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

Hua, C.

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Empirical evidence, classroom practice, and teacher preparation

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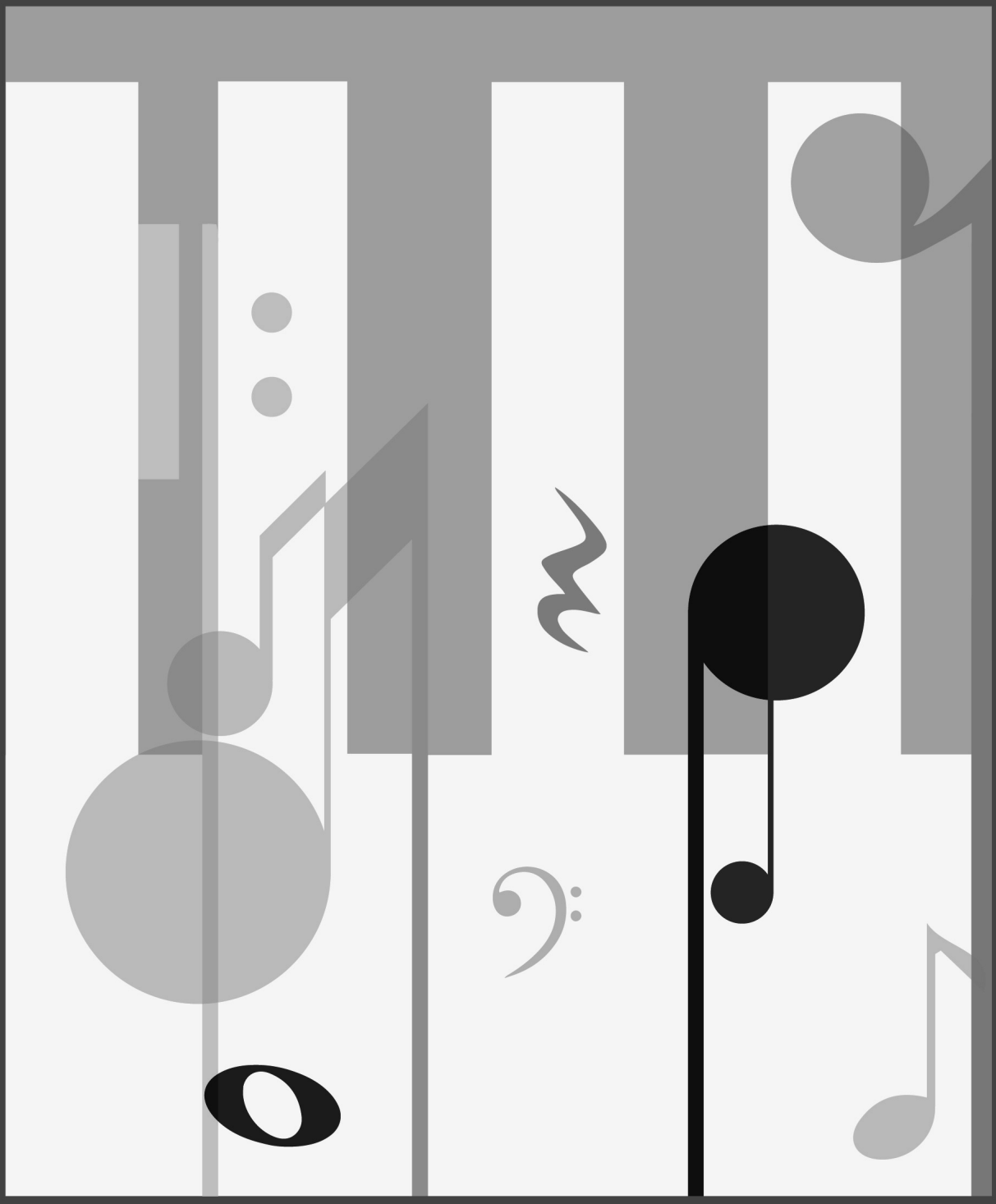

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1. General introduction

1.1. Introduction

Musical creativity is central to music, while improvisation is one of its most immediate and dynamic forms. The essence of music is not simply about making sounds or performing precomposed pieces but about creating and articulating new ideas through sound. This generative aspect distinguishes music from many other fields of learning and places creativity at the core of contemporary music education. Creativity, as one of the key 21st-century skills (Trilling & Fadel, 2009), is increasingly emphasized. Creativity has been described as "the driving force that moves civilization forward" (Jauk et al., 2013, p. 213). Improvisation and composition are important forms of musical creative activities. In contrast to composition and performing pre-composed pieces, improvisation requires musicians to generate novel musical ideas on the spot and to interact with others in real time.

Creation is a key part of music education because it gives musicians opportunities for individual self-expression and the development of their own musical ideas. In this context, improvisation is widely recognized as an effective teaching method that supports multiple dimensions of students' personal and musical development. Empirical studies show that engagement in improvisation has positive effects on the development of fundamental musical skills, including aural skills, rhythmic awareness, and musical expression (Chandler, 2018; Varvarigou, 2017a). When students spontaneously create and manipulate sound, they cultivate the skills to listen, respond musically, and express their musical ideas in real time. Improvisation not only enhances musical abilities but is also associated with overall cognitive and creative development. Studies indicate that improvisation has beneficial outcomes in problem-solving, higher-order thinking, creativity, and self-efficacy (de Bruin, 2018b; Navarro Ramón & Chacón-López, 2021; Wing et al., 2014; Yao & Qin, 2024). By engaging in open-ended musical contexts, students are encouraged to explore possibilities, take risks, and make independent musical decisions. Improvisation fosters socio-emotional development by enhancing self-confidence, collaboration, emotional expression, and empathy through interactive and exploratory musical creation experiences (Black, 2017; Cuervo & Campayo, 2024). Additionally, improvisational activities

are strongly associated with enjoyment and flow experiences, highlighting their potential to enhance pleasant learning experiences (Pellegrino et al., 2019; Verneert et al., 2024). Given the numerous benefits, improvisation has also been increasingly advocated by researchers and music educators and has been included in curriculum standards globally.

Despite the widely recognized value of improvisation, a gap persists between its acknowledged importance and its actual implementation in teaching practice. In other words, although improvisation has been considered a core element of music, it remains underutilized in classroom practice in many regions. Survey data indicate that 66% of elementary school music specialists gave “no” (16%) or “minor” (50%) emphasis on improvisation (U.S. Department of Education, 2002), suggesting that improvisation is often overlooked in elementary music teaching. Even in countries like Finland and Germany, which explicitly incorporate creativity into their national curricula, implementation remains “scarce” or “rare” (Treß et al., 2022). This practical dilemma stems from several teacher-related challenges. For example, Piazza and Talbot (2021) found that while pre-service music teachers considered improvisation “important” or “very important” (87.7%), they reported low confidence and felt unprepared to incorporate improvisation into their classes. The previous study suggests that only about 10 percent of music teachers felt that their higher education training was sufficient to support their inclusion of improvisation activities in class (Brophy, 2002). Other factors, such as limited instructional time, large class sizes, a lack of teaching resources, and classroom discipline, also hinder the inclusion of improvisation (Bogojević & Pance, 2022; Koutsoupidou, 2005). The long-term disconnection between theory and practice carries significant consequences. Students may have limited opportunities to express their own musical ideas and develop creativity. This situation highlights an urgent need to bridge the gap between theoretical and policy calls and practical implementation. Otherwise, it would be hard to achieve the core creative and transformative goals in music education.

There is a growing body of research investigating the engagement with improvisation activities in music education, examining pedagogical benefits, instructional strategies, and students’ learning outcomes (e.g., Chandler, 2018; Edmund & Keller, 2020; Hickey, 2015; Kratus, 1995). However, as Larsson and Georgii-Hemming (2019) pointed out, this field is still an “undeveloped” category, lacking an empirical synthesis that maps the

types of improvisation activities and related learning outcomes. Although many studies focus on theoretical benefits or student experiences, research attention to actual teaching behavior in the real classroom environments is very limited (Koutsoupidou, 2005). It would be crucial to understand how teachers understand improvisation and the barriers they encounter when engaging in improvisation activities with students. In addition, the challenge of teacher readiness has not been fully explored. Many teachers reported avoiding improvisation activities because they feel less confident, are less familiar with the concept, and have had limited experience with it during their professional education (Bernhard, 2013; Piazza & Talbot, 2021). Although Piazza and Talbot's (2021) survey results show that pre-service teachers highly recognize the value of improvisation, it remains unclear how teachers' attitudes, efficacy beliefs, and motivations shape their intention to implement improvisation.

Through a comprehensive, multi-study investigation, this PhD dissertation aims to address these identified research gaps and systematically examine improvisation activities across empirical evidence, classroom practice, teachers' perceptions, and teacher preparation. At the theoretical framework level, this dissertation is rooted in the Theory of Self-efficacy (Bandura, 1997), the Theory of Planned Behavior (Ajzen, 1991), and the Integrative Model of Behavior Prediction (Kreijns et al., 2013). By integrating multiple theoretical perspectives and applying a variety of research methods, this dissertation provides a holistic understanding of the gap between theory and practice in improvisation activities in music education. Together with empirically grounded suggestions for improvement and insights to inform the reform of music teacher education.

1.2. Understanding improvisation in music education

1.2.1. Defining improvisation

Improvisation is broadly defined as the spontaneous creation of music in real time (Pressing, 1988). Immediacy and creativity are two central features of this definition. Immediacy highlights that the generation, selection, and realization of musical ideas occur almost simultaneously with the production of sound. Creativity emphasizes the need for performers to generate and organize the music material on the spot and to translate emerging ideas into auditory reality. In contrast to composition, which typically allows

planning, revision, and refinement over time, improvisation requires performers to make decisions under time pressure. Improvisers must balance novelty with coherence, choosing solutions that work in the moment rather than searching for the "best" option (Pressing, 1988). Although improvisation has different forms across cultures and genres, such as jazz soloing, Indian classical music, Baroque ornamentation, or the real-time realization of figured bass, the real-time creative decision-making under constraints is still its common essence.

In the context of music education, improvisation serves multiple functions. It is not merely a learning activity but also a teaching tool for developing musical understanding, creativity, and performance skills, as well as an important means of personal musical expression (Ho, 2022). Improvisation activities can be broadly categorized into the following types: (a) Free improvisation: a completely open exploration without preset rules or frameworks, emphasizing musical communication, flexibility, and freedom among improvisers. (b) Structured or bounded improvisation: creating within boundaries (such as pentatonic scales, blues scale, or fixed rhythmic patterns) and providing students with the necessary sense of security by balancing freedom and constraints in a safe space. Furthermore, the formats of improvisation activities show diversity. For example, in collective and individual forms (emphasizing social interaction and shared intention); in vocal and instrumental modes (covering singing, melody, and rhythm creation); and in interdisciplinary approaches (combined with dancing, painting, or drama). The comprehensive mapping of these rich and diverse forms will be presented in Chapter 2. This chapter presents improvisation activities and learning outcomes reported over the past decade, through a systematic literature review.

This dissertation defines improvisation as the spontaneous creation and performance of music, with or without a preset structure, and as a learning activity in the context of music education. The definition includes individual and collective improvisation, vocal and instrumental improvisation, and free and structured improvisation. It also covers the interdisciplinary integration of improvisation with other art forms, such as visual arts, movement, and story. Under the definition, this dissertation excludes composition (i.e., a non-real-time creative process) and the pure performance of notated music (i.e., reproduction without creative input). Although the boundary between improvisation and

composition has been noted to be hazy (Burnard, 2000), this definition is intended to be both inclusive and clearly bounded, enabling us to span the four studies and analyze the diversity of improvisation within this dissertation.

1.2.2. From pedagogical approaches to curriculum standards: Improvisation as classroom practice

Since the 20th century, a series of influential teaching approaches have been developed consciously in the field of music education, shaping music teachers' professional identities and often serving as practical guidelines for classroom teaching and teacher education (Juntunen & Westerlund, 2011). These methods give music teachers a chance to get their students involved in improvisation activities in music classrooms. Émile Jaques-Dalcroze developed Dalcroze Eurhythmics in the early 1900s, while he pioneered an approach to learning music through bodily rhythm and movement in the early 1900s (Odom, 2016). In Dalcroze-inspired instruction, students learn about music through purposeful movements and physical experience, and improvisation is often a part of the process (Iddings, 2024). Later, in the middle of the 20th century, Orff's teaching method highlighted the core concept of deriving meaning from music making through performing, creating, and responding (Edmund & Keller, 2020). The Kodály method generally focuses on musicianship and musical literacy through singing, while it can also use improvisation as a tool for students to explore rhythm and pitch in a scaffolded framework (Lukács et al., 2022). Gordon also highlights the importance of improvisation in music class and provides a series of practical suggestions for engaging improvisation in class (Gordon, 2003).

Creating music is a vital focus in music education, as consistently highlighted. Improvisation is a common form of music creation. Improvisation has been incorporated into policies and professional standards across multiple contexts. For example, in the United States, the National Standards for Arts Education (1994) talked about "improvising melodies, variations, and accompaniments," and the National Core Arts Standards (2014), supported by NAfME, include improvisation within the "Creating" strand across grade levels. Similar curriculum emphases are also present in national curriculum documents across Europe. According to the National Curriculum (England, 2021) for Music, improvisation is a mandatory requirement for primary teachers in music lessons. In Key Stage 2, students

learn how to develop rhythm and melody improvisation during performance (Koutsoupidou, 2005). In the Netherlands, although there is no national curriculum, recommendations for music lessons emphasize creating music to express and communicate (SLO, n.d.). In East Asia, the curriculum standards of China have consistently highlighted improvisation activities across primary to higher school in the past decades (Ministry of Education, PRC, 2001, 2011, 2017, 2022). Furthermore, in a broader educational agenda, the OECD's education 2030 framework emphasizes the need for students to develop key abilities such as "creative thinking" (Vincent-Lancrin et al., 2019). Improvisation as a direct and situated form of creative learning in music education has unique educational value. Even though the specific requirements related to improvisation vary from country to country, many music education systems around the world increasingly recognize improvisation as an important aspect of music education.

1.3. General aims of the dissertation

As established in the previous sections, improvisation is a valuable component of music and has been widely advocated by researchers, educators, and national policies across various situations. Nevertheless, the limited classroom use of improvisation has been noted in music education (Wang, 2024; Whitcomb, 2013). Gruenhagen and Whitcomb (2014) surveyed 1174 primary music teachers and found that improvisation is usually seen as important and necessary by teachers. However, they also found that improvisation is not given a high priority in lesson time allocation. Teachers face many challenges when they try to include improvisation in their lessons. For example, due to limited instructional time, teachers' limited personal experience with improvisation, a lack of preparation for creative activities in teacher education, and concerns about classroom discipline and uncertainty, improvisation often receives lower priority in music lessons (e.g., Bogojević & Pance, 2022; Koutsoupidou, 2005). Students may lose opportunities for exploration and creative expression, and the potential to translate curriculum standards and teacher education investments into classroom learning benefits is also limited.

The theory-practice gap remains to be investigated. Especially regarding classroom practice and the factors that hinder music teachers from engaging students in improvisation. It is necessary to conduct a systematic and multi-level investigation in order to understand

and bridge this gap. First, the current empirical evidence about classroom improvisation remains fragmented. Various improvisation activities have been documented across studies, differing in forms and learning outcomes. There is a need to map these activities and integrate the evidence into a coherent picture. Second, a previous literature review noted that "*No studies available are based on qualitative interviews with teachers as to their views and experiences of improvisation in general music education."* (Larsson & Georgii-Hemming, 2019, p. 62). This highlights an urgent need to investigate the implementation and teachers' perspectives on improvisation in actual classroom practice. Third, improvisation implementation depends not only on external conditions but also on internal factors. For example, teachers' attitudes and efficacy beliefs about improvisation, especially among pre-service teachers. The pre-service phase is critical, as teachers' efficacy beliefs tend to become more stable over time (Hoy & Spero, 2005). Fourth, understanding the formation of intention to include improvisation is crucial because it is likely to shape whether teachers' will continue to include improvisation in their teaching. Such factors may change across teachers' professional careers (Tschannen-Moran & Hoy, 2007). Therefore, comparing pre-service and in-service music teachers can provide more targeted and useful suggestions for teacher education and professional development.

This dissertation aims to provide a comprehensive and evidence-based understanding of improvisation in music education. By extending the research field from theoretical investigations and empirical evidence to classroom practice. This dissertation also further examines teachers' challenges, readiness, and the formation of intention to implement improvisation. To obtain a holistic view, multiple perspectives and methodologies in different contexts are integrated. The studies in this dissertation seek to illuminate the theory-practice gap in music improvisation and identify the pathways for strengthening teacher preparation. This dissertation is guided by the following objectives:

(1) To systematically categorize and summarize improvisation activities and their learning outcomes.
(2) To explore classroom practice to identify the current situation and teachers' evaluation of implementing improvisation.

(3) To examine pre-service music teachers' attitudes and efficacy beliefs towards improvisation, and how related factors shape their willingness and ability to use improvisation.

(4) To identify the multiple pathways underlying teachers' intention formation to implement improvisation and test whether there are differences between in-service and pre-service music teachers.

In the next sections, the specific details of these objectives will be discussed.

1.3.1. Mapping the evidence: A systematic review of improvisation (Chapter 2)

While improvisation's benefits are widely recognized, the empirical evidence is still fragmented and lacks integration. There are various forms of improvisation activities, from free exploration to within-boundaries improvisation, and from vocal to instrumental performance. Improvisation activities have been linked to diverse learning outcomes, including the development of musicianship, creativity, and collaboration skills. Yet there is still a lack of a systematic framework to coherently categorize the activities and learning outcomes coherently. Therefore, the first objective of this dissertation is to systematically categorize and summarize improvisation activities and identify their learning outcomes. Providing an integrated picture of improvisation activities and their learning outcomes, which supports teachers and curriculum designers in selecting, designing, and justifying classroom improvisation tasks. Furthermore, this study follows PRISMA guidelines (Moher et al., 2009; Page et al., 2021). Through combining an inductive approach to classify activity types and a deductive approach to code learning outcomes, this review develops a structured classification of classroom improvisation. By synthesizing the evidence, the review clarifies the learning outcomes of different improvisation activities in different classroom situations. As well as identify research gaps and future research directions accordingly, and provide evidence for subsequent empirical research, for example, on classroom practice, teacher readiness, and teachers' intentions.

1.3.2. Exploring classroom practice: current situation and implementation challenges (Chapter 3)

While empirical evidence described in the music education literature is limited, an investigation into what is happening in the real classroom becomes crucial. As Shulman (1986) pointed out, there is often a gap between theoretical knowledge and practical knowledge; therefore, bridging this gap through an in-depth investigation of the current situation of classrooms becomes important. In music education, despite the importance of improvisation and its endorsement by policies, improvisation activities appear to remain limited in real classrooms (Whitcomb, 2013). Moreover, current evidence provides only limited insight into how teachers understand improvisation, what kinds of improvisation activities they use, and what challenges they face in practice (Larsson & Georgii-Hemming, 2019). Teachers play a crucial role in students' creative development, as they are not only role models and mentors but also spend a considerable amount of time with students (Kampylis et al., 2009). Teachers also serve as primary drivers of curriculum implementation, and their practices are strongly influenced by their knowledge and prior experience (Oleson & Hora, 2014).

Therefore, the second objective of this PhD dissertation is to explore classroom practice to identify the current situation and challenges in improvisation implementation. Understanding teachers' improvisation is essential. In addition, it is also necessary to understand how teachers conceptualize improvisation, how they implement it, and how they provide feedback on students' improvisation. This exploration seeks to move beyond theoretical and empirical evidence from prior studies. The study will further examine how in-service music teachers perceive improvisation as a learning activity, and what factors promote or hinder their engagement with improvisation in class.

1.3.3. Pre-service teacher preparation: attitudes and efficacy beliefs to implement improvisation (Chapter 4)

Understanding in-service teachers' practice and perceptions on improvisation is necessary. However, it is insufficient to explain why improvisation remains difficult to implement consistently. Prior findings show that many pre-service and in-service teachers value improvisation, yet report being underprepared and lack confidence to implement it

(Bernhard, 2013; Piazza & Talbot, 2021). This makes teacher education a key point of change for addressing the theory-practice gap. Teachers who include improvisation often tend to report greater personal experience with improvisation in their own musical backgrounds (Koutsoupidou, 2005). This suggests that preparedness is closely linked to prior opportunities to learn and practice improvisation.

To examine readiness more precisely, this dissertation focuses on two core constructs: attitudes and efficacy beliefs. Attitude represents the individual's evaluative orientations of a goal, which shapes their willingness to engage in specific practices (Fishbein & Ajzen, 1975b). In current research on music education, there are limited studies into music teachers' attitudes toward improvisation. The concept of self-efficacy is suggested by Bandura in the social cognitive theory. It refers to the belief that an individual believes that they have the ability to complete a specific action, in order to achieve specific actions to achieve specific objectives (Bandura, 1997). Self-efficacy is usually shaped by mastery experiences, vicarious experiences, social persuasion, and emotional states (Bandura, 1997). When individuals perceive higher self-efficacy, they are more likely to put greater effort, persistence, and willingness to participate in challenging tasks, including improvisation activities. As Tschannen-Moran and Hoy (2001, p. 783) noted, "Efficacy beliefs influence teachers' persistence when things do not go smoothly and their resilience in the face of setbacks."

The pre-service phase in teacher development is a particular formative period because attitudes and efficacy beliefs develop during preparation and early teaching experiences, and these would shape subsequent instructional choices (Hoy & Spero, 2005; Pajares, 1992). The third objective of this dissertation is to examine the preparation of pre-service teachers, their attitudes and efficacy beliefs, and how these factors shape their willingness and ability to use improvisation. A focused exploration of pre-service teachers' attitudes toward improvisation (i.e., studying, teaching, and including improvisation) and their efficacy beliefs (i.e., self-efficacy and teacher efficacy for improvisation) can clary clarify what contributes to teachers' readiness to include improvisation in classroom practice. This focus helps to clarify which aspects of teachers' training can enhance pre-service teachers' readiness to implement improvisation in teaching as a classroom practice.

1.3.4. Multiple pathways of intention formation: comparing in-service and pre-service teachers (Chapter 5)

Improvisation and its implementation in the classroom have been reported as limited, despite continued advocacy from educators and music education researchers. When teachers face constraints such as insufficient confidence, limited pedagogical materials or repertoire, and concerns about lesson feasibility, their willingness to implement improvisation can be reduced (Bogojević & Pance, 2022; Koutsoupidou, 2005). Drawing on the Integrated Model of Behavior Prediction (IMBP; Kreijns et al., 2013), teachers' willingness to engage in a particular activity is typically determined by proximal factors such as attitude, subjective norms, and efficacy beliefs. Variables such as motivation and emotion often shape intentions indirectly by influencing these proximal constructs. Therefore, this dissertation proposes that the formation of teachers' intentions to use improvisation in class is best understood as multiple pathways rather than a single linear route. Importantly, these pathways are also likely to differ between pre-service and in-service teachers. For example, evidence suggests that contextual factors (e.g., available teaching resources and interpersonal support) are more likely to influence teachers who are at the beginning of their career, their self-efficacy beliefs are more likely to be influenced easily by teaching resources and support from others, while in-service teachers are less influenced less by these contextual factors (Tschannen-Moran & Hoy, 2007). This makes it important to do a comparison between different teacher groups. In addition, the Control-Value Theory highlights the key role of teacher emotions in achievement and learning settings (Pekrun, 2006), suggesting that teachers' emotions may influence intention indirectly and may also manifest differently across career stages.

The fourth objective of this dissertation is to identify the multiple pathways underlying teachers' intention formation to implement improvisation and test whether there are differences between in-service and pre-service music teachers. Further investigates how distal factors (e.g., emotions, motivations) influence intention through proximal factors (e.g., attitude, subjective norm). Based on the differentiated pathway patterns, targeted recommendations are proposed for pre-service preparation and in-service professional development. Therefore, it helps to bridge the gap between the widely acknowledged value of improvisation and its consistent classroom implementation.

1.4. Outline of this Dissertation

This dissertation aims to provide a comprehensive overview of improvisation in music education, which consists of an investigation into theoretical and practical processes. Six chapters are included in this dissertation. The overview of this dissertation is presented in Figure 1.1, showing how the four studies and their corresponding variables, as reported in **Chapters 3, 4,** and **5,** interconnect.

Chapter 1 (the current section) introduces the overall aim of this dissertation by describing the research background, theoretical framework, aim, and the theoretical and practical implications. This provides an overview of the coherence of the research project.

Two research questions are addressed in Chapter 2: (1) What improvisation activities are applied in music education? and (2) What are the learning outcomes of improvisation activities in music education? To provide an answer to these questions, this dissertation conducted a systematic literature review by following the Preferred Reporting Items of Systematic Reviews and Meta-Analyses (PRISMA) statement (Moher et al., 2009; Page et al., 2021). A total of 63 related empirical articles published between 2015 and 2025 were analyzed. Following the PRISMA, the coding process combined both inductive and deductive approaches. It presents the five key forms and components of improvisation activity and four domains of learning outcomes (i.e., affective, behavioral, cognitive, and social learning outcomes), providing a theoretical foundation and classification framework for this project, by confirming the improvisation in the existing research.

In **Chapter 3**, a qualitative research study is presented that aims to provide a deep understanding of how improvisation activities are implemented in real classrooms and how teachers perceive these creative activities. The guiding research questions are: (1) *How do teachers implement improvisation activities in class? and* (2) *How do teachers evaluate these improvisation activities in class?* To derive an answer to these two questions, the study employed a data collection design comprising semi-structured interviews, classroom observations, and field notes with eight primary school teachers. All of them were teaching music and had professional musical backgrounds. The coding and analysis followed an inductive thematic analysis (Braun & Clarke, 2006), with the classroom observations and field notes providing in-depth descriptions that were triangulated with the interview data. The results are organized around the two research questions, giving a descriptive overview

of how teachers implement improvisation (i.e., forms of improvisation activities, perceived effectiveness of improvisation activities, and feedback), as well as how teachers evaluate improvisation (i.e., benefits, challenges, and reflections).

From the teacher education context, **Chapter 4** presents a mixed-method study to gain insight into the readiness to implement improvisation activities among pre-service music teachers. The research developed a conceptual model examining how attitude toward studying improvisation (AS), attitude toward teaching improvisation (AT), and attitude toward including improvisation (AI) function as predicting variables, with self-efficacy for improvisation (SEI) operating as a mediating construct, and self-efficacy for teaching improvisation (SETI) as the outcome variable. A total of 123 pre-service music teachers participated in the research, and 10 follow-up semi-structured interviews were conducted to further illustrate the quantitative questionnaire survey results. Participants were bachelor students who were enrolled in music teacher bachelor programs across 10 conservatoires and universities of applied science during the academic year 2023–2024 in the Netherlands. The data were analyzed by using one-way ANOVA and T-tests for group differences, and the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach.

To investigate the intention to implement improvisation activities in the broader context, **Chapter 5** of this dissertation presents a mixed-method study comparing the formation of intentions between pre-service and in-service music teachers. This study aimed 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? and* (3) *Is there a significant difference between the pathways of pre-service and in-service music teachers?* **Chapter 5** addresses these research questions through an explanatory sequential mixed-methods design. In total, 605 questionnaires were completed by 378 pre-service music teachers and 227 in-service music teachers. Following the survey, 45–60-minute interviews were conducted with 12

participants, comprising six teachers from each of the teacher groups with diverse teaching experience and backgrounds, to obtain a holistic picture of teachers' intention formation based on emotions, motivations, efficacy beliefs, attitudes, and subjective norms for improvisation activities.

Finally, Chapter 6 integrates the main findings from all chapters, together with the theoretical and practical implications, reflects on the limitations, and proposes future research directions and recommendations for music teacher education.

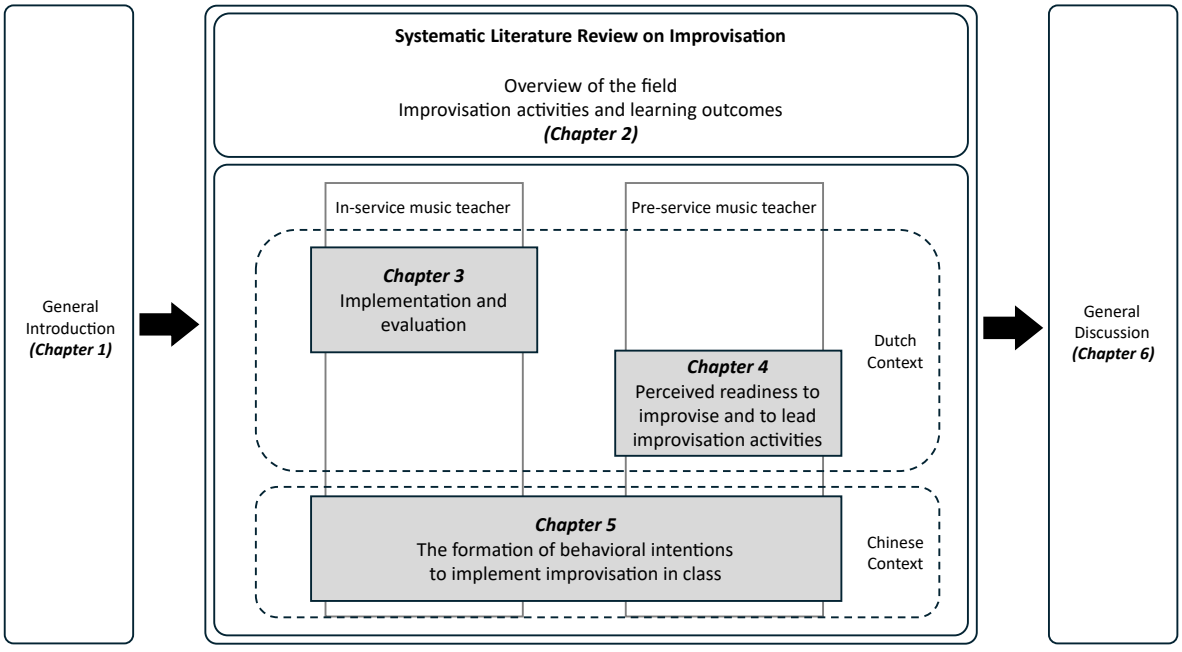
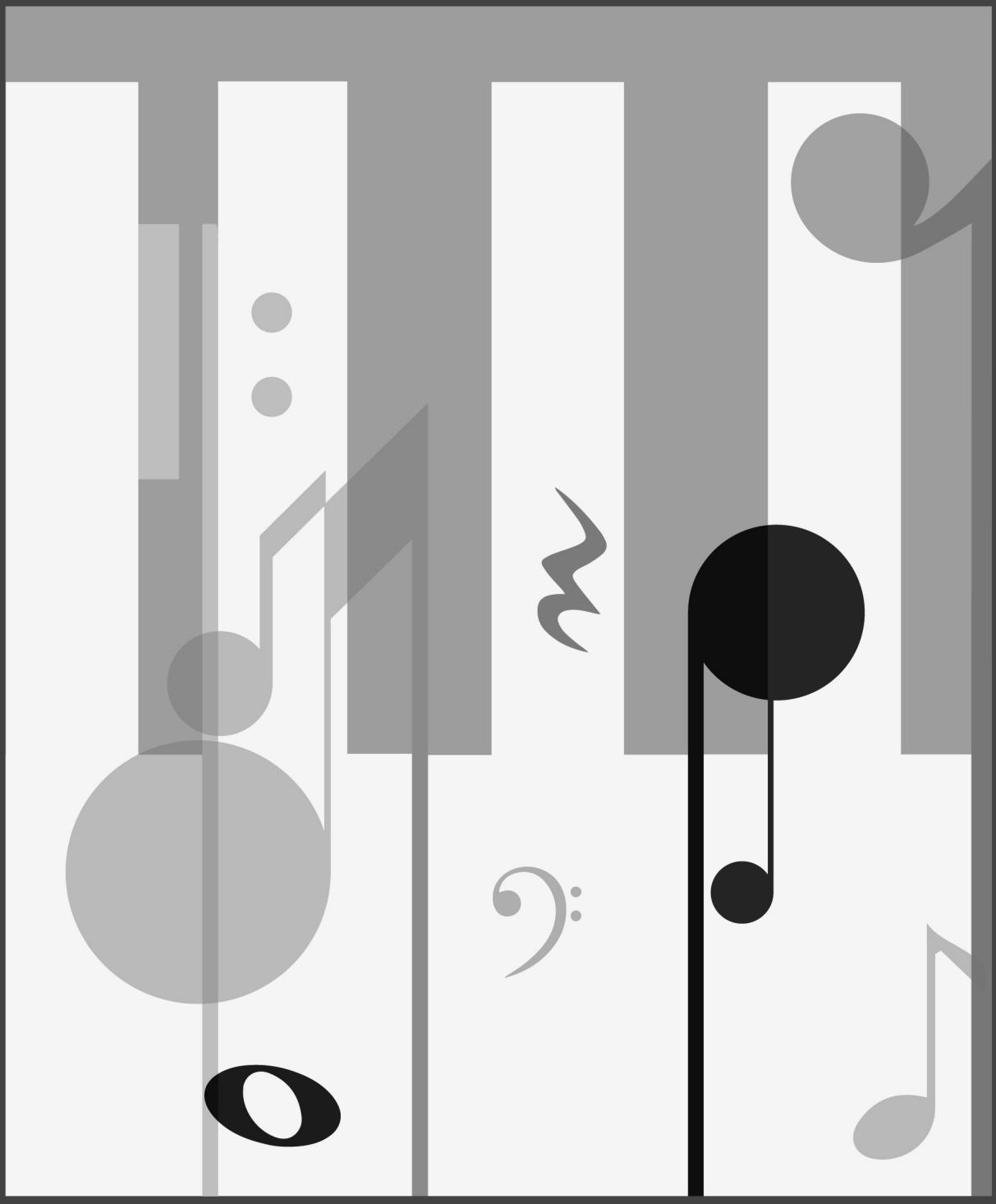


Figure 1.1 Overview of this dissertation



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2. Improvisation in music education: A systematic mapping of activities and learning outcomes

Abstract

A growing body of studies acknowledges improvisation as a powerful learning activity in music education. Yet the evidence remains fragmented, and the field still lacks a systematic overview of how different types of improvisation activities and learning outcomes are represented in empirical research. To address this gap, we conducted a systematic literature review to examine research on how improvisation activities and learning outcomes have been reported in empirical studies, resulting in the analysis of 63 peer-reviewed articles published between 2015 and 2025. We mapped five key components of improvisation activity and grouped the reported learning outcomes into four domains. The main results indicate that collective improvisation, free improvisation, improvisation with boundaries, and improvisation on the instrument were the most common activities. Furthermore, reflection on learning and creating was also frequently reported in the reviewed studies. Interdisciplinary activities, including movement and fusion with other art forms, often accompany musical improvisation. Regarding learning outcomes, more than half of the reviewed studies highlight a positive effect on musical knowledge and technical skills. Other learning outcomes, such as creativity, confidence, emotional expression, enjoyment, engagement, and collaboration, are likewise commonly identified in the reviewed publications. Overall, our findings provide a holistic picture of improvisation activities and learning outcomes in music education. These findings can inspire educators and curriculum designers to diversify improvisation practice and align it with appropriate learning outcomes, thereby enhancing the relevance and quality of their music educational practice.

