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Improvisation in music education: empirical evidence, classroom practice, and teacher preparation

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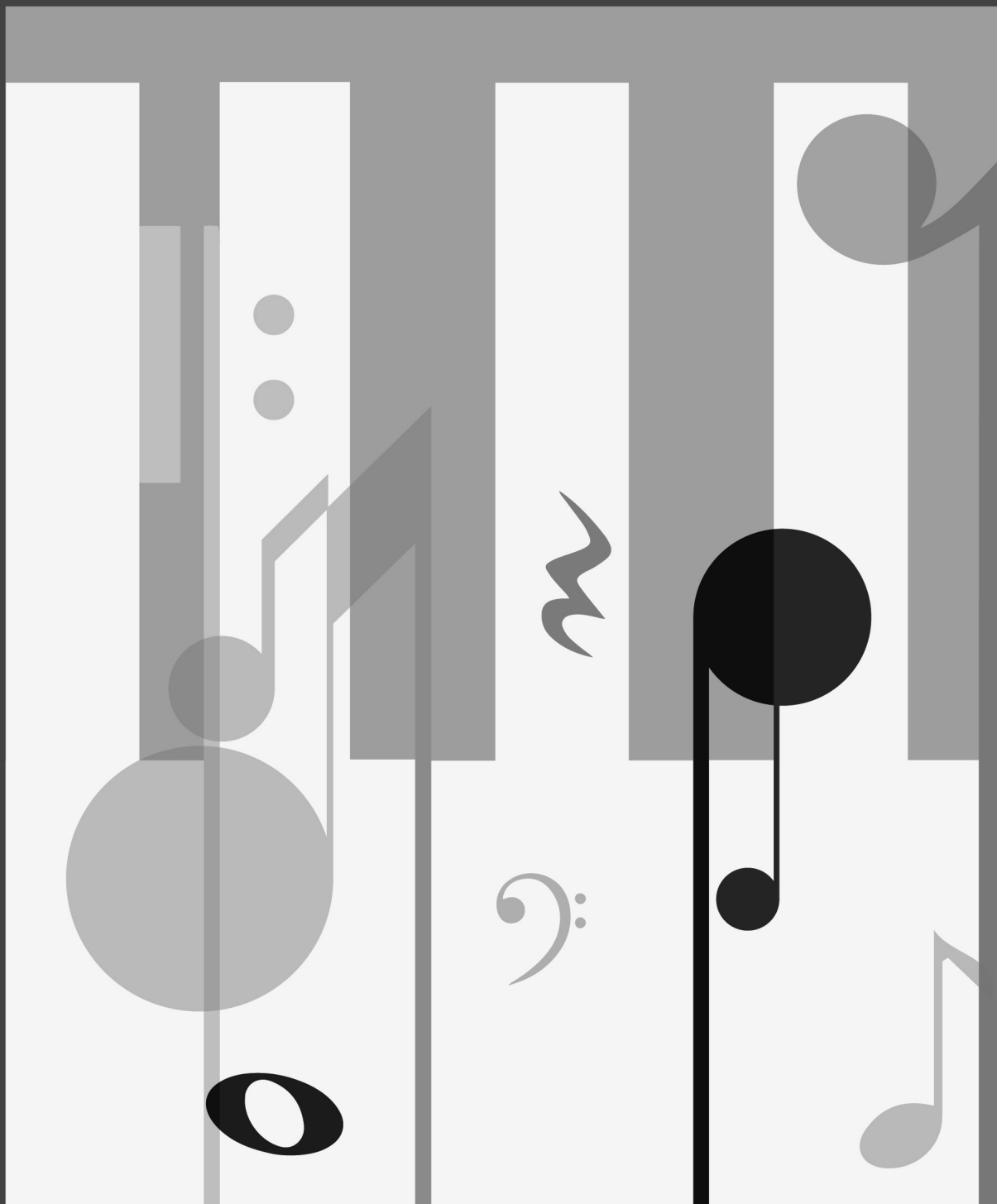
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6. General discussion

6.1. Introduction

This dissertation brings together evidence from multiple studies to understand how improvisation is conceptualized, implemented, and supported in music education. These studies were conducted across different educational levels, career stages, and cultural contexts. To achieve this aim, four studies were conducted with the following objectives: (1) mapping the overall landscape of improvisation activities and learning outcomes of improvisation through a systematic literature review (**Chapter 2**); (2) examining primary music teachers' implementation and evaluation of improvisation in classroom practice (**Chapter 3**); (3) investigating pre-service teachers' attitude and efficacy beliefs toward improvisation (**Chapter 4**); and (4) exploring the formation of the intention for implementing improvisation activities by pre-service and in-service music teachers, including a comparison between these two groups (**Chapter 5**).

