Process*, Boston, MA: D.C. Heath & Co Publishers.

Dorfman, J. (2017), 'Traditions and ways forward in the United States', in R. Mantie and A. Ruthman (eds), *Oxford Handbook of Technology and Music Education*, Oxford: Oxford University Press, pp. 523–37.

Engeness, I. (2021), 'Developing teachers' digital identity: Towards the pedagogic design principles of digital environments to enhance students' learning in the 21st century', *European Journal of Teacher Education*, 44:1, pp. 96–114, <https://doi.org/10.1080/02619768.2020.1849129>.

Eteläpelto, A. and Vähäsantanen, K. (2008), 'Ammatillinen identiteetti persoonallisena ja sosiaalisena konstruktiona', in A. Eteläpelto and J. Onnismaa (eds), *Ammattilaisuus ja ammatillinen kasvu*, Helsinki: Kansanvalistusseura, pp. 26–49.

Finnish National Agency for Education (FNAE) (2016), *National Core Curriculum for Basic Education 2014*, Helsinki: Finnish National Agency for Education.

Future Songwriting (2020), 'Future Songwriting', <https://drive.google.com/file/d/1ifSwEePmJISvpyfRSwszr2OqUD6jKMP2/view>. Accessed 1 September 2021.

- Gall, M. (2016), 'TPACK and music teacher education', in A. King, E. Himonides and A. Ruthmann (eds), *The Routledge Companion to Music, Technology, and Education*, Oxford: Routledge, pp. 305–18.
- Gall, M., Sammer, G. and Vugt, A. de (2012), *European Perspectives on Music Education. New Media in the Classroom*, Innsbruck: Helbling.
- Godau, M. (2018), 'Inklusion und Appmusik – wie die Integration von Apps in den inklusiven Musikunterricht gelingen kann', in A. Bosse and B. Jank (eds), *Musikarbeit im Kontext von Inklusion und Integration*, Potsdam: Universitätsverlag Potsdam, pp. 97–120.
- Holdhus, K., Christophersen, C. and Partti, H. (2022), 'Soundtrapped? Socio-material perspectives on collaborative teaching within the music classroom', *Research Studies in Music Education*, article first, <https://doi.org/10.1177/1321103X221115978>.
- Kenny, A. and Christophersen, C. (2018), 'Musical alterations: Possibilities for musician–teacher collaborations', in C. Christophersen and A. Kenny (eds), *Musician–Teacher Collaborations. Altering the Chord*, New York: Routledge, pp. 3–12.
- Kultusministerkonferenz (KMK) (2012), 'Medienbildung in der Schule (Beschluss der Kultusministerkonferenz vom 8. März 2012)', KMK, 8 March, https://www.kmk.org/fileadmin/Dateien/veroeffentlichungen_beschluesse/2012/2012_03_08_Medienbildung.pdf. Accessed 1 September 2021.
- Kultusministerkonferenz (KMK) (2016), 'Bildung in der digitalen Welt, Strategie der Kultusministerkonferenz', KMK, 8 December, https://www.kmk.org/fileadmin/Dateien/veroeffentlichungen_beschluesse/2016/2016_12_08-Bildung-in-der-digitalen-Welt.pdf. Accessed 1 September 2021.

Leong, S. (2010), 'Strategies for enabling curriculum reform: Lessons from Australia, Singapore and Hong Kong', in J. Finney and P. Burnard (eds), *Music Education with Digital Technology*, London: Bloomsbury Publishing, pp. 181–95.

Luik, P., Taimalu, M. and Laane, H. (2019), 'Estonian in-service teachers' and pre-service teachers' perceptions of content, pedagogy, and technology knowledge, based on the TPACK framework', in T. Väljataga and M. Laanpere (eds), *Digital Turn in Schools – Research, Policy, Practice*. Lecture Notes in Educational Technology, Singapore: Springer, pp. 111–22, https://doi.org/10.1007/978-981-13-7361-9_8.

Miles, M. B. and Huberman, A. M. (1994), *Qualitative Data Analysis: An Expanded Sourcebook*, Thousand Oaks, CA: Sage.

Ministerium für Schule und Weiterbildung des Landes Nordrhein-Westfalen (MSW NRW) (2012), *Kernlehrplan für die Gesamtschule in Nordrhein-Westfalen, Musik*, Frechen: Ritterbach-Verlag, https://www.schulentwicklung.nrw.de/lehrplaene/lehrplan/52/KLP_GE_MU.pdf. Accessed 1 September 2021.

Mishra, P. and Koehler, M. J. (2006), 'Technological pedagogical content knowledge: A framework for teacher knowledge', *Teachers College Record*, 108:6, pp. 1017–54.

Muukkonen, M. (2010), 'Monipuolisuuden eetos. Musiikin aineenopettajat artikuloimassa työnsä käytäntöjä', Ph.D. thesis, Helsinki: Sibelius Academy, <http://urn.fi/URN:ISBN:978-952-5531-82-4>.