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Hua, C., Admiraal, W., Nieuwmeijer, C., & Van der Rijst, R.M. (under review). *Improvisation in music education: A systematic mapping of activities and learning outcomes.*

2.1. Introduction

Musical improvisation is a vital creative activity in music education. It can help individuals express creative thinking, improve collaborative skills, and expand their musical knowledge and abilities (Coulson & Burke, 2013; Hickey, 2009; Koutsoupidou & Hargreaves, 2009; Makris et al., 2021; Whitcomb, 2013). As emphasized by Siljamäki and Kanellopoulos (2020), improvisation is a powerful way to highlight and cultivate the core of music and its significance for human life. Empirical research shows that engaging in improvisation activities can significantly promote the development of students' higher-order creative thinking, cognitive skills, and confidence (Azzara, 1993; Koutsoupidou, 2005; Navarro Ramón & Chacón-López, 2021; Wing et al., 2014). Through improvisation, learners can express emotions and ideas while integrating their musical skills into performance, listening, and analysis(Burnard, 2002; Chandler, 2018; Makris et al., 2021). Improvisation has been included in national music education curricula, such as the US, Australia, the UK, and many other European countries (Koutsoupidou, 2005; Larsson & Georgii-Hemming, 2019).

The definitions of improvisation in music education are different, such as "*spontaneous musical activities*" (Whitcomb, 2013); "*the spontaneous creation of original musical ideas (without revision*)" (Piazza & Talbot, 2021); and "*generative song making*" (Barrett, 2006). In this review, improvisation refers to the spontaneous, real-time process of creating and performing music, characterized by creative expression, emotional release, and interactive communication among performers (Pressing, 2001). This definition covers a wide range of practices, from teacher-guided structured tasks to student-led free exploration. Learning outcomes represent the results of such activity, including not only improvisation and experiences, but also broader musical skills, affective responses, and social competence. Given its importance, it is crucial to systematically understand the learning outcomes. As Murtonen et al. (2017) pointed out, learning outcomes have become an essential connection between learning goals, teaching activities, and assessment standards.

Previous reviews have explored improvisation from various perspectives. Chandler (2018) provided practical recommendations for integrating improvisation into primary music education, pointing out that students' improvisational skills tend to develop with age, especially in rhythm and phrase structure. Larsson and Georgii-Hemming (2019) reviewed

20 empirical studies (2000-2015), identifying two main approaches: "*structured, teacher-directed improvisation*" and "*free, child-directed improvisation*". They highlighted a noticeable research gap in improvisation research at the secondary school level. Siljamäki and Kanellopoulos (2020) analyzed 77 articles (1985 and 2015), presenting five visions of improvisation pedagogy and mapping trends in research topics, methodologies, and educational levels. Ng (2019) emphasized collective free improvisation from socio-cultural perspectives, demonstrating its potential for developing social skills within diverse learning communities. Although previous meta-analyses have shown that general music instruction has a moderate impact on students' musical development (Valache et al., 2025), the specific instructional value of improvisation has not been fully investigated.

Although previous reviews provided valuable conceptual insights, they also revealed a persistent methodological gap (Larsson & Georgii-Hemming, 2019; Siljamäki & Kanellopoulos, 2020). These reviews outline the overall development trend of improvisation in music education from 1985-2015, but did not systematically classify the types of improvisational activities and learning outcomes used in different educational settings. As a result, this field still lacks a coherent overview of how empirical studies conceptualize and operationalize improvisation in music education. Although many studies have shown that improvisation has many benefits, such as enhancing creative thinking and promoting the formation of musical identity (Larsson & Georgii-Hemming, 2019; Navarro Ramón & Chacón-López, 2021). These findings remain fragmented across levels, contexts, and methodologies.

Since 2015, empirical research has increasingly focused on creativity, inclusion, and assessment in improvisation practice. In the past decade, research methods have become more and more diverse, and with increasing numbers of mixed-methods and quasi-experimental studies addressing improvisation from practical and inclusive perspectives. To date, these developments have not been systematically synthesized.

This systematic review aims to provide an evidence-informed framework of improvisational activities and learning outcomes in music education from 2015 to 2025, and expand the chronological scope of previous reviews (Larsson & Georgii-Hemming, 2019; Siljamäki & Kanellopoulos, 2020). This study examines research across all educational levels because improvisation is a dynamic developmental process. Analyzing research across

different educational levels also helps maintain the coherence of research within a wider educational continuum. Through the systematic classification of activities and learning outcomes, this review provides theoretical guidance (a clear classification framework) and practical suggestions (precise strategies for effectively incorporating improvisation across diverse music education contexts). Therefore, this study aims to answer the following research questions:

RQ1: What improvisation activities are applied in music education?

RQ2: What are the learning outcomes of improvisation activities in music education?

2.2. Method

This systematic literature review followed the PRISMA (Preferred Reporting Items of Systematic Reviews and Meta-Analyses) statement (Moher et al., 2009; Page et al., 2021). The following sub-sections address the components recommended in the methods section of the PRISMA-P checklist, including eligibility criteria, information sources, search strategy, study records, data items, and data synthesis.

2.2.1. Databases and search strategy

The literature search was conducted using all electronic databases available in the library of Leiden University, such as Web of Science, JSTOR Scholar, and ERIC. A keyword-based search strategy was employed, guided by the study's central concepts: improvisation, music, and education. The specific keywords used in the search are "Any field contains Improvis* AND Any field contains Music* AND Any field contains teach* OR student* OR pedagog* OR educat*" (see Table 2.1). The final search was carried out on May 4th, 2025, and yielded a total of 904 articles across all databases (see Table 2.2).

Table 2.1 Searching keywords

	Improvis*	AND	Music*	AND	teach* OR student* OR pedagog* or educat*
Covered inflections	Improvise, improvisation, improvisor, etc.		Music, musician, musical, etc.		Teach*: teaching, teacher(s), etc. Student*: student(s), etc. Pedagog*: pedagogy, pedagogic, Educat*: education, educator, educate, educative

Table 2.2 Database collection

Name of databases	Number of articles found in the databases
Web of Science	343
JSTOR (Journal STOR)	107
SAGE Journals	93
Proquest	85
ERIC	81
Taylor & Francis Online	75
SpringerLink	49
ScienceDirect (Elsevier)	43
Wiley Online Library	28
Total	**904**

2.2.2. Criteria for inclusion and identification

This study focused on the activities and learning outcomes related to improvisation. A total of 904 articles were initially identified. Of these, 876 articles fulfilled the following criteria: (a) article reported on improvisation activities and learning outcomes; (b) written in English; (c) based on empirical research; (d) peer-reviewed article; (e) published from 2015 to date. The timeframe from 2015 to the present was chosen based on existing literature reviews on improvisation. Larsson and Georgii-Hemming (2019) included studies published between 2000 and 2015, emphasizing the fragmented nature of improvisation research and the lack of improvisation in the music classrooms. Siljamäki and Kanellopoulos (2020) examined literature from 1985 to 2015, presented five visions of improvisation pedagogy, and highlighted the need for more structured frameworks and empirical data-driven insights into improvisation.

The remaining 876 articles were screened, removing 28 duplicate articles, 560 articles that were in fields other than music education, and 85 articles that were not empirical studies, did not address improvisation and learning outcomes of improvisation, or were not written in English. In total, 63 articles met all the criteria and were identified for further study (Fig. 2.1). 40 articles were randomly selected and screened for evaluating the inter-rater reliability by two co-authors. There was a 100% match in the inclusion and exclusion of papers by the raters. With the high level of agreement, the manual selection resulted in 63 eligible articles for this systematic review.

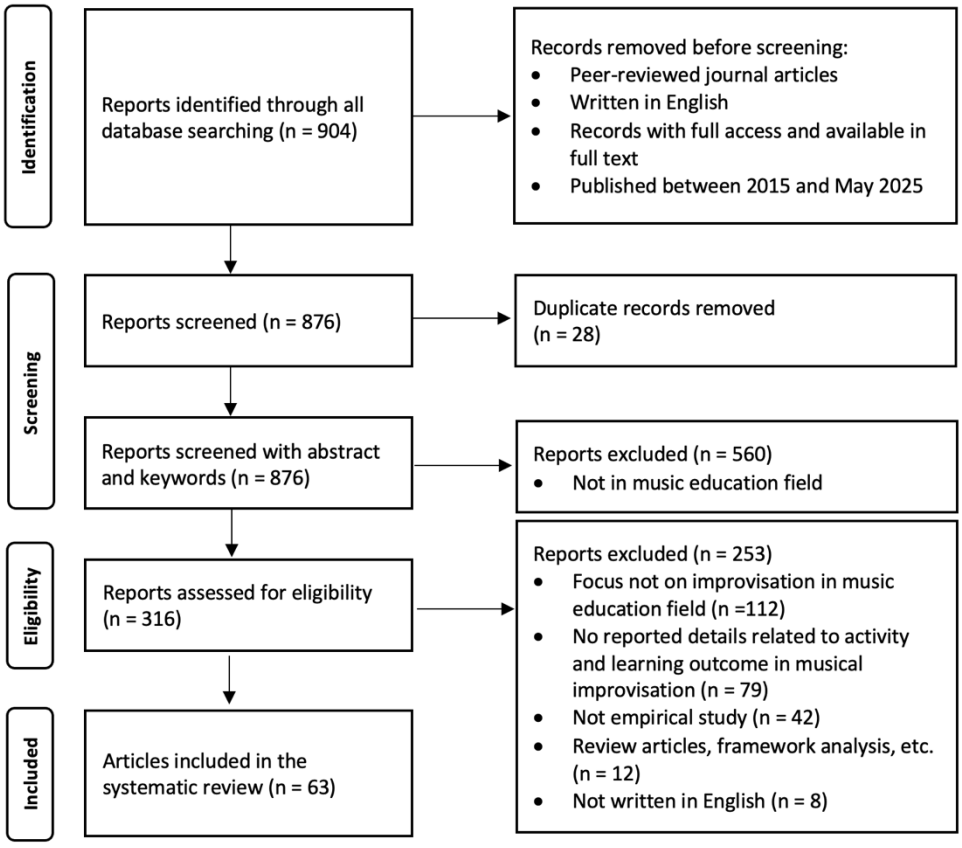


Figure 2.1 Literature selection process

2.3. Data analysis and coding scheme

This review adopted the content analysis method with combined inductive and deductive approaches guided by Elo and Kyngäs (2008). Detailing key characteristics such as author, publication year, geographical context, and research design (educational level of the target population, sample size, methodology, and the data source) is provided for each article (Appendix B-1). To synthesize the findings across studies, a matrix was developed to systematically map the musical improvisation activities and learning outcomes reported in the literature. This matrix provided a structured overview, highlighting the frequently described improvisational practices and related outcomes. This process was supported by ATLAS.ti, which facilitated the management and organization of code segments and categories.

An inductive content analysis approach was employed, allowing themes and categories to emerge directly from the dataset, ensuring interpretations remained grounded in the empirical context. Initially, in vivo codes were preserved to capture the original phrasing from the articles. These initial codes were then iteratively compared, refined, and grouped into broader categories to reveal underlying themes related to improvisation practices and learning outcomes.

For the overarching structure of learning outcomes, we grounded our four principal domains: affective, behavioral, cognitive, and social, which adapted from Bloom's Taxonomy and its subsequent developments. Specifically, Bloom et al. (1956) and Krathwohl (2002) informed the cognitive and affective outcomes. For the principal domains of engagement in behavioral and social outcomes, we drew on recent applications of student engagement and interaction in educational settings (Post et al., 2019; Wei et al., 2021). Detailed sub-codes emerged inductively from the articles themselves. In the final scheme, all subthemes were mapped onto the four primary domains, yielding a coding framework that was both theory-informed and data-driven.

To ensure the reliability of coding, all authors collaboratively developed and refined the coding scheme through multiple discussions. Later, a second coder joined the project and applied the codes to a random 20 percent subset of the articles independently, achieving a Cohen's kappa inter-rater reliability of .88, indicating almost perfect agreement (Landis & Koch, 1977). The first author completed the coding of all remaining publications, bringing any uncertain cases back to the group for review. Whenever disagreements arose, all authors engaged in discussion and resolved them until everyone agreed on the final coding.

2.4. Results

The results of the coding and analysis are presented in Appendices B-2 to B-5. Appendices B-2 and B-3 report the findings from improvisation activities and learning outcomes, specifying how each activity or learning outcome was investigated within the analyzed publications. These tables feature categories, sub-categories, abbreviations, explanations, relevant examples from the selected works, article frequency counts, and a comprehensive list of all cited publications. As a single publication may correspond to

multiple sub-categories, and frequency counts for each sub-category can come from one article. Appendix B-1 summarizes the studies included in this review. Appendices B-4 and B-5 display the specific activities and learning outcomes of each article using standardized abbreviations.

2.4.1. Details of the improvisation activities

2.4.1.1. Improvisation forms and techniques

The data-driven sub-categories of improvisation forms and techniques include (a) Collective improvisation, (b) Individual improvisation, (c) Free improvisation, (d) Improvisation with boundaries, (e) Melodic or rhythmic variation, (f) Jazz Combo / Blues improvisation, (g) Call and response, and (h) Repetitive riffs.

Collective improvisation was the most applied activity, identified in 48 of the reviewed publications. This highlights its importance in promoting collaborative learning environments. Lage-Gómez and Cremades-Andreu (2019) implemented collective improvisation as musical dialogue, facilitating group musical creation in a secondary school setting. Individual improvisation was less common, noted in 15 studies. It often appeared in one-to-one instrumental lessons or as personal contributions in group settings, typically aiming to support individual creativity and self-expression. Free improvisation and improvisation with boundaries were also widely adopted, both reported in 38 publications. Free improvisation gave students space to explore and experiment, making the activity more student-centered.

Other notable approaches include melodic or rhythmic variation (n = 23). Students modify familiar songs or patterns and transition them from imitation to creation. Jazz combo or blues improvisation, identified in 17 studies, was almost exclusively found in secondary or higher education contexts. Call-and-response appeared in 16 studies, promoting interactive musical dialogue. It was particularly common in primary and secondary education, as well as among beginners. It helped develop improvisational vocabulary through a gradual, scaffolded process. Repetitive riffs have been identified in 12 studies. This technique was considered a valuable skill, helping students enrich existing material through the repetition and development of simple phrases.

2.4.1.2. Tools & mediums-specific improvisation

The review identified a variety of tools and media employed in improvisation. Instrumental improvisation was the most common, which has been mentioned in 52 studies. Vocal improvisation appeared in 19 studies, while percussion-based improvisation was mentioned in 15 studies. Electronic or digital tools were relatively rare, with only 10 studies reporting their use, indicating the incorporation of technological advancements in improvisation in music education. Several innovative practices demonstrated the potential of technology to support improvisation in music education. These include the use of GarageBand (Augustyniak, 2015), Playback Orchestra (P. Juntunen et al., 2015), MIROR-Impro (Rowe et al., 2015), ImproviSchool (Palaigeorgiou & Pouloulis, 2018), and Sanka Play (Terauchi, 2022). For instance, Palaigeorgiou and Pouloulis (2018) presented the ImproviSchool system, which integrated touch-sensitive digital music interfaces into classroom settings. It guided students through improvisation in fairy tale scenarios. Their study demonstrated that digital media could offer immediate auditory feedback and a wide selection of timbres, encouraging students to explore and experiment with diverse improvisational ideas.

2.4.1.3. Reflection on learning & creating

Coaching, Mentorship, and Scaffolding were the most frequently utilized strategies in the learning and creating process (n = 23). These approaches provided structured support to enhance students' improvisational skills. In this context, teachers' guidelines and strategies (e.g., providing examples, offering feedback, and conducting evaluations) functioned as scaffolds to help students gradually master the essentials of improvisation. Cognitive apprenticeship and scaffolded support in improvisation helped learners address activities that are beyond their independent capabilities by gradually shifting responsibilities (de Bruin, 2019b).

Twenty studies reported Imitation and Modeling, enabling learners to replicate and adapt the observed techniques. For example, in the study of Varvarigou (2017a) study, the teacher first asked students to imitate a melody from a recording, and then guided them to personalize their melodic ideas. Then, gradually transitioning it toward freer performances rather than accurate replication. Nineteen studies noted Exploring and Experimenting,

which encouraged students to try out a variety of sounds and motifs and to reflect on their musical choices through trial. Eighteen studies identified Listening and Personalizing, which often appeared in the form of "play by ear," emphasizing attentive listening and the development of a personal musical voice.

2.4.1.4. Interdisciplinary improvisation

Some studies reported that improvisation activities were combined with other forms of expression. Twenty-two studies investigated bodily responses to improvisation, such as improvised movement or body percussion, which were often used in primary or special education. For instance, Lukács et al. (2022) conducted a study in the primary setting, which implemented a body movement-based music program. Under the guidance of teachers, students improvised dance or body movement to music and developed rhythm patterns. In special education, studies by Sutela and their colleagues (2020, 2021) have demonstrated that combining improvisation with movement can significantly improve students' engagement and confidence. In addition, 15 studies identified the integration of improvisation with other art forms, especially painting. The integration of visual elements with improvisation has been shown to offer suitable options for music education across all levels. For instance, MacGlone et al. (2021) used graphic symbols to stimulate improvisation among pre-school children and provided a visual scaffold for musical creativity. Similarly, Hedden (2017) explored the combination of improvisation with painting or pictures in higher education settings. Their finding noted that commenting on pictures enhanced students' expressive capabilities, resulting in both subtle and overt forms of expression.

2.4.1.5. Improvisation games

Nineteen studies explored story- or role-based improvisation, which provided the background and direction for improvisation. For example, some studies described improvisation inspired by animals (Hedden, 2017; Larsson & Öhman, 2018), weather or seasonal changes (Juntunen et al., 2015; MacGlone et al., 2021a), or animated short films (Cremades-Andreu & Lage-Gómez, 2024). Nine articles identified improvisation games, highlighting their role in fostering structured, playful improvisation. They could reduce students' anxiety about mistakes and create enjoyable learning experiences.

2.4.1.6. Improvisation activities across educational levels

Improvisational activities showed significant differences across educational levels. Collective improvisation, free improvisation, and improvisation with boundaries were common across all levels, especially prominent in elementary and secondary education, aiming to foster student collaboration and classroom engagement. In pre-school and early childhood education, free, body-based improvisation and improvisation games were most common, reflecting the emphasis on exploration and sensory learning among younger children. Special education research also indicated that collective and body-based improvisation enhances student engagement and communication skills. Jazz combo or blues, and melodic or rhythmic variation activities were mostly documented in secondary or higher education settings. The learning goals of these stages centered on stylistic expression and technical proficiency.

2.4.2. Specific learning outcomes of improvisation activities

2.4.2.1. Affective outcomes

Affective outcomes highlight emotional engagement and personal growth in musical improvisation. The learning outcomes of the affective dimensions appeared particularly strong in musical improvisation activities, and we summarized seven dimensions, particularly in the development of emotional expression and self-confidence. About two-thirds of the studies (n = 43) mentioned confidence, indicating that improvisation can empower individuals to trust their ideas and build their self-efficacy in music creation. For example, Marino and Chinn (2023) found that through group free improvisation training, middle school students' self-confidence and expressiveness in improvisation have been significantly improved. Nikolaou (2023) also observed a similar phenomenon in elementary school pre-service teachers. In the process of experimenting with improvisation, their confidence in teaching and self-expression gradually developed.

Nearly half of the reviewed articles (n = 28) emphasized emotional expression, revealing how improvisation enables individuals to communicate feelings spontaneously. Enjoyment and motivation were both identified in 24 studies, highlighting that improvisation not only brings a positive emotional experience but also encourages participants to be more aware of their feelings. Self-awareness has also been emphasized

in some of the studies (n = 22), as evidenced by learners' gradual awareness of their preferences, expressive styles, and learning strategies during improvisation. Fifteen articles reported the reflection or meaning making (21%). Similarly, the experience of flow as a state of deep engagement, although only mentioned directly in nine studies, also exemplifies the challenging and fun nature of the improvisation process (Verneert et al., 2024).

2.4.2.2. Behavioral outcomes

Behavioral outcomes refer to the observable actions and performances that reflect personal application of improvisational skills in practice. Among the behavioral outcomes, engagement was the most frequently reported (n = 25). This finding shows that improvisation strongly appeals to learners, capturing their attention and encouraging them throughout the musical process. Due to the immediacy and unpredictability of improvisation, participants tend to be more engaged, thus establishing a deeper connection with music activities. Risk-taking was identified in 15 studies, which encouraged learners to step out of their comfort zone, explore unfamiliar ideas, and embrace uncertainty. Thus, it expanded learners' adaptability and made them feel more comfortable in a wider context.

Autonomy (n = 12) was less frequently discussed among the reviewed studies; it reflects how improvisation promotes independent thinking skills and self-directed learning. Students gain agency and personal initiative when they make creative choices and take ownership while creating music. Finally, adaptive skills were identified in only seven articles. These findings revealed that improvisation may contribute to learners' flexibility, responsiveness, and ability to adjust to navigate new or uncertain musical contexts, including skills that are essential both within and beyond musical settings.

2.4.2.3. Cognitive outcomes

Cognitive learning outcomes refer to the development of knowledge, technical proficiency, and higher-order thinking skills such as analysis, evaluation, and problem-solving. More than half of the reviewed publications (n=42) reported improvements in learners' musical knowledge or technical skills. These include instrumental or vocal skills (Ng, 2023; Zhang, 2023); auditory skills and musical memory (Augustyniak, 2015; Cossey, 2024; MacGlone & Gravem Johansen, 2024); structural understanding of music (Norgaard,

2016; Tomlinson, 2015); theoretical knowledge, such as harmony (Guilbault, 2009; Johansen, 2018; Snell & Azzara, 2015); deepen mastery of the previous knowledge (Hanson, 2023); and the development of improvisational technique itself (Liu, 2025; Palmer, 2016).

Creativity, as a cognitive outcome, has been identified in 36 studies. A variety of methodological approaches were used to capture this complex element. The enhancement of creativity is often presented through qualitative methods, such as de Bruin (2018a), who analyzed changes in students' creative thinking through the case study and interview with teacher-student pairs. MacGlone et al. (2021a) used classroom observation data and interviews to identify children's creative musical behaviors in group creative musical behavior in improvisation. On the other hand, some studies have used quantitative or mixed methods to measure the changes in creativity in a more systematic way. For example, Yao and Qin (2024) utilized a quasi-experimental design, adapted a scale to measure the increase in college students' personal creativity and thinking skills after receiving improvisation instruction. The tailored instrument, Webster's Measure of Creative Thinking in Music – MCTM II (Webster, 1994) was applied by Navarro Ramón and Chacón-López (2021) to compare creative thinking before and after improvisation practices with primary students. Therefore, researchers have not only constructed theories about the impact of creativity through improvisation from different perspectives but also realized the effective capture of this complex learning outcome through a variety of empirical strategies.

Finally, 25 reviewed studies discussed the development of higher-order thinking. Problem-solving, although only mentioned by ten, showed that despite the strong cognitive challenges embodied in improvisational activities themselves, such outcomes are still not fully explored and systematically measured in current research.

2.4.2.4. Social outcomes

Social outcomes emphasize the development of interpersonal collaboration and communication through shared improvisational experiences. The role of improvisation in promoting social learning was emphasized by 34 reviewed publications. These results highlight the importance of building trust, cooperation, and a sense of belonging during the improvisation process. Approximately one-third of the studies (n=21) identified communication skills as a key social learning outcome. These include verbal communication,

such as classroom dialogue and spoken reflection (e.g., MacGlone et al., 2021; Tomlinson, 2015), and non-verbal interaction, such as musical communication (e.g., Juntunen et al., 2015; Lage-Gómez & Cremades-Andreu, 2019; Larsson & Georgii-Hemming, 2019), as well as the use of body language and eye contact during collective improvisation (Ng, 2023). In addition, eight studies reported the influence of improvisation on empathy, as students are required to recognize and respond to the emotions and expressive intentions of others. In a nutshell, these findings indicate that improvisation supports not only individual and technical development but also functions as a social-practical form of learning that can help learners build meaningful interpersonal connections and shared expression in collective participation.

2.5. Discussion and conclusion

This systematic literature review synthesized 63 empirical studies (2015-2025) to map improvisation activities and learning outcomes in music education. We clustered the improvisation activities in five essential components: improvisation forms and techniques, tools and medium-specific improvisation, reflection on learning and creating, interdisciplinary improvisation, and improvisation games. The learning outcomes have been summarized in affective, behavioral, cognitive, and social domains.

This review adopted a hybrid inductive-deductive approach to allow activity categories to emerge from data while mapping the results to the established educational taxonomies (Bloom et al., 1956; Krathwohl, 2002; Krathwohl et al., 1964). This method balanced empirical grounding with conceptual coherence, facilitating interpretation and comparison across studies. It incorporated a variety of research designs from qualitative case studies to quasi-experimental research, which provided comprehensive coverage but also limited causal inference.

2.5.1. Discussion of improvisation activity

The results indicated that collective improvisation and instrumental improvisation were the most frequently reported types, appearing in 76.1% of the reviewed publications. Compared to Siljamäki and Kanellopoulos (2020), who found that only 17.3% of studies published between 1985 and 2015 addressed collective improvisation. This substantial

increase may reflect both a temporal change toward collaborative learning frameworks (Burnard, 2002; Ng, 2019) and the differences in activity classification methods. Our refined classification approach identified group-based practices that previous conceptual frameworks may have categorized differently.

More than half of the reviewed publications discussed free improvisation and improvisation with boundaries. This echoes the emphasis in earlier literature on balancing unstructured, learner-driven improvisation with structured, teacher-guided practices (Hickey, 2009; Larsson & Georgii-Hemming, 2019; Wilson & MacDonald, 2016). Our analysis further distinguished three distinct subtypes of scaffolded activities: melodic or rhythmic variation, call-and-response, and repetitive riffs. Our refined categories offer a detailed framework for creating boundary-based improvisation activities, providing both flexibility and practical guidance for curriculum development and assessment. These refined categories may offer practical guidance for curriculum development.

However, the frequency of reporting does not imply effectiveness. The frequency of specific activities in the literature may indicate publication trends or ease of implementation rather than verified educational efficacy. Experimental research is needed to determine which approaches, under what conditions, best support specific learning goals.

Jazz and blues improvisation appeared in 27% of publications, similar to Siljamäki and Kanellopoulos (2020) (30.8%). Nearly one-third of the articles mentioned vocal and percussion improvisation. Nine publications discussed electronic or digital tools, suggesting emerging but still limited integration of technology in improvisation. Digital tools have potential benefits, including real-time feedback, expanding creative possibilities and personalized learning pathways. Future research should explore how technology-mediated improvisation influences learning processes and outcomes across different educational contexts.

More than one-third of the publications mentioned coaching, mentorship, and scaffolding strategies. These strategies seemed to be related to students' learning and teachers' confidence. For example, Bernhard and Stringham (2016) found that specific mentorship processes enhanced pre-service teachers' confidence in leading improvisation. Coulson and Burke (2013) observed that students produced more varied improvisations when teachers modeled improvisational practice frequently. However, most of the studies

reporting these associations employed correlational or descriptive designs. Experimental research is needed to establish whether and how specific scaffolding approaches causally influence learning outcomes.

Publications emphasized self-directed exploration and observational learning, suggesting that learners might benefit from open-ended improvisation and structured examples. Exploring and experimenting may foster the generation of new musical ideas (Augustyniak, 2015), while imitation and modeling in apprenticeship (de Bruin, 2018a) and peer learning contexts (MacGlone et al., 2021) may support vocabulary development and confidence building. Playing by ear has been mentioned in several reviewed publications, representing not only a technique but also situational and social understanding essential in collective improvisation (Varvarigou, 2017a, 2017b). These modes of engagement suggest that improvisation learning involves building habits of listening, adapting, and reflecting throughout the creative process.

More than one-third of the publications discussed integration of movement and fusion with other art forms, consistent with the recommendations from previous research (Chandler, 2018; Koutsoupidou, 2005; Whitcomb, 2013). Movement-based improvisation, in particular, is frequently used to foster embodied musical understanding and enhance students' expressive engagement (Burnard & Dragovic, 2015; MacGlone & Gravem Johansen, 2024) and is commonly used in special education (Sutela et al., 2020; Sutela et al., 2021). Moreover, movement-based improvisation is an essential component of the Orff method, allowing students to directly experience the dynamics of music through improvised performance and physical movement (Jiang, 2025). Furthermore, linking musical creation with the visual arts has given students a meaningful musical experience (Lage-Gómez & Cremades-Andreu, 2019).

Story- or role-based improvisation (30% of studies) appeared to provide narrative frames that support expressive autonomy. These findings support the perspective that structured imaginative environments can help learners express musical ideas in meaningful ways (Burnard, 2000). Game-based approaches were associated with higher motivation and stronger creative fluency, especially among younger or less experienced students (Borgo, 2007). These findings suggested that improvisation often occurs within multi-sensory, embodied, and contextually enriched environments. It positions itself as a holistic process

rather than solely a technical skill. The integration of movement, visual arts, and storytelling challenges traditional understanding of improvisation as purely technical. This highlights the expressive and imaginative dimensions.

Differences in improvisational activities at different educational levels reflect how teachers adapt pedagogy to learners' developmental needs and curricular aims. In early childhood and preschool education, free, body-based, and game-like improvisation, which is consistent with the development theory that emphasizes play, sensory exploration, and embodied learning (Burnard & Dragovic, 2015). At the elementary and secondary levels, the frequent use of collective and structured improvisation underscores the importance of social cooperation and guided participation, core features of classroom-based music learning (Chandler, 2018). In higher education, improvisation becomes increasingly medium- and genre-specific, as seen in jazz/blues and melodic–rhythmic variation, and its goals shift toward stylistic control and technical mastery. This progression suggests a pedagogical continuum in which improvisation moves from exploration to conscious artistic creation. However, most studies examined only a single educational level. Comparative research investigating how the same improvisation activities function differently across levels is still limited.

2.5.2. Overview of learning outcomes of improvisation

Confidence and emotional expression were the most frequently reported affective outcomes. It shows that improvisation may support the development of musical self-efficacy and reduce fear of judgment when conducting in non-evaluative environments (Biasutti & Frezza, 2009; Burnard & Dragovic, 2015; Kanellopoulos, 2007). The emphasis on emotional expression indicates that improvisation provides students with a way to express their inner emotions and individual voices, which is consistent with the dimensions of musical improvisation identified in previous research (Biasutti, 2015; Biasutti & Frezza, 2009). Enjoyment and motivation appeared in one-third of articles, often in contexts emphasizing student-centered, exploratory activities. The open-ended nature of improvisation may enable students to engage with music in more personal and playful ways, fostering intrinsic motivation, particularly when improvisation is embedded in game-like or story-based formats (Nikolaou, 2023).

Flow, characterized by deep concentration, effortless engagement, and intrinsic enjoyment when activity challenge matches skill level (Csikszentmihalyi, 1990). In the context of music education, flow in improvisation has been mentioned in previous research (such as Biasutti, 2015; Biasutti & Frezza, 2009; Custodero, 2005), suggesting that improvisation tasks can create optimal learning environments by enhancing intrinsic motivation and emotional immersion. Despite its significance, only a limited number of reviewed publications (e.g., Augustyniak, 2015; Juntunen et al., 2015; Lage-Gómez & Cremades-Andreu, 2019; Verneert et al., 2024) identified flow, which remains an underexplored field in the context of music education. Systematic investigation of how different improvisational structures influence flow experiences, and whether flow mediates relationships between improvisation activities and other outcomes, represents a valuable direction for future research.

Engagement was the most frequently identified behavioral outcome, followed by risk-taking, autonomy, and adaptive skills. These outcomes together show that improvisation is associated with students' active participation, independence, and flexibility, consistent with the goals of learner-centered pedagogy. Engagement not only includes attention and task completion, but also emotional and cognitive investment in music creation. Risk-taking enables students to move beyond comfort zones and engage with uncertainty, potentially fostering creative development. The emphasis on autonomy reflects a transition from teacher-directed instruction to student-led exploration, allowing students to make their own musical choices. In addition, adaptive skills illustrate that improvisation can help students better cope with complex learning environments.

More than half of the publications reported associations between improvisation and musical knowledge and skills. Creativity appeared both as an outcome and as an inherent process within improvisation (Burnard & Dragovic, 2015; Whitcomb, 2013), with students generating original ideas, exploring musical possibilities, and expressing themselves in novel ways. Critical thinking and decision-making were often mentioned in contexts requiring spontaneous choices and real-time problem-solving (Terauchi, 2022). Problem-solving abilities were highlighted in both one-to-one instrumental lessons (de Bruin, 2018b), and collective improvisation situations (Veloso, 2017), where students navigate unexpected changes and find creative solutions.

Nearly half of the reviewed publications (46%) associated improvisation with collaboration development, indicating that improvisation creates spaces for learners to engage with others in meaningful ways, where collaborative musical creation supports group identity and well-being (Lage-Gómez & Cremades-Andreu, 2019; Ng, 2022). Communication was identified, including musical (P. Juntunen et al., 2015; Larsson & Öhman, 2018), verbal (MacGlone et al., 2021a; Tomlinson, 2015), and body language or eye contact (Ng, 2023) dialogue in our reviewed publication, which also aligned with the previous findings (Biasutti, 2015; Larsson & Georgii-Hemming, 2019; Siljamäki & Kanellopoulos, 2020). Few publications examined empathy development, despite improvisation's emphasis on actively listening to peers, perceiving others' expressive intentions, and responding musically. This interactive process may promote emotional sensitivity and non-verbal communication abilities. Given contemporary emphases on social-emotional learning in education, empathy development in improvisational contexts represents a promising direction for future investigation.

2.5.3. Emerging patterns across improvisation types and learning outcomes

Most studies approached improvisation in a holistic way and did not establish clear causal links between specific activity types and outcomes. This reflects the multi-dimensional nature of improvisation, where a single activity often combines several elements, such as vocal improvisation using call and response in a group setting. As a result, it is methodologically difficult to isolate the effects of individual activity components. For example, vocal improvisation with a call-and-response form in a group setting could contribute to the development of collaboration and communication. As a result, most studies assessed improvisation in descriptive and holistic ways, making it difficult to analyze the effects of individual activity types.

Nevertheless, some tentative patterns emerged from our analysis. Improvisation activities that involve group collaboration, embodiment, or open structures (such as collective improvisation, free improvisation, and improvised movement) often appeared with social and affective learning outcomes, including collaboration, communication, empathy, and identity. These activities emphasize listening and responding, and reduce

feelings of timidity, which can effectively support the achievement of social-emotional learning (Váradi, 2022).