This chapter concludes the dissertation by first organizing the key findings from Chapters 2 to 5. The findings are then brought together to form an integrated interpretation. Next, the chapter reflects on the strengths and limitations of the dissertation and outlines directions for future research. Finally, it derives practical implications for music teacher education and professional development and ends with the core conclusions of the dissertation.

6.2. Main findings per chapter

Chapter 2 aims to provide an overview of improvisation activities conducted in the past decade, and to examine the perceived and empirically tested learning outcomes of improvisation. Despite several previous literature reviews in music education providing useful background information, these reviews mainly covered studies up to 2015. In addition, previous research did not provide a comprehensive analysis of different types of improvisations and learning outcomes across educational settings. To address this gap, this chapter develops a structured classification system for improvisation activities, together with a summary of both perceived and empirically verified learning outcomes. This investigation covers multiple educational levels, from early childhood education to primary

and secondary, as well as higher education and teacher education. Therefore, the main questions of this study are: (a) What improvisation activities are applied in music education? (b) What are the learning outcomes of improvisation activities in music education? This dissertation conducted a systematic review of empirical studies between 2015 and 2025 to answer these questions. This literature review is guided by the PRISMA statement (Moher et al., 2009; Page et al., 2021). First, a search was conducted in relevant digital databases for music education research using keywords related to improvisation and improvising in student learning activities, teaching materials of any other pedagogical or educational setting for music practice. The university library provides access to several commonly used databases, such as Web of Science, SCOPUS, JSTOR, and ERIC. A set of inclusion criteria was applied during the screening and eligibility process, and 63 peer-reviewed empirical articles written in English were selected for further analysis in this study.

Through this systematic literature review, this dissertation provides an overview of five key components of different forms of improvisation activities, and groups the learning outcomes in four domains based on Bloom's taxonomy and subsequent developments (e.g., Bloom, 1956; Krathwohl, 2002). The five components of improvisation activity in the classrooms are (1) improvisation forms and techniques, (2) tools and medium-specific improvisation, (3) reflection on learning and creating, (4) interdisciplinary improvisation, and (5) improvisation games. The four domains of learning outcomes are affective, behavioral, cognitive, and social domains.

Following the systematic review of empirical evidence, **Chapter 3** turns to the level of classroom practice to examine how improvisation is implemented and evaluated in actual primary music lessons. This chapter aims to answer two questions: (1) How do teachers implement improvisation activities in class? and (2) How do teachers evaluate these improvisation activities in class? To answer these questions, this study used a qualitative design, including semi-structured interviews, classroom observations, and field notes. Through triangulation of different data sources, this study provides a richer overview of how teachers implement improvisation activities in current classroom settings.

Based on the data analysis, two main themes emerged from the research questions. The results indicate that teachers commonly use improvisation, such as in vocal and instrumental-based activities. A supportive and safe environment, a clear structure, and

student-centered activity seem to support the effectiveness of implementing improvisation in class. Teachers also provide feedback in several ways, for example, through self and peer reflection, and some mainly give compliments to younger students. Teachers' evaluation of improvisation includes perceived benefits, challenges, and reflections for improvement. Teachers believe improvisation brings benefits to musical learning, personal development, and classroom processes. Meanwhile, teachers also face challenges when implementing improvisation, such as classroom discipline, their own limited experience with improvisation, as well as limited time and classroom space.

In the study described in **Chapter 4**, the focus is on pre-service music teachers' attitudes and efficacy beliefs about improvisation. Based on the investigation among in-service primary music teachers, findings showed that teachers often face challenges because of their limited experience with improvisation. Even though they have a specialization in music education from higher education, there is a need to investigate pre-service teachers' preparation and readiness for improvisation. Therefore, this study included five main constructs, including three attitudes [(i.e., attitude toward studying improvisation (AS), attitude toward teaching improvisation (AT), and attitude toward including improvisation (AI)] and distinguished two efficacy beliefs [i.e., self-efficacy for improvisation (SEI) and self-efficacy for teaching improvisation (SETI)]. This study hypothesized that three attitudes would positively affect two efficacy beliefs, with self-efficacy for teaching improvisation as the main outcome variable, and self-efficacy for improvisation as a mediator. To test hypotheses, a mixed-methods study was conducted, including: (1) self-report questionnaires completed by 123 pre-service music teachers; and (2) ten voluntary follow-up semi-structured interviews with participants from the same group. Data collection covered ten conservatories and universities of applied sciences that offer music education programs, which are designed to train music teachers for primary and secondary schools. The data were analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) and thematic analysis.