OECD (2016), *Supporting Teacher Professionalism: Insights from TALIS 2013*, Paris: OECD Publishing, <http://dx.doi.org/10.1787/9789264248601-en>.

- Paavola, S. and Hakkarainen, K. (2008), 'Välittyneisyys ja dialogisuus innovatiivisten tietoyhteisöjen perustana', in J. Virkkunen and R. Engeström (eds), *Kulttuurinen välittyneisyys toiminnassa ja oppimisessa*, Helsinki: Yliopistopaino, pp. 47–80.
- Partti, H. (2015), 'The bliss and dread of creative music making: Finnish music teachers' approaches to teaching composing', in *Nordic Network for Research in Music Education (NNMPF) Conference*, Helsinki, Finland, 3–5 March.
- Partti, H. (2016), 'Muuttuva muusikkous koulun musiikinopetuksessa', *Musiikkikasvatus – The Finnish Journal of Music Education*, 19:1, pp. 8–28, https://issuu.com/sibelius-akatemia/docs/fjme_vol19nro1_netiversio.
- Partti, H. (2017), 'Building a broad view of technology in music teacher education', in R. Mantic and A. Ruthman (eds), *Oxford Handbook of Technology and Music Education*, Oxford: Oxford University Press, pp.123–28, <https://doi.org/10.1093/oxfordhb/9780199372133.013.10>.
- Partti, H. and Westerlund, H. (2013), 'Envisioning collaborative composing in music education: Learning and negotiation of meaning in operabyyou.com', *British Journal of Music Education*, 30:2, pp. 207–22, <https://doi.org/10.1017/S0265051713000119>.
- Pierson, M. E. (2001), 'Technology integration practice as a function of pedagogical expertise', *Journal of Research on Computing in Education*, 33:4, pp. 413–30.
- Riel, M. and Polin, L. (2004), 'Online learning communities: Common ground and critical differences in designing technical environments', in S. A. Barab, R. Kling and J. H. Gray (eds), *Designing for Virtual Communities in the Service of Learning*, New York: Cambridge University Press, pp. 16–50.

- Rolle, C. (2017), 'What is right – what is wrong? On what should we base our arguments in a pluralistic and changing world of music and music education?', *Philosophy of Music Education Review*, 25:1, pp. 87–99, <https://doi.org/10.2979/philmusieducrevi.25.1.07>.
- Shandomo, H. M. (2010), 'The role of critical reflection in teacher education', *School-University Partnerships*, 4:1, pp. 101–13.
- Shulman, L. (1987), 'Knowledge and teaching: Foundations of the new reform', *Harvard Educational Review*, 57:1, pp. 1–21.
- Stake, R. (1995), *The Art of Case Study Research*, London: Sage.
- Stake, R. (2000), 'The case study method in social inquiry', in R. Gomm, M. Hammersley and P. Foster (eds), *Case Study Method*, London: Sage, pp. 19–26.
- Suomi, H. (2019), 'Pätevä musiikin opettamiseen? Luokanopettajaksi valmistuvan musiikillinen kompetenssi perusopetuksen opetussuunnitelman perusteiden toteuttamisen näkökulmasta', Ph.D. thesis, Jyväskylä: University of Jyväskylä.
- Tynjälä, P. (1999), 'Konstruktivistinen oppimiskäsitys ja asiantuntijuuden edellytysten rakentaminen koulutuksessa', in A. Eteläpelto and P. Tynjälä (eds), *Oppiminen ja asiantuntijuus. Työelämän ja koulutuksen näkökulma*, Helsinki: WSOY, pp. 160–79.
- Tynjälä, P. (2004), 'Asiantuntijuus ja työkuultuurit opettajan ammatissa', *Kasvatus*, 35:2, pp. 174–90.
- Väkevä, L. (2017), 'Defining and acknowledging music education technology in music teacher training', in S. A. Ruthmann and R. Mantie (eds), *The Oxford Handbook of Technology and Music Education*, Oxford: Oxford University Press, pp. 587–94.

Vesioja, T. (2006), 'Luokanopettaja musiikkikasvattajana', Ph.D. thesis, Joensuu:

University of Joensuu, http://epublications.uef.fi/pub/urn_isbn_952-458-810-2/urn_isbn_952-458-810-2.pdf.

Zhang, X., King, A. and Prior, H. (2021), 'Exploring the factors influencing Chinese music teachers' perceptions and behavioural intentions in using technology in higher education: A pilot study', *Music & Science*, 4, pp. 1–19, <https://doi.org/10.1177/20592043211044819>.

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Note

[1] It is quite typical both in Finland and Germany that general classroom teachers provide music instruction in primary schools, whereas in lower-secondary and upper-secondary schools music is taught by a music subject teacher. However, as the role division and different ways of organizing music instruction are not relevant for the purposes of this study, we have not focused on these differences in this article.

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