More structured or guided activities, such as improvisation with boundaries, Coaching & Mentorship & Scaffolding, and Imitation & Modeling, more often co-occurred with reports of musical knowledge and technical skill development. This pattern may indicate that in skill-oriented teaching settings, structured improvisation serves as a supplementary tool for technical practice and knowledge internalization, while allowing teachers to assess students' mastery of existing knowledge. Percussion-based and technology-integrated improvisation appeared more frequently with enjoyment outcomes, possibly due to physical engagement (percussion) and ease of soundscape construction or immediate playback (technology) (Terauchi, 2022).

It is critical to realize that these patterns are related and depend on specific context rather than being causal. Most studies did not explicitly test the relationship between specific activity features and particular outcomes. Experimental research with controlled comparisons is needed to determine whether specific activity types differentially and causally influence particular outcome domains, and under what instructional conditions these relationships hold.

2.5.4. Limitations and directions for future research

This literature review systematically categorized improvisation activities and learning outcomes in music education. Several limitations need to be acknowledged. First, the analysis was limited to studies published in English, and relevant studies published in other languages may be omitted. Second, most of the included studies presented relationships in a narrative or correlational way, rather than examining causal patterns, which makes it difficult to establish clear connections between specific instructional designs, contextual factors, and learning outcomes. Thus, our findings must be interpreted as evidence-informed observations of commonly reported practices, rather than validated recommendations. Future research should employ experimental or longitudinal designs to explore the causal processes underlying improvisation outcomes. It would also be valuable to explore how outcomes differ across educational levels, instructional settings (formal vs. informal), and cultural contexts where improvisation plays distinct musical roles.

Although ten studies in this review were conducted in East Asian contexts, the analysis did not show clear cultural differences in improvisation activities or learning outcomes. This similarity may suggest that music education across regions often shares common goals, such as creativity, collaboration, and expression. More cross-cultural studies are needed to understand whether these similarities reflect the general goal or the influence of the global music education models. Finally, key questions remain: Why do some improvisational activities seem to be more effective? Is it the activity structure, the improvisational content itself, or the teaching environment?

2.5.5. Implications

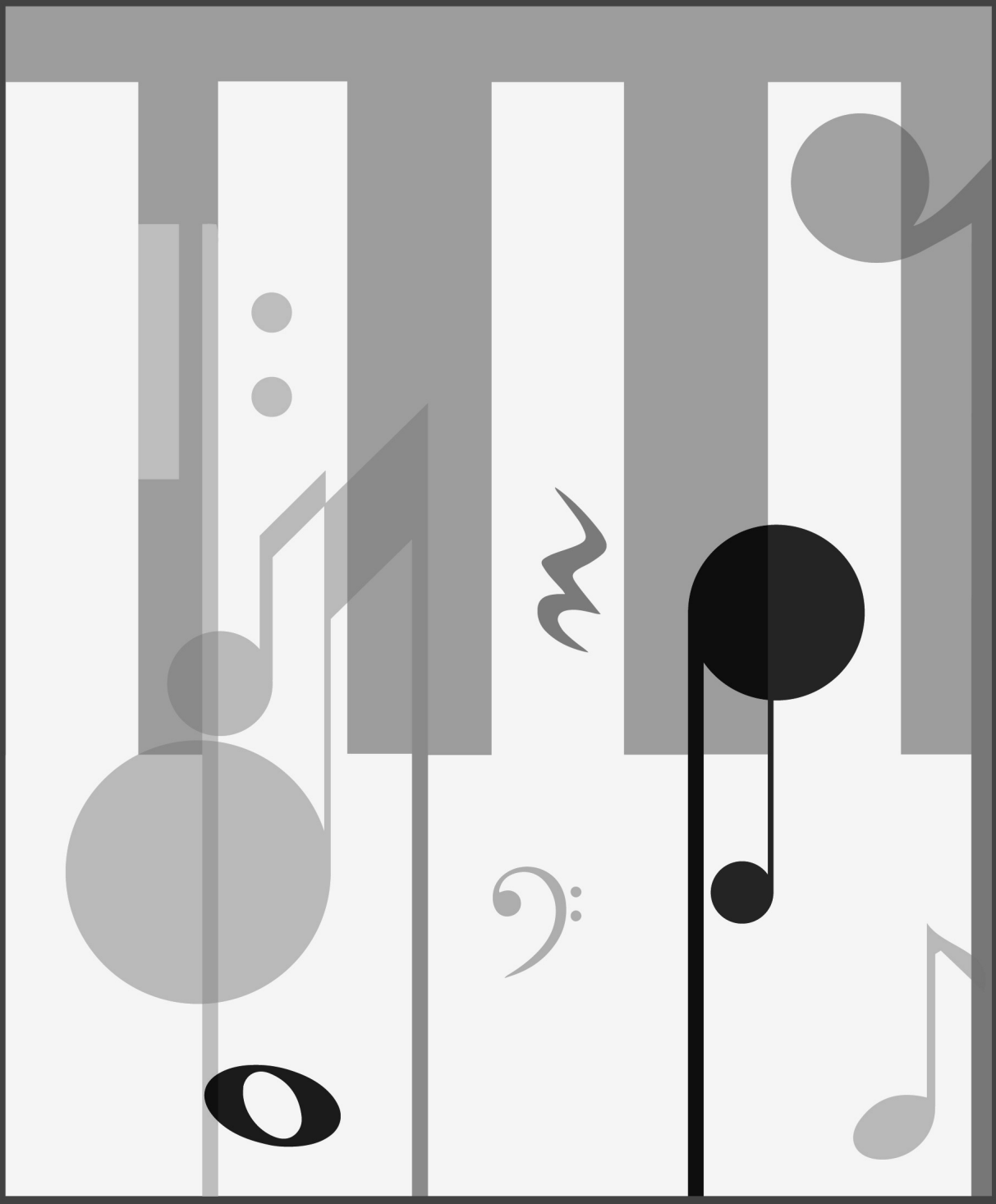
The classification frameworks provide conceptual tools for future research and may help educators understand the variety of improvisation activities and learning outcomes. It is important to note that most reviewed studies used correlational or descriptive designs rather than experimental methods. The findings represent frequently reported patterns rather than validated evidence of effectiveness. Educators can use these patterns as starting points for pedagogical experimentation within their own contexts, while researchers are encouraged to conduct experimental and longitudinal studies to establish causal relationships between instructional conditions, specific practices, and learning outcomes.

2.6. Conclusion

This systematic review analyzed 63 empirical studies published between 2015 and 2025, aiming to map improvisation activities and learning outcomes in music education. Five main activity categories were identified inductively: improvisation forms and techniques, tools and mediums, specific improvisation and physical response, reflection on learning and creating, interdisciplinary improvisation, and improvisation games. Learning outcomes were documented across affective, behavioral, cognitive, and social domains. This review offers a comprehensive overview of current empirical evidence on improvisation activities and outcomes in music education and provides a conceptual foundation for future teaching and research developments.

This review expands the previous literature reviews (Larsson & Georgii-Hemming, 2019; Siljamäki & Kanellopoulos, 2020), provides a comprehensive activity classification grounded in recent research, systematically mapping outcomes to established educational taxonomies. In addition, this review also documents developmental patterns across educational levels and captures trends including increased emphasis on collaborative practices, interdisciplinary integration, and diverse methodological approaches. The hybrid inductive-deductive coding method demonstrates how systematic reviews can balance theoretical coherence with empirical openness.

Together, these findings suggest that improvisation has great pedagogical potential in supporting whole-person development in music education. Previous reviews have consistently highlighted the lack of research on improvisation in music education (Larsson & Georgii-Hemming, 2019; Siljamäki & Kanellopoulos, 2020). However, the significant growth in empirical studies over the past decade indicates an increasing and renewed interest in this domain. We advocate a more systematic integration of improvisation in music education. Building on these findings, we propose several potentially beneficial strategies, including positioning improvisation as a regularly practiced activity, designing semi-structured tasks scaffolded by teachers, and encouraging student-led exploration. As also suggested by prior studies (see, e.g., Hickey, 2009), students would engage deeply and meaningfully benefit from improvisation activities when they are in a safe, supportive, and non-judgmental setting, offering opportunities for self-reflection and providing constructive feedback.



3

3. Unpacking musical improvisation: Implementation and evaluation by primary music teachers in the Netherlands

Abstract

Improvisation is widely recognised as a musical creative activity, yet it remains infrequently used in classroom practice. This qualitative study examines how eight Dutch primary music teachers understand, implement, and evaluate improvisation. Drawing on semi-structured interviews, classroom observations, and field notes, two themes emerged: **implementation**, including commonly used improvisation activities, perceived effectiveness of improvisation activities, and feedback, and **evaluation**, including perceived benefits, challenges, and reflections for improvement. Findings show teachers value improvisation for fostering creativity and confidence but face considerable challenges, including managing classroom dynamics and limited pedagogical training, suggesting that teachers' engagement with improvisation is shaped by both pedagogical beliefs and contextual constraints.

*This chapter is an adapted version of:

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3.1. Introduction

Music is an essential subject in the primary education curriculum, and improvisation has been lauded by both educators and researchers as a core musical activity. A musical improvisation is an act of creation without prior agreement or planning, also described as a spontaneous musical endeavour (Whitcomb, 2013). Improvisation has a significant impact on the development of creativity, higher-order thinking skills, cognition, and confidence (Chandler, 2018; Navarro Ramón & Chacón-López, 2021; Siljamäki & Kanellopoulos, 2020; Wing et al., 2014).

Using an ethnographic research design, Burnard (2002) examined the meaning of improvisation among 18 twelve-year-old children through observations, interviews, and analysis of recorded improvisations, and found that group improvisation supported creativity, social engagement, and the development of musical identity. Drawing on questionnaire data from 3,820 Swedish adults, Theorell et al. (2015) examined the long-term effects of childhood music education and found that engagement in activities such as improvisation was a significant determinant of whether individuals continued to sing or play an instrument in adulthood. Using Webster's Measure of Creative Thinking in Music (MCTM II) (Webster, 1987, 1994), Navarro Ramón and Chacón-López (2021) examined the effectiveness of an improvisation workshop with 17 children aged 8–11 and reported improvements in students' musical creativity. The authors show the impact of improvisation on the development of creative thinking of children in music. Furthermore, improvisation has been added to the national recommendations as part of the music education curricula, such as in the US (Whitcomb, 2013); the UK (Koutsoupidou, 2005); China (Ministry of Education of the People's Republic of China, 2011); and many European countries (Larsson & Georgii-Hemming, 2019).

Nonetheless, a lack of improvisation in musical classrooms has been reported. There are three main reasons for this situation. First, music teachers have reported a lack of knowledge about teaching improvisation. This relates to teachers' professional training, as the absence of improvisation in music teacher education has been shown to influence pre-service teachers' (i.e., teachers in training who have not yet started in a formal teaching position) confidence in incorporating improvisation activities into their teaching (Piazza & Talbot, 2021). Additionally, Koutsoupidou (2005) found that teachers who use

improvisation tend to be older, have more teaching experience, and have specialist music qualifications, which indicates that younger or inexperienced teachers, especially those who have not received professional music training, may feel less equipped to teach improvisation. Furthermore, limited time, classroom space, and inadequate instruments hinder the use of improvisation activities by music teachers (Bogojević & Pance, 2022; Makris et al., 2021).

A systematic review by Larsson and Georgii-Hemming (2019) examined the literature about improvisation in general music education published between 2000 and 2015. They argued that "*improvisation is an underdeveloped field*" (p. 49). Of the studies identified, only 20 empirical studies met their inclusion criteria, focusing on improvisation in primary or secondary general music classrooms and drawing on methods such as classroom observations, interviews, or case studies. Among these studies, most of the authors involved students' learning of improvisation, while others examined the relationship between musical development and age. They also highlighted the limited number of studies focusing on teachers' perspectives and experiences of improvisation in classroom practice.

3.2. Aim of this study

In summary, although the literature has explored the benefits of improvisation to children's musical and cognitive development, curriculum integration across different countries, and barriers to implementation in classrooms, there remains a lack of research examining teachers' actual experiences and pedagogical approaches when teaching improvisation in primary music education. In this study, we collected in-depth data through semi-structured interviews, classroom observations, and field notes to provide evidence-based insights into improvisation activities in class and teachers' perspectives on improvisation in Dutch primary education. Only when we understand music teachers' perspectives on improvisation can we develop activities to foster teachers' use of improvisation activities in class and foster students' learning (Sawyer, 2004). The following two research questions (RQs) are addressed:

RQ1: How do teachers implement improvisation activities in class?

RQ2: How do teachers evaluate the improvisation activities in class?

3.3. Method

3.3.1. Research context and participant

In the Netherlands, schools follow a set of national 'core objectives' – goals that indicate what primary schools should focus on in the development of their pupils. Schools are allowed to decide for themselves how to achieve these core objectives.

To study improvisation in primary music classrooms, this study involved eight Dutch primary school teachers (labelled T1 to T8), consisting of seven females and one male. They were recruited based on the combination of the following criteria: (1) teaching music lessons in primary school and (2) having professional music backgrounds. Gender identity was not deemed a relevant factor for teachers' use of improvisation activities in class, and therefore, in this study, all references to participating teachers are using feminine pronouns. Their average teaching experience was 15.38 years (SD=8.23). The schools were in both urban and suburban areas, providing a diverse range of educational environments. Table 3.1 shows the characteristics of participating teachers, including their education, the type of schools where they teach, the age group of their current teaching, the frequency and duration of the music lesson, and their teaching domain and teaching experience.

The teachers had different types of music education backgrounds from higher education in different countries. Besides undergraduate and graduate education, six participated in music teacher education programs. The teachers taught in three types of schools: Montessori schools, international schools, and general schools. While most teachers only taught music, Teacher 2 was a general teacher who taught all subjects, including music, to a single class with a cohort of 30 students. In contrast, the other teachers taught multiple grades.

3.3.2. Data collection

Qualitative methods were adopted to explore teachers' self-perceptions and classroom practices related to musical improvisation. A multi-source inductive design was used, drawing on semi-structured interviews, classroom observations, and field notes. This combination allowed us to examine how teachers implemented improvisation in practice, and how they interpreted its pedagogical value. To ensure validity, the observation and field-note data were triangulated with the interview data.

Ethical approval for this study was obtained through the internal review procedures of the first author's institution. All teachers were informed about the purpose of the study and provided informed consent. The involvement was entirely voluntary, and anonymity was guaranteed as a condition of participation consent.

3.3.2.1. Classroom observation and field notes

Classroom observations provided in-depth descriptions of how improvisation was enacted during primary music lessons, including teachers' repertoire of improvisation activities and how they valued student learning during these activities. During all observations, detailed field notes were taken to capture instructional sequences, students' responses, and contextual features of the lessons. Voice recordings and photographs of the classroom setting (e.g., instrument and space) were also collected with consent. Observation length varied depending on teachers' schedules. Seven teachers were observed for three to six lessons (90–150 minutes for each participant), and one generalist teacher was observed for a single 45-minute lesson.

3.3.2.2. Semi-structured interviews

Prior to the formal data collection, two pilot interviews with Dutch primary teachers were conducted to refine the interview protocol and ensure the clarity and relevance of the questions. During the data collection, seven interviews were conducted directly after the classroom observation in the school building, and one interview was conducted online due to a schedule conflict. All interviews were audio-recorded with consent and conducted in English.

The interviews explored teachers' interpretations and classroom use of improvisation (e.g., creative activities used, perceived benefits and challenges, strategies for implementation, and approaches to evaluating students' improvisation). These topics are aligned to understand how teachers implement and make sense of improvisation in their teaching. A full interview guide is provided in Appendix C.

Table 3.1 Characteristics of participating teachers.

Teacher	Background	School Type	Age Group	Music Lessons per Week and Duration for (Each) Group	Group Size	Teaching domain	Teaching Experience (Years)
1	PABO & Classical saxophonist	Montessori school	4 -12	Once a week – 30 minutes	6 to 14 students	Music	20
2	Bachelor and Master in music education & PABO	Montessori school	6 - 8	Two to three times a week – 45 minutes	30 students	All subjects	9
3	Bachelor in viola & Master in Music Education & PABO	Montessori school	4 - 12	Once a week – 30 minutes	10 to 20 students	Music	7
4	Bachelor in flute and music education & Master in art education and child development	International school	4 - 6	Every other day – 30 minutes	10 to 20 students	Music	4
5	Bachelor in music education & Master in education (curriculum and instruction)	International school	7 - 9	Two to three times a week (two general music lessons and one ensemble lesson) – 45 minutes	20 to 22 students	Music	29
6	Bachelor in classical singing & Choir conductor	General school	4 - 12	Once a week – 30 minutes	20 to 24 students	Music	25
7	Bachelor in violin (world music)	International school	4 - 12	Two music lessons & Four Dutch lessons per week – 45 minutes	12 to 24 students	Dutch & Music	14
8	Bachelor in music education	Montessori school	4 - 12	Only one lesson in two weeks for grades 7&8 – 30 minutes	12 to 24 students	Music	15

1. PABO is a teacher training program in the Netherlands. It is a bachelor-level program that equips students with the knowledge and abilities necessary to teach all primary school subjects.
2. Montessori is a common school in the Netherlands that follows the educational philosophy of Maria Montessori (1870–1952), an Italian educationalist. Mixed-age classrooms are an identifying characteristic of this school, where students of various ages learn together and from each other.

3.3.3. Coding procedures and analysis

To answer the research questions, we applied coding and analysis to guide the inductive thematic analysis for the eight interviews (Braun & Clarke, 2006). After the recorded interviews were transcribed verbatim and anonymized, we carefully examined the transcribed text, first reading it in-depth to become acquainted with the material. Next, the data analysis was conducted using NVivo 12. The initial stage of analysis was to identify relevant text fragments and label those with identifiable codes. Following the initial labelling, the labels were merged based on considering the thematic similarities of the common concerns. For instance, labels such as 'improve creativity', 'more expressive', and 'build confidence' all underpin the category 'personal development'. Several rounds of re-reading and discussion were necessary until no new labels were found and the subcategories were confirmed. Finally, 21 subcategories emerged from the data through the systematic analysis.

Meanwhile, observations and field notes were analyzed based on the framework of Gruenhagen and Whitcomb (2014), accompanied by improvisation activities mentioned by teachers during the interview. The activities were grouped into three subcategories: vocal activity, instrument activity, and other activity. To ensure validity, observational data and field notes were triangulated with interview responses to provide a comprehensive understanding of the situation of improvisation in the classroom. Likewise, the observation and field notes provided resources to interpret the improvisation activities in class and to converse about them with participating teachers during interviews.

The subcategories, grouped into six main categories, describe the aspects of implementation and evaluation of improvisation activities in class perceived by primary music teachers. The main categories were distinguished and clustered into the two main themes to answer the two research questions: **implementation**: (1) forms of improvisation activity, (2) perceived effectiveness of improvisation activity, and (3) feedback; **evaluation**: (4) benefit, (5) challenge, and (6) reflection (Tables 3.2 and 3.3).

3.4. Findings

In Table 3.2, we present teachers' perspectives on the implementation of improvisation to address RQ1; in Table 3.3, we summarize teachers' perspectives on the evaluation of improvisation are summarized to address RQ2.

Table 3.2 Teachers' perspectives on the implementation of improvisation activities.

Main Category	Subcategory	Label
Forms of improvisation activity	Vocal activity	Call-and-response singing
		Improvising vocal sounds to accompany a story or poem
		Improvising words and melodies as sung conversation
		Improvising descants over a melody
		Improvising short melodic phrases or motives
		Scat singing (explore own voice – younger groups)
		Improvising melodies to a given set of lyrics
	Instrumental activity	Improvising on unpitched and pitched percussion instruments
		Improvising rhythmic patterns using instruments
		Call-and-response/question-and-answer using instruments
		Improvising sound accompaniments to a story or poem
		Improvising with the recorder
	Other activities	Individual students improvising (jazz melody)
		Improvising using body percussion (on rhythm and melody)
		Improvising a melody to correspond with words or lyrics
		Group/collaborative improvising (first led by the teacher, then students)
		Using a recording as a model for improvising in a specific style
Perceived factors of effective improvisation activity	Supportive and safe environment	Give compliments
		Group improvisation
		Do everything in a non-judgmental way
	Structuredness of activity	More organized and structured activity
		Clear steps for students to follow
		Guide improvisation with clues
	Student-centred activity	Activities connect students' interest
Feedback	Self-reflect	Ask if the student likes it or not
		Feedback in small questions to prompt students to keep thinking
	Peer feedback	Encourage feedback from classmates
	Feedback without pressure	Short compliments
		Without student noticing
	Feedback depends	Directly after each improvisation product
		Only positive feedback for younger groups
		More technical suggestions for older groups
		Only give feedback to older students

3.4.1. Implementation of improvisation activity

The teachers in this study reported including improvisation activities in their music classes to varying extents. Some teachers had only recently begun to engage with improvisation in their own musical practice or had used improvisation activities in class only occasionally, while others had used them frequently. One teacher reported that she seldom applied improvisation activities in her lessons due to a lack of suitable improvisation repertoire, explaining that she was still developing confidence with improvisation herself. She said, "*I have to learn it for myself before I feel free to do it [improvisation] with my students*" (T1). Three other teachers explained that they were early-career teachers or had limited time to apply improvisation activities. Other teachers had more experience and were, therefore, more fluent with improvisation activities. For example, one teacher mentioned using self-written poetry as a starting point for musical improvisation, helping students to enter a shared narrative context and understand improvisation as a process of freely generating ideas before moving into singing or sound-making, within a non-judgmental classroom setting.

3.4.1.1. Forms of improvisation activity

The analysis of all data sources provided a full understanding of the breadth of improvisation activities that participants applied in their lessons. Teachers described specific and detailed improvisational activities, including their plan and goal to include these activities. All teachers adapted singing for improvisation activities as they considered it readily accessible and natural. All teachers conducted the call-and-response singing during our observations as a learning technique. Some teachers did this at the beginning of the lesson for greetings and name-singing, while others used it to practice rhythm patterns.

Four teachers (T3, 4, 7, and 8) instructed students (especially lower grades) to engage in scatting improvisation according to predefined themes, such as weather and animals. Scatting or scat singing is a vocal improvisation of singing spontaneous melodies and rhythms with nonsense syllables and noises (Edwards, 2002, p. 622). Some teachers added variations that were conducted by the teacher and selected students. One teacher explained, "*I often use improvisation with the voice. They (the students) can try all kinds of stuff and explore their voice and what to do* (T8)". Another commonly used activity was to

improvise based on a four-bar familiar song or melody. Teacher 3 and Teacher 6 used this activity during the observations. In this activity, students improvise one bar while others sing the other three fixed bars.

Teacher 5 introduced her frequent use of improvisation activities, including (1) asking students to improvise vocally based on given pitches when learning a tonality; (2) vocal improvisation based on a familiar song and end on a specific note (e.g., "do or la"), which provides a framework for exploring different tonalities and musical keys; (3) introducing Orff instruments and asking students to choose an instrument and improvising based on a given story. During observation, Teacher 5 briefed the students on the instruments and then encouraged students to actively participate by choosing their own instruments and exploring the instruments. In addition, the teacher prompted them to perform and utilize iPads to record their improvisations in pairs. This interactive session allowed both teachers and parents to review or assess the improvisation afterwards. This was the only application of learning technology in class during the improvisation activity observed.

From observations, six teachers incorporated instruments into their improvisation activities, including both pitched and unpitched instruments, such as guitar, xylophone, djembe, and other handheld rhythm instruments. Three teachers, however, faced a dilemma as students were fascinated by the sounds of the instruments, but the noise disturbance became problematic in the classroom. Additionally, some schools had limited access to instruments: "*Children want to play the real instruments, but it's hard in primary school because schools are too small and don't have instruments"* (T6). During observation, Teacher 7 introduced the xylophone to students. After a brief explanation, she asked students to improvise on a few notes, mentioning that improvisation is also an excellent way to encourage students' exploration. Another teacher expressed the belief that improvising on instruments would be less intimidating for students: *"Vocal improvisation is complicated for little kids, and it's so personal. It's less personal to play it on an instrument. […] It makes risk-taking a little easier."* (T5)

One teacher often used different instruments to create diverse possibilities and variations to attract students' attention and make them more focused in class, however, "*changing instruments can also lead to noise, chaos, and disappointments*" (T2). Besides

singing and instrument playing, movement or dancing is a regularly used activity for improvisation. Seven teachers mentioned they improvise on movement, some of them combined with rhythm, such as body percussion in a group setting. Movement makes students less reluctant to improvise when performing: "*I set them in groups, and they can make a movement on music with the group and then show it to the class. […] I improvise with movements a lot because they [students] don't find that so scary." (T3)*

According to the teachers, movement improvisation appeared more accessible for students, as it allowed the whole class to improvise simultaneously without producing sound, suggesting that success in a silent, low-risk context may build confidence for more challenging musical improvisation later. One teacher led "*Stop Dance*" in her five music lessons, and students in all classes were very engaged during this activity as we observed. In this activity, students perform movements while listening to the music. When the music stops, students stop dancing and show their movements to their classmates*:* "*They feel the music while they dance, so they feel the flow of the music. […] I think that's also easier because it doesn't make noise. […] The chaos is okay because every child can, at the same time, do their own improvisation."* (T8)

3.4.1.2. Perceived factors of effective improvisation activity

The teachers mentioned three factors that contribute to the effective implementation of improvisation activity in class: a supportive and safe environment, scaffolding, and student-centred activity. Teachers emphasized creating a supportive environment and giving compliments, which is effective when implementing improvisation activities. Teachers believed that a secure environment is the foundation of any improvisation activity. To make students feel uninhibited to improvise, a teacher tried to do "*everything in a non-judgmental way*" (T6), while another teacher always "*gives a lot of compliments*" (T1) to encourage students. Two teachers found it compelling to improvise in groups to reduce students' reluctance, for instance: *"'Let's sing on 'Hm' so the other children can hear it!'. They cannot hear who is singing what, so they are not scared. Then, as a class, they created a beautiful harmony together, and I love that, it stands out as something they also like."* (T3)

Half of the teachers identified the importance of scaffolding structured activities with clear steps as the most effective, as they found them helpful in improvisation. Providing clues and guidance to students, rather than leaving them to free improvisation, made the activities more accessible to accept: "*I scaffolded them correctly, so when I made sure that the steps were there for them to be successful, I checked them step by step to see if there were problems fixing them along the way*." (T5)

However, finding the balance between structure and freedom in improvisation is challenging for teachers. Some teachers described a developmental progress, starting with structured activities (as discussed in 3.4.2.2) and gradually allowing greater freedom over time. Others emphasized incorporating stress-free improvisation activities to encourage independent exploration while reducing direct instruction by teachers. Teachers lauded the nature of improvisation and provided more space to foster creative retention and self-directed learning. For instance, Teacher 8 mentioned that "*every human is born with the capability to improvise or create something, and so they do this all the time*."

Moreover, the importance of choosing student-centred activities or materials was emphasized, as this attracts their attention and focus, which ensures that students remain engaged and motivated throughout the learning process: "*First grade is very interested in a story they're creating right now. So, that gives me a little bit of room to be [creative]. Then, the characters' names can become rhythmic pieces that they can do, like chants. And I know they will be interested in it because they're interested in the story. So, anything that is connected to their lives.*" (T4)

3.4.1.3. Feedback

All the teachers mentioned that they give feedback to students during improvisation activities, and the way they give feedback varies. For example, Teacher 7 noted that she always provided feedback directly after each improvisation session. While teacher 1 only gave feedback to older groups, Teacher 8 only gave positive feedback to younger groups and more technical suggestions for older groups. Positive and constructive feedback, such as compliments, helps students build confidence. Knowing their efforts are recognized and valued, encouraged them to take risks and explore their creativity further. To create a safe and supportive environment, Teacher 7 always gave feedback carefully, without students

noticing. This approach prevented the improvisation from becoming a "*fixed thing*" due to direct feedback. As Teacher 7 noted, "*When you feel judged, you cannot be creative.*" At the same time, students also get bored with structures. However, it is essential to avoid making the structure too rigid, as students can get bored with repetitive patterns.

Feedback guides students in exploring improvisation, offering them direction to improve specific aspects. It enables students to improve their skills and enhance their musical abilities more efficiently. The following teacher believed that students need to experience feedback to improve: "*Students don't get better without feedback. It's not free for all. […] Experiences are great, but you can have experiences with feedback and concrete concepts or goals you're working towards."* (T5)

In addition to feedback from educators, four teachers welcomed input from students, both from self-reflection and feedback from their classmates. It facilitated further improvement, increased class engagement, and fostered a supportive learning environment. A teacher mentioned giving feedback in the form of questions to encourage students to think: "*I think kids who are sitting around listening should also provide feedback. I often do it like, 'Did you hear this? Did you hear that?' And as the kids get more advanced, it's like, 'Are we using steps? Are we not? Are we taking too many leaps? What makes a good melody? Why don't we like that sound? What makes it good?"* (T5)

Self-reflection is an essential part of the learning process, as it allows students to integrate feedback, identify their strengths and imperfections, and think critically about their music-making. Teacher 4 mostly gave feedback right after the improvisation product: "*When a pattern has come out nicely, I like to use it as an example for others and to self-reflect about their actions. […] I like to give them some hints that can help them when they return to the activity to make it better."* (T4)

Although all teachers have provided feedback on improvisation activities, their methods differ in three key dimensions. First, the nature of feedback varies with the age of students. Teachers always focus on active reinforcement for young students (4–7 years old), while older students (8–12 years old) receive more technical and critical guidance. Secondly, the timing and clarity of feedback vary depending on the teaching concept. Some teachers gave direct feedback immediately after each performance, while others more subtly integrated feedback into the whole process of the activity to maintain improvisation and

avoid students' sense of being judged. Third, there are differences in feedback sources. Half of the teachers actively introduced peer feedback and student self-reflection through questioning techniques, while others mainly provided teacher-led feedback. No common assessment criteria emerged across teachers. Instead, each teacher used their evaluation method based on the specific situation, student characteristics, and learning objectives of each improvisation activity.

3.4.2. Evaluation of improvisation activity

3.4.2.1. Benefit

All teachers mentioned that improvisation activities make music less exclusive, vary familiar repertoires, and make students think and create musically. For personal improvement, all teacher participants confirmed the validity of improvisation in fostering creativity. Two teachers believed that humans are born with creativity, and teachers simply need to facilitate it in a non-judgmental way and provide more space for students to explore it: "*Improvisation can improve children's creativity, but I think it's more about giving them the space, and they can already do it. It's more important to inspire them and say, 'This is cool what you're doing,' and 'It's nice, try again or try something else.'"* (T8)

To assist children in discovering ways to express themselves, two teachers suggested expanding improvisation beyond music and incorporating other forms of expression, such as drawing. Improvisation also empowers students by giving them ownership over their musical creations, encouraging them to become more expressive. Teacher 5 highlighted this by saying, "*I think it is a nice way for kids to be able to express themselves and take ownership of what they do, and they shouldn't just be little robots.*" This statement underscores the need to foster individuality and creativity in students. Through improvisation, students are not simply following instructions but actively engaging in the creative process, which allows them to express their unique ideas and emotions, as reflected in Teacher 5's emphasis on ownership and individual expression. This approach improves their musical skills and promotes personal development and confidence (Wright & Kanellopoulos, 2010), helping them develop a sense of agency and self-worth in their learning journey.

Table 3.3 Teachers' perspective on the evaluation of improvisation activity.

Main Category	Subcategory	Label
Benefit	Musical development	Make music less serious and exclusive
		Improve music making and originality
		Vary familiar repertoire
		Thinking and creating musically
		Opportunity to create
	Personal development	Improve creativity
		More expressive
		Ownership
		Build confidence
	Classroom development	Class management
		Get teachers informed
Challenge	Chaos	Controlling excitement
		Not structured
		Mess and noise
		Keep students' attention
		Students not listening to each other
	Choose repertoire	Match material for mixed-level groups
		Scaffold the activity correctly
		Make a balance
		Structured activity
	Reluctance of students	Intimidate
		Scared to improvise
	Limitation	Big group
		Limited time
		Classroom space
Reflection	Create a safe and inclusive learning environment	Provide instructions when required
		Encourage peer learning
		Lead the natural
	Start improvising early and in groups	Easier
		Less scary
		Reduce nervous feeling
	Teaching aim	Not too focused on technical things
		Enjoy music
		Improvisation as a tool instead of a goal
	Teachers' background	Preparation and practice of teachers

While improvisation can offer many benefits, one teacher observed some challenges. Improvisation led some students to feel intimidated and scared during the activity. The

solution to this problem was to try improvisation at early ages, to combine both solo and group settings, to start with movement and easy singing sessions, and to build up the improvisation progression slowly: "*Children can be intimidated by improvisation or get scared to do it, and I think it has the opposite effect. And it doesn't make them feel free, but it makes them feel scared to perform. So, I often combine it with small parts of solo singing."* (T3).

According to some teachers, improvisation can enhance the creation of conducive learning environments and be a tool to assess students' musicianship, aural skills, and cognitive development. It fosters a positive group environment. *"They are very effective for class management, and for the environment in the group, they all accept each other more easily. They're used to listening to each other.* (T2)*".* Furthermore, teachers mentioned that improvisation offers students opportunities for self-expression, providing teachers with insights into their developmental stages: *It can give a lot of opportunities just to express what's inside of you, and it also can inform you about where that student is developmentally. […] When you see an improvisation activity, you can see where this student is musically or where the student is in terms of body awareness.* (T4)

3.4.2.2. Challenge

While many participating teachers had positive attitudes toward improvisation, we noticed some teachers struggled to maintain order in the classroom during improvisation activities. Seven teachers specifically noted difficulties in controlling students' excitement, as well as their tendency to become distracted during individual improvisations. This often resulted in a loss of focus and a chaotic classroom environment. Thus, improvisation activities were seen as both a potential enhancement and a burden to classroom management, depending on the dynamics of the group. For instance, "*If we tried to improvise all at the same time, it doesn't work. You can only let one child improvise, and that means that the others must wait"* (T8). The cause of the chaos problem related to the limited time of music lessons also appeared to be a challenge, especially because of the limited chance for instrumental playing: "*They are so excited when they play instruments because they have limited time to do that. […] And I must lead them. That's very challenging, and I must learn that they don't only make noise, but they make music."* (T1)

Nevertheless, several teachers demonstrated effective strategies to address these challenges through structured improvisation approaches. Teacher 5 started with limited pitch materials: "*I take all the bars off and give them two notes*," and gradually expanded the tonal materials when students gained confidence. She also set melodic improvisation on rhythmic frameworks: "*A lot of melodic improvisation will be based on a rhythm. I take a poem or some sort of rhyme that they can use to sort of hang their melody on*." Furthermore, she proposed connecting improvisation to newly learned music concepts: "*When we're learning, for example, a tone set...one of the activities we'll do is improvisation where 'do' is one of the notes they can use*," ensuring that improvisation activities serve the concept development rather than a disorderly exploration. Other teachers also provided complementary strategies, including providing harmonic or rhythmic ostinatos (T6), turn-taking improvisation instead of simultaneous improvisation (T3, T8), and using movement improvisation (T8). As Teacher 4 noted, "*The structure must be clear […] you can improvise within that form*." These findings suggest that chaos relates to unstructured rather than structured improvisation.