Group comparisons examined potential differences by gender, age, and grade through one-way ANOVA and t-tests. The results indicated that only gender differences were significant, showing that male students reported higher confidence in their attitude toward studying improvisation, as well as self-efficacy for their own improvisation skills and

for teaching improvisation. The PLS-SEM results showed that attitudes toward studying and teaching improvisation (AS and AT) significantly predicted self-efficacy for improvisation (SEI), while only attitude toward teaching improvisation (AT) and self-efficacy for improvisation (SEI) predicted self-efficacy for teaching improvisation (SETI). In addition, SEI served as a mediator between AS, AT, and SETI. This suggests that the pre-service teachers in this study may have different starting points when it comes to improvisation activity. A learning-oriented attitude (AS) is more likely to promote personal competence (SEI), while the relationship between a teaching-oriented attitude (AT) and teaching confidence (SETI) is more direct and stronger. The mediating role of SEI also suggests that a key path to improving teaching confidence and readiness is to help students build on-the-spot experience of “I can do it” and then transfer this experience to “I can teach”.

After examining how attitudes and efficacy beliefs influence music teachers' preparation and readiness to teach improvisation, **Chapter 5** tests the formation of intention to implement improvisation activities among both pre-service and in-service music teachers. The Integrative Model of Behavior Prediction (IMBP; Kreijns et al., 2013) is used as the theoretical framework to investigate the formation of intention in the context of improvisation, including emotions, motivations, subjective norms, attitudes, and efficacy beliefs. This chapter aims to answer the following research questions: (1) How do emotions (joy, anxiety, and anger) influence teachers' intentions to guide improvisation activities in teaching through attitude, self-efficacy, teacher-efficacy, motivations (intrinsic motivation, extrinsic motivation, and amotivation), and subjective norms? (2) To what extent do attitude, self-efficacy, teacher-efficacy, motivation (intrinsic motivation, extrinsic motivation, and amotivation), and subjective norm directly predict teachers' intentions to implement improvisation activities in teaching? (3) Is there a significant difference between the pathways of pre-service and in-service music teachers? An explanatory sequential mixed-method design (Creswell & Clark, 2017) was conducted in this study. A total of 605 teachers (378 pre-service teachers and 227 in-service teachers) completed the questionnaire. Later, twelve participants joined the follow-up interview and gave more contextual interpretation for the quantitative results.

The descriptive analysis shows that in-service teachers reported higher familiarity with curriculum-related improvisation than pre-service teachers, while pre-service teachers

reported slightly higher verbal persuasion. The two groups were very similar in their reported teaching frequency and mastery experience, with both at a medium level. Only a minority had systematic improvisation training or a jazz background. Improvisation was most often used intermittently, typically once every 2-5 lessons. The vocal and movement-based activities were reported most frequently used activities.

Through multigroup structural equation modeling (MG-SEM), teachers' emotional experience of improvisation emerged as a key foundation to the formation of intentions. Joy was associated with higher motivation, attitude, and self-efficacy in the most consistent ways. Anxiety mainly influenced teachers' confidence in "Can I do it?" Anger was related to amotivation and reduced motivation, especially among in-service music teachers. In both groups, subjective norms were the direct predictors with the strongest effects on intention. This suggests that system requirements or expectations from other people are important in promoting teachers' implementation of improvisation. Self-efficacy and teacher efficacy seem to shape "whether I can do it well", rather than "whether I want to do it".

Data from interviews further explained these paths. Joy mostly came from the classroom atmosphere and students' feedback and reactions during improvisation activities. Anxiety was often related to the fear of making mistakes and losing professional authority. Anger was almost always triggered by classroom management and students' behavior. Many teachers also mentioned that improvisation is more like a mandatory activity in highly visible situations, such as public classes and evaluations, rather than in daily classrooms. The implementation of improvisation activity is also hindered by time limitations, heavy workload, and teachers' limited experience with improvisation.

6.3. Discussing the findings: An integrated perspective

6.3.1. From evidence to practice: What works and what challenges remain

As mentioned earlier in the beginning of the introduction of this dissertation, improvisation is widely valued in music education, with its potential to enhance musical, social, and affective development. It has been lauded by educators and researchers, as well as by policy makers in national recommendations for musical improvisation as it brings several benefits in different domain of music teaching and learning (Larsson & Georgii-Hemming, 2019; Siljamäki & Kanellopoulos, 2020). The findings included in the systematic

literature review of Chapter 2 inform about the diverse components and forms of improvisation activities from empirical evidence. These components are improvisation forms and techniques, tools, and medium-specific improvisation, reflection on learning and creating music, interdisciplinary improvisation, and improvisation games. Improvisation activities are not a simple activity but comprise several components. Meanwhile, these components can be implemented in either a structured or an open, free, or unstructured approach, and there is a need to find the appropriate balance for the specific group involved (Hickey, 2009). Implementing improvisation activities in classrooms leads to several learning outcomes in affective, behavioral, cognitive, and social domains. When moving the attention to actual classrooms (Chapter 3), a far more complex picture emerges. Classroom observation and interviews show that teachers are implementing improvisation activities, especially rhythmic improvisation, vocal improvisation, and movement improvisation. However, teachers' implementation of improvisation activities in class shows the following characteristics:

Structured instead of free improvisation. From our observation in primary education settings, improvisation has often been presented in structured forms, rather than as completely free or open-ended activities. For example, a teacher provides a fixed musical pattern and asks students to change a few notes. This aligns with the more traditional approaches to improvisation described by Hickey (2009). Teachers often prefer structured activities because they are easier to manage in terms of classroom discipline, and these structured approaches give teachers more confidence in leading the activity than free or open approaches. However, if a class only works with structured improvisation activities, it may reduce the space for students' creative decision-making. As Borgo (2005, p. 9) suggested, teachers may also need to allow more openness, to "throw them in the deep and work with what naturally happens." Another main reason the teachers of Chapter 3 preferred structured improvisation is that many of them were still new to using improvisation by themselves. Therefore, improvisation activities tend to be new to their students as well. Both students and teachers may need more time to become familiar with the practice and to build the basic knowledge and skills needed for freer improvisation.

Safe environment. Evidence from both the literature and the classroom contexts highlights the importance of creating safe environments (Black, 2017; MacGlone & Gravem Johansen, 2024; Rowe et al., 2015; Savage & Harry, 2024). In a safe space, students feel able to take risks and try out ideas without fear of embarrassment and negative judgment. Improvisation is also a social and dialogic practice that requires trust, respect, and a sense of safety for individuals to participate creatively and collaboratively (Lage-Gómez & Cremades-Andreu, 2019; Treß et al., 2022). Several teachers from Chapter 3 also noted that they see safety as a basic condition before starting any improvisation. This may help explain why classroom improvisation is often more structured. Without enough safety, more open-ended or free improvisation can be difficult to sustain. This is not only seen in primary settings (Chapter 3) but also in higher education (Chapter 4). Pre-service teachers with limited experience of improvisation also reported anxiety when doing it on the spot. After the teacher educator simplified the activities and used more structured tasks, they became more relaxed and started to enjoy the activity.

Fragmented activity. From our observations, teachers tend to use brief, one-off improvisation activities, such as 5–10-minute rhythm call and response games. This fragmented use does not mean that teachers ignore the value of improvisation. Instead, it reflects a classroom strategy. Small portions of improvisation are easier to include in the regular teaching, with lower risk, less time cost, and a better chance of keeping students' attention in the short term. Previous studies have pointed out that classroom improvisation is often affected by practical conditions, such as time limits, classroom discipline, and a lack of instruments (Bogojević & Pance, 2022; Koutsoupidou, 2005). Therefore, teachers may prefer short improvisation moments rather than longer cycles.

Several articles in Chapter 2 reported improvisation activities supported by technology or digital tools (e.g., Liu, 2025; Palaigeorgiou & Pouloulis, 2018; Terauchi, 2022). However, such technology-supported activities were rarely observed in the classroom practice in Chapter 3 and were barely mentioned by participants in Chapter 4. This suggests that the practical limitations faced by teachers may also limit the feasibility of integrating digital tools into daily courses.

The results presented in Chapter 2, the literature review, show that many studies have identified the benefits of improvisation, such as sustained exploration, decision-making, and higher-order thinking. These learning outcomes often require more continuous time and more complete improvisation activity sequences, for example, students improvising and teachers giving in-time feedback. In a nutshell, fragmented improvisation may be more likely to produce an immediate sense of participation, a positive and safe classroom atmosphere, and basic skills practice. At the same time, this makes it more difficult to reach the multi-dimensionality of improvisation described in the literature (Biasutti, 2017).

6.3.2. Teachers' readiness and intention: A multi-level account of capability and willingness

The limited inclusion of improvisation in the classroom, although it has several practical reasons, is mainly related to teachers, as they are the ones who lead the lesson. Therefore, teachers' readiness and intention to incorporate improvisation become essential. Readiness refers to teachers' perceived capability of implementing improvisation activities, including confidence in teaching improvisation and related classroom management. Teachers' intention describes their plan or willingness to incorporate improvisation in future teaching. While readiness and intention are related, they are not the same. A teacher might have readiness ("I can teach this") but lack intention ("I do not want to teach this"). Another teacher may have a strong intention ("I really want to teach this"), but insufficient readiness ("I do not know how to teach this"). Commonly, readiness and intention influence each other dynamically. When teachers enhance their readiness through professional training, their intention might be strengthened. Vice versa, if intention is disrupted (e.g., by anger, as shown in Chapter 5), they may withdraw effort even with adequate readiness.