Three teachers mentioned it was hard for them to find materials or activities that suited all the levels of students. Teacher 3 taught students in mixed age groups at school: "*I have three levels together in the class […], and that makes it difficult because, for example, group three is not as far in improvisation as group five."* The teachers at the international school were facing a similar challenge. One teacher mentioned that it is important to maintain a balance in finding the right activity to suit the personalities of different students. Another teacher noted that if she scaffolds the activities well by finding a suitable difficulty level, her students are more likely to be successful in those activities: "*For example, a lot of melodic improvisation you do will be based on a rhythm. I take a poem or some sort of rhyme that they can use to sort of hang their melody on. Then, we just work on the aspects of melodic improvisation. The challenges arise oftentimes if I've made the activity too difficult for them."* (T5)

Two teachers mentioned that their students are scared to improvise. For instance, "*Some students are just scared to do it. So, we need to do it in a non-judgmental way*" (T7). One reason is that "*they get insecure over what they're doing, which is logical*" (T3). This teacher tries to make her students dare to make mistakes by framing that "*mistakes are*

non-existent in improvisation." Moreover, limited time was another challenge mentioned by half of the teachers, which made them have no time to focus on just one concept or activity. When implementing improvisation activities, one teacher found maintaining good classroom discipline was time-consuming.

3.4.2.3. Reflection

Six teachers advocated to invest in a safe and supportive classroom environment. There were some comments on starting improvisation activities at an early age to reduce nervous feelings, especially by improvising with smaller numbers of students and implementing group improvisation. A teacher explicitly stated that experience with improvisation herself was necessary before using improvisation activities in the classroom with students. Despite pursuing perfection, a teacher prioritized creativity over perfection when doing improvisation activities, even though it came up messy and time-consuming. It is about individual preferences and priorities: "*If you want something that is just super structured, it takes a lot of time […] Then everybody does this until it is perfect. […] And I give up that part of perfectionism for more creativity. But maybe for other teachers, it is more important that they have their [students] completely professional in one piece and that they sing it with the clearest head voice. It's just like, where would you want your priority to be?"* (T4)

Half of the teachers reported that they could not cover all the musical concepts during time-limited music lessons in primary schools. Improvisation was incorporated by making students enjoy the music rather than prioritizing improvisation itself. In other words, improvisation was used as a tool to enhance musical enjoyment, not as the primary objective of the lessons. The main goal was always to enable students to enjoy the music: "*Keep the interest level high for kids, and ensure they're engaged and enjoying what they're doing because it doesn't matter how good they are."* (T5)

3.5. Discussion

This study aimed to provide evidence-based insights into the current situation and teachers' implementation and evaluation of improvisation activities in Dutch primary school settings. We collected in-depth data through semi-structured interviews, classroom

observations, and field notes to answer the research questions on teachers' perspectives on improvisation activities. This section will address the theoretical and practical implications of our findings.

3.5.1. Implementation of improvisation activity

The first research question sought to characterize how music teachers apply improvisation activities in class and their intentions. The result indicates that all the teachers in this study mentioned they were applying improvisation in their music lessons for various reasons.

The results from the study clarified the understanding of music teachers' utilization of musical improvisation in primary schools. It indicated that music teachers are convinced of the importance of improvisation, similar to the advocacy of improvisation by researchers and educators in the past decades. All the teachers in this study shared how they implement creative activities, although some of them were still learning to use improvisation in class or had limited time to do so. Previous studies have revealed that improvisation is a tool to develop both musical and non-musical skills in various forms, such as vocal, instrumental, rhythm, or adherence to pulse (Gruenhagen & Whitcomb, 2014; Larsson & Georgii-Hemming, 2019; Whitcomb, 2013). Our findings confirmed that these are the commonly used forms of improvisation activities in primary music classrooms, aligning with the findings from (Gruenhagen & Whitcomb, 2014), who found that call-and-response singing, improvising on percussion instruments, and improvising rhythmic patterns are the most commonly used activities. Many teachers use call-and-response singing activities in their classrooms.

When conducting improvisation activities in the classroom, teachers stated that providing a safe and supportive environment and scaffolding structured, suitable activities were important factors of effective improvisation activity. The importance of a safe environment to reduce students' reluctance and fear has been indicated in previous studies (Gruenhagen & Whitcomb, 2014; Hickey, 2015; Koutsoupidou, 2005; Whitcomb, 2013). Furthermore, a safe environment is crucial in improvisation and other forms of creative activities, such as composition (Devaney, 2023).

Teachers emphasized that scaffolding structured activities aligns with the developmental approach to teaching improvisation proposed by Kratus (1991, 1995), who advocates that gradually providing structured parameters and sequencing introduction before expecting students to engage in free improvisation. Our research further presents that teachers often face challenges in balancing structure with creative freedom. As mentioned by Kratus (1991), "*growing with improvisation*", where the degree of guidance is gradually adjusted as learners develop.

Many teachers mentioned that choosing structured and suitable improvisation activities can lead to more success in their teaching when they follow this approach. Furthermore, we conclude that teachers could employ more student-centred activities, such as those activities that connect students' interests and daily lives, to stimulate improvisation and make it more accessible, which aligns with the conclusions of Silseth and Erstad (2022), who argued the validity of taking leisure activities as a resource to make students concentrate on the lessons.

Feedback is an essential part of the improvisation activity. This study supports evidence from previous observations (e.g., Gruenhagen & Whitcomb, 2014; Rozman, 2009), such as teachers giving feedback after their students' improvisation. Most teachers gave feedback directly after their students improvised. Some teachers gave short compliments, while others only gave feedback to older groups. Feedback from peers and self-reflection by students were encouraged. This finding is consistent with that of (Beegle, 2010, p. 225), who argued that those kinds of feedback allow students to "*verbally communicate their ideas to the group, reflect and evaluate, and make musical choices*." Giving feedback in the form of questions can also stimulate students' thinking and help with the improvement of the improvisation product.

3.5.2. Evaluation of improvisation activity

In the current study, the evaluation of improvisation activities is related to benefit, challenge, and reflection. Teachers emphasized the benefits of improvisation for musical skills development, personal growth, and creation of conducive learning environments. For instance, improvisation allows for thinking and creating musically and makes music feel less severe and exclusive. The finding echoes Wright and Kanellopoulos (2010), who encouraged

students to create music in their own way and have a more personal relationship between students and music. All teachers from the current study described that improvisation could foster creativity, findings supported by previous work (e.g., Koutsoupidou & Hargreaves, 2009; Navarra Ramón & Chacón-López, 2021).

Moreover, teachers believed improvisation brings more expression and ownership and builds confidence. While some teachers indicated that improvisation activities can create chaos, an interesting finding is that these activities can also improve group dynamics and provide valuable insights for teachers. These results align with (Azzara, 1999), who found that improvisation can be a tool to "*measure and evaluate students' musicianship and aural skills*."

Despite improvisation's benefits, teachers face challenges when applying improvisation to music education in their classrooms. Chaos is likely the most significantly impacted aspect among difficulties in choosing appropriate repertoire, dealing with student reluctance, and managing time limitations, group size, and classroom space. It can be challenging to maintain the attention of all students during solo improvisation by one student, particularly in more extensive group settings. Additionally, some schools may have limited time and instruments, and students may quickly become excited when playing instruments, making it difficult for teachers to maintain classroom discipline. Due to limited teaching tools, like systematic guidance on improvisation activities, teachers may struggle to find a suitable repertoire to scaffold the activity, especially when teaching mixed-level groups.

Furthermore, some students may be timid or reluctant to improvise in front of their classmates. The study also identified limitations in terms of timing, group size, and classroom space. These limitations add to findings obtained in earlier studies, such as Devaney (2023), who also reported the limited time of composition. Similar results were reported by Bogojević and Pance (2022), who surveyed teachers in Slovenian and Montenegrin primary schools and found that the limitation of time, instruments, and creative pedagogy significantly impacted the completion of creative musical tasks.

Our findings indicate that teachers need to create a safe and supportive learning environment when students improvise and provide feedback when required. Moreover, during the process, teachers should achieve a delicate balance between allowing freedom

and setting limits to prevent the constraint of students' creativity (Lage-Gómez & Cremades-Andreu, 2019). This result is consistent with Beegle (2010), who also confirmed that teachers need to find a balance between autonomy and structure when leading improvisation activities. Similar findings were also reported by Coulson and Burke (2013), who suggested that teachers need to be aware of their modelling of improvisation, as they found that students are more likely to take risks when they have confidence in improvising. Furthermore, we found that students can also learn from improvisation products created by their peers.

A finding of this study shows that some teachers' belief that it is better to start improvisation with younger age groups and in group settings to reduce students' anxiety when improvising. This result is consistent with a literature review (Chandler, 2018), which described that students' improvisation skills increase with age. Teachers indicated that, rather than making improvisation a primary goal, they use it as a tool to stimulate more possibilities in music learning (Hickey, 2009, 2015). In this process, teachers would prefer to allow students to create and give them ownership to let them enjoy music instead of focusing on technical things. Furthermore, teachers who had just started to lead improvisation activities in their classrooms had just begun to learn to improvise themselves. This finding confirms that teaching content is associated with teachers' experience (Gruenhagen & Whitcomb, 2014; Koutsoupidou, 2005).

3.5.3. Limitations and future research

The small sample (N=8) of music teachers provides an in-depth insight into teachers' perspectives on improvisation in classroom practice but potentially limits the breadth of applicability of the conclusions for other contexts. In future research, a combination of qualitative and quantitative research with teachers working in diverse contexts and with a variety of students could be conducted to further examine the teachers' perspectives on implications and evaluation of improvisation activities. In this study, we purposefully focused on teachers' perspectives of improvisation in class in primary education. Additional investigations could extend this focus by examining students' reactions to and experiences with improvisation activities by, for example, exploring how students perceive, engage with, and respond to improvisation in classroom settings. Future studies could also investigate

whether teachers' perceptions of improvisation are consistent with the perceptions of their students. Furthermore, later works could examine the relationship between specific teaching methods and quantifiable changes in students' improvisation skills.

Additionally, conducting similar research in higher education would be valuable, as primary music teachers are graduates from higher education, such as conservatories or music teacher education programs. Similarly, studying improvisation activities in secondary education schools will also provide insight into the teaching and learning of students of a different age group. Both this study and previous work indicate that there is a relationship between teachers' experience with improvisation and their teaching approach to improvisation activities in their classrooms. The improvisation expertise developed in their higher education programs can help teachers to be better prepared for leading improvisation activities later in their careers.

3.5.4. Practical implications

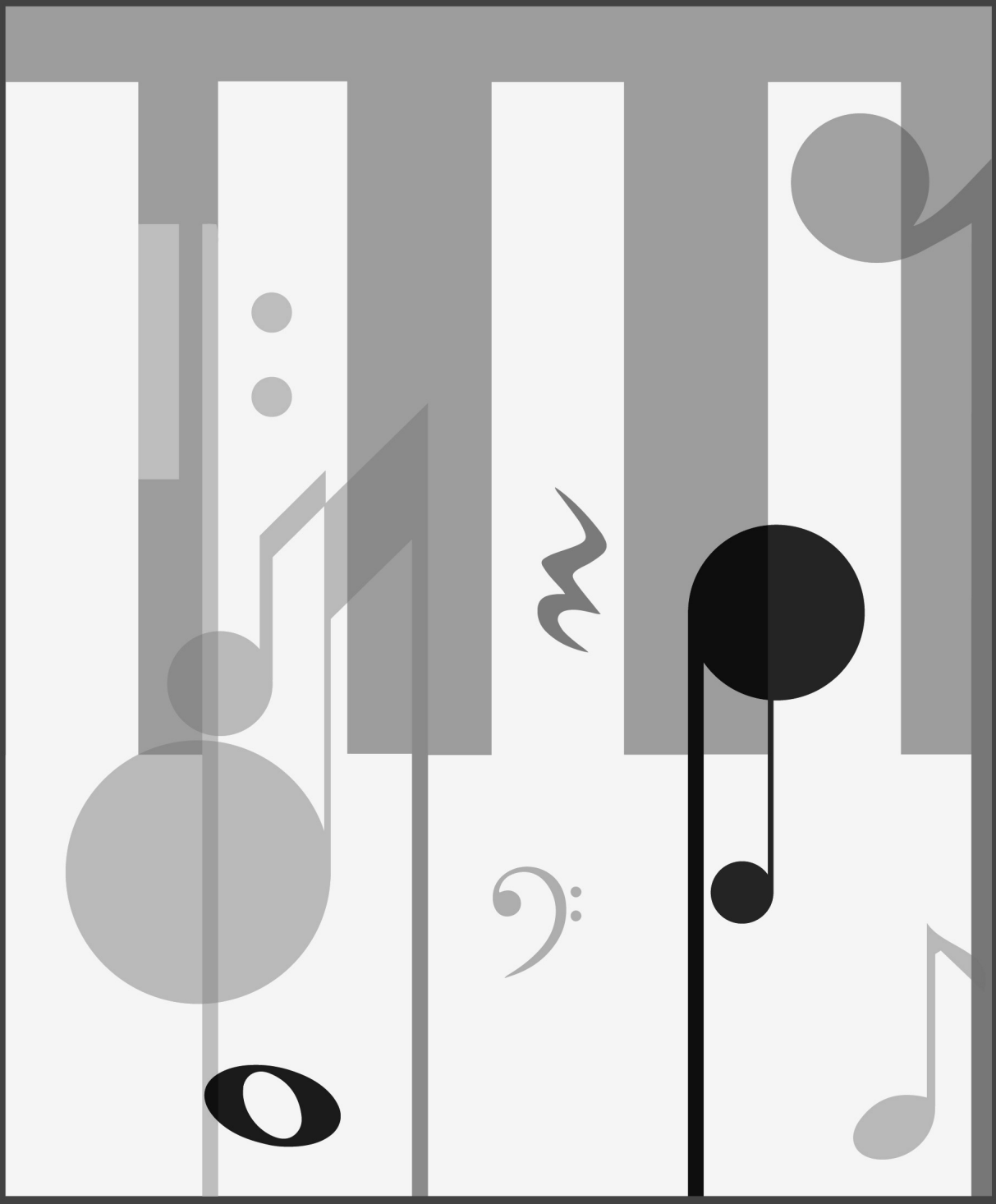
The findings provide practical insights derived from the practical experience of teachers in implementing improvisation in primary music classes. The findings of this research have implications for future teaching practice. First, despite the primary focus of this study on improvisation, similarities have been found in previous studies that focus on creative activity and composition (e.g., Devaney, 2023; Rozman, 2009). Similar findings highlight improvisation and composition as under-practiced activities in the primary and secondary schools' music curriculum. Fortunately, this is an emerging field with a growing body of literature. It is worth noting that teachers and researchers seeking knowledge about improvisation can also refer to literature on creative activity and composition.

Creating a supportive and safe environment for students when improvising can make teaching improvisation activities more successful. Teachers who model improvisation more frequently can positively affect students' creation process, making them feel more confident, and encouraging them to take risks in their improvisations. To alleviate any fear or apprehension among students, teachers can start with improvisation activities in a group setting, beginning with early age groups. It is essential, however, to keep the group size manageable, as larger groups can lead to decreased attention and difficulty in listening to each other, potentially resulting in chaos.

Concerning the reported lack of improvisation training, some earlier studies have provided practical guidance for teachers who want to conduct improvisation activities in their lessons (e.g., Beegle, 2010; Monk, 2013; Whitcomb, 2013). Feedback during the process of improvisation is essential. Moreover, feedback can be provided in the form of questions on the level of self-regulation to encourage students to keep thinking and reflecting on the improvisation process. Group feedback and guided peer reviews from classmates, rather than plain instruction by the teacher, can further promote self-reflection of students on their improvisation activities. For teachers, improvisation can also serve as a tool to assess and evaluate students' musicianship and aural skills. For schools and curriculum designers, we argue for allocating adequate time in the curriculum for students and teachers to explore and develop their musical ideas to foster creativity and improve musical skills.

3.6. Concluding remarks

This paper contributes to the understanding of the value of improvisation in primary music education, exploring teachers' implementation and evaluation of improvisation activities. Through the systematic analysis of interview transcripts and classroom observations, we investigated teachers' perspectives on improvisation activity in the classroom. In general, the amount of time spent on improvisation in class depends on teachers' musical background, experience with improvisation, time constraints, classroom space, and student group size. Improvisation on voice and instruments is likely the most used activity in the classroom. Also, the combination of movement, lyrics, and other art forms is identified in this study. All teachers confirmed the positive effects of improvisation, such as improving creativity, taking ownership, building confidence, and making music less serious and exclusive. Furthermore, teachers noted that their students would enjoy the improvisation activity more when teachers create a supportive and safe environment, scaffold clear steps for students to follow, and use components that connect to students' interests.



4

4. Perceived readiness to improvise and to lead improvisation activities: A mixed-methods study of attitudes and self-efficacy in music teacher education

Abstract

This study investigated how pre-service music teachers' (PMTs) attitudes toward improvisation relate to their self-efficacy. A questionnaire was completed by 123 PMTs from ten music teacher education programs, followed by semi-structured interviews with ten participants. A PLS-SEM indicated that attitude toward studying and teaching significantly predicted self-efficacy for improvisation, whereas the attitude toward inclusion of improvisation showed no significant effect. Mediation analysis further confirmed that improvisation self-efficacy served as a key variable linking attitudes and self-efficacy for teaching improvisation. Qualitative analyses provided explanatory depth by revealing how mastery experiences gradually transformed fear into enjoyment, how teaching-oriented motivation stimulated both personal learning and classroom application, and how endorsing the inclusion of improvisation did not automatically lead to confidence without sufficient preparation. This study contributes to understanding how attitudes and self-efficacy interact and offers pedagogical insights for strengthening pre-service teachers' readiness to incorporate improvisation into their learning and teaching.

*This chapter is an adapted version of:

Hua, C., Admiraal, W., Nieuwmeijer, C., & van der Rijst, R. (2026). Perceived readiness to improvise and to lead improvisation activities: A mixed-methods study on attitudes and self-efficacy in music teacher education. *Teaching and Teacher Education*, 181(October), 105689. https://doi.org/10.1016/j.tate.2026.105689

4.1. Introduction

Teacher education programs face persistent challenges in developing pre-service teachers' (PMTs) readiness for pedagogically complex practices. Research showed that teaching ability not only requires subject knowledge, but also subject-specific pedagogical content knowledge (PCK; Shulman, 1987) and the readiness shaped by attitude and self-efficacy beliefs (Bandura, 1997; Zee & Koomen, 2016). In music education, Ballantyne and Canham's (2023) importance-confidence analysis across dimensions of music teachers' works revealed that pedagogical knowledge and skills are highly important. Their results showed that novice teachers reported lower confidence than more experienced teachers in several areas. This tension between perceived importance and confidence may also be relevant during the pre-service stage, highlighting the importance of examining how PMTs' attitudes and self-efficacy beliefs relate to perceived readiness for specific practices.

One such practice is musical improvisation. As a creative activity, improvisation receives widespread support in national policies and educational frameworks, with research consistently demonstrating that improvisation fosters creativity, musicianship, and engagement (Koutsoupidou, 2008; Siljamäki & Kanellopoulos, 2020). In classroom settings, improvisation refers to generating and shaping musical ideas in real time. Rather than random sound making, improvisation is "*purposeful sounds through time, no intention for revision or replication, and freedom to make melodic and rhythmic decisions within certain constraints."* (Kratus, 1995, p. 27). For example, students could improvise a melody using only three pitches, create rhythm variations, or engage in call-and-response and exchanges with peers. These structured activities provide opportunities for creative decision-making and allow beginners to engage in musical improvisation. Improvisation has been included in school music curricula and policy frameworks in many countries (Larsson & Georgii-Hemming, 2019). For example, students are expected to improvise and compose for diverse purposes, developing musical ideas through structures, styles, genres and traditions (*National Curriculum in England*).

Beyond the curricular requirements, improvisation is not only a musical skill, but also a pedagogical resource through which students can explore, create, and understand musical concepts. Drawing on Shulman's (1987) concept of PCK and its subsequent application in music education, effective music teaching requires not only musical

knowledge and skills, but also music-specific PCK (Ballantyne & Packer, 2004; Kong, 2025). Research in music education has further distinguished teachers' music content knowledge (CK) from their pedagogical content knowledge (PCK), suggesting that these two dimensions may not always develop in parallel (Chung & Ho, 2026). In this context, music-specific PCK refers to the knowledge and skills required to teach music content in pedagogically meaningful ways, effectively guide students to participate in music activities, implementing the curriculum, explaining and demonstrating musical concepts, and assessing students' musical learning (Ballantyne & Packer, 2004; Grieser & Hendricks, 2018). When applied to improvisation activities, teachers need to transform improvisation into teachable tasks, appropriate scaffolds, and visible learning processes for students. Developing such domain-specific PCK requires not only personal musical experience but also opportunities for professional preparation (Chung & Ho, 2026; Kong, 2025).

However, translating this recognized value into routine classroom practice is constrained by multiple interconnected challenges. At the system level, improvisation may be constrained by the contradiction between standard evaluation and the open, unpredictable outcomes of musical creation, making it difficult to implement in an outcome-driven curriculum (Treß et al., 2022). At the teacher level, research on the PMTs' professional identities suggests that their creative musical identities are shaped by professional socialization and are closely related to their self-perceived competence and comfort with both personal practice and teaching creative activities (Randles & Ballantyne, 2018; Randles & Smith, 2012). Many PMTs face challenges balancing their identities as musicians and as teachers. Professional socialization shapes their perception of their own abilities, including personal practice and the ability to teach creative activities (Randles & Ballantyne, 2018). Consequently, this challenge would further affect PMTs' confidence and willingness to implement improvisation into teaching. At the pedagogical level, teachers face practical limitations, such as limited time and insufficient pedagogical scaffolding (Bogojević & Pance, 2022; Makris et al., 2021; Piazza & Talbot, 2021).

Among these challenges, research has identified teachers' attitudes toward improvisation, confidence with improvisation, training or musical background, and classroom practice experience as particular influential teacher-level factors determining successful implementation of improvisation in music education (Koutsoupidou, 2005;

Larsson & Georgii-Hemming, 2019; Whitcomb, 2013). Research has suggested that music teachers' perceptions of importance and confidence may not parallel (Ballantyne & Canham, 2023). For example, teachers may regard improvisation as important, however, feeling insufficiently confident to improvise themselves or to teach it. The importance of understanding these teacher-level factors is underscored by empirical evidence that improvisation instruction, when implemented effectively, significantly enhances students' musical achievement (Azzara, 1993).

PMTs report varying confidence levels for teaching improvisation, with confidence differences attributable to grade level and background experiences (Bernhard & Stringham, 2016; Ng, 2021). The pre-service phase represents a critical developmental period for understanding and shaping the relationship between improvisation-related attitudes and self-efficacy beliefs, with significant implications for subsequent classroom practice and student learning outcomes. However, existing studies still leave several issues insufficiently examined. First, the research in the field of music education has often addressed attitudes (e.g., Koutsoupidou, 2005) and self-efficacy (e.g., Bernhard & Stringham, 2016) separately, with limited attention to distinct attitude dimensions, and their interconnections with different forms of efficacy beliefs. Second, previous research has provided limited evidence on whether different attitude dimensions toward improvisation are differentially related to efficacy beliefs. Third, although general teacher education research suggests that self-efficacy may mediate the relationship between attitude and teaching practice (Bas, 2022; Vieira et al., 2024), this path has received limited direct examination in music education, particularly in relation to improvisation.

This study aims to identify these research gaps, examine how three different attitude dimensions are related to two self-efficacy beliefs, and test whether personal improvisation self-efficacy plays an intermediary role between attitude and teaching confidence. Although many factors would affect teacher training (such as musical experience and institutional support), we focus specifically on attitudes and self-efficacy, because these are cognitive attributes that can be adapted during pre-service training, which makes them more actionable intervention targets than relatively fixed or contextual variables.

4.2. Literature review and theoretical framework

4.2.1. Attitudes as motivational foundations

Attitude reflects evaluative orientations toward objects, behaviors, or outcomes, serving as the motivational foundation that shapes an individual's willingness to engage in specific practices (Fishbein & Ajzen, 1975a). According to The Theory of Planned Behavior (Ajzen, 1991), attitudes, together with subjective norms and perceived behavioral control, are key determinants of behavioral intentions and subsequent actions.

Although attitudes have been recognized as important in shaping teaching practices, less attention has been paid to distinguishing multiple attitude dimensions and examining how these dimensions relate to different forms of efficacy beliefs in pre-service teacher preparation. While several studies have addressed attitudinal factors, few have systematically measured attitudes as a distinct psychological construct or investigated how different attitude dimensions relate to teaching outcomes. For example, Koutsoupidou (2005) found that while most primary music teachers in England acknowledged the educational value of improvisation, less experienced teachers reported limited use due to unfamiliarity, lack of confidence, or time constraints. Similarly, recent studies by Nikolaou (2023) found that although PMTs reported positive attitudes toward improvisation after receiving systematic training, a considerable number (41%) of teachers mentioned that they were only moderately prepared to implement improvisation activities. Ng (2023) further emphasized that developing confidence and a positive attitude toward improvisation requires continuous support to motivate PMTs to incorporate improvisation in their future teaching. This gap between attitude and practice may also reflect the pedagogical complexity of improvisation. Research suggests that effective improvisation requires specialized pedagogical knowledge, including strategies such as modeling, scaffolding, coaching, and reflective processes (de Bruin, 2019b). Furthermore, diverse pedagogical visions and approaches to improvisation exist across different educational contexts (Siljamäki & Kanellopoulos, 2020).

More recently, Korošec et al. (2022) examined students' attitudes toward improvisation and found that more positive attitudes were associated with higher flow experiences during improvisation, suggesting that favorable evaluations may foster engagement and skill development. However, their focus was on learner-flow rather than

systematically examining how different attitude dimensions relate to teaching confidence or practice. Cossey (2024) further identified teachers' understanding of how to teach improvisation as a major influence on whether it was included in piano lessons, yet the study did not empirically examine attitude dimensions. Therefore, while existing research acknowledges that attitudinal factors influence the teaching and learning of improvisation, there remains a gap in systematically conceptualizing and measuring attitudes as a multidimensional construct within this context.

4.2.2. Self-efficacy for improvisation and teaching improvisation

Self-efficacy refers to an individual's belief in the capability to complete specific actions to achieve specific goals (Bandura, 1997). According to the social cognitive theory of Bandura (1997), self-efficacy not only influences individuals' goals and behaviors but is also affected by environmental factors. Teachers' self-efficacy appears to be a key factor influencing the learning outcomes of both teachers and students in music education (J. J. West & Frey-Clark, 2019). Research in both general and music education has suggested that self-efficacy is multidimensional and varies by domain and task (e.g., Orejudo et al., 2021; Zee & Koomen, 2016). For example, people may feel confident in one area yet less so in another (Tschannen-Moran & Hoy, 2001). In music teacher education, Burak (2019) also distinguished pre-service teachers' self-efficacy in musical ability and their self-efficacy in music teaching, and found that these two constructs were strongly related. Such specificity underscores the necessity of specifying the domain of efficacy under investigation. In the music context, we distinguish the self-efficacy beliefs into two domains: self-efficacy for improvisation (SEI) and self-efficacy for teaching improvisation (SETI).

Self-efficacy for improvisation (SEI) refers to PMTs' confidence in their own ability to engage in spontaneous musical creation and make appropriate real-time music decisions. As improvisation demands on-the-spot creativity, interactive responsiveness, and risk-taking, effective SEI is regarded as a key factor in facilitating improvisational practice: individuals who believe in their improvisational abilities are more likely to seek out opportunities for improvisational practice, experiment with new ideas, and persevere when faced with improvisational challenges. Research indicates that self-efficacy for improvisation can be systematically developed through appropriate pedagogical

approaches. Bernhard and Stringham (2016) found a positive connection between prior experience in jazz and improvisational activities and confidence in improvisation, which tended to rise with increased experience and educational progression. This association probably indicates a development of mastery experiences in improvisation settings. In addition, sequential scaffolding and explicit strategy instruction enhance improvisational skills and confidence (Hickey, 2009; Hickey et al., 2016; Kratus, 1995). These findings align with Bandura's (1997) the perspective of mastery experiences as the most powerful source of self-efficacy: successful improvisation experiences, appropriately scaffolded, build confidence for future improvisation challenges.

Self-efficacy for teaching improvisation (SETI) extends Bandura's concept into the pedagogical domain, referring to PMT's confidence in designing, facilitating, and assessing improvisation instruction. Following Tschannen-Moran and Hoy's (2001) conceptualization, teacher self-efficacy is defined as educators' beliefs in their capabilities to affect student performance. SETI specifically encompasses PMT's confidence in their capability to design effective improvisation activities, guide students' improvisational processes, and provide constructive feedback for creative risk-taking. From the PCK perspective, SETI also relies on teachers' ability to transform personal improvisation competence into teachable representations and learning sequences (Chung & Ho, 2026; Grieser & Hendricks, 2018). This includes designing a series of sequence tasks. For example, from highly structured improvisation to more free improvisation, scaffold the activity that suits students' level, and evaluate students' creative process without limiting the exploration. Research shows that while high SEI may contribute to SETI, it is not sufficient on its own; teachers with limited personal improvisational fluency can still develop strong teaching confidence through well-structured teacher education (Ng, 2021, 2022; Ward-Steinman, 2007).

SETI represents not only a psychological outcome but also a behavioral predictor. Teachers' sense of efficacy determines their willingness to adopt new methods, persevere through uncertainty, and support students' creative risk-taking (Tschannen-Moran & Hoy, 2001; Zee & Koomen, 2016). In the context of improvisation pedagogy, SETI serves as a crucial leverage point: without sufficient confidence to teach improvisation, even musically skilled teachers may avoid it. By identifying which attitudinal and experiential factors foster SETI, this study contributes actionable insights for teacher educators. It can inform how pre-

service programs can intentionally cultivate teaching efficacy for improvisation through authentic mastery experiences and reflective pedagogical practice.

4.2.3. The relationship between attitudes and self-efficacy

Recent empirical research provides evidence that attitudes influence self-efficacy and that self-efficacy, in turn, predicts teaching-related outcomes, indicating a mediating pathway from attitudes through self-efficacy to teaching practices. In teacher education, Bas (2022) found that self-efficacy played a mediating role in student teachers' teaching beliefs, attitudes towards teaching, and motivation to teach. Vieira et al. (2024) similarly confirmed that self-efficacy is an important bridge between PMTs' attitudes toward inclusive education and personal accomplishment. These findings reveal a complementary structure: attitudes provide motivational orientation, while self-efficacy provides belief in competence, jointly shaping professional behavior.

Despite this evidence in general teacher education, the mediating role of self-efficacy between attitudes and teaching practices has received limited attention in music teacher education, particularly in the context of improvisation. Current studies in music education have explored attitudes (e.g., Koutsoupidou, 2005) and self-efficacy (e.g., Bernhard & Stringham, 2016) as separate constructs, but their interrelationship remains unclear. Given that both are malleable through pre-service training and jointly influence teaching practices, understanding whether self-efficacy mediates the relationship between attitudes and improvisation teaching confidence is critical for designing effective teacher preparation programs.

4.2.4. The present study and hypotheses

Drawing on these frameworks, this study distinguishes attitudes into three dimensions: **attitude toward studying improvisation, attitude toward teaching improvisation,** and **attitude toward inclusion of improvisation.** These dimensions are conceptually distinct and may not develop in parallel. For instance, a teacher might enjoy improvisation personally but feel unprepared to teach it or may support its inclusion in the curriculum while lacking the practical tools to implement it effectively. Previous evidence demonstrates that while teachers generally value improvisation, their confidence in

teaching it varies widely (Bernhard & Stringham, 2016; Larsson & Georgii-Hemming, 2019), and longitudinal research suggests that professional attitudes are adaptable through training (Tok, 2011). However, existing research has not systematically examined how these distinct attitudinal dimensions relate to teachers' improvisation-related self-efficacy, nor how these relationships evolve during pre-service training.

Building on this theoretical foundation, the present study examines how these three attitudinal dimensions relate to two efficacy beliefs: **self-efficacy for improvisation** and **self-efficacy for teaching improvisation**. While general teacher education research suggests that attitudes influence teaching behavior through self-efficacy (Bas, 2022; Vieira et al., 2024), whether this pathway operates directly, indirectly through self-efficacy for improvisation, or both remains unclear in the context of improvisation teaching. We therefore investigate how attitudes differentially predict these efficacy beliefs, and how efficacy beliefs in turn shape PMTs' intentions to employ improvisation in their teaching. To achieve this, we adopt a sequential explanatory mixed methods design that integrates quantitative data from PMT surveys with qualitative interviews, allowing us to contextualize and deepen our understanding of the survey findings.

Central to this investigation is the hypothesized relationship between self-efficacy for improvisation and self-efficacy for teaching improvisation. We propose that self-efficacy for improvisation serves as a developmental foundation for self-efficacy for teaching improvisation. This hypothesis is grounded in the principle that personal competence precedes pedagogical confidence: teachers who feel capable of improvising themselves are better positioned to model, scaffold, and respond to students' improvisational efforts. General teacher efficacy research supports this premise, demonstrating that high self-efficacy correlates with teaching quality, persistence through challenges, and willingness to adopt innovative methods (Holzberger et al., 2013; Klassen & Chiu, 2010; Zee & Koomen, 2016). However, empirical evidence for this developmental sequence within improvisation teaching remains limited. Moreover, self-efficacy develops most readily during early training and becomes increasingly stable over time (Hoy & Spero, 2005), making the pre-service phase a critical period for testing and supporting this relationship.

Specifically, this study draws on the theory of planned behavior (Ajzen, 1991), and social cognitive theory to examine how attitudes and self-efficacy interact (Bandura 1997)

to examine how attitudes and self-efficacy relate in the context of improvisation. We conceptualize attitudes as PMTs' perceived orientations toward learning, teaching, and supporting the inclusion of improvisation (AS/AT/AI), while self-efficacy reflects their perceived capability to improvise, or to teach improvisation (SEI and SETI, respectively). In Bandura's framework, mastery experience is the most important source of self-efficacy. Attitudes may relate to efficacy beliefs through motivational and cognitive pathways. For example, a positive attitude can enhance the behavioral intention of seeking learning opportunities, as well as influence how they interpret and evaluate their own practice (Ajzen, 1991). Understanding how these constructs interact is essential for designing teacher preparation programs that address both motivational and competence-related barriers to improvisation instruction.

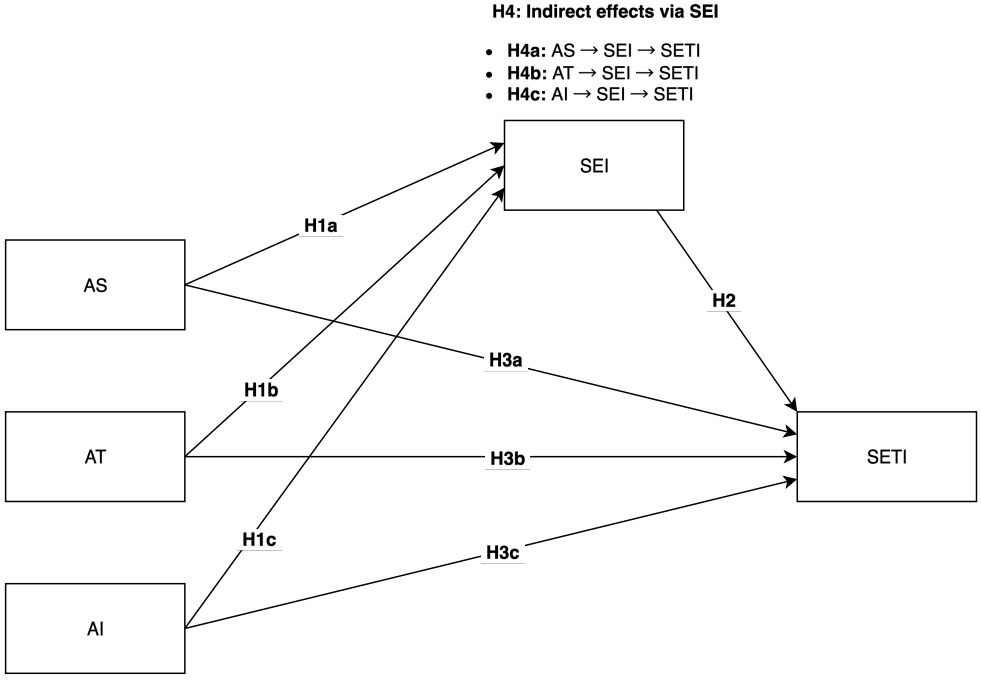


Figure 4.1. The proposed research model for predicting self-efficacy of teaching improvisation

Note: AS = Attitude toward studying improvisation, AT = Attitude toward teaching improvisation, AI = Attitude toward inclusion of improvisation, SEI = Self-efficacy for improvisation, SETI = Self-efficacy for teaching improvisation.

We include attitude toward studying improvisation (AS), attitude toward teaching improvisation (AT), and attitude toward inclusion of improvisation (AI) as predictors, self-efficacy for improvisation (SEI) as a mediator, and self-efficacy for teaching improvisation (SETI) as the outcome. Building on this framework, we propose the following research question: What are the relationships between PMTs' attitudes (i.e., AS, AT, and AI) and their self-efficacy for improvisation (SEI), and self-efficacy for teaching improvisation (SETI)? Figure 4.1 illustrates the hypothesized relationships among these constructs

H1: AS, AT, and AI are positively associated with SEI.

H2: SEI positively predicts SETI among PMTs.

H3: AS, AT, and AI have direct effects on SETI, independent of their indirect effects through SEI.

H4: The relationship between attitudes (AS, AT, and AI) and SETI is mediated by SEI.

By testing these hypotheses, this study aims to provide evidence-informed guidance for music teacher education. If attitudes are associated with personal improvisation confidence (H1) and teaching readiness (H3, H4), and if personal mastery serves as a foundation for pedagogical confidence (H2), then effective interventions must address both motivational dispositions and competence development. These findings will inform the design of targeted professional development programs that strengthen teachers' capacity to implement improvisation in music classrooms.

4.3. Method

This study employed an explanatory sequential mixed-method design (Creswell & Clark, 2017). Data were collected through a questionnaire, and the relationships among attitudes and self-efficacy regarding improvisation were tested. Follow-up semi-structured interviews illustrate and explain quantitative patterns. Abbreviations for groups and variables are listed in Appendix A.

4.3.1. Research context

In the Netherlands, ten conservatories and universities of applied sciences offer a bachelor's program in Music Teacher Education, preparing students for primary, secondary, and community settings. This research focuses on third- and fourth-year bachelor PMTs,

who are at a critical transition point from academic study to the actual practice of teaching in schools. At this stage, students engage in school internships, gaining first-hand teaching experience and encountering the complex challenges of incorporating improvisation into their instructional practice.

Compared to first- and second-year PMTs, they possess greater experience in both learning and teaching contexts. Across the ten institutions, approximately 225 third- and fourth-year bachelor's PMTs were enrolled in the music education program during Spring 2024 in the Netherlands, though cohort sizes varied considerably across institutions.

4.3.2. Data collection and measuring instruments

4.3.2.1. Procedures

We used a mixed-method design comprising (i) a questionnaire adapted from prior validated scales and refined through a pilot with three PMTs, and (ii) an interview guide aligned to the questionnaire constructs for drawing an interpretive illustration of the questionnaire data. A music teacher educator, co-author, facilitated introductions to pedagogy course leaders at all ten higher music education institutions in the Netherlands. The first author then recruited on-site and distributed the online Qualtrics survey. Participation was voluntary with informed consent, and ethical approval was granted by the research ethics committee (IREC_ICLON 2023-07). Participants were informed that they could withdraw at any time without any reason, and their responses would be treated confidentially. Survey data were collected anonymously, and interview data were pseudonymized at transcription. Any identifying information was removed. Data were collected from March to June 2024.

4.3.2.2. Participants

In total, 123 PMTs completed the questionnaire, which took about 10 to 15 minutes to complete. Participants were not recruited based on their previous improvisation experience. Eligibility criteria were (a) registered in the third- or fourth-year bachelor's music education program in the academic year 2023–2024, and (b) voluntary consent to participate. During the data collection for the questionnaire and interviews, participants were encouraged to reflect on their current stage of music teacher education. For example,

reflect on the experience gained through course learning, peer teaching, and internships. Although the focus was on their current training experiences, some participants naturally drew on their earlier improvisation experiences or reflected on their future teaching expectations.

Table 4.1 presents demographic information for the PMT's questionnaire participants. To complement the survey findings, follow-up semi-structured interviews were conducted with one representative PMT from each of the ten participating institutions (Appendix D). Each interview lasted 40-60 minutes, conducted in English. All participants signed a consent form and permitted recording.

Table 4.1 Demographic and descriptive characteristics of the participants (n=123)

	Category	Frequency	%
Gender	Female	63	51.2%
	Male	54	43.9%
	Others	6	0.04%
Age	18–22	72	58.5%
	23–25	34	27.6%
	≥26	17	13.8%
Grade	Year 3	79	71.6%
	Year 4	44	28.4%
School location	Amsterdam	14	11.4%
	Den Haag	8	6.5%
	Enschede	16	13.0%
	Groningen	7	5.7%
	Leiden	10	8.1%
	Maastricht	16	13.0%
	Rotterdam	7	5.7%
	Tilburg	10	8.1%
	Utrecht	26	21.1%
	Zwolle	9	7.3%

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4.3.2.3. Questionnaire development and measures

The questionnaire consisted of three sections: demographics, variables in the research model, rated on a 5-point Likert scale, and optional open-ended questions for deeper insight. For each variable, validated scales were used, and items were only adapted to fit the specific variable and context of music (teacher) education. Before distribution, the questionnaire was reviewed by three Dutch native speakers, who participated in a translation and group discussion to ensure the accuracy and linguistic equivalence of the items. All example items with factor loadings can be found in Appendix E.

Attitude toward studying improvisation was measured by six items, which were adapted from Wei et al. (2024). Attitude toward studying refers to the general belief in favorability and the benefits of improvisation. Next, the six-item scale by Admiraal et al. (2017) was adapted for **attitudes toward teaching improvisation**. It refers to the general belief of personal preference in teaching improvisation. In order to examine PMTs' **attitudes toward inclusion of improvisation**, the items by Piazza and Talbot (2021) were adapted to match the improvisation contexts. Attitude toward the inclusion of improvisation refers to PMTs' endorsement of its inclusion in music education across contexts (e.g., school curricula and teacher education).

Self-efficacy for improvisation was assessed by adapting the scale by Chen et al. (2001) with eight items. It measures PMTs' belief in their capacity to succeed in self-practicing and learning improvisation. In addition, eight items were developed to measure PMTs' **self-efficacy for teaching improvisation**. The original form with 24 items came from

Tschannen-Moran and Hoy (2001). We adapted the instructional strategies section in the improvisation teaching context for measuring the PMTs' belief in their own ability to positively influence (future) students' learning. All the items were formatted on a 5-point Likert scale, scoring from 1 (strongly disagree) to 5 (strongly agree).

4.3.2.4. Interview protocol

To extract as much information as possible from the interview, we posed open-ended primary questions supplemented by pre-determined follow-up questions. We inquired about participants' experiences with learning improvisation during their undergraduate studies and (where applicable) teaching improvisation, focusing specifically on five core variables (AS, AT, AI, SEI, and SETI). For example: "Do you think it is important for bachelor students in music education to have improvisation in the curriculum?" and "Do you feel confident or well-prepared to teach improvisation by yourself after the instruction from your bachelor study?" Follow-up questions were used to seek further explanation, clarify meaning, and inquire about reasons for "Why / Why not?".

4.3.2.5. Factor structure and validity of the questionnaire.

An exploratory factor analysis (EFA) was performed in IBM SPSS 29.0 to examine the measurement structure and detect possible cross-loadings. The Kaiser-Meyer-Olkin (KMO) and Bartlett's test validated the appropriateness of doing the EFA (Kaiser, 1974). Following the common guidelines, items with factor loadings below .50 or cross-loadings over .40 were removed (Ferguson & Cox, 1993; Hair, Black, et al., 2019, p. 151). Based on the factor analysis, we could keep all three attitudes and the two self-efficacy dimensions.

4.3.3. Data analysis

4.3.3.1. Quantitative data

We determined the minimum sample size using G*Power 3.1 (Faul et al., 2009). Taking the variable self-efficacy for teaching improvisation (SETI) as the most demanding endogenous construct with four predictors (AS, AT, AI, SEI), we ran a priori power analysis (F test: Linear multiple regressions: Fixed model, R2 deviation from zero). With $\alpha = .05$, power = .80, and a medium effect size ($f^2 = 0.15$), the analysis indicated a minimum of 85

cases (Hair et al., 2021, p. 18). Since our study collected 123 valid responses, exceeding both criteria, the sample size is considered adequate.

Building on prior research on attitudes and self-efficacy, this study explores the interrelationships and predictive effects among the five constructs. To test these relationships, we applied Partial Least Squares Structural Equation Modeling (PLS-SEM), which emphasizes prediction and is well-suited for small-to-medium sample sizes as well as exploratory, theory-extending research (Hair et al., 2011). Compared with covariance-based SEM, PLS-SEM is more appropriate for our study because of the relatively small sample size, the focus on prediction-oriented modeling, and the aim of model development, which aligns well with the aim of this study. PLS-SEM was conducted in R (Version 2025.05.0). The data were bootstrapped with 5,000 subsamples to ensure stable and reliable results.

4.3.3.2. Qualitative data

The thematic analysis (Braun & Clarke, 2006) with an inductive approach (Elo & Kyngäs, 2008) was adapted for the exploration of the qualitative dataset. The qualitative analysis aimed to capture the key factors shaping PMTs' attitudes towards improvisation, exploring the development of self-efficacy, and understanding the underlying reasons for the interactions between attitudes and self-efficacy. First, we transcribed the semi-structured interviews on Amberscript (https://app.amberscript.com/). The interview transcripts were inductively coded in ATLAS. ti 25 to identify recurring patterns related to attitudes and self-efficacy, while also allowing for new themes to emerge. The codes were then organized into broader themes and compared with the quantitative model to explore additional influences beyond the questionnaire. During the coding procedure, the authors engaged in multiple discussions to resolve any disagreements between the coding and the categories. Ultimately, the qualitative findings were integrated with quantitative results, providing a more comprehensive understanding of PMT's attitudes and self-efficacy for improvisation.

4.4. Result

4.4.1. Descriptive analysis

Exploratory group comparisons were performed to examine potential differences by gender, grade, and age (Table 4.2). Levene's tests confirmed homogeneity of variances for all variables (ps > .05). A one-way ANOVA revealed significant gender differences in AS, F(1, 121) = 4.25, p = .042, η^2 = .07, SEI, F(1, 121) = 7.83, p < .001, η^2 = .12, and SETI, F(1, 121) = 3.76, p = .046, η^2 = .06. Male students (M = 4.12, SD = 0.53) scored higher than female students (M = 3.85, SD = 0.49) on these variables. No significant differences were observed across grade or age, all ps > .05.

A repeated-measures ANOVA revealed a significant main effect of construct, $F(2, 244) = 80.67$, $p < .001$, $\eta^2 = .40$, indicating that PMTs' mean ratings differed across the three variables. Bonferroni-adjusted pairwise comparisons showed that AI ($M = 3.98$, $SD = 0.83$) was significantly higher than both SEI ($M = 2.95$, $SD = 0.85$; $p < .001$) and SETI ($M = 3.35$, $SD = 0.78$; $p < .001$), and SETI was significantly higher than SEI ($p < .001$). This pattern suggested that PMT feels more confident about teaching improvisation than performing improvisation themselves. As one PMT explicitly noted: "*I will always know more than the kids in the class*" (PMT 1). Although PMT felt that their personal improvisational abilities (SEI) were still limited by professional standards, they were confident to support improvisational teaching self-efficacy (SETI) in primary and secondary education.

Table 4.2 Group differences in five variables via one-way ANOVA and T-test

Variable	Gender		Grade		Age	
	F	η^2	t	*d*	*F*	η^2
AS	4.25*	.07	0.65	.12	0.82	.01
AT	1.10	.02	1.48	.28	0.18	.00
AI	0.82	.01	1.42	.28	0.13	.00
SEI	7.83***	.12	1.59	.27	0.01	.00
SETI	3.76*	.06	0.97	.27	0.95	.02

Note. Gender = female, male, other;Grade = 3rd and 4th year; Age = 18–22, 23–25, ≥26 years. p < .05*, p < .01**, p < .001***. AS = Attitude toward studying improvisation, AT = Attitude toward teaching improvisation, AI = Attitude toward inclusion of improvisation, SEI = Self-efficacy for improvisation, SETI = Self-efficacy for teaching improvisation.

4.4.2. Measurement model assessment

The measurement model was first examined in SPSS to establish reliability and convergent validity. All reflective indicator loadings exceeded the recommended threshold of 0.708. As shown in Table 4.3, all average variance extracted (AVE) values were above 0.50, Cronbach's α values ranged from 0.812 to 0.912, and composite reliability (CR) values ranged from 0.886 to 0.932, all within the recommended ranges (Hair, Black, et al., 2019; Hair et al., 2021). These results indicate satisfactory internal consistency and convergent validity across constructs.

Table 4.3 Reliability and convergent validity of the measurement model.

Latent variables	Correlation					AVE	Cronbach's α	CR
	1	2	3	4	5			
AS	1					0.621	0.855	0.891
AT	0.606**	1				0.694	0.855	0.900
AI	0.541**	0.658**	1			0.723	0.812	0.886
SEI	0.447**	0.389**	0.270*	1		0.697	0.912	0.932
SETI	0.396**	0.538**	0.350**	0.585**	1	0.647	0.891	0.916

Note: CR: composite reliability; AVE: average variance extracted. ** $p < 0.01$
AS = Attitude toward studying improvisation, AT = Attitude toward teaching improvisation, AI = Attitude toward inclusion of improvisation, SEI = Self-efficacy for improvisation, SETI = Self-efficacy for teaching improvisation.

Table 4.4 Discriminant validity of the constructs (Fornell-Larcker criterion)

	AS	AT	AI	SEI	SETI
AS	**0.788**				
AT	0.600	**0.833**			
AI	0.551	0.665	**0.850**		
SEI	0.488	0.411	0.290	**0.835**	
SETI	0.440	0.557	0.369	0.602	**0.805**

Note: AS = Attitude toward studying improvisation, AT = Attitude toward teaching improvisation, AI = Attitude toward inclusion of improvisation, SEI = Self-efficacy for improvisation, SETI = Self-efficacy for teaching improvisation.

Next, discriminant validity was examined using the PLS-SEM analysis conducted in R. As shown in Table 4.4, the Fornell-Larcker criterion was satisfied for all constructs, indicating that each construct's AVE exceeded its correlations with other constructs (Fornell & Larcker, 1981). Given recent evidence that the Fornell–Larcker criterion alone may not reliably detect discriminant validity issues, the heterotrait–monotrait ratio (HTMT; Table 4.5) was additionally examined as a more rigorous criterion (Henseler et al., 2015). All HTMT

values ranged from 0.316 to 0.795, well below 0.85, providing strong evidence of discriminant validity for the measurement model.

Table 4.5 Discriminant validity of the constructs (HTMT)

	AS	AT	AI	SEI	SETI
AS					
AT	0.703				
AI	0.658	0.795			
SEI	0.495	0.436	0.316		
SETI	0.445	0.610	0.417	0.649	

Note: AS = Attitude toward studying improvisation, AT = Attitude toward teaching improvisation, AI = Attitude toward inclusion of improvisation, SEI = Self-efficacy for improvisation, SETI = Self-efficacy for teaching improvisation.

4.4.3. Structural model assessment

As common method bias is a potential concern in survey-based research, we examined the collinearity among predictors. In this study, the variance inflation factor (VIF) ranged from 1.36 to 2.16. All values were well below the threshold of 3, indicating that multicollinearity was not a problematic issue (Hair et al., 2021, p. 96).

To evaluate the significance of the structural relationships, a bootstrapping process was conducted using 5,000 samples taken with replacement from the original dataset. The structural model showed satisfactory explanatory power. According to Hair et al. (2019, p. 11), R^2 values of 0.25, 0.50, and 0.75 present weak, moderate, and substantial explanatory power. The model explained 26.3% of the variance in SEI (R^2 = 0.263, adjusted R^2 = 0.244) and 47.8% of the variance in SETI (R^2 = 0.478, adjusted R^2 = 0.460), indicating moderate explanatory power for SEI and substantial explanatory power for SETI. The PLSc results produced highly consistent path coefficients and a slightly increased explained variance (SEI: R^2 = .315, adjusted R^2 = 0.297; SETI: R^2 = .578, adjusted R^2 = 0.564), further confirming the robustness of the structural correlations. Figure 4.2 presents the results of the PLS-SEM analysis of the proposed model.

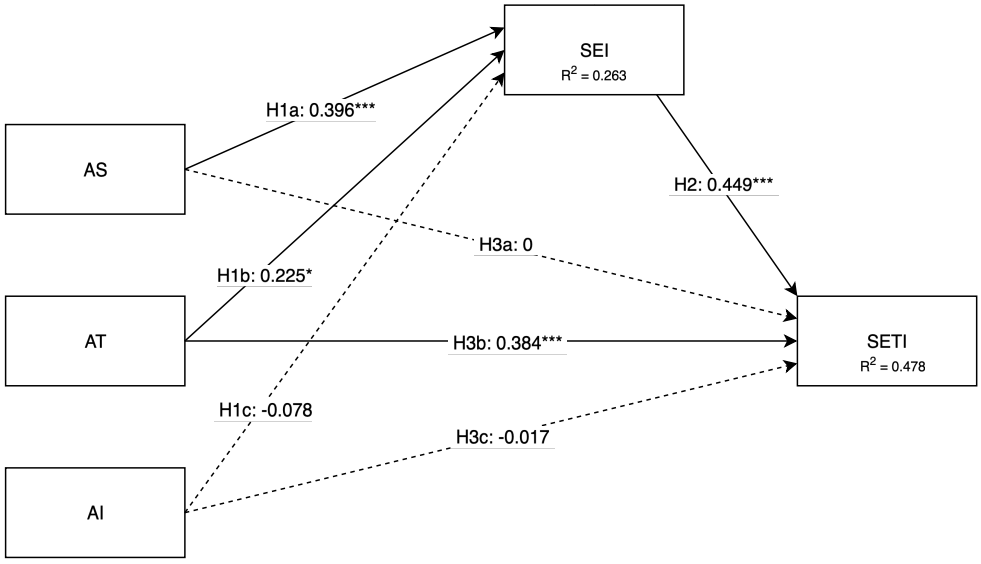


Figure 4.2. Structural model results for predicting self-efficacy for teaching improvisation

Note:

1. Solid lines represent significant paths; dashed lines represent non-significant paths.
2. ***$p < 0.001$, *$p < 0.05$.
3. AS = Attitude toward studying improvisation, AT = Attitude toward teaching improvisation, AI = Attitude toward inclusion of improvisation, SEI = Self-efficacy for improvisation, SETI = Self-efficacy for teaching improvisation.

Table 4.6 Results of direct effects (H1-H3) and indirect effects (H4).

Hypotheses	Path	β	t-value	p-value	95% CI	Supported
H1a	AS→SEI	0.396***	4.323	0.000	[0.219, 0.579]	✓
H1b	AT→SEI	0.225*	2.025	0.043	[0.003, 0.439]	✓
H1c	AI→SEI	-0.078	-0.623	0.533	[-0.324, 0.162]	✗
H2	SEI→SETI	0.449***	5.723	0.000	[0.291, 0.599]	✓
H3a	AS→SETI	0.000	-0.002	0.998	[-0.204, 0.218]	✗
H3b	AT→SETI	0.384***	3.754	0.000	[0.175, 0.575]	✓
H3c	AI→SETI	-0.017	-0.186	0.853	[-0.190, 0.167]	✗
H4a	AS→SEI→SETI	0.178***	3.449	0.000	[0.077, 0.278]	✓
H4b	AT→SEI→SETI	0.101	1.909	0.056	[-0.003, 0.205]	✗
H4c	AI→SEI→SETI	-0.035	-0.620	0.535	[-0.146, 0.076]	✗

Note: $p < 0.001$***, $p < 0.05$*; AS = Attitude toward studying improvisation, AT = Attitude toward teaching improvisation, AI = Attitude toward inclusion of improvisation, SEI = Self-efficacy for improvisation, SETI = Self-efficacy for teaching improvisation.

Table 4.6 presents the path coefficients, t-values, and significance levels for all hypothesized relationships in the structural model. Effect sizes higher than 0.02, 0.15, and 0.35 are typically interpreted as small, medium, and large effect sizes, respectively (Chin, 2009; Cohen, 2013). A greater effect size between two latent variables indicates a stronger association between them.

Self-efficacy for improvisation (SEI) was the strongest predictor of Self-efficacy for teaching improvisation (SETI) ($\beta = 0.449$, $p < 0.001$), while also functioning as an essential mediator. Attitude toward studying improvisation (AS) showed a strong positive effect on SEI ($\beta = 0.396$, $p < 0.001$) and indirectly influenced SETI through this mediation ($\beta = 0.178$, $p < 0.001$). Attitude toward teaching improvisation (AT) had direct impacts on SETI ($\beta = 0.384$, $p < 0.001$) and SEI ($\beta = 0.225$, $p < 0.05$). Attitude toward inclusion of improvisation (AI) did not significantly predict either SEI ($\beta = -0.078$, $p = 0.533$) or SETI ($\beta = -0.017$, $p = 0.853$).

AI showed no significant correlations with either efficacy construct, although attaining the highest mean scores ($M = 3.98$), while AS and AI displayed no direct effects on SETI.

4.4.4. Findings from the interviews

4.4.4.1. Experiential foundation

Interviews indicate a three-stage experiential process, transforming fear into confidence via scaffolded success and continued engagement. Many participants recalled initial anxiety when first asked to improvise. PMT6 described: "*My first impression was: I'm scared, this is awful. But then my teacher said: start with three notes… it was scary, but then relieving. It became fun, like a game*." This step-by-step scaffolding approach transforms anxiety into enjoyment, thereby fostering positive emotional experiences. Once enjoyment replaced fear, students engaged voluntarily and repeatedly. PMT6 continued: "*My whole drum career is basically improvising… a lot of jazz improvisation and stuff*." The "fun" derived from early successes supports long-term engagement, transforming initial practice into a personal learning habit. Over time, repeated improvisational experiences build into mastery. By the bachelor phase, PMT6 stated, *"I feel positive and confident (in improvisation)."*

A positive learning attitude motivates PMT to engage in achievable improvisation tasks. The repeated successes reinforce enjoyment, thereby maintaining practice and ultimately building self-efficacy in improvisation.

4.4.4.2. Teaching orientation

Interviews revealed that a teaching-oriented attitude (AT) functions as both a motivational and identity-based driver, fostering self-efficacy in two interconnected ways: by motivating personal learning (AT → SEI) and by strengthening teaching confidence (AT → SETI).

For many PMTs, the desire to teach improvisation inspired their own motivation to refine their improvisational skills. "*I really want to... see the possibilities in it to teach. So, I'm thinking, okay, I want to learn more about my own improvisation to also give it to students"* (PMT 2). The pedagogical intention creates a purposeful context for skill development, turning self-improvement into a professional commitment rather than a personal hobby. Over time, the connection between individual growth and students' future learning gradually becomes evident, thereby enhancing their sense of efficacy (SEI) in improvisation itself.

Beyond personal mastery, pedagogical motivation also fostered confidence for teaching improvisation. PMT1 recalled: "*Yes, I do (feel confident to teach improvisation). It has given me a lot more because I've always wanted to do improvisation with children, but I never knew how. But now I've had so many different types of how you can do improvisation in class that I have all the tools I need to implement it in my work*." Her statement shows the conversion of intention into efficacy through building up teaching strategies and refining practices.

This attitude dimension connects directly to how PMT conceives, and potentially identifies with, the teaching profession, making it particularly relevant for teacher preparation.

4.4.4.3. Translating personal mastery into teaching confidence

Interviews confirmed that SEI serves as the most immediate foundation for teaching confidence. Participants consistently described how their own improvisational competence

provides the psychological foundation necessary for teaching: "*I'm comfortable doing it myself... so I guess I'm comfortable teaching it as well*" (PMT9). This transfer from personal to pedagogical confidence captures how teaching self-efficacy is grounded in experience, showing that the sense of security that comes from personal competence.

Several PMTs described this progression as an emotional transformation, from fear and hesitation to confidence to guide students. For example, "*I feel confident [to teach improvisation] because I don't feel scared myself anymore. Now I feel like I can teach other people*" (PMT5). Having overcome personal anxiety through repeated improvisation practice, she perceived her own growth as evidence of what could be achieved by her students, strengthening her confidence as an educator.

As PMTs became fluent in improvisation, their attention gradually shifted from self-performance to facilitation. PMTs turning the sense of "I can do it" into "I can guide it." This developmental transition captures the essence of the SEI → SETI pathway: teaching confidence grows from the lived experience of doing.

4.4.4.4. Recognizing the value, missing the practice

Despite strong encouragement for the educational benefits of improvisation, participants struggled to convert this acknowledgment into practical confidence. Many PMTs described improvisation as "fun" or "important"; however, their appreciation often lacked experiential grounding. PMT3 described, "*It's not very clear why I should improvise with my students, even though it's a fun thing to do*". PMT3's statement highlights a gap between valuing improvisation and knowing how to translate it into teaching practice. Similarly, PMT2 described feeling confident to use improvisation only in "*safe*" one-on-one lessons, but not in classroom settings where outcomes felt unpredictable: "*Some kids enjoyed it, and others didn't… I just want them to have fun*. " Her description reveals how uncertainty about classroom dynamics limits the transformation of positive attitudes into teaching confidence.

A further dimension of this disconnection emerged through insufficient preparation experiences. For example, "*I do think [improvisation] is important... but if you never really did that, it's also hard to say to the students. If you yourself are not even sure what you're doing. Because we didn't really do that in the bachelor's, I don't really think that it has so*

much influence on my teaching skills" (PMT10). His reflection shows that recognizing the value of improvisation is not enough. Without concrete experience and training, this belief remains theoretical and cannot translate into confidence for teaching.

Collectively, these narratives explain why the quantitative model found no significant link between AI and both forms of self-efficacy. While PMTs cognitively valued improvisation, the lack of meaningful practical experience or structured pedagogical guidance hindered this belief from becoming an embodied skill. In summary, attitudinal support without experiential grounding fails to generate efficacy.

4.5. Discussion

This study examined the relationships between three dimensions of attitudes toward improvisation and two forms of self-efficacy beliefs among PMTs. The findings provided new insights into how different attitudinal orientations promote the development of the preparation of improvisation in teaching practice. It holds major implications for music teacher education. We will discuss our findings in relation to existing theory and research, address unexpected findings, and consider practical implications for teacher preparation programs.

4.5.1. The central role of self-efficacy for improvisation

The result confirmed the central role of self-efficacy for improvisation in the model, highlighting its strong association with teachers' attitudes toward improvisation. This pattern suggests that attitudes and self-efficacy beliefs operate as key motivational beliefs that shape intentions and guide teaching-related actions (Ajzen, 1991; Bandura, 1997). In line with Bandura's social cognitive theory, mastery experiences emerged as a primary source of confidence: PMTs who experienced success in improvisation felt more capable of applying it in educational contexts. Previous studies have reported similar patterns in other educational domains, where positive attitudes and self-efficacy jointly predict stronger behavioral intentions and classroom implementation (Prior et al., 2016; Wei et al., 2024).

The finding is also consistent with prior music research, showing that related forms of music-specific self-efficacy are often closely associated. Burak (2019) found that pre-service teachers' self-efficacy in music ability and the self-efficacy of music teaching

significantly predicted each other. Orejudo et al. (2021) also found that the self-efficacy for learning strongly predicted the self-efficacy for public performance among music students. Furthermore, Biasutti and Concina (2018) also showed that the self-efficacy of music teachers is shaped by a variety of personal and professional factors. These studies show that self-efficacy beliefs related to music are interrelated but not interchangeable. In the current study, this pattern is specifically reflected in the relationship between SEI and SETI: self-confidence in improvisation may help improve teaching confidence, but it does not automatically translate into confidence in engaging students in improvisation activities.

Moreover, SEI also functioned as a mediator between attitudes and SETI, revealing that positive attitudes alone are insufficient for developing teaching confidence. It must be accompanied by opportunities to build a sense of ability and mastery through improvisation practice. Consistent with this, previous studies have emphasized the central role of self-efficacy as a proximal predictor of teaching-related motivation and action. For example, Bas (2022) demonstrated that teaching self-efficacy mediates the relationship between attitudes toward teaching and teachers' motivation. Similarly, Vieira et al. (2024) reported that when training enhances individuals' attitudes, self-efficacy increases accordingly and further promotes their sense of accomplishment. Collectively, these studies reinforce the central position of self-efficacy as an important factor translating attitudinal beliefs into pedagogical practice.

4.5.2. Differential effects of attitude dimensions

Further analysis revealed significant differences among attitude dimensions in predicting efficacy beliefs. AS significantly predicted SEI but not SETI, indicating that valuing personal learning fosters one's own skill development but does not automatically translate into teaching confidence. This distinction between believing in one's capacity to learn versus one's capacity to facilitate others' learning, underscores that pedagogical self-efficacy requires more than personal mastery; it demands experiences that bridge personal skill with instructional practice (e.g., modeling, leading, and reflecting on improvisation in teaching contexts).

AT significantly influenced both SEI and SETI, with stronger direct links to SETI than AS. This pattern is conceptually consistent with the framework of teacher efficacy

(Tschannen-Moran & Hoy, 2001), suggesting that teaching-oriented attitudes are more directly linked to instructional confidence than attitudes focused on personal learning. PMTs who view improvisation as a teaching tool, rather than merely a personal skill, tend to feel more capable of facilitating it in the classroom. This reflects a motivational shift from self-development to pedagogical engagement. This finding extended beyond Koutsoupidou's (2005) identification of teacher attitudes as a key implementation factor, specifically illustrating how teaching-focused attitudes uniquely promote professional competence.

AI did not predict either SEI or SETI, indicating a gap between curriculum endorsement and capability beliefs. AI mainly reflects a value or advocacy perception, while efficacy beliefs on learning and teaching improvisation are more based on practical experience and task-specific judgments. This interpretation is consistent with work by Ballantyne and Canham (2023), who suggest that importance (i.e., knowledge or skills teachers perceive as essential in their work) and confidence (i.e., a sense of capacity in performing these tasks) are distinguishable dimensions that do not always change in synchrony. Furthermore, our findings echo previous evidence that PMTs may value creative activities such as improvisation while still reporting lower confidence or comfort in engaging with or teaching them (Bernhard & Stringham, 2016; Randles & Ballantyne, 2018; Randles & Smith, 2012).

The perspective of PCK helps explain why AI did not predict efficacy beliefs. Supporting improvisation's inclusion is not the same as knowing how to design and teach it. Previous music education studies have shown that teacher preparation depends not only on valuing musical content, but also on developing the ability to transform music knowledge into teachable and learnable classroom experiences (Grieser & Hendricks, 2018; Mateiro et al., 2012). In music teaching, PMTs need music-specific pedagogical skills to transform musical knowledge into classroom practice, such as activity design, scaffolding, explaining, assessment, and feedback (Ballantyne & Packer, 2004; Grieser & Hendricks, 2018). This is also consistent with recent evidence that self-efficacy in music teaching is differentiated across domains. For example, Chung and Ho (2026) found that preschool music teachers reported lower self-efficacy in CK than in PCK for implementing musical play.

This suggests that pedagogical confidence in music teaching does not simply derive from personal musical confidence but also depends on PCK and practice-based preparation.

According to Social Cognitive Theory (Bandura, 1997), self-efficacy develops through mastery experience and supported practice, rather than by abstract advocacy. AI may raise awareness, but it does not build the sense of capability that comes from envisioning oneself successfully engaging in the activity. This helps explain why teachers often support creative activities but integrate them inconsistently (Piazza & Talbot, 2021). Teacher education may need structured and practice-based opportunities, for example, modeling, coaching, and scaffolding, as in cognitive apprenticeship frameworks (de Bruin, 2019b). In addition, mentoring and ongoing professional learning can play a crucial role in helping teachers navigate the transition from pre-service preparation to the teaching practice (Ballantyne & Zhukov, 2017).

These results may also be understood in relation to identity development in music teacher education. The literature on the musician-teacher dilemma has long suggested that PMTs may experience tension between developing as musicians and as teachers (Mark, 1998; Pellegrino, 2009). If improvisation is perceived primarily as an advanced performance skill, PMTs may evaluate themselves through a musician or performer perspective. In this case, PMTs may recognize its value, but at the same time feel unprepared to use it in teaching. Recent studies suggest that PMT's professional identity development is complex and dynamic (Yang, 2022), shaped by program experiences, curriculum, and authentic teaching opportunities (Albert, 2023). Research also demonstrated that music teacher role-identity is constructed through ongoing negotiation during undergraduate education (Long, 2024). These literatures suggest that attitudes toward improvisation may differ depending on whether improvisation is perceived as a form of personal musical development or as a pedagogical practice. From this perspective, AS predicting SEI only may reflect a stronger orientation toward personal musical growth, whereas AT predicting both SEI and SETI may indicate a pedagogical orientation toward facilitating others' learning. The non-significant effect on AI is consistent with the framework of Ballantyne and Canham (2023), showing that importance and confidence are separate concepts. This may help explain why teachers recognize the value of improvisation but seldom implement it (Piazza & Talbot, 2021).