Chapter 4 combines questionnaire results with interviews and provides a model for teachers' readiness, offering insight into the shift from "I can improvise" to "I can teach improvisation." The model shows two significant effects on teachers' readiness. First, the studying-oriented path shows that pre-service teachers believe that practicing improvisation is important for their professional development (AS; attitude toward

studying improvisation). This belief supports the development of personal competence (SEI; self-efficacy for improvisation), which then indirectly enhances teaching confidence (SETI; self-efficacy for teaching improvisation). The effect of AS on SETI is mediated by SEI, emphasizing that the foundation of teachers' confidence comes from personal mastery experience (Bandura, 1997). Second, the teaching-oriented path highlights that a positive attitude towards teaching improvisation (AT) relates more directly to SETI. This finding suggests that teaching readiness is not only a function of musical competence but also related to pre-service teachers perceived ability to design and scaffold improvisation tasks, while maintaining classroom discipline. In other words, teaching control (i.e., task structure and classroom management) is also related to teachers' readiness to implement improvisation.

This may also help explain why classroom improvisation activities typically occur in structured forms (Chapter 3). These two paths indicate that enhancing teachers' readiness requires two aspects: (1) providing opportunities for repeated, low-risk improvisation practice; and (2) offering explicit instructional support for designing and scaffolding improvisation activities in actual classrooms. Similar calls have also been made by previous research (e.g., Larsson & Georgii-Hemming, 2019; Whitcomb, 2013). However, the mediating role of SEI from our findings shows that if a teacher lacks personal mastery experience, it is not enough to only promote the value of implementing improvisation (improve AT; attitude toward teaching improvisation). This explains why even teachers who acknowledge the importance of improvisation teach improvisation only to a limited extent (Chapter 3). It means that they lack the confidence that comes from "I can do it myself."

Teachers' readiness does not automatically translate into willingness to include improvisation activities. Even when teachers feel capable of leading improvisation activities, they may still decide not to implement them when contextual demands become pressing. For example, in the case of heavy workload, limited lesson time, or classroom discipline issues, they must give up the plan to incorporate improvisation. This gap between "can do" and "will do" points to the need for further exploration of intention formation. Chapter 5 draws on the Integrated Model of Behavior Prediction (Kreijns et al., 2013), it conceptualizes intention as the product of both internal (e.g., emotions and attitudes) and external (e.g., subjective norms and extrinsic motivation) factors.

Findings from Chapter 5 suggest that improving the frequency and quality of implementing improvisation activities requires not only skill training and attitude change, but also attention to teachers' emotional resilience (Gu & Day, 2007). Emotions are not merely side effects. They also play an important role in promoting or hindering, shaping motivations, attitudes, and self-efficacy beliefs. According to Hargreaves (2000), teachers' emotional rewards are frequently produced during ongoing classroom interactions, through on-the-spot feedback from both individual students and entire classes. Emotions come from teachers' perceived control and value (Pekrun, 2006), and further shape motivation and engagement. Positive emotions such as joy can strengthen teachers' willingness to persist, influencing both intrinsic and extrinsic motivation, while anger can increase amotivation. This connects with Chapter 2, where enjoyment and joy are identified as important affective learning outcomes of improvisation. These findings suggest that emotional experiences may be both an outcome of improvisation and a driver of its continued use. It is also important to note that building such resilience can be done in their pre-service stage (Mansfield et al., 2016).

The gap between the widely acknowledged value of improvisation and its limited presence in the everyday classroom should be interpreted from a broader view and beyond individual teachers. Chapter 5 highlights the importance of subjective norms, as this was one of the most powerful predictors in shaping teaching intention, which far exceeds the influence of attitude, efficacy beliefs, and motivations. This challenges the common assumption that when teachers have positive attitudes, strong intentions, and enough confidence, they will implement improvisation more often in the classroom. Interview results from Chapter 5 suggest that, in this study context, subjective norm is not about how others evaluate the teachers' use of improvisation. Instead, the implementation of improvisation is shaped by the system's expectations and peer pressure. Many in-service teacher participants mentioned that improvisation, together with other creative activities, is often treated as a required element in highly visible contexts, such as open lessons, teaching and research activities, and evaluation situations (e.g., competitions). This normative pressure is therefore situational, while improvisation is more likely to be found in these highly visible settings. In daily classrooms, however, improvisation is often rare because of the time constraints and workload pressures (Chapter 5). In other words,

subjective norm can work as a double-edged sword. They can push teachers to include improvisation in performative settings, but they may not support improvisation as a routine practice in daily classroom teaching.

6.4. Strengths, reflections, and future research

6.4.1. Strengths

This dissertation comprises four interrelated studies that together provide a holistic view of improvisation in music education, with a particular focus on explaining the limited use of improvisation activities in the classroom from teachers' perspectives. By integrating evidence from theory to practice and from teacher readiness to behavior intention, this dissertation moves beyond the fragmented focus present in the previous research who often limited to single dimensions. For example, some research focuses on students' learning outcomes (e.g., Navarro Ramón & Chacón-López, 2021; Yao & Qin, 2024), or teachers' confidence only (e.g., Bernhard & Stringham, 2016; Ward-Steinman, 2007). This fragmented perspective makes it complex to understand the gap between high value and low frequency of using improvisation. Therefore, this dissertation combines systematic literature review, classroom observation, interview, and a large-scale questionnaire, then analysis by structural equation modeling, helping with the triangulations and enhancing the validity of the findings through mixed methods research design (Creswell & Clark, 2017). Across the four studies, qualitative data is used to interpret teachers' behavior, and quantitative data is used to validate how the relevant variables are related. Through four studies, evidence is gradually accumulated, compared with each other, which helps to clarify why the positive belief in improvisational teaching may not be transformed into frequent practice in the classroom.

Another strength of this dissertation is the breadth and depth of the empirical studies. The studies provide a comprehensive classification of the forms of improvisation activities and learning outcomes covering four domains, which updates and extends earlier reviews of improvisation in music education, which mainly covered until 2015 (i.e., Larsson & Georgii-Hemming, 2019; Siljamäki & Kanellopoulos, 2020). Furthermore, Chapter 3 provides qualitative insights into improvisation in Dutch primary schools by examining teachers' perceptions, perceived value, and challenges in classroom practice. Chapter 4

then reports a large-scale national study of pre-service music teachers' readiness for improvisation, covering all institutions in the Netherlands that offer music teacher education programs. Chapter 5 further compares pre-service and in-service teachers' intention formation. This chapter uses a large sample and structural equation modelling, group differences are examined, including how emotions and subjective norms relate to intention in each group. By linking improvisation activities in classroom practice with teachers' readiness and intention formation, this dissertation provides a more integrated interpretation of how improvisation moves from "value" to "use." This work is grounded in established theoretical frameworks, including the Social Cognitive Theory, the Theory of Planned Behavior, and the Integrative Model of Behavior Prediction (Bandura, 1997; Fishbein & Ajzen, 2010; Kreijns et al., 2013). Together, the qualitative and quantitative evidence not only strengthens the knowledge base on classroom improvisation but also offers practical support for policy making and music teacher education.

6.4.2. Reflections on limitations

First, this dissertation is limited by the representativeness and generalizability of the sample. All empirical data were collected in the Netherlands and China, which may lead to geographical limitations. The implementation and challenges of improvisation may differ across contexts, especially with the influence of the culture. There is also a limitation due to self-selection bias, because teachers who are willing to participate in improvisation-related research may be more interested in improvisation. Teachers who have completely given up improvisation may not be included in the sample. **Second**, Chapters 4 and 5 use a cross-sectional research design, which does not allow us to track the dynamic changes in readiness and willingness over time. Despite the sequential equation modeling tests the proposed paths, the results are correlational and do not imply causation. **Third**, there are limitations in the interview findings. Teachers may hold preconceived assumptions, especially during the face-to-face interviews; they may give socially desirable answers (e.g., improvisation is very important) rather than sharing their full views. **Fourth**, Chapter 5 discusses joy, anxiety, and anger. However, the complexity of emotions has not been fully explored. Teachers may experience a variety of emotions at the same time, such as mixing

happiness with anxiety. This reveals the function of emotions, but the understanding of the source and meaning of emotions still needs to be further explored.

6.4.3. Future research

Based on the findings and reflections, this dissertation suggests several directions for future research. First, it is essential to understand how music teachers' preparation and intention for improvisation activities develop over time. Future research would benefit from moving beyond existing cross-sectional designs and adopting longitudinal tracking and intervention research. For example, researchers could follow pre-service teachers across their full three to four years of bachelor's study and continue to follow them into their first three years as novice teachers. This will help explore the following question: How do readiness and formation of intention change with early teaching experience? When do shifts happen? What triggers them? What kinds of support help teachers maintain or rebuild their confidence in improvisation? In addition, using multiple data sources, such as self-assessment, lesson plans, and classroom observations, can reduce reliance on self-report alone. By tracking these psychological trajectories, future research can identify the critical period during which teachers are most likely to struggle or improve and provide a stronger basis for testing causal explanations and for designing more effective teacher education.

This dissertation focuses on the perspectives of pre-service and in-service teachers. Further research could also include the perspectives of students. Researchers could further incorporate the learners' perspective to investigate their participation experiences, perceived safety, and learning gains during improvisation activities. Such studies could more directly capture the implementation outcomes of improvisation activities and their potential impacts at the classroom level. Furthermore, this dissertation focuses on music education contexts in the Netherlands and China. Future work could conduct similar research in broader cultural and geographical contexts. This could further enrich and validate the understanding of improvisation activities in the classroom.