4.5.3. Implications for music teacher education

This research provides a theoretically informed and empirically tested basis for designing more effective pedagogical preparation for improvisation in music teacher education. Our findings suggest that the development of teaching confidence involves both a direct path (teaching-oriented attitude → teaching self-efficacy) and an indirect path (attitudes → personal skills confidence → teaching self-efficacy). In this process, SEI serves as a key mediator linking attitudinal orientations and teaching confidence.

AT directly predicted SETI, indicating that teaching-oriented attitudes can support instructional confidence. The mediating role of SEI suggests that this effect may be strengthened when PMTs also builds confidence in their own improvisation ability. In other words, programs cannot rely on cultivating a teaching-centred attitude, they should also give priority to experiential learning that supports personal mastery.

This is consistent with Azzara's (1993) emphasis on the role of improvisation experience in developing confidence, while further specifying a possible pathway: positive attitudes (AS/AT) → self-efficacy for personal improvisation (SEI) → pedagogical confidence (SETI). Critically, SEI is shaped by mastery experiences in improvisation, successful practice builds the sense of "I can do this," which may then supports the belief "I can teach this" (Bandura, 1997). Therefore, teacher education programs could provide structured opportunities for PMTs to develop improvisation skills through repeated, scaffolded practice, as such experiences may form an important foundation for both SEI and SETI.

Teacher education programs could support PMTs' improvisation preparation from two complementary roles: as learners developing their own improvisational skills (building AS and SEI), and as facilitators leading improvisation activities with peers or students (building AT and SETI). Given that SEI mediates the relationship between AS and SETI in our model, progressive mastery experiences are essential: starting with simple, low-risk group activities, such as rhythmic call-and-response or melodic variations, allows PMTs to accumulate successful experiences that build SEI. Because AT directly predicts SETI, programs should integrate pedagogical rehearsal opportunities, such as microteaching sessions in which PMTs lead improvisation activities with peers, to help them envision themselves as capable educators. These peer teaching experiences may strengthen both personal mastery and readiness.

For PMTs new to improvisation, especially those from classical backgrounds, our finding that AS predicts SEI suggests that instruction should emphasize exploratory, non-evaluative practice in supportive environments where mistakes are tolerated and regarded as part of developing musical imagination. This approach aligns with research highlighting the importance of creative, supportive environments and reflective improvisation pedagogies (Biasutti & Frezza, 2009; Burnard & Dragovic, 2015). The differential effects of attitude dimensions suggest that programs could strategically integrate three components: (1) personal improvisation practices (addressing the AS→SEI pathway), (2) pedagogical rehearsal opportunities (addressing the AT→SETI pathway), and (3) scaffolded mastery experiences (strengthening SEI as the mediator).

4.5.4. Limitations and future research

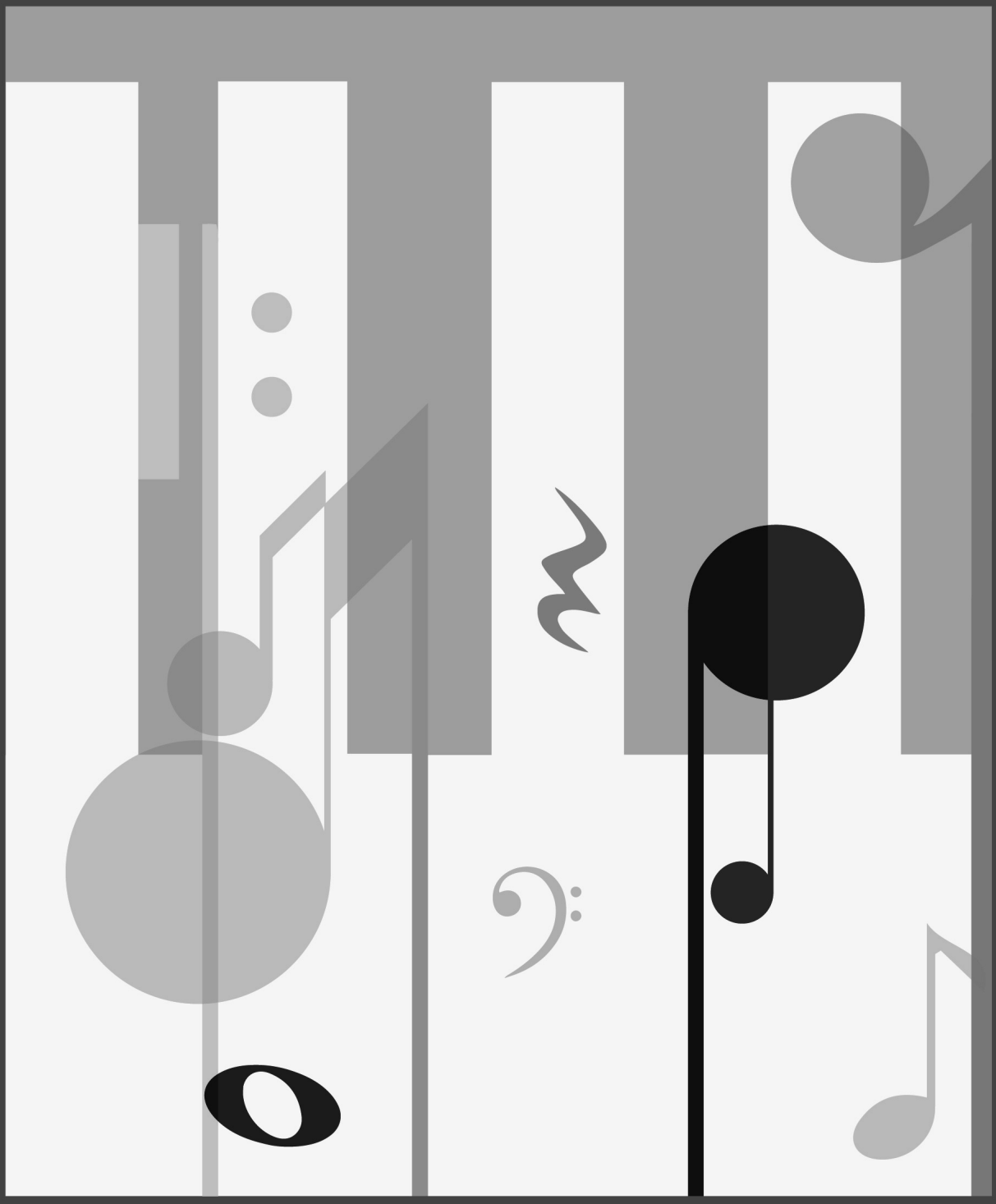
Several limitations of this study should be acknowledged. First, the cross-sectional survey design prevents causal inference. Longitudinal research is needed to confirm how attitudes and efficacy beliefs evolve dynamically across teacher preparation programs. Second, although we collected both quantitative and qualitative data, our sample was limited to the Dutch national context. Future studies should examine the model in broader cultural contexts and educational systems. Third, the study focused exclusively on psychological beliefs, without including behavioral or teaching performance variables. Fourth, prior improvisation experience was not directly measured in the survey, although it emerged in the interview data. This makes it difficult to distinguish whether participants' self-efficacy reflects program effects, personal beliefs, or previous experience. Given that mastery experiences function as a key source of self-efficacy (Bandura, 1997), future research could include prior experience as a variable in the quantitative model by, for example, measuring years or frequency of improvisation, coursework, ensemble participation, or other related practical experiences. Future research should incorporate observational or performance-based indicators of improvisational ability and teaching practice to better connect PMTs' perceived confidence with their actual instructional behavior. Such research could test whether the pathways identified in our model predict actual classroom implementation of improvisation. Additionally, research exploring factors underlying the teacher's self-efficacy can offer valuable insights into how novice teachers

develop professional identity and competence. Understanding these factors can inform the design of scaffolded interventions that build realistic and sustainable teaching confidence among PMTs.

4.6. Conclusion

This study deepens the understanding of how PMTs develop confidence for teaching improvisation by examining the interplay between attitudinal dimensions and self-efficacy beliefs. Findings reveal that positive attitudes (toward studying and teaching improvisation) significantly predicted improvisation self-efficacy, which functioned as the central pathway to teaching confidence, supporting that self-efficacy for improvisation provides an important foundation for pedagogical readiness. Attitudes toward inclusion of improvisation (AI) did not predict either form of self-efficacy. This non-significant pattern reveals a critical distinction: endorsing curriculum inclusion operates through different psychological paths than action-oriented attitudes, suggesting that valuing improvisation at the curricular level does not necessarily translate into perceived capability to perform or teach it.

The findings also highlight the complementary roles of self-efficacy and PCK in teaching preparation. While SEI provides a foundation for SETI, transforming personal improvisation ability into effective teaching requires PCK related to improvisation (e.g., knowing how to design, scaffold, and assess students' improvisation development). For teacher education, these findings highlight the importance of cultivating personal improvisation skills (as a foundation for SEI), as well as PCK (as the support for transforming SEI into effective teaching practice). The findings underscore the need to provide PMTs with structured opportunities to develop personal improvisational skills. Therefore, teacher education programs may incorporate progressive mastery experiences, peer learning opportunities, and supportive environments that embrace mistakes and encourage exploration. Such practices not only enhance self-efficacy but also sustain long-term motivation and professional autonomy, thereby advancing PMTs' readiness to lead creative musical activities in diverse classroom contexts.



5

5. Understanding teachers' intention to implement improvisation in the classroom: A multi-group study of pre-service and in-service music teachers

Abstract

Based on the Integrative Model of Behavior Prediction (IMBP), this study examined how emotions, motivation, efficacy beliefs, attitudes, and subjective norms collectively influence music teachers' intentions to implement improvisation activities. The study used a mixed-methods design, surveyed 605 pre-service and in-service music teachers, and included semi-structured interviews. Multigroup structural equation modeling (MG-SEM) demonstrated that joy served as the most stable and strongest distal predictor in both groups, broadly predicting motivation, attitudes, and efficacy beliefs. Subjective norm emerged as the strongest predictor of intention among the two groups, followed by intrinsic motivation, highlighting how intentions to implement improvisation activities are deeply embedded within institutional environments and professional cultures. Group differences revealed that pre-service teachers' intrinsic motivation was more directly linked to intention, whereas in-service teachers' motivation was more strongly influenced by alignment with social expectations. Interview findings further validate the essential roles of emotional experiences, social norms, and classroom realities in teachers' meaning construction. This study extends the application of IMBP to music education, emphasizing the central role of emotional and social contexts in fostering teachers' intention to implement improvisation.

*This chapter is under review in an adapted form as:

Hua, C., Admiraal, W., Nieuwmeijer, C., & Van der Rijst, R.M. (under review). *Understanding teachers' intention to implement improvisation in the classroom: A multi-group study of pre-service and in-service music teachers.*

5.1. Introduction

In teacher education, a persistent problem is that teachers often recognize the value of a certain teaching method, however, may not implement it in the classroom. The gap between importance and confidence has been identified among teachers (Ballantyne & Canham, 2023). In music education, improvisation as a creative activity, can cultivate students' creativity, listening ability, and musical expression skills (Azzara, 2002; Siljamäki & Kanellopoulos, 2020). Despite improvisation being included in national recommendations in many countries, various studies indicate that improvisation remains understudied in music education and largely absent in contemporary music classrooms (Larsson & Georgii-Hemming, 2019; Whitcomb, 2013). Research on teachers' intentions to include improvisation activities in teaching presents three major limitations. First, most studies focus on isolated variables, such as confidence or perceptions of improvisation, without reference to an integrated theoretical framework (Bernhard & Stringham, 2016; Koutsoupidou, 2005). Second, teachers' emotions as a critical factor in teacher decision-making (Sutton & Wheatley, 2003) have received less attention in research on teacher behavior and behavioral change. Third, systematic comparisons of pre-service and in-service teachers remain uncommon in music education. Although some qualitative studies (del Barrio et al., 2024; Mateos-Moreno, 2022) have identified differences in the views, expectations, and professional conceptions of pre-services and in-service music teachers. There is an absence of comprehensive models that explicitly compare motivational and affective predictors of specific intentions, such as the inclusion of improvisation activities in the classroom.

This study applies the Model of Behavior Prediction (IMBP; Kreijns et al., 2013) to examine how emotions, motivations, attitudes, efficacy beliefs, and subjective norm shape intention to include improvisation activities in teaching. Through multi-group analysis, the comparison made between pre-service and in-service music teachers. This study extends the IMBP framework to creative activity contexts and provides empirical evidence on differentiated strategies for pre-service preparation and in-service professional development.

5.2. Theoretical framework

5.2.1. Integrative Model of Behavior Prediction (IMBP)

The formation of teachers' behavioral intentions is a complex psychological process involving the interaction of cognitive, affective, and social factors (Ajzen, 1991; Fishbein & Ajzen, 2010). IMBP integrates the Theory of Reasoned Action (TRA; Fishbein & Ajzen, 1975) and the Theory of Planned Behavior (TPB; Ajzen, 1991). In addition, IMBP further integrated the construct of self-efficacy from Social Cognitive theory (Bandura, 2001).

The important theoretical contribution of IMBP is to clearly distinguish between proximal and distal determinants of behavior. Attitude, subjective norm, and self-efficacy are proximal variables that directly affect behavioral intention. Distal variables, such as demographic variables, culture, moods, and emotions, are posited to influence behavior indirectly through their effects on these core proximal constructs (Fishbein & Ajzen, 2010; Kreijns et al., 2013). IMBP clarifies the levels of influence for different psychological constructs and emphasizes the mediating role of proximal factors in connecting situational and emotional conditions to intention formation.

IMBP has been successfully applied in the field of education, especially in understanding teachers' behavior and technology adoption (Admiraal et al., 2013, 2017; Kreijns et al., 2013; J. Wang et al., 2021). These studies have shown that attitude, perceived norms, and self-efficacy are important factors of teachers' behavioral intentions, which further confirms the practical value of the model in explaining voluntary professional practice in the education field. However, applications of IMBP in music education, and specifically in explaining music teachers' intention to guide improvisation activities in their pedagogy, remain limited in the existing literature. This highlights the need to extend this framework to the musical creative activity context.

5.2.2. Emotion

Emotion refers to an individual's momentary affective reaction occurring at a specific point in a specific situation (Pekrun, 2006). In IMBP, emotions are distal variables that indirectly affect intention by influencing attitudes, efficacy beliefs, and subjective norms (Fishbein & Ajzen, 2010). Specifically, positive emotions can broaden attention and enhance the evaluation of the intrinsic value of teaching activities, thus promoting both intrinsic

motivation and extrinsic motivation. In contrast, negative emotions will increase the perceived pressure on the task, thus enhancing amotivation and weakening positive motivational orientations. Longitudinal studies have shown that teachers' emotions during teaching can significantly predict their subsequent self-efficacy (Frenzel et al., 2016). Furthermore, research on pre-service teachers found that enjoyment positively affects intrinsic motivation and extrinsic motivation (Guo & Xu, 2024). This evidence confirm that emotions affect motivational results through individuals' assessment of control and value.

Although the importance of emotions in teachers' behavior has been recognized, research mainly focuses on the impact of emotions on general teaching behavior or professional burnout (Frenzel et al., 2016). There is relatively limited attention to the field of music education. Joy, anger, and anxiety are considered to be the most common and distinguishable emotional dimensions in teaching situations (Frenzel et al., 2016).

5.2.3. Motivation

Within IMBP, motivation indirectly affects behavioral intentions by influencing subjective norms (Fishbein & Ajzen, 2010; Kreijns et al., 2013). To observe the differences in motivational orientations, this study applies Self-Determination Theory (SDT; Ryan & Deci, 2000a, 2000b) and distinguishes three types of motivation: intrinsic motivation, participation because of the fun and satisfaction of the activity itself; extrinsic motivation, participation because of extrinsic rewards, punishments, or obligations; and amotivation, lack of value perception and competence.

In educational research, teachers' motivation not only influences classroom practices and professional development, but also determines the extent and persistence with which teachers adopt innovative and creative teaching behaviors (Gorozidis & Papaioannou, 2014). Evidence from music education emphasizes the importance of motivation as a background factor related to perceived competence and intention. Ward-Steinman (2007) provides rare empirical evidence in music education, indicating that teachers reported relatively low confidence in their own improvisation ability, while simultaneously expressing the highest level of interest in learning more about how to teach improvisation. This pattern shows that motivational orientations may persist even when perceived competence is limited, thereby influencing teachers' openness to future

engagement in including improvisation activity in teaching. These findings highlight the importance of distinguishing between motivation and self-efficacy, especially in educational environment full of uncertainty and creative adventure.

5.2.4. Attitude

Attitude refers to an individual's positive or negative evaluation of a specific behavior, which is composed of behavioral beliefs and their evaluation (Ajzen, 1991). Teachers who have a positive belief towards improvisation can promote students' development, and active classroom management are more likely to integrate improvisation into daily teaching. For example, a survey of British primary school music teachers conducted by Koutsoupidou (2005) found that teachers who use improvisation are more likely to believe that improvisation has a positive impact on children's musical and creative development. It shows that they have a strongly positive attitude toward this pedagogical behavior.

5.2.5. Self-efficacy and Teacher-efficacy

According to Bandura (1997), self-efficacy reflects an individual's belief in their ability to complete specific actions and eventually achieve specific behaviors. The sense of effectiveness regulates behavior by influencing goal setting, effort, persistence, and emotional response (Bandura, 1997). Teacher efficacy refers to the specific form of efficacy in the teaching context, which is defined as teachers' capabilities that could affect students' engagement and learning outcomes (Tschannen-Moran & Hoy, 2001, p. 783). Tschannen-Moran and Hoy (2001) distinguished three dimensions of teacher efficacy (i.e., efficacy for student engagement, instructional strategies, and classroom management). Efficacy beliefs seem to be most pliable during the early stages of learning (Tschannen-Moran & Hoy, 2007), as their findings indicate that novice teachers relied more on vicarious experience and verbal persuasion, while experienced teachers' efficacy beliefs were mainly rooted in mastery experiences. In the music education field, the influence of efficacy beliefs on teachers' behavior of implementing improvisation in class is examined. Bernhard (2013) and Bernhard and Stringham (2016) also found that the confidence of teaching

improvisation of pre-service music teachers was directly related to their related mastery experience.

However, the relationship between self-efficacy (beliefs in one's own improvisation ability) and teacher-efficacy (beliefs that one can teach improvisation to students), as well as both constructs' contributions to behavioral intentions, has not been systematically tested in the integrated model. In this study, we add two efficacy beliefs into our construct: self-efficacy for improvisation activities and teacher efficacy for leading improvisation activities. Our construct of teacher efficacy for leading improvisation activities also includes the three dimensions.

5.2.6. Subjective Norm

Subjective norm refers to the social influences individuals perceive to perform a particular behavior. These influences come from beliefs about whether important others think they should carry out the behavior (Ajzen, 1991). Such influences are not only experienced as pressure but may also be perceived as support, encouragement, or simply "the normal way of doing things" within a professional context. For pre-service and in-service music teachers, subjective norm usually comes from their educators, colleagues, and school leaders. In IMBP, subjective norm is one of the three core proximal factors of behavior intention, reflecting the effect of social influence on individual decision-making (Fishbein & Ajzen, 2010; Kreijns et al., 2013).

5.2.7. Intention

Intention refers to the subjective willingness and plan of an individual to perform a specific behavior, reflecting the degree of an individual's commitment to that behavior (Ajzen, 1991). In IMBP, behavioral intention is the result of the joint action of the three proximal factors of attitude, subjective norm, and self-efficacy. It is an important variable that connects mental factors with actual behavior (Fishbein & Ajzen, 2010; Kreijns et al., 2013). In other words, the stronger the intention, the greater the chance that an individual will perform a particular behavior. A meta-analysis by Armitage and Conner (2001) demonstrated that intentions capture motivational effort and consistently represent the strongest proximal predictor of behavior.

5.2.8. Aim of the Study

Improvisation is a highly creative, flexible, and context-sensitive musical activity. It may have various forms across different educational settings. Teachers' actual use of improvisation may differ across lessons and settings. This study takes behavioral intention as the core dependent variable, aiming to measure the willingness and plan of pre-service and in-service music teachers to use improvisation. Specifically, behavioral intention includes two dimensions: (1) behavioral intention to use improvisation, which measures the extent to which teachers intend, expect, and plan to use improvisation in future teaching; (2) Persistence of behavioral intention, which measures the willingness of teachers to continue to use improvisation when facing time limitations, teaching challenges, and other difficulties. This study focuses on behavioral intention rather than actual behavior, given the highly situational and adaptive nature of improvisation.

In summary, there are three main gaps in the current literature. First, there is a lack of an integrated model based on IMBP that systematically examines the impact of emotions, motivations, attitudes, efficacy beliefs, and subjective norms on teachers' intentions to include improvisation activities in pedagogy, as well as the mediating paths among these constructs. Second, related research has limited the use of emotions as important background variables. The influence of emotions on intentions through proximal factors is still not clear. Third, there is a lack of systematic multi-group comparisons between pre-service and in-service music teachers, which limits the development of theoretical understanding and differentiated intervention strategies. This study aims to address these gaps by answering 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?

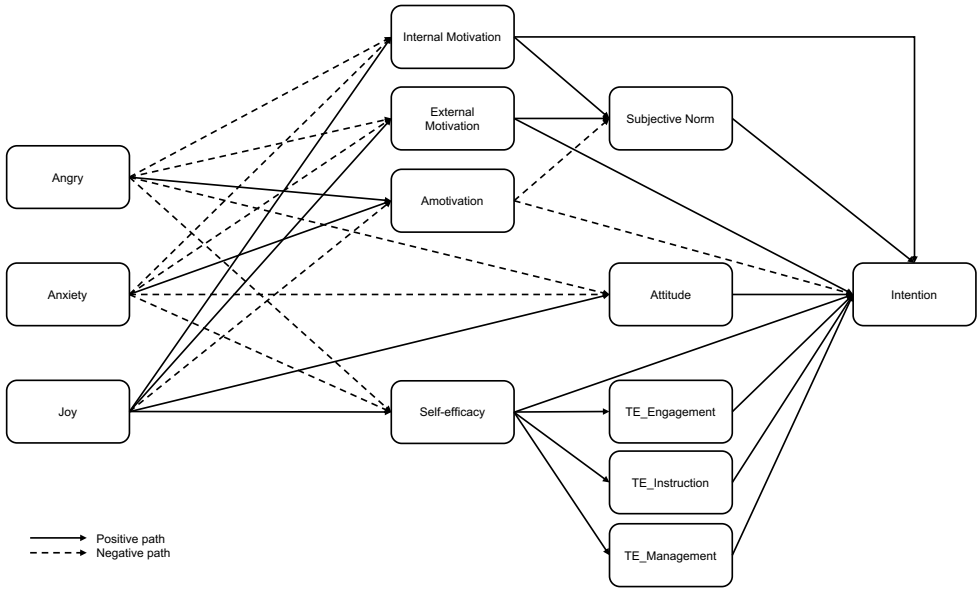


Figure 5.1 The proposed theoretical model based on IMBP

Figure 5.1 shows the proposed model. Through MG-SEM, this study seeks to provide empirical support for the application of IMBP in musical creative activity situations, depending on the understanding of the formation of teachers' intention to lead improvisation activities. This study will provide differentiated and evidence-based strategies for pre-service education and in-service teacher professional development.

5.3. Method

5.3.1. Research design and participants

This study adopted an explanatory sequential mixed-method design (Creswell & Clark, 2017). Quantitative survey data were first collected and analyzed, followed by semi-structured interviews to further interpret findings, especially unexpected quantitative patterns. Participants were Chinese in-service music teachers in primary and secondary schools, and pre-service music teachers enrolled in a music education program (Table 5.1). Participants were recruited through convenience sampling through the conservatory, normal university, and the professional development community of music teachers in China. The questionnaire was released through Qualtrics and accessed via an anonymous hyperlink or QR code. The first page of the questionnaire explained the purpose of the study,

Table 5.1 Demographic and descriptive statistics of participants (n=605)

Construct		In-service teacher	Pre-service teacher
=== Categorical variables: n (%) ===			
Gender	Female	171 (75.3%)	271 (71.7%)
	Male	55 (24.2%)	99 (26.2%)
	Others	1 (0.4%)	8 (2.1%)
Age	18–25	18 (7.9%)	367 (97.1%)
	26–35	99 (43.6%)	11 (2.9%)
	36–50	100 (44.1%)	
	50+	10 (4.4%)	
Educational Level	College	4 (1.8%)	
	Bachelor	174 (78.0%)	
	Master	39 (17.5%)	
	PhD	6 (2.7%)	
	Bachelor Year 1		103 (27.2%)
	Bachelor Year 2		116 (30.7%)
	Bachelor Year 3		54 (14.3%)
	Bachelor Year 4		68 (18.0%)
	Master Year 1		14 (3.7%)
	Master Year 2		12 (3.2%)
	Master Year 3		10 (2.6%)
	PhD student		1 (0.3%)
Instrument	Brass	1 (0.4%)	7 (1.9%)
	Percussion	4 (1.8%)	5 (1.3%)
	Piano	70 (30.8%)	121 (32.0%)
	String	30 (13.2%)	25 (6.6%)
	Voice	89 (39.2%)	184 (48.7%)
	Woodwind	9 (4.0%)	15 (4.0%)
	Others	24 (10.6%)	21 (5.6%)
Teaching Experience (Year)	0		257 (68.0%)
	1–2	28 (12.3%)	80 (21.2%)
	3–5	34 (15.0%)	31 (8.2%)
	6–10	49 (21.6%)	10 (2.6%)
	11–20	75 (33.0%)	
	21+	41 (18.1%)	
Teaching Level	Primary School	114 (50.2%)	70 (18.5%)
	Middle School	66 (29.1%)	17 (4.5%)
	High School	31 (13.7%)	38 (10.1%)
	Others	16 (7.0%)	253 (66.9%)
Location	West	71 (31.3%)	144 (38.1%)
	Central	71 (31.3%)	128 (33.9%)
	East	85 (37.4%)	106 (28.0%)
Total		227 (100.0%)	378 (100.0%)
=== Single items: Mean (SD) ===			
Verbal persuasion		2.77 (1.05)	3.10 (1.15)
Mastery experience		2.84 (0.94)	2.78 (1.03)
Familiarity with the national music curriculum		3.35 (0.89)	2.78 (0.93)

Table 5.2 Descriptions and sources of variables**.**

Construct	Abbr.	Description	Items	Source	Cronbach's alpha
Self-efficacy	SE	Teachers' perceptions of their capability to improvise music themselves.	3	Cheon et al. (2012)	0.846
Joy	JOY	Frequency/intensity of feeling enjoyment and enthusiasm when implementing improvisation activities.	4	Frenzel et al. (2016)	0.867
Anxiety	ANX	Frequency/intensity of feeling nervous, tense, or worried when implementing improvisation activities.	4		0.882
Anger	ANG	Frequency/intensity of feeling irritated, frustrated, or angry when implementing improvisation activities.	4		0.877
Intrinsic motivation	INT_MOT	Intrinsic reasons for implementing improvisation activities (e.g., interest, enjoyment, personal value).	4	Vansteenkiste et al. (2009)	0.905
Extrinsic motivation	EXT_MOT	Extrinsic reasons for implementing improvisation activities (e.g., extrinsic expectations, rewards, or pressure).	3		0.880
Amotivation	AMT	Lack of intention or perceived reasons to implement improvisation activities in teaching.	3	Fernet et al. (2008)	0.898
Attitude	AT	Teachers' overall positive or negative evaluations of including improvisation in their teaching.	6	Admiraal et al. (2017)	0.913
Subjective norm	SN	Perceived social pressure from significant others (e.g., colleagues, teacher educators, school leaders) to implement improvisation.	3	Teo and van Schaik (2012)	0.904
Teacher efficacy	TE_eng TE_instr TE_mgmt	Teachers' beliefs in their ability to effectively engage students, use instruction, and manage classrooms when implementing improvisation.	12	Tschannen-Moran and Hoy (2001)	0.931 0.914 0.935
Behavioral intention	INTENT	The degree to which teachers intend to include improvisation activities in their future teaching.	3	Teo (2011)	0.949
Attitude for future persistence		Willingness to continue implementing improvisation in teaching despite the time, effort, or stress involved.	2	Lam et al. (2010)	

participants' rights, and the voluntary and anonymous nature of participation. All participants provided informed consent before completing the questionnaire. The study was approved by the Research Ethics Committee of the first author's institution. Completing the questionnaire took about 10–15 minutes.

Following the quantitative analysis, interview participants were selected from the survey sample using maximum variation sampling to ensure diversity in teaching experience and geographical distribution. Twelve online semi-structured interviews were conducted, including six in-service music teachers and six pre-service music teachers. Each interview lasted 45–60 minutes, and informed consent was obtained in advance. The interview focused on participants' backgrounds and the core themes of the questionnaire variables. Follow-up questions used flexibly according to the interviewee's answers to obtain a more in-depth and specific description.

5.3.2. Measuring instruments

The questionnaire comprises four parts, including demographic information, background related to improvisation activities, all variables involved in the research model, and open-ended questions. In addition to demographic information, all items used a five-point Likert scale. All measuring items were adapted and modified based on existing validated scales to fit the context of music education (Table 5.2). The questionnaire was translated using a translation-back-translation procedure and combined with expert review and a pilot study for cultural adaptation. According to the feedback, the wording of individual expressions has been adjusted to ensure that the questions are clear and conform to the context of Chinese music education. Appendix H displays all items.

5.3.3. Data analysis

5.3.3.1. Quantitative data

First, confirmatory factor analysis was conducted to evaluate the measurement model. In this step, factor loadings were obtained, and the reliability and validity of each construct were assessed using composite reliability (CR) and average variance extracted (AVE) (Fornell & Larcker, 1981). In addition, inter-construct correlations and heterotrait-monotrait ratios (HTMT) were examined to evaluate convergent and discriminant validity.

Second, a structural model was specified to examine the strength of the relationships among the latent variables. Model fit was assessed through various widely recognized acceptable measures for the measurement model and structural model. A ratio of Chi-Square to Degrees of Freedom (χ^2/df) < 3 is considered an acceptable model fit (Schumacker & Lomax, 2010). Tucker–Lewis Index (TLI) and Comparative Fit Index (CFI) values > .90 indicated good model fit (Kline, 2016). In addition, values of the Standardized Root Mean Square Residual (SRMR) and the Root Mean Square Error of Approximation (RMSEA) < .08 are taken to indicate acceptable model fit (Hu & Bentler, 1999).

Third, to examine whether the structural relationships differ between in- and pre-service music teachers, MG-SEM was conducted. Following the procedures outlined by Vandenberg and Lance (2000), a multi-group measurement model was first established, and metric invariance was imposed by constraining factor loadings to be equal across groups to ensure measurement comparability. On this basis, two structural models were specified: (a) a freely estimated model, in which all structural paths were allowed to vary across groups, and (b) a constrained model, in which all structural paths were constrained to be equal across groups. A chi-square difference test was used to compare the two models. A significant deterioration in model fit under equality constraints indicated meaningful differences in the pattern of structural relationships between teachers and students.

In addition, indirect effects were examined using 5,000 bootstrapping procedures with 5,000 resamples and 95% confidence intervals (Preacher & Hayes, 2008). When the confidence interval did not include zero, indirect effects were considered statistically significant. Separate mediation analyses were conducted for the two groups to compare potential differences. All analyses were performed in R (version 4.5.2) using the lavaan package (Rosseel, 2012).

5.3.3.2. Qualitative data

Interview data were analyzed using thematic analysis (Braun & Clarke, 2006). The coding process combines deduction and induction methods. The initial coding was based on the quantitative model and allowed additional themes to emerge from the data. Mixed-method integration followed an explanatory sequential design, in which qualitative findings were used to interpret and explain key quantitative results.

5.4. Result

5.4.1. Descriptive statistics

Descriptive statics are presented in Table 5.1. At the end of the questionnaire, participants were asked to indicate the forms of improvisation they typically used (multiple responses allowed). Vocal improvisation was the most frequently used activity (n = 389), followed by movement/dance (n = 347), group improvisation (n = 365), individual improvisation (n = 338), and instrumental improvisation (n = 295). A small number of participants selected "other" and provided examples such as rhythm/melody invention, sound-based role play, integrating rhythm/lyrics/stories, and instrument-specific activities (e.g., guzheng); some also reported no opportunities to engage with improvisation due to time limitation, lack of related knowledge and experience. Regarding frequency of use, most participants reported using improvisation once every 2–5 lessons (n = 285), followed by once every 6–10 lessons (n = 97) or less than every 10 lessons (n = 101). A smaller proportion reported using improvisation in every lesson (n = 66), whereas some reported never engaging in improvisation (n = 55).

5.4.2. Measurement model and model fit

Table 5.3 Fit index for CFA and SEM

Fit index	Criteria	CFA	SEM	MG-SEM (Free)	MG-SEM (Equal)
χ^2		2112.43	3293.62	5034.67	5090.29
df		1196	1239	2523	2552
χ^2/df	<3	1.77	2.66	2.00	2.00
CFI	>0.90	.966	.924	.909	.908
TLI	>0.90	.963	.919	.904	.904
RMSEA	<0.08	.036	.052	.057	.057
RMSEA 90% CI	Not including 0	[.033, .038]	[.050, .055]	[.055, .059]	[.055, .059]
SRMR	<0.08	.032	.051	.060	.063

The results indicated that the HTMT value (see Table 5.5) between behavioral intention to use improvisation and attitude toward future persistence in using improvisation exceeded the commonly recommended threshold of .90 (HTMT = .943), suggesting insufficient discriminant validity between the two constructs. This pattern indicates that, in the present study context, the two constructs may reflect a single underlying intention dimension rather than empirically distinct factors. Therefore, the

items from these two scales were combined into a single latent construct labeled **Intention**, which was subsequently used in all further structural analyses.

After this modification, the measurement model demonstrated good fit to the data (see Table 5.2). Reliability and convergent validity of all constructs have reached an acceptable level (see Table 5.3). Results of the confirmatory factor analysis (CFA) indicated that standardized factor loadings for all items were acceptable to strong, ranging from .657 to .963, and all loadings were statistically significant (ps < .001). Intrinsic consistency reliability was satisfactory for all constructs, with Cronbach's alpha values ranging from .846 to .949 (criterion: $\alpha \geq .70$) and CR values ranging from .839 to .950 (criterion: CR ≥ .70). Convergent validity was also supported, as the AVE values ranged from .629 to .790, exceeding the recommended threshold of .50. Overall, the HTMT values ranged from to .172 to .882, were all lower than the recommended threshold (.90), which supported the distinguishing validity of the model (see Table 5.4).

5.4.3. Structural model results and comparisons

The structural equation model demonstrated an acceptable fit to the data for both pre-service and in-service teachers. The MG-SEM with freely estimated structural parameters showed acceptable fitting indicators ($\chi^2/df = 2.00$, CFI = .909, TLI = .904, RMSEA = .057, SRMR = .060), indicating that the model adequately captured the relationships among constructs across groups.

To examine whether the structural relations differed between pre-service and in-service teachers, models with freely estimated and constrained structural paths were compared. The likelihood ratio test indicated that constraining the structural paths across groups led to a significant decrease in model fit ($\Delta\chi^2 = 54.97$, $\Delta df = 30$, $p = .004$). Consistent with this result, lower AIC and BIC values (AIC = 62989.02 vs. 62994.05; BIC = 64350.23 vs. 64487.42) further supported the freely estimated model, suggesting meaningful group differences in structural relationships.