Finally, there is a need for further research on the integration of technology tools when implementing improvisation activities in the classroom. Based on the observation in Chapter 3, although the previous study (Chapter 2) evaluated several technical support

activities, their application in the classroom was still limited. Teachers rarely use music production software or electronic instruments. This might be due to the resource constraints, such as a lack of equipment in schools. Also, it reflects teachers' limited understanding of how technology supports improvisation. With the rapid development of artificial intelligence (AI) and music education technology, digital tools may offer new solutions to the challenge of integrating improvisation activities into classrooms. Future research should explore the possibilities and limitations of technology in supporting improvisation in class. For example, research could examine whether AI-assisted improvisational tools could improve the classroom atmosphere while also helping address the challenges teachers face.

AI tools could provide evaluations by automatically analyzing the accuracy of rhythm and pitch, as well as other dimensions of students' improvisation outputs. This kind of support could reduce teachers' workload and provide students with more rapid and timely feedback for future improvement. There is also a need to investigate whether there is any difference in the impact of various types of technical tools on teachers' readiness and intention. For example, some easy-to-use applications, such as GarageBand, may reduce technical anxiety. However, more complex tools might need more time for teachers to learn and implement, and therefore may increase their pressure. In this case, a relevant question is how the usability and learnability of technology affect teachers' willingness to adopt it in their classes.

6.5. Implications for practice

6.5.1. Suggestions for music teachers

For teachers who want to start using improvisation activities in class, small and highly structured activities of about 2-5 minutes may be suitable as an entry point, especially for those who feel uncertain about their own improvisation skills or classroom implementation. Teachers can start with call-and-response, simple rhythm improvisation, and movement improvisation. It may also be helpful to start with activities with clear boundaries, rather than free or open improvisation. Teachers can also set limits for notes, rhythm, or short musical patterns, and then gradually move to more open trials. Improvisation can also be integrated into current teaching content, instead of treating it as

a new curriculum topic. For instance, when introducing pentatonic scales, teachers can ask students to do vocal or instrumental improvisation using the five tones. While students are familiar with new knowledge, they can also express their musical ideas.

Creating a safe environment for improvisation is a key point highlighted throughout this dissertation. Teachers could give students opportunities to make choices, take risks, and experiment with their musical ideas. More importantly, teachers may create an atmosphere where students do not fear making mistakes. Mistakes can be treated as resources for learning, instead of failure. Group improvisation can also help, for example, working in groups of 2-4 students before moving to whole-class sharing. This can reduce performance anxiety and peer pressure. Positive feedback can promote students' confidence and agency and support their continued participation in improvisation. However, giving feedback at the right time and in a helpful way can support exploration and improvement, even if it is only a short descriptive sentence. Asking students to do self-reflection and peer feedback can also improve the classroom atmosphere and support teachers' future implementation of improvisation.

Some more specific suggestions are provided for pre-service and novice music teachers themselves. As they try to balance their role as teachers and musicians, they can see improvisation as both an important musicianship skill and a practical learning tool to use in the internship or teaching. In our findings from Chapter 5, readiness for implementing improvisation is not simply about improving personal improvisation skills, but about systematically transferring self-efficacy for personal improvisation to self-efficacy for teaching improvisation. Therefore, in teacher preparation, each improvisation skill can be linked to teaching method training, for example, by reflecting on how to use it in the classroom, designing suitable activities, and then trying them during internships in actual lessons. Improvement can come from repeated practice of teaching improvisation with different age groups and class sizes. At the same time, the pre-service stage needs more opportunities to practice their teaching, and to discuss experience with peers and teacher educators, which can support practice and feedback. For in-service music teachers, a key constraint is whether improvisation can become a routine part of their teaching. With limited lesson time, large class sizes, and a lack of equipment, improvisation is often less common. Therefore, it may be helpful to build improvisation into classroom routines in

manageable and repeatable ways. For in-service teachers with less experience in improvisation, it may be helpful to first explore short improvisation tasks themselves before introducing improvisation in class. Such experience may help teachers better understand the value of improvisation and increase their willingness to incorporate it into classroom practice.

6.5.2. Suggestions for the teacher educators and program designers

It is important for teacher educators and program designers for music education to change their mind of teaching traditional vocal and instrumental skills into a comprehensive development for cultivating holistic teaching readiness and emotional resilience. First of all, many previous studies and the studies in this dissertation imply that both pre-service and in-service teachers noted they have limited experiences with improvisation in their education (Bernhard & Stringham, 2016; Piazza & Talbot, 2021). A redesign of the curriculum in music education programs is urgently needed. Many institutions consider improvisation as something only in jazz or pop. Therefore, teacher educators should introduce improvisation activities with their students in daily classes, such as musicianship and pedagogy courses. Even a special compulsory course for creative music is needed. The creative music course focuses not on training high-level performing skills, but on teaching how to successfully design and scaffold improvisation activities in the classroom. Also, designing progressive sequences from highly structured to free improvisation activities, and helping with evaluating and improving students' improvisation products, will assist in further developing the improvisation skills of future musicians and music teachers.

Pre-service teachers need more chances to practice implementing improvisation because opportunities vary across music teacher education programs. In this study, some students start internships only in the final year, while others begin in the first year. Therefore, preparation should not rely on internships alone. Practice can be built into bachelor courses through structured opportunities for pre-service teachers to design, lead, and reflect on short improvisation tasks. Even when access to real classrooms is limited, peer teaching in higher education classes can still provide valuable rehearsal for classroom work. For example, instead of teacher educators always demonstrating activities, pre-service teachers can take turns teaching short segments, followed by discussion with peers

and feedback from teacher educators. Recording these teaching sections and using brief video reflection with mentor feedback may also reduce fear of uncertainty in improvisation and strengthen readiness before entering the profession. At the same time, the implementation of these changes may also depend on the music teacher educators' familiarity of improvisation activities. If the expertise in this area is limited, it may be necessary to provide some professional development training for teacher educators.

This dissertation suggests that emotions should be regarded as an important part of the training of music teachers. Chapter 5 found a significant link between anger and amotivation, particularly among pre-service teachers. Emotional frustration can be caused by classroom management challenges, unsuccessful improvisation sessions, and peer pressure. Therefore, training should include support for dealing with these emotions. Two strategies may help teachers keep the willingness to incorporate improvisation. First, help pre-service teachers reframe classroom “chaos” as part of the learning process, especially when improvisation activities are used in classroom contexts. Second, help them accept imperfection in improvisation and avoid seeing improvisation as a high-level activity that must be perfect every time.

6.5.3. Suggestions for the school leader and policy makers

School leaders and policymakers can support music teachers by improving music learning spaces. For example, schools can provide more open space, rather than always teaching music in a regular classroom where students sit behind desks. If possible, schools can also provide a wider range of instruments and simple devices. These do not need to be expensive, but variety matters. For instance, more percussion instruments (e.g., Orff instruments) and easy-to-tune or easy-to-play instruments (e.g., recorders and xylophones). It would also be helpful to include tablets and simple music production apps, such as GarageBand. However, the priority should be to support schools with ample resources for music lessons.

As subjective norms are a double-edged sword in the previous section (6.3.2), policies on incorporating improvisation in class can create both pressure and support. It may be reasonable to include improvisation as one aspect of teaching evaluation, but the focus should be on the process, not the product. Instead of judging how successful a lesson

is, when it includes improvisation, evaluation could pay more attention to questions such as: Which components of improvisation does the teacher use? How does the teacher adjust teaching to meet students' needs during the lesson? What challenges does the teacher face when implementing improvisation, and how are these challenges addressed? The aim is to encourage reflective practice, rather than performing improvisation for assessment.

At the same time, further teacher training is needed to incorporate improvisation and other creative activities into lessons. This training should not be limited to one-off workshops. Instead, teachers need sustained and step-by-step support. Research in the field of conservatoire education also suggests that reflection, collaboration, and inquiry into one's own practice promote pedagogical innovation (Rumiantsev et al., 2024). This step may take several years. However, it is difficult to achieve long-term change without starting.

6.6. Conclusions

This dissertation provides an in-depth exploration of improvisation activities in music education. The studies included in this dissertation present the evidence base, teachers' readiness, and intention to implement improvisation. Two generic take-home messages emerged from this dissertation.

First, improvisation is not only a goal but also a tool. Across our four studies, improvisation appears in many forms, from highly scaffolded and low-risk activities to more open exploration. Teachers would continue to adapt improvisation activities to students' responses, classroom discipline, time constraints, and available resources. For musicians in conservatories who already have advanced instrumental skills, improvisation can be a goal. Improvisation can help them develop more advanced skills, higher-order thinking skills, and other achievements. In school music education or at the early stage of music learning, improvisation can be a tool for students to enjoy music, express their own musical ideas, and collaborate with others to make music. As a teacher from Chapter 3 said, *"every human is born with the capability to improvise or create something, and so they do this all the time."*

Second, the implementation of classroom improvisation is affected by the interactive process between teachers, students, and the educational environment. Personal mastery experience and pedagogical support are important, but they are not the only factors. Teaching behaviors emerge from the interaction of individual decision-making

(e.g., personal improvisation confidence, emotions, and attitudes toward improvisation), perceived institutional expectations, and other external conditions (e.g., resource availability). Understanding this interaction can help explain why teachers value improvisation but still rarely use it in daily classroom practice.