Importantly, overall model fit remained stable across the configural, metric, and structural models, with highly similar CFI and RMSEA values. This indicates that the detected group differences were attributable to specific structural paths rather than to

differences in overall model fit. Accordingly, structural path coefficients were examined separately for pre-service and in-service teachers.

The model explained a substantial proportion of explained variance (R^2) across key endogenous constructs in both groups (see Table 5.6). The model accounted for 83% of the variance in intention among pre-service teachers and 87% among in-service teachers. Self-efficacy was also well explained (R^2 = .83 for pre-service teachers; .67 for in-service teachers), as were the three dimensions of teacher efficacy, particularly classroom management efficacy (R^2 = .90 and .93). These results indicate that the proposed predictors jointly provided strong explanatory power for teachers' intentions and efficacy-related beliefs regarding improvisation activities in their teaching.

Figures 5.2 and 5.3 present the standardized path models for in-service and pre-service teachers. The corresponding data details are reported in Appendices F and G. For reference, Appendix I presents the pre-service teachers' model with grey lines marking non-significant direct paths.

Table 5.4 Descriptive statistics, factor loadings, and reliability and validity indices for the measurement model

Construct	Mean (SD)	Item	Estimate	SE	z	p_sig	std_loading	item_rel	CR	AVE
Self-efficacy	2.85(1.00)	SE1	0.983	0.039	25.362	***	0.871	0.758	0.839	0.649
		SE2	0.842	0.044	19.179	***	0.712	0.506		
		SE3	0.912	0.039	23.452	***	0.827	0.683		
Joy	3.48 (0.93)	JOY1	0.928	0.039	23.763	***	0.818	0.670	0.866	0.629
		JOY2	0.886	0.036	24.659	***	0.838	0.703		
		JOY3	0.749	0.043	17.486	***	0.657	0.431		
		JOY4	0.888	0.036	24.857	***	0.843	0.711		
Anxiety	2.91 (0.97)	ANX1	0.879	0.042	20.842	***	0.749	0.561	0.881	0.653
		ANX2	0.851	0.039	21.799	***	0.773	0.598		
		ANX3	0.964	0.038	25.194	***	0.852	0.726		
		ANX4	0.959	0.038	25.173	***	0.852	0.726		
Anger	2.42 (0.88)	ANG1	0.881	0.035	25.066	***	0.852	0.725	0.880	0.644
		ANG2	0.826	0.038	21.991	***	0.781	0.61		
		ANG3	0.845	0.036	23.618	***	0.819	0.671		
		ANG4	0.761	0.036	20.947	***	0.755	0.571		
Intrinsic motivation	3.60 (0.83)	INT1	0.815	0.031	25.932	***	0.857	0.735	0.902	0.703
		INT2	0.752	0.032	23.452	***	0.804	0.646		
		INT3	0.817	0.031	26.571	***	0.870	0.757		
		INT4	0.765	0.032	24.237	***	0.822	0.675		
Extrinsic motivation	3.40 (0.79)	EXT1	0.774	0.031	24.726	***	0.836	0.699	0.885	0.652
		EXT2	0.827	0.032	25.625	***	0.855	0.730		
		EXT3	0.602	0.030	19.830	***	0.718	0.515		
		EXT4	0.773	0.033	23.759	***	0.814	0.662		
Amotivation	2.46 (0.90)	AMT1	0.850	0.034	24.712	***	0.842	0.708	0.897	0.746
		AMT2	0.849	0.033	25.758	***	0.866	0.750		
		AMT3	0.869	0.033	26.506	***	0.883	0.780		

Attitude	3.60 (0.74)	AT1	0.803	0.029	27.499	***	0.886	0.785	0.914	0.639
		AT2	0.665	0.033	20.092	***	0.720	0.518		
		AT3	0.727	0.030	23.830	***	0.810	0.656		
		AT4	0.649	0.030	21.835	***	0.764	0.583		
		AT5	0.635	0.030	21.320	***	0.751	0.564		
		AT6	0.772	0.030	25.842	***	0.853	0.728		
Subjective Norm	3.62 (0.84)	SN1	0.804	0.031	26.070	***	0.862	0.743	0.903	0.758
		SN2	0.795	0.030	26.111	***	0.863	0.745		
		SN3	0.803	0.029	27.321	***	0.887	0.787		
TE_Engagment	3.30 (0.84)	TE11	0.818	0.029	27.957	***	0.894	0.800	0.930	0.771
		TE2	0.769	0.031	25.099	***	0.837	0.700		
		TE3	0.801	0.029	27.219	***	0.880	0.774		
		TE4	0.840	0.030	28.311	***	0.901	0.811		
TE_Instruction	3.23 (0.85)	TE1	0.740	0.035	21.393	***	0.753	0.567	0.918	0.736
		TE6	0.841	0.030	27.645	***	0.89	0.792		
		TE7	0.820	0.030	27.498	***	0.887	0.787		
		TE8	0.850	0.031	27.807	***	0.893	0.797		
TE_Management	3.34 (0.85)	TE10	0.800	0.030	26.240	***	0.859	0.738	0.936	0.784
		TE12	0.841	0.031	27.428	***	0.882	0.779		
		TE5	0.778	0.028	27.753	***	0.889	0.790		
		TE9	0.861	0.030	28.878	***	0.910	0.828		
Intention	3.63 (0.93)	AP1	0.882	0.031	28.319	***	0.898	0.807	0.950	0.790
		AP2R	0.805	0.033	24.641	***	0.824	0.680		
	3.70 (0.94)	BIU1	0.908	0.031	28.920	***	0.909	0.826		
		BIU2	0.911	0.031	28.923	***	0.909	0.826		
		BIU3	0.898	0.031	28.517	***	0.902	0.813		

Note: M = mean; SD = standard deviation. Standardized factor loadings are reported. CR = composite reliability; AVE = average variance extracted. All factor loadings are statistically significant at $p < .001$.

Table 5.5 HTMT

Construct	SE	JOY	ANX	ANG	INT_MOT	EXT_MOT	AT	AMT	SN	TE_eng	TE_instr	TE_mgmt	INTENTION
SE	1												
JOY	0.627	1											
ANX	0.444	0.218	1										
ANG	0.214	0.340	0.689	1									
INT_MOT	0.376	0.635	0.223	0.348	1								
EXT_MOT	0.359	0.634	0.124	0.250	0.845	1							
AT	0.407	0.701	0.256	0.360	0.862	0.860	1						
AMT	0.172	0.334	0.307	0.473	0.391	0.288	0.334	1					
SN	0.314	0.598	0.184	0.263	0.736	0.767	0.728	0.344	1				
TE_eng	0.555	0.709	0.230	0.271	0.647	0.612	0.672	0.287	0.566	1			
TE_instr	0.542	0.593	0.210	0.209	0.539	0.536	0.552	0.217	0.526	0.797	1		
TE_mgmt	0.626	0.700	0.256	0.254	0.636	0.586	0.630	0.295	0.557	0.882	0.863	1	
INTENTION	0.345	0.638	0.230	0.362	0.820	0.778	0.779	0.442	0.862	0.611	0.534	0.618	1

Table 5.6 R^2 for each construct

	Pre-service teacher	In-service teacher
Self-efficacy	0.83	0.67
Intrinsic motivation	0.84	0.63
Extrinsic motivation	0.17	0.39
Attitude	0.65	0.61
Amotivation	0.86	0.71
Subjective norm	0.62	0.69
TE_Engagment	0.75	0.89
TE_Instruction	0.66	0.81
TE_Management	0.90	0.93
Intention	0.83	0.87

Note: ANG = anger; ANX = anxiety; JOY = joy; INT_MOT = intrinsic motivation; EXT_MOT = extrinsic motivation; AMT = amotivation; AT = attitude; SE = self-efficacy; SN = subjective norm; TE_Engagement = teacher efficacy for student engagement; TE_Instruction = teacher efficacy for instructional strategies; TE_Management = teacher efficacy for classroom management; Intention = intention to implement improvisation activities.

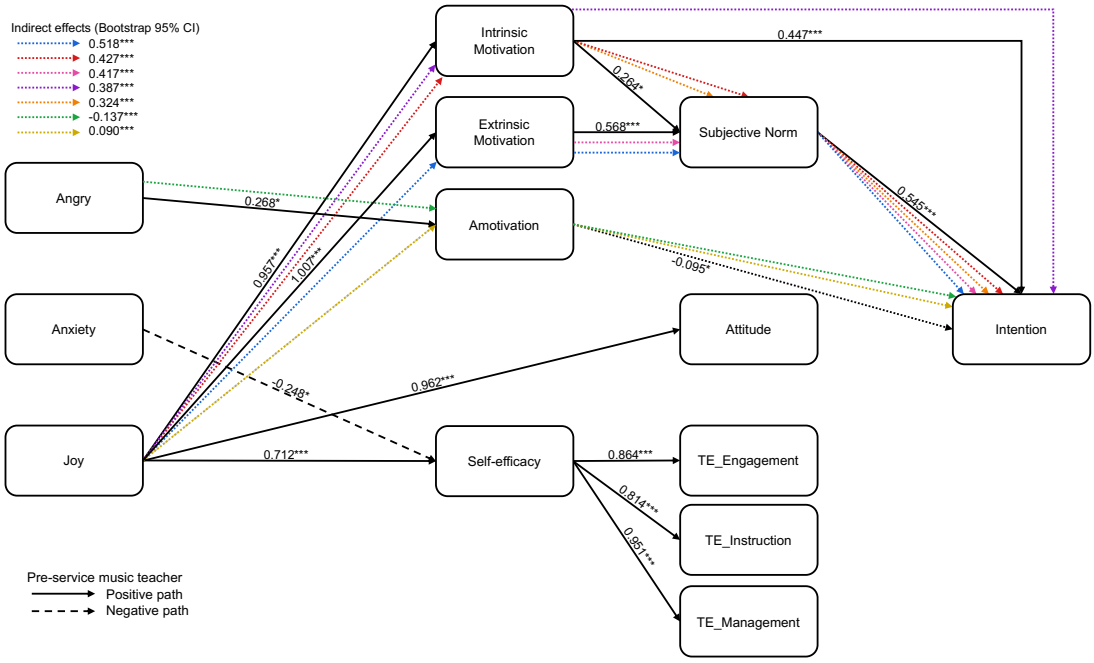


Figure 5.2 Direct and indirect effects predicting pre-service music teachers' intention to implement improvisation activities.

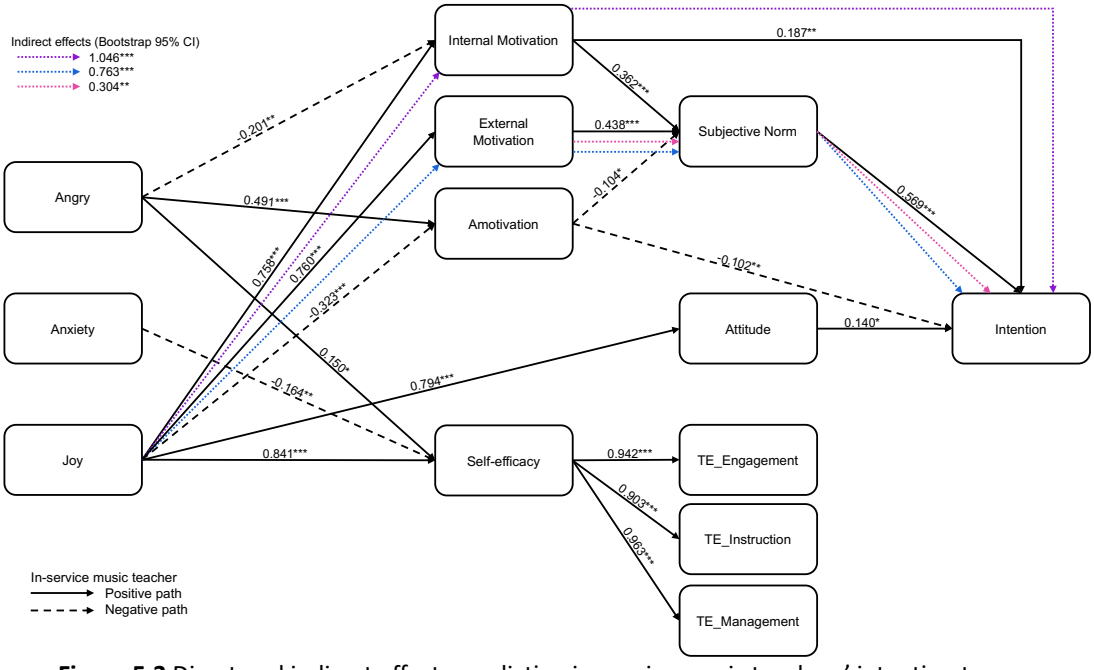


Figure 5.3 Direct and indirect effects predicting in-service music teachers' intention to implement improvisation activities

5.4.3.1. Direct effects

Joy emerged as the most stable and influential predictor across constructs. For both groups, joy significantly predicted intrinsic motivation (β = .957 for pre-service teachers; β = .758 for in-service teachers) and extrinsic motivation (β = 1.007; β = .760). Joy also significantly predicted self-efficacy (β = .712; β = .841) and attitude (β = .962; β = .794). Anxiety showed a more limited pattern, being negatively correlated with self-efficacy in both groups (β = −.248; β = −.164) but not significantly related to motivation or attitude. Anger showed clearly differentiated effects across the two groups. For pre-service teachers, anger positively predicted amotivation (β = .268). In contrast, among in-service teachers, anger was negatively associated with intrinsic motivation (β = −.201) and positively associated with amotivation (β = .491), while joy negatively predicted amotivation (β = −.323). Self-efficacy consistently predicted all three dimensions of teacher efficacy in both groups, with the strongest effect on classroom management (β = .951 for pre-service teachers; β = .963 for in-service teachers).

Regarding intention, subjective norm was the strongest direct predictor in both groups (pre-service teachers β = .545; in-service teachers β = .569), followed by intrinsic motivation (β = .447; β = .187). Amotivation showed a small but consistent negative association with intention in both groups (β = −.095; β = −.102). Extrinsic motivation, self-efficacy, and the three teacher-efficacy scales did not predict intention. A notable group difference shows in attitude, attitude failed to significantly predict intention among in-service teachers (β = −.042, p = .698), while attitude was a significant positive predictor of intention among in-service teachers (β = .140, p = .018).

5.4.3.2. Indirect effects

Bootstrapped indirect effect analyses (Appendix G) demonstrated distinct mediation patterns across groups. Among pre-service teachers, joy showed multiple significant indirect effects on intention, mainly through motivations and subjective norm. The strongest indirect effect was joy → extrinsic motivation → subjective norm → intention (effect = 0.518, 95% CI [0.146, 1.022]), followed by joy → intrinsic motivation → subjective norm → intention (effect = 0.427, 95% CI [0.107, 0.922]).

For in-service teachers, the pattern differed. The most substantial pathway was joy → intrinsic motivation → intention (effect = 1.046, 95% CI [0.280, 2.661]), indicating that joy's influence on intention was largely mediated by enhanced intrinsic motivation. The pathways joy → extrinsic motivation → subjective norm → intention (effect = 0.763, 95% CI [0.242, 1.831]) and extrinsic motivation → subjective norm → intention (effect = 0.304, 95% CI [0.115, 0.613]) also remained significant. Across both groups, indirect effects involving anxiety, self-efficacy and teacher-efficacy dimensions were non-significant.

Overall, subjective norm played a key intermediary role in both groups, linking motivation to intentions. However, intrinsic motivation among in-service teachers is more prominent, whereas pre-service teachers rely more on the path of subjective norm in the process of intention.

5.4.4. Qualitative results

5.4.4.1. Emotion as initial trigger

Many participants described joy as the most typical and common experience in improvisation. This joy often connects with classroom management and collective atmosphere. When discussing the feeling about improvisation, an in-service teacher (IT1) stated, "*It is fun*." The main reason was the collaborative classroom atmosphere. "*I really enjoy the vibe when everyone sings together, and the kids genuinely love it too*." This positive feedback pattern of "*I enjoy it, and students like it too*" makes improvisation become an activity that can enhance the vitality of the classroom, supporting the stable promotion of quantitative results of JOY on a variety of proximal factors from the empirical level.

Pre-service teachers' (PT) descriptions of joy were more concentrated on the excitement and curiosity brought by "creative unpredictability." PT6 described it as "*treasure hunting or opening Pandora's boxes*," emphasizing "*you never know what sparks might fly.*" It makes them feel even more "*excited*" when thinking about improvisation activities. Meanwhile, teachers often express joy as "expectation" toward students' outcomes. For example, IT5 mentioned feeling "*quite looking forward" to engaging students in improvisation activities, especially to "seeing what kind of improvisational creations the students might come up with right now."*

Consistent with the quantitative findings, showing that anxiety primarily influences efficacy beliefs. According to interviews, anxiety mainly comes up with "*What if I mess up?"* PT1 participant emphasized experiencing "*significant anxiety*" when improvising on the piano by showing examples herself. This anxiety came from fears of on-the-spot mistakes and student reactions: "*I'm really worried about playing wrong notes... Students might even heckle me... It feels like I'd lose my professional authority as a teacher."* This anxiety is not denying the value of improvisation but rather points directly to a reduced sense of *"competence"* and *"controllability.*" This further explains why in the qualitative results anxiety inhibited self-efficacy.

In the interviews, anger was almost always triggered by classroom management problems and individual student behaviors, which directly supports the significant positive association between anger and amotivation. PT5 noted that anger never emerged when classroom discipline was maintained. However, "*once classroom order becomes hard to control*," she felt that she "*could only shout angrily*." Another teacher (IT6) also pointed out that "*students not following instructions*" was the most influential factor; he further summarized the emotion during improvisation as "*anticipation mixed with anger*" because of the classroom management. This explains at the experiential level how anger increases amotivation and is more likely to further reduce teachers' intrinsic engagement in the teaching context. In addition, a high-school teacher participant (IT4) expressed deep frustration: "*Students have no musical theory background at all, so it's hard to include improvisation and other creative activities. This leaves me feeling quite helpless*."

Some participants acknowledged that classroom management difficulties were sometimes interpreted because of "*insufficient scaffolding of the activity*" (IT3). Such reflections motivated teachers to improve their own skills and teaching competence for improvisation and even broaden their repertoire. This further illustrates the significant positive association between anger and self-efficacy in the model.

5.4.4.2. Motivation and subjective norm

Consistent with MG-SEM, interviews revealed that teachers' subjective norms regarding "*the necessity of implementing improvisation*" were shaped by two primary

motivations: intrinsic motivation based on interest and pedagogical value, and extrinsic motivation derived from national recommendations and evaluation systems.

Intrinsic motivation was frequently expressed through "*the student feedback and sense of accomplishment*" pattern. Therefore, promoting teachers' perception of validity and sustainability. For example, IT2 emphasized that "*passion comes first… the feedback I received from the children also motivates me... it gives you a sense of accomplishment.*" IT6 also highlighted their commitment to doing improvisation primarily due to positive student feedback: "*Students enjoy this way of learning... Students can provide teachers with positive feedback*."

The normative sources corresponding to extrinsic motivation were highly specific in the interviews, primarily linked to curriculum policy and institutional evaluation context, such as the new national curriculum standards, subject-based pedagogical meetings (i.e., teachers organized pedagogical discussions within a specific subject area), public lesson observations, and professional training systems. IT6 stated that "*improvisation activities are mandatory*," and explained that subject-based pedagogical meetings and school-based public lesson evaluations "*place particular emphasis on creative activities."* Another in-service teacher summarized this normative pressure more directly: "*With the new national curriculum standards, everyone has to do it (improvisation).*" In addition, some participants noted that the practice is dependent on context. In high-visibility contexts, such as teaching competitions (i.e. formal competitive teaching events) or public lessons (i.e. lessons taught for observation and demonstration), improvisation was more likely to be regarded as a "*required*" component, whereas its use in everyday classroom teaching tended to be less frequent. PT3 noted that in public lessons, "*the improvisation part is very important, you must include it… But in the daily music classes… opportunities for improvisation are very limited.*"

5.4.4.3. Self-efficacy and teacher efficacy

During interviews, participants naturally distinguished two types of efficacy beliefs: one being self-efficacy regarding their own improvisation skills, and another being teaching confidence or teacher efficacy in organizing students when implementing improvisation

activities. This differentiation aligns with the structural finding in the quantitative results that self-efficacy strongly predicts all dimensions of teacher-efficacy.

Self-efficacy strongly predicted all dimensions of teacher-efficacy; however, it did not directly influence intention. IT3 explained: "*I'm confident in my ability to improvise, but that doesn't mean I can teach well... The challenge lies in classroom management… 48 kids get chaotic when they get excited.*" PT4 added: "*My confidence is about whether I can scaffold improvisational activities that students can engage with, not just whether I can improvise myself."*

Teacher efficacy for classroom management while improvisation showed marginal significance (β = .41 for both groups, p = .08/ .06), which was the most frequently mentioned concern among teachers. IT1 described classroom management efficacy as context-sensitive and adaptive: "*When class routines are well established, I can introduce new approaches more directly. In groups that need more structure, I start by piloting the activity in a settled class, refine the scaffolding, and then implement it with additional supports.*"

5.4.4.4. The formation and inhibition of intentions

Several teachers described improvisation activities as a mandatory component (see section 5.4.4.2), and several participants reported a context-dependent intention to implement improvisation in high-visibility lessons rather than in routine classes. Compared to extrinsic requirements, teachers more frequently mentioned "*enjoyment, interest, sense of accomplishment, student feedback*" as key reasons for intention to implement improvisation activity. IT6 noted, "*I witnessed students develop through improvisation, a shy third-grade student becoming confident by sixth grade. This truly convinced me of its value*."

When teachers felt overwhelmed by workload and time pressure, they tended to reduce the frequency of improvisation activities. For example, IT2 noted that "*just dealing with the heavy workload is already exhausting*." Several teachers explained that, in addition to music classes, they were also responsible for public lessons, teaching competitions, after-school programs, and extended school services. One in-service teacher (IT3), who taught up to 14 regular classes per week, five interest groups, and several after-school groups,

reflected that while she valued improvisation, "*doing it in every lesson is simply not realistic… It's physically exhausting.*"

Pre-service students' intentions often carry stronger conditional elements, which means they are willing to engage, but their intention depends on future school instruments and contexts. PT2 noted, "*If there were more equipment available... I'd be even more willing to do it,*" noting that key schools even place higher expectations on such activities. In-service teachers more frequently mentioned "*systematic training and student cooperation*" as preconditions for making improvisation a routine practice. IT6 mentioned, "*If there were integrated systematic training... I would be willing to incorporate these creative elements into every lesson.*" Some in-service teachers also expressed a "*strong desire*" while also acknowledging practical constraints (T3).

5.5. Discussion

5.5.1. Emotion as the distal motivator of intention

Joy showed strong positive influences on all proximal variables. This highlights the essential role of positive emotional engagement in forming intentions to implement improvisation activities. This pattern is consistent with the view of Control-Value Theory. There is a connection between achievement emotions and individuals' appraisals of control and value, thereby shaping motivation and engagement (Pekrun, 2006). Positive emotions promote exploration, flexibility, and creative engagement by broadening immediate thought-action repertoires, and progressively building individual repertoire (Fredrickson, 2001). Positive emotion could provide psychological energy and encourage teachers for motivation in highly uncertain improvisation activities. Qualitative data further revealed differences in sources of joy between the two groups: pre-service teachers emphasized excitement from "*creative unpredictability*," while in-service teachers more frequently associated joy with "*classroom atmosphere*" and "*student feedback and growth*." This finding corresponds with result from Hagenauer et al., (2015) which shows that teachers' classroom joy is positively associated with teacher-student closeness and student engagement, and negatively associated with lack of classroom discipline.

Anxiety primarily functions as a signal for capability. In both groups, anxiety significantly and negatively predicted self-efficacy, while showing no effect on motivations

or attitudes. During highly unpredictable improvisation activities, teachers tend to interpret tensions and worry as cues of "*whether I can handle this.*" Therefore, anxiety mainly impacts self-efficacy, rather than directly influencing their attitude or motivations. Anxiety shows a higher effect on self-efficacy in the pre-service music teacher group. As mastery experiences are considered the most powerful source of self-efficacy, other sources, including contextual inputs and emotional arousal, tend to play a larger role in self-assessment when having fewer mastery experiences (Tschannen-Moran & Hoy, 2007).

Anger shows the most distinct group differences. With limited teaching experiences, pre-service teachers' anger was situational and temporary, mainly due to classroom management difficulties, with its impact limited to a slight increase in amotivation. In-service teachers' anger was systematic and accumulated over time, not only severely undermining intrinsic motivation but also significantly enhancing amotivation. An unexpected positive correlation between anger and self-efficacy appeared in the in-service group. In-service teachers' anger usually came from classroom discipline and activity progression. The anger from these sources does not explain the loss of control but may trigger teaching reflection and problem-solving (e.g., "*I did not scaffold this activity well enough*"). Therefore, prompting teachers to seek strategy adjustments and professional learning that build mastery experiences and strengthen self-efficacy over time.

5.5.2. Motivation and subjective norm

Intrinsic motivation significantly predicted subjective norm and intention in both groups but showed different effect sizes. Among pre-service teachers, intrinsic motivation directly drives intention, while intrinsic motivation functioned more through subjective norms for the in-service group. This pattern is consistent with Self-Determination Theory by Ryan and Deci (2000b), who proposed that motivation can become internalized and self-endorsed while remaining socially shaped. Thus, pre-service teachers' intrinsic motivation may function more as a personal driver of intention, whereas in-service teachers' motivation is more likely to be perceived as subjective norms and support.

Extrinsic motivation supported the core assumption of the IMBP through the strong mediating effect of subjective norms, rather than directly predicting intention (Kreijns et al., 2013). Interviews revealed that the origins of subjective norms are specific, such as national

curriculum standards, school-based teaching evaluations, and teaching competitions. These subjective norms regard improvisation activities as mandatory or expected part of music lessons. However, findings showed that improvisation was more commonly implemented in highly visible contexts (e.g., public lessons) than in everyday teaching. This may reflect common challenges associated with improvisation activities, such as limited instructional time and classroom management concerns (Koutsoupidou, 2005).

Amotivation negatively predicted intention in both groups and acted as a mediator for anger and intention. This indicated that amotivation is not a direct product of emotion but rather an accumulative result of frustrated needs. When teachers frequently perceive heavy workload, time pressure, and insufficient support may lead teachers to question both the feasibility and the value of implementing improvisation activities.

5.5.3. Self-efficacy and teacher efficacy

Self-efficacy strongly predicted all dimensions of teacher efficacy (engagement, instruction, and classroom management), also influenced by emotions, especially joy. Interviews clearly distinguished two efficacy beliefs: "*I can improvise*" (self-efficacy) and "*I can teach improvisation well*" (teacher efficacy). This supported a hierarchy in which personal capability beliefs form the foundation of more context-specific teaching efficacy. However, there was no significant direct relationship between the efficacy beliefs and intention across both groups, which challenges the common assumption that stronger efficacy beliefs translate into stronger implementation intentions (Kreijns et al., 2013; Tschannen-Moran & Hoy, 2001; Zee & Koomen, 2016).

One possible explanation is that the traditional teaching efficacy emphasizes control and predictable outcomes (e.g., "I can make students follow the rules"), while improvisation activities as a creative activity, which requires on-the-spot spontaneous responses. Improvisation requires "letting go" and collaborative exploration, especially in free improvisation (Hickey, 2009; Ng, 2021). Our interview supports this interpretation: teachers frequently mentioned classroom management challenges, "48 kids get chaotic when they get excited," indicating their understanding of "effective teaching" remains tied to control-oriented efficacy.

Efficacy beliefs may not directly predict intention, but through attitude (evaluations of improvisation's value) and subjective norms (perceptions of social expectations). Although indirect effect paths in this study failed to confirm, teacher participants in our interview described situational adaptation strategies: piloting in stable classes and refining scaffolding before broader implementation.

5.5.4. The formation of teachers' intentions to implement improvisation

Our results indicated that subjective norm was the strongest predictor of intention for implementing improvisation activities among both groups, followed by intrinsic motivation. The main reason is that improvisation has been added in the national recommendations for several years (Ministry of Education of the People's Republic of China, 2011). The core position of subjective norm shows that teachers' behavioral intention is shaped by perceived expectations from colleagues, school leaders, professional communities, and curriculum standards. However, the interviews also reveal a potential risk. When implementation is mainly driven by external expectations rather than internal values, improvisation may be treated as a required performance. It becomes about completing the task instead of a deeply internalized practice. Meanwhile, the policy guidance, peer communication, and school leaders can help teachers gradually recognize the value of improvisation and integrate it into teaching more meaningfully.

It is important to note that attitude predicted intention only among in-service teachers. These group differences align with previous research findings. Teachers' attitudes are inherently complex and lack a simple linear correspondence (Fives & Buehl, 2012). Especially in the pre-service stage, teachers' attitudes are often based on idealized beliefs, rather than empirical experience, thus lacking practical implementation. Novice teachers' beliefs change significantly when they start their professional career, while their attitudes become more realistic and stable through practice (Hoy & Spero, 2005). The predictive role of in-service teachers' attitudes in this study shows that attitudes that are based on experience, are supported by classroom practice, and are more likely to help teachers make decisions about how to implement improvisation activities.

5.5.5. Limitations and directions for future research

There are several limitations that remain. First, the self-reported questionnaire was the primary data in this study, which may introduce common method bias. Although qualitative interviews were used to triangulate the findings, future studies could strengthen external validity by adopting classroom observations or student reports to capture how teachers' emotional changes over time, and how these dynamic processes shape the formation and maintenance of implementation intentions. To trace teachers' psychological developments from pre-service to in-service stages, especially at the turning point, future studies should employ longitudinal designs. For example, initial successful or unsuccessful experience with improvisation activities, and how it shapes the following developments in efficacy beliefs, motivations, and attitudes. Second, this study focuses on music teachers in China. Future research could validate this model in another context to yield more general conclusions. Third, traditional teacher efficacy scales may inadequately measure the special demands of improvisation activities in teaching. Tschannen-Moran and Hoy's (2001) classical scale emphasizes teacher control and predictable teaching behavior, while improvisation as a creative activity requires embracing uncertainty. Future research could develop a tailored scale for such creative activities.

5.6. Conclusions and implications

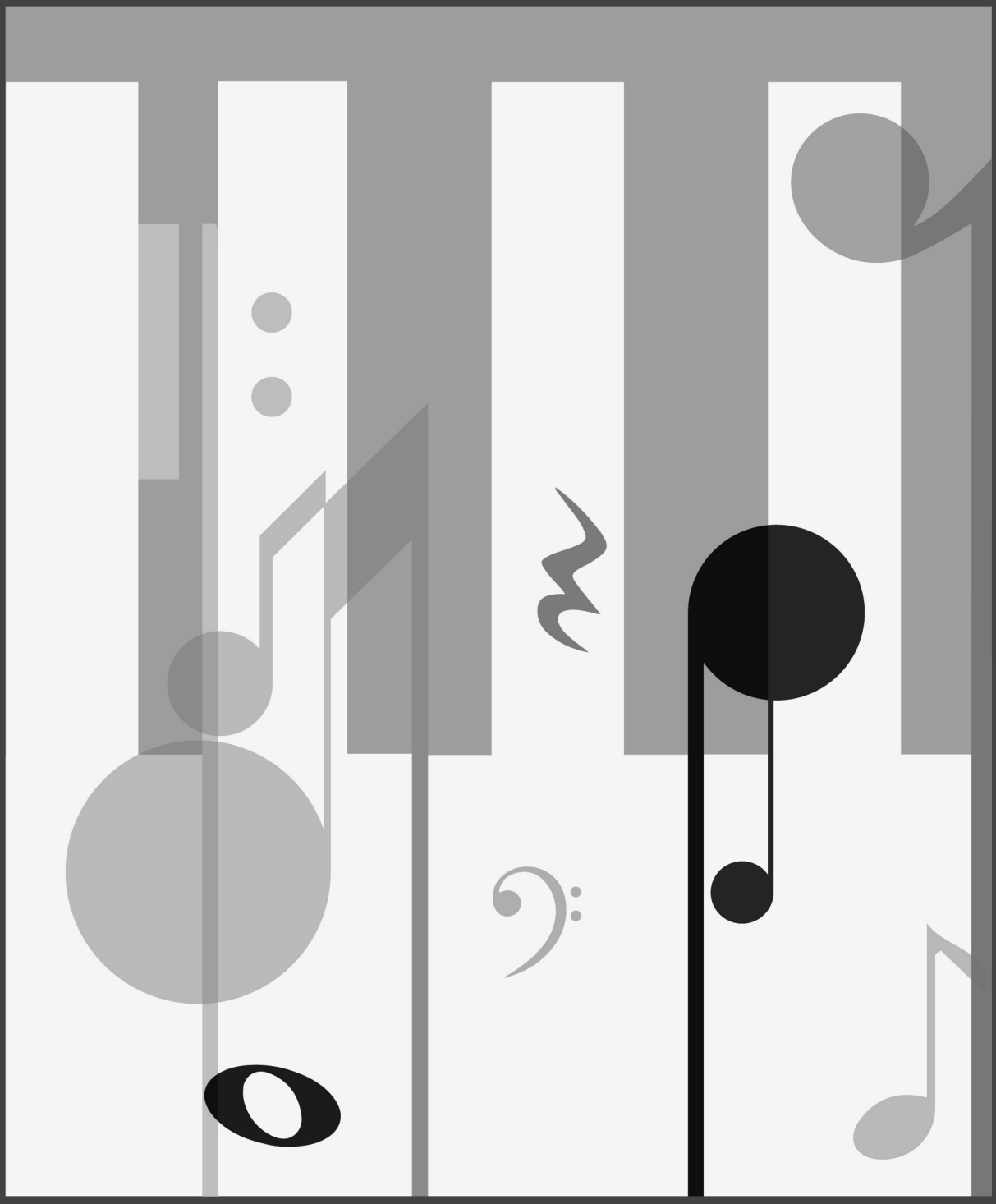
This study systematically integrates emotions, motivations, efficacy beliefs, attitudes, and subjective norm based on IMBP (Kreijns et al., 2013), providing an in-depth psychological interpretation underlying pre-service and in-service music teachers' intention to implement improvisation activities in teaching. Through the combination of MG-SEM and interviews, the research demonstrates that teachers' intentions to implement improvisation cannot be simply explained by a single belief or ability but rather are based on a complex system driven by emotion and attitude, guided by motivation and subjective norms, and supported by efficacy beliefs.

Theoretically, this study offers three primary contributions. First, joy emerged as the strongest and most stable distal variable within both groups, significantly influencing motivation, efficacy, and attitudes, while anger and anxiety showed inhibitory effects. The finding shows the important position of emotion in intention formation, supporting the

central role of emotion in the teacher's decision-making process (Frenzel et al., 2016; Pekrun, 2006). Second, intrinsic motivation and subjective norm served as the key proximal constructs for intention. Pre-service teachers' motivation more directly translates to intention, while in-service teachers' motivation relies more on professional norms and situational expectations. This reflects that teachers' intention is not only the individual's psychological process, but is also shaped by regulation, culture, and professional development. Third, self-efficacy and teacher efficacy did not directly predict intention in this study, suggesting that when implementing improvisation, confidence supports how teachers teach rather than whether they choose to teach. In environments that require continuous spontaneous creation and adaptation, efficacy beliefs seem essential but insufficient for building intention, highlighting the importance of motivational and normative factors.

Practically, this study supports differentiated teacher training approaches. Pre-service training should prioritize creating low-risk and enjoyable improvisation practice settings to foster a positive impression and experience. In-service teachers' professional development must focus on heavy workload, lack of resources or instruments, and student diversity, which often lead to frustration and amotivation. Both groups of teachers need to develop confidence in navigating uncertainty, responding to student creativity, and constructing the music learning process, rather than a control-oriented view of competence (Hickey, 2009). At the policy level, only the normative requirements without source support are insufficient to drive pedagogical transformation. Institutional design must prioritize fostering a professional culture that actively supports improvisation, avoiding perceived improvisation as a performance during public lessons.

Teachers' intention to implement improvisation is complex. It can be influenced by emotional foundation, motivational orientation, social persuasion, and beliefs about individuals' capabilities, with joy serving as the most essential catalyst. As one teacher remarked, witnessing a third-grade student grow into a confident sixth-grade student after years of improvisation, "*truly convinced me of its value."* This practice validated belief represents precisely the goal that teacher education and professional development should strive to achieve. This intention reflects a deep professional commitment nourished by joy, reinforced by social support, and robust enough to withstand pressures.



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.

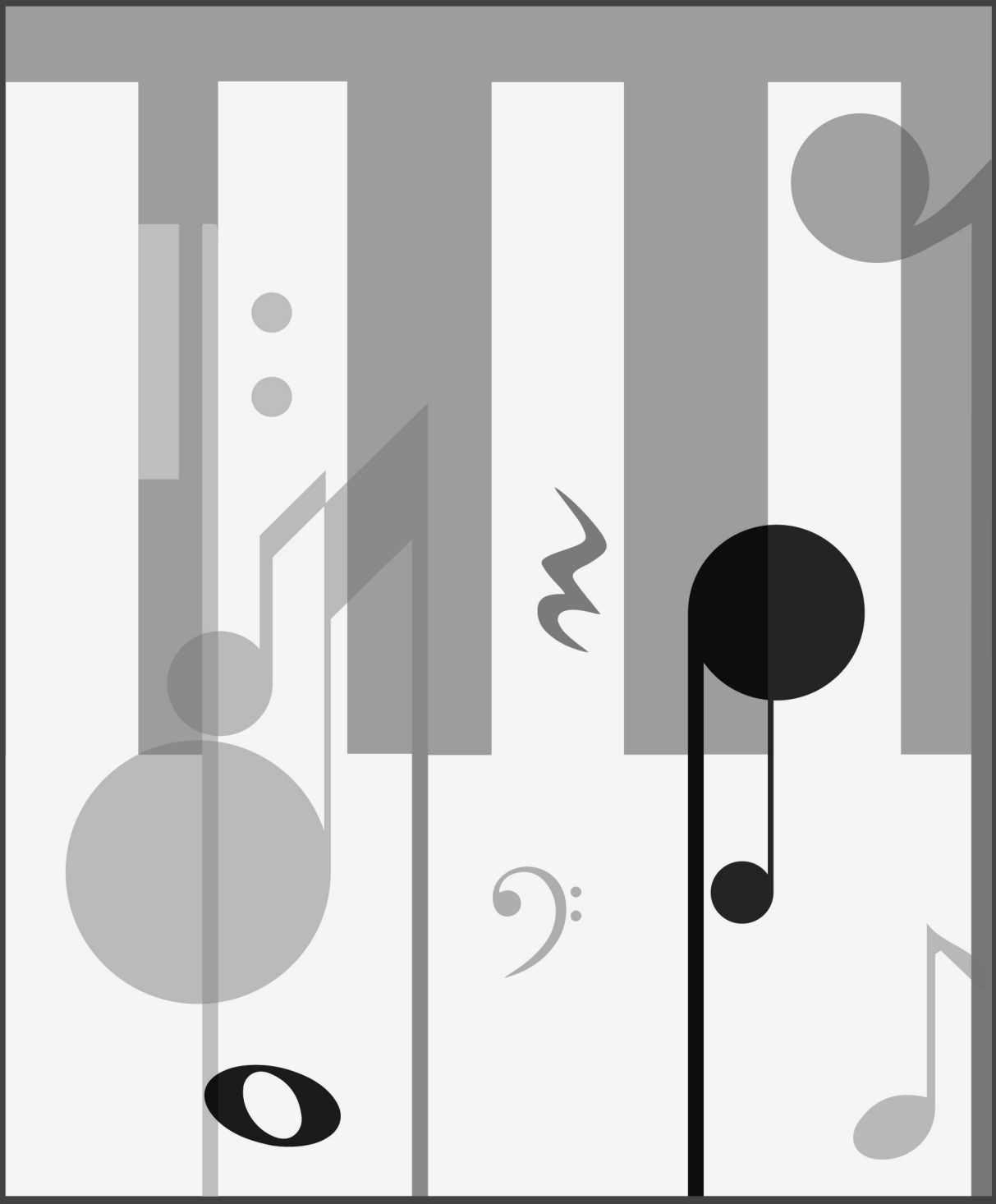
6.6. Conclusions

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.



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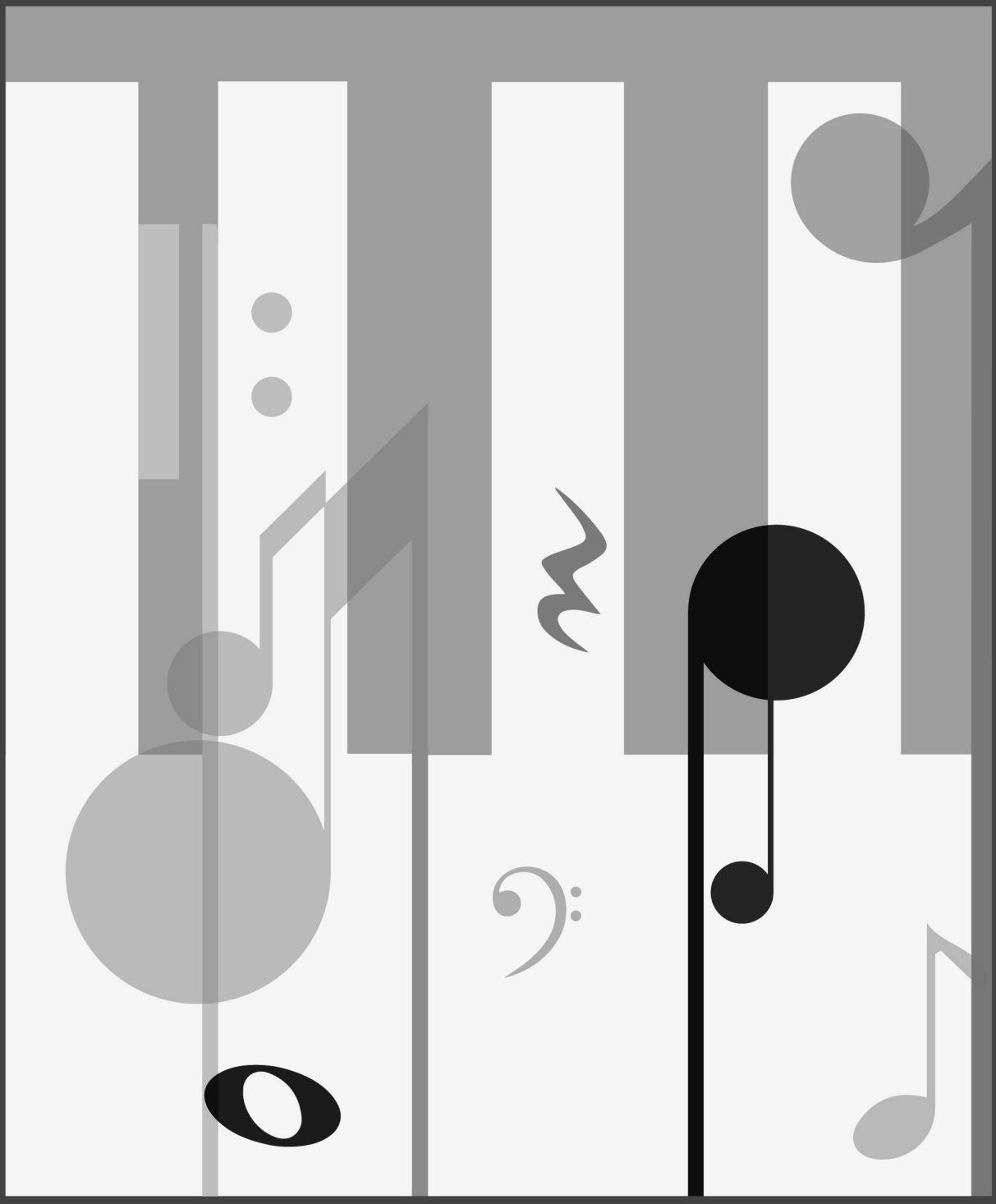


Appendices

Appendices

Appendix A Abbreviations

Abbr.	Full term
AI	Attitude toward inclusion of improvisation
AS	Attitude toward studying improvisation
AT	Attitude toward teaching improvisation
AVE	Average variance extracted
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CR	Composite reliability
EFA	Exploratory factor analysis
HTMT	Heterotrait–Monotrait ratio
IMBP	Integrative model of behavior prediction
M	Mean
MCTM	Measure of creative thinking in music
MG-SEM	Multigroup structural equation modeling
PCK	Pedagogical content knowledge
PLS-SEM	Partial least squares structural equation modeling
PMT	Pre-service music teacher
PRISMA	Preferred reporting items of systematic reviews and meta-analyses
RMSEA	Root mean square error of approximation
RQ	Research question
R^2	Explained variance
SD	Standard deviation
SDT	Self-determination theory
SEI	Self-efficacy for improvisation
SEM	Structural equation modeling
SETI	Self-efficacy for teaching improvisation
SRMR	Standardized root mean square residual
TLI	Tucker–lewis index
TPB	Theory of planned behavior
TRA	Theory of reasoned action
VIF	Variance inflation factor

Appendix B-1 Characteristics of included publications.

	Authors (year)	Region	Educational level	Participants group	N	Methodology	Data collection method
1	Augustyniak (2015)	Australia	Secondary	Student	40	Qualitative	• Questionnaire • Video • Interview
2	Bernhard and Stringham (2016)	US	Higher	Pre-service music teacher	397	Quantitative	Questionnaire
3	Black (2017)	Scotland	Secondary	Student	8	Qualitative	• Observation • Interview
4	Corcoran (2021)	Canda & UK	Primary and community	Teacher	8	Qualitative	• Observation • Interview • Field notes • Reflective journal
5	Cossey (2024)	UK	Multiple levels	Piano teacher	117	Mixed	Questionnaire
6	Cremades-Andreu and Lage-Gómez (2024)	Spain	Secondary	Student	267	Mixed	• Observation • Interview • Class diary • Questionnaire
7	Cuervo and Campayo (2024)	Spain	Secondary	Student	63	Quantitative	• Questionnaire • Pre–post test
8	de Bruin (2018a)	Australia	Higher	Teacher and student	4 teacher-student pairs	Qualitative	Case study • Video • Interview
9	de Bruin (2018b)	Australia	Higher	Teacher and student	5 teacher-student pairs	Qualitative	• Video • Interview
10	de Bruin (2019a)	Australia	Higher	Teacher / Expert improviser	6	Qualitative	Interview
11	de Bruin (2019b)	Australia	Higher	Teacher and student	3 teacher-student pairs	Qualitative	• Video observation • Interview
12	de Bruin (2022)	Australia	Higher	Student	3 projects	Qualitative	• Pre/post-questionnaire (open-ended) • Diary

13	Hanson (2023)	US	Higher	Pre-service music teacher	5	Qualitative	• Interview • Field notes • Classroom observations • Researcher journal
14	Healy and Albert (2025)	US	Higher	Student	4	Qualitative	• Interview • Focus group • Student reflections on readings • Interview • Reflective journal • Observation • Field notes
15	Hedden (2017)	Lithuania	Higher	Teacher	1	Qualitative	• Interview • Informal conversations • Classroom observation • Field notes
16	Hickey et al. (2016)	US	Higher	Student	19	Quantitative	Questionnaire
17	Ho (2022)	China	Secondary	Student	1083 (questionnaire); 53 (interview)	Mixed	• Questionnaire • Focus group interview
18	Huovinen and Keipi (2022)	Finland	Higher	Student	16	Mixed	• Retrospective verbal protocol • Expert ratings • Observation • Questionnaire
19	Johansen (2018)	Norway and Sweden	Higher	Student	13	Qualitative	• Interview • Practice session video • Practice diaries
20	Juntunen et al. (2015)	Finland	Primary and secondary in the conservatoire	Student	10	Mixed	• Qual: case study • Video observation • Quasi-experimental tests • Expert rating
21	Lage-Gómez and Cremades-Andreu (2019)	Spain	Secondary	Student	Not mention	Qualitative	• Observation • Interview • Questionnaire • Video recording • Classroom diary
22	Langley (2018)	US	Secondary	Student and teacher	314 students, 11 teachers	Mixed	Explanatory Sequential Design • Questionnaire

							• Focus group • Interview
23	Larsson and Öhman (2018)	Sweden	Primary	Student	Not mention	Qualitative	• Video • Classroom observation
24	Liu (2025)	China	Higher	Student and audience	183 students, 315 audience members	Mixed	• Expert rating • Audience survey • Video observation • App-based performance tracking
25	Lukács et al. (2022)	Hungary	Primary	Student	40	Quantitative	• Questionnaire • Tests
26	MacGlone and Gravem Johansen (2024)	Europe	Higher	Teacher	12	Qualitative	Interview
27	MacGlone et al. (2021a)	UK	Pre-school	Student	14	Mixed	• Interview • Video recording • Field notes • Rating sessions
28	MacGlone et al. (2021b)	UK	Pre-school	Parents and teachers	13 children (in improvisation workshop), 11 parents, 4 teachers	Qualitative	• Interview • Field notes
29	Marino and Chinn (2023)	US	Secondary	Student	43	Quantitative	• Pre-, mid-, post-instruction testing • Questionnaire • Audio recordings of improvisation
30	Mateos-Moreno and Erlanson (2022)	Sweden & Spain	Not mention	Teacher and student	3 teachers, 11 students	Qualitative	• Interview • Focus group • Teaching journals
31	Ng (2021)	Singapore	Higher	Pre-service music teacher	9	Qualitative	• Interview • Video recording • Field notes
32	Ng (2022)	Singapore	Higher	Pre-service music teacher	9	Qualitative	• Video recording • Field notes • Interview • Surveys • Focus group discussions • Performance observations

33	Ng (2023)	Singapore	Higher	Pre-service music teacher	9	Qualitative	• Interview • Video recording • Surveys • Field notes
34	Nikolaou (2023)	Greece	Higher	Pre-service generalist teacher	40	Qualitative	• Observation • Diary • Questionnaire (open- and closed-ended)
35	Norgaard (2017)	US	Secondary	Student	6	Qualitative	• Interview • Audio recording
36	Norgaard et al. (2019)	US	Secondary	Student	155	Quantitative	Test
37	Palaigeorgiou and Pouloulis (2018)	Greece	Primary	Student	30	Mixed	• Questionnaire • Observation • Focus group • Field Note • Interview
38	Palmer (2016)	US	High school & College	Student	70	Quantitative	• Questionnaire • Test • Recording
39	Pellegrino et al. (2019)	US	Higher	Teacher	3	Mixed	• Researcher journals • Interview • Survey • Observations • Written communications
40	Piazza and Talbot (2021)	US	Higher	Pre-service music teacher (PMT) & Music teacher educator (MTE)	331 (236 PMTs, 95 MTEs)	Quantitative	Questionnaire
41	Navarro Ramón and Chacón-López (2021)	Spain	Primary	Student	17	Mixed	• Pre-post test • Video analysis • Observation
42	Regier (2022)	US	Secondary	Teacher	264	Quantitative	Questionnaire

43	Rowe et al. (2015)	UK & Greece	Music school	Student	19	Qualitative	• Interview • Recording • Field notes • Questionnaire
44	Russell and Woodward (2024)	Australia	Higher	Student	11	Qualitative	• Interview • Recording
45	Savage and Harry (2024)	US	Secondary	Teacher	42	Qualitative	• Questionnaire • Interview
46	Smith (2024)	US	Higher	Pre-service music teacher	6	Qualitative	• Diary • Interview • Recording • Questionnaire • Group discussion
47	Snell and Azzara (2015)	US	Higher	Student	4	Qualitative	• Survey • Interview • Improvisation course assignment
48	Sutela et al. (2020)	Finland	Secondary special education	Student	13	Qualitative	• Interview • Recording • Research diary
49	Sutela et al. (2021)	Finland	Secondary special education	Student	13	Qualitative	• Interview • Recording • Research diary
50	Sutherland and Smith (2022)	Australia & HongKong	Higher	Student	8	Qualitative	Interview
51	Terauchi (2022)	Japan	Primary	Student	61	Qualitative	• Recording • Questionnaire • Observation
52	Tomlinson2015)	Australia	Pre-school	Student	21	Qualitative	• Recording • Interview • Observation • Field note
53	Tomlinson (2018)	Australia	Primary	Student	16	Qualitative	• Recording • Field note • Interview • Observation

54	Varvarigou (2017a)	UK	Higher	Student	46	Qualitative	• Reflective log • Feedback form • Interview
55	Varvarigou (2017b)	UK	Higher	Student	46	Qualitative	• Recording • Reflective log • Feedback form • Interview
56	Veloso (2017)	Portugal	Primary	Student	24	Qualitative	• Recording • Participant observation • Field note • Photographs and artefacts by children
57	Verneert et al. (2024)	Belgium	Secondary	Student and teacher	Student (n = 1282) Teacher (n = 14)	Mixed	Questionnaire
58	Wall (2018)	US	Primary	Student	6	Qualitative	• Observation • Interview • Video recording • Personal reflective notes
59	Wang (2023)	China	Higher	Student	122	Quantitative	Test
60	West (2019)	US	Kindergarten and adult	Teacher	2	Qualitative	• Observation • Interview • Field note
61	Yao and Qin (2024)	China	Higher	Student	187	Quantitative	• Pre-/post-test test • Expert rating • Self-report questionnaire
62	Zalar et al. (2015)	Slovenia	Primary	Student	18	Qualitative	• Observation • Recording • Field note • Reflective protocol
63	Zhang (2023)	China	Higher	Student	421 (Control = 221; Experimental = 200)	Quantitative	Pre-/post-test with control group test

Appendix B-2 Improvisation Activity

Category	Abbr.	Sub-category	Description	Example	Frequency (N)	Reference
Improvisation forms and techniques	COL	Collective improvisation	Multi-performer spontaneous music making.	The teacher-students' carried out music improvisations individually, as responses to visual, verbal, or musical stimuli, in pairs when they improvised using the call and response or the binary form (AB), and in groups when they improvised rhythmically or melodically using specific notes, on a melody or a song or when they had to work as a team to make decisions with their teammates to carry out the music improvisation (Nikolaou, 2023).	48	Augustyniak (2015); Bernhard and Stringham (2016); Black (2017); Corcoran (2021); Cremades-Andreu and Lage-Gómez (2024); Cuervo and Campayo (2024); de Bruin (2019a, 2022); Hanson (2023); Hedden (2017); Hickey et al. (2016); Ho (2022); Juntunen et al. (2015); Lage-Gómez and Cremades-Andreu (2019); Langley (2018); Larsson and Öhman (2018); MacGlone et al. (2021a, 2021b); MacGlone and Gravem Johansen (2024); Marino and Chinn (2023); Ng (2021, 2022, 2023); Nikolaou (2023); Norgaard et al. (2019); Palaigeorgiou and Pouloulis (2018); Palmer (2016); Pellegrino et al. (2019); Piazza and Talbot (2021); Navarro Ramón and Chacón-López (2021); Russell and Woodward (2024); Savage and Harry (2024); Snell and Azzara (2015); Sutela et al. (2020, 2021); Sutherland and Smith (2022); Terauchi (2022); Tomlinson (2015, 2018); Varvarigou (2017a, 2017b); Veloso (2017); Verneert et al. (2024); Wall (2018); Yao and Qin (2024); Zalar et al. (2015); Zhang (2023)
	IND	Individual improvisation	Individual spontaneous music making.	Each session consisted of the performance of an improvised jazz solo followed by an interview (Norgaard, 2016).	15	Black (2017); de Bruin (2018a, 2018b, 2019b); Hickey et al. (2016); Ho (2022); MacGlone and Gravem Johansen (2024); Mateos-Moreno and Erlanson (2022); Nikolaou (2023); Norgaard et al. (2019); Navarro Ramón and Chacón-López (2021); Rowe et al. (2015); Veloso (2017); Wall (2018); Yao and Qin (2024)
	FRE	Free improvisation	Improvising without structure, norms, or limits for spontaneity and creativity.	He starts by improvising freely on the guitar, playing all along the neck and looking for different timbres and approaches to the guitar (Veloso, 2017).	38	Augustyniak (2015); Black (2017); de Bruin (2018a, 2018b, 2022); Healy and Albert (2025); Hedden (2017); Hickey et al. (2016); Huovinen and Keipi (2022); Johansen (2018); Juntunen et al. (2015); Lage-Gómez and Cremades-Andreu (2019); Larsson and Öhman (2018); Lukács et al. (2022); MacGlone et

					al. (2021a, 2021b); MacGlone and Gravem Johansen (2024); Ng (2021, 2022, 2023); Nikolaou (2023); Norgaard (2016); Palaigeorgiou and Pouloulis (2018); Palmer (2016); Pellegrino et al. (2019); Navarro Ramón and Chacón-López (2021); Rowe et al. (2015); Smith (2024); Snell and Azzara (2015); Sutela et al. (2020); Terauchi (2022); Tomlinson (2015, 2018); Varvarigou (2017b); Veloso (2017); Verneert et al. (2024); Wall (2018); West (2019)
IWC	Improvisation with boundaries	Creating spontaneously within set limits to spark creativity and focus.	This activity constituted a short group improvisation with simple rules without using Sanka Play (Terauchi, 2022).	38	Augustyniak (2015); Bernhard and Stringham (2016); Black (2017); Cossey (2024); de Bruin (2018a, 2018b); Hanson (2023); Healy and Albert (2025); Ho (2022); Huovinen and Keipi (2022); Johansen (2018); Liu (2025); MacGlone et al. (2021b); MacGlone and Gravem Johansen (2024); Marino and Chinn (2023); Ng (2021, 2023); Nikolaou (2023); Norgaard (2016); Norgaard et al. (2019); Palaigeorgiou and Pouloulis (2018); Palmer (2016); Pellegrino et al. (2019); Navarro Ramón and Chacón-López (2021); Rowe et al. (2015); Russell and Woodward (2024); Snell and Azzara (2015); Sutherland and Smith (2022); Terauchi (2022); Tomlinson (2015); Varvarigou (2017a, 2017b); Verneert et al. (2024); Wall (2018); West (2019); Yao and Qin (2024); Zalar et al. (2015); Zhang (2023)
MRV	Melodic or rhythmic variation	Improvise variations based on the familiar melody or songs.	Improvise simple rhythmic variations and simple melodic embellishments on familiar melodies (Bernhard & Stringham, 2016).	23	Bernhard and Stringham (2016); Corcoran (2021); Cossey (2024); Johansen (2018); Larsson and Öhman (2018); Liu (2025); MacGlone and Gravem Johansen (2024); Ng (2022, 2023); Palmer (2016); Pellegrino et al. (2019); Piazza and Talbot (2021); Rowe et al. (2015); Terauchi (2022); Tomlinson (2018); Varvarigou (2017a, 2017b); Wall (2018); Wang (2023); West (2019); Yao and Qin (2024); Zalar et al. (2015); Zhang (2023)
JCB	Jazz Combo / Blues improvisation	Improvisation based on jazz or blues	An improvised solo over a modal tune's form (John Coltrane's "Impressions") and another over	17	Black (2017); Corcoran (2021); de Bruin (2018b); Healy and Albert (2025); Hickey et al. (2016); Johansen (2018); Lage-Gómez and Cremades-Andreu

			traditions, as well as harmonic structures.	a 12-bar blues form (Sonny Rollins's "Sonnymoon for Two") (Marino & Chinn, 2023).		(2019); Marino and Chinn (2023); Ng (2022); Norgaard (2016); Norgaard et al. (2019); Palmer (2016); Pellegrino et al. (2019); Regier (2022); Russell and Woodward (2024); Snell and Azzara (2015); Wall (2018)
	CAR	Call and response	A dialogue-like interaction between two performers or groups who play a musical phrase and react with a complementary phrase.	To converse musically, improvisers need to tap into a wide repertoire of personalized musical vocabulary (e.g., musical motifs, rhythmic patterns, harmonic progressions) to express themselves freely and respond appropriately to fellow players' musical stimuli (Ng, 2023).	16	Augustyniak (2015); Bernhard and Stringham (2016); Cossey (2024); de Bruin (2018a, 2018b); Hickey et al. (2016); Ng (2021, 2022, 2023); Nikolaou (2023); Norgaard et al. (2019); Pellegrino et al. (2019); Snell and Azzara (2015); Sutela et al. (2021); Verneert et al. (2024); Wall (2018)
	RR	Repetitive riffs	Building and changing improvisational concepts on repeating melodic patterns or motifs.	For example, at one point, the students developed a riff they enjoyed, so I asked them to return to the next session with another riff to play for the group (Wall, 2018).	12	Augustyniak (2015); Bernhard and Stringham (2016); Corcoran (2021); Hedden (2017); Hickey et al. (2016); Liu (2025); Ng (2021, 2022, 2023); Rowe et al. (2015); Varvarigou (2017a); Wall (2018)
Tools & Mediums-Specific improvisation	INS	Instrument improvisation	Using the acoustic instrument as the primary medium for spontaneous musical creation.	For example, when Jared began his group performance with a 12-bar blues harmonic groove on his electric guitar in the first CFMI session, fellow players entered the performance by filling in musical roles common to the style—Megan with a bassline on the piano, Valerie with a melodic line on the same piano, and Adrienne with a rhythmic ostinato on a drum (Ng, 2022).	52	Augustyniak (2015); Bernhard and Stringham (2016); Corcoran (2021); Cossey (2024); Cremades-Andreu and Lage-Gómez (2024); Cuervo and Campayo (2024); de Bruin (2018a, 2018b, 2019b, 2022); Hanson (2023); Healy and Albert (2025); Hedden (2017); Huovinen and Keipi (2022); Johansen (2018); Juntunen et al. (2015); Lage-Gómez and Cremades-Andreu (2019); Larsson and Öhman (2018); Liu (2025); MacGlone et al. (2021b); MacGlone and Gravem Johansen (2024); Marino and Chinn (2023); Mateos-Moreno and Erlanson (2022); Ng (2021, 2022, 2023); Nikolaou (2023); Norgaard (2016); Norgaard et al. (2019); Palaigeorgiou and Pouloulis (2018); Palmer (2016); Navarro Ramón and Chacón-López (2021); Rowe et al. (2015); Russell and Woodward (2024); Savage and Harry (2024); Smith

						(2024); Snell and Azzara (2015); Sutela et al. (2021); Sutherland and Smith (2022); Terauchi (2022); Tomlinson (2015, 2018); Varvarigou (2017a, 2017b); Veloso (2017); Wall (2018); Wang (2023); West (2019); Yao and Qin (2024); Zalar et al. (2015); Zhang (2023)
	VOC	Vocal Improvisation	Using the human voice as the primary medium for spontaneous musical creation.	Improvisation began with the children singing long mf notes (MacGlone et al., 2021a).	19	Augustyniak (2015); Bernhard and Stringham (2016); Cuervo and Campayo (2024); de Bruin (2018b); Hedden (2017); Ho (2022); Lage-Gómez and Cremades-Andreu (2019); Lukács et al. (2022); MacGlone et al. (2021a); Ng (2022); Nikolaou (2023); Palaigeorgiou and Pouloulis (2018); Pellegrino et al. (2019); Russell and Woodward (2024); Terauchi (2022); Tomlinson (2015, 2018); Verneert et al. (2024); Zhang (2023)
	PER	Percussion-based improvisation	Using percussion as the primary medium for spontaneous musical creation.	Students played xylophones (tuned to the pentatonic scale), box drum, and bongo drums, while the teacher/ researcher accompanied them on piano (Transcript 1) (Tomlinson, 2018).	15	Cremades-Andreu and Lage-Gómez (2024); Hedden (2017); Lage-Gómez and Cremades-Andreu (2019); Larsson and Öhman (2018); MacGlone et al. (2021a); Ng (2021, 2022); Nikolaou (2023); Palaigeorgiou and Pouloulis (2018); Terauchi (2022); Tomlinson (2015, 2018); Veloso (2017); Verneert et al. (2024); West (2019)
	E&D	Electronic / Digital Tools	Using technology such as software or digital devices to create spontaneous music.	Uses Sibelius in a formal situation in class as well as Acid Studio as a loop-based product in class (Augustyniak, 2015).	10	Augustyniak (2015); Cossey (2024); Cremades-Andreu and Lage-Gómez (2024); Hickey et al. (2016); Ho (2022); Juntunen et al. (2015); Liu (2025); Palaigeorgiou and Pouloulis (2018); Rowe et al. (2015); Tomlinson (2015)
Reflection on Learning & Creating	CMS	Coaching & Mentorship & Scaffolding	Providing systematic advice and assistance to facilitate the development of improvisational abilities through training.	Teaching to an advanced improvisation student is a dynamic, fluid, and reflexive interplay of pedagogical applications of modelling, scaffolding, coaching, and reflective processes (de Bruin, 2019b).	23	Bernhard and Stringham (2016); de Bruin (2018a, 2018b, 2019a, 2019b); Hedden (2017); Lage-Gómez and Cremades-Andreu (2019); Larsson and Öhman (2018); Lukács et al. (2022); MacGlone et al. (2021a, 2021b); MacGlone and Gravem Johansen (2024); Ng (2022, 2023); Nikolaou (2023); Palaigeorgiou and Pouloulis (2018); Pellegrino et al. (2019); Snell and Azzara (2015); Sutherland and Smith (2022); Terauchi (2022); Verneert et al. (2024); Wall (2018); West (2019)

	IM	Imitation & Modeling	Learning musical expression or strategies by observing and imitating the way teachers or others do.	Trills first initiated by Valerie on the piano are soon imitated by Megan at a higher register on another piano, followed by Jared on the electric guitar (Ng, 2022).	20	Augustyniak (2015); Corcoran (2021); de Bruin (2018a, 2018b); Hedden (2017); Hickey et al. (2016); Larsson and Öhman (2018); Liu (2025); MacGlone et al. (2021a); Mateos-Moreno and Erlanson (2022); Ng (2022, 2023); Pellegrino et al. (2019); Rowe et al. (2015); Snell and Azzara (2015); Terauchi (2022); Varvarigou (2017a, 2017b); Veloso (2017); Wall (2018)
	EXR	Exploring & Experimenting	Trying out musical ideas in different ways to see what works, manipulating musical material to explore possibilities.	Exploration/experimentation is key—there are no errors or bad sounds; each note is simply a stepping stone to the next (Ng, 2023).	19	Augustyniak (2015); Black (2017); de Bruin (2018a, 2018b, 2019a, 2019b); Huovinen and Keipi (2022); Lage-Gómez and Cremades-Andreu (2019); MacGlone et al. (2021b); Ng (2022, 2023); Nikolaou (2023); Palaigeorgiou and Pouloulis (2018); Rowe et al. (2015); Varvarigou (2017a, 2017b); Veloso (2017); Wall (2018); West (2019)
	LP	Listening & Personalizing	Actively listening and adapting to others to create one's own improvisational style (e.g., play by ear).	The tutor clarified that the task was not to produce an accurate imitation of the copied material. Instead, the students were free to make any changes they wished to the pieces copied, for example, changes in the dynamics, tempo, rhythm, harmony, and even the melody, as long as they kept the flow of the music (Varvarigou, 2017b).	18	Augustyniak (2015); Corcoran (2021); de Bruin (2018a, 2019a); Healy and Albert (2025); Mateos-Moreno and Erlanson (2022); Ng (2021, 2023); Nikolaou (2023); Pellegrino et al. (2019); Rowe et al. (2015); Russell and Woodward (2024); Savage and Harry (2024); Snell and Azzara (2015); Varvarigou (2017a, 2017b); Wall (2018); West (2019)
Interdisciplinary Improvisation	MOV	Improvised movement	Spontaneous physical movements or dance in response to the music.	In the first illustration, Sebastian, improvises movements in the moment recalling and reactualising specific disco dance moves (Larsson & Öhman, 2018).	22	Bernhard and Stringham (2016); Cuervo and Campayo (2024); Hedden (2017); Ho (2022); Larsson and Öhman (2018); Lukács et al. (2022); MacGlone et al. (2021a, 2021b); MacGlone and Gravem Johansen (2024); Ng (2023); Nikolaou (2023); Palaigeorgiou and Pouloulis (2018); Sutela et al. (2020, 2021); Terauchi (2022); Tomlinson (2015, 2018); Veloso (2017); Verneert et al. (2024); West (2019); Yao and Qin (2024); Zalar et al. (2015)

	FUS	Fusion with other art forms	Improvisation based on other art forms, for instance, painting, sculpture, or other visual stimuli.	For instance, he showed the class a picture or a short video, then asked them to create an interpretation as a group (Hedden, 2017).	22	Cossey (2024); Cremades-Andreu and Lage-Gómez (2024); Cuervo and Campayo (2024); Hedden (2017); Hickey et al. (2016); Ho (2022); Lage-Gómez and Cremades-Andreu (2019); Larsson and Öhman (2018); MacGlone et al. (2021a, 2021b); MacGlone and Gravem Johansen (2024); Nikolaou (2023); Palaigeorgiou and Pouloulis (2018); Navarro and Chacón-López (2021); Rowe et al. (2015); Smith (2024); Terauchi (2022); Tomlinson (2018); Veloso (2017); Verneert et al. (2024); West (2019); Zhang (2023)
Improvisation Games	STO	Story or role-based improvisation	Improvisation directed by a narrative, poem, or text, offering a contextual foundation.	Exercises emphasizing contrast between free and organized improvisations, improvisation inspired by poetry (Hickey et al., 2016).	19	Cossey (2024); Cremades-Andreu and Lage-Gómez (2024); de Bruin (2019b); Hedden (2017); Hickey et al. (2016); Huovinen and Keipi (2022); Juntunen et al. (2015); Larsson and Öhman (2018); MacGlone et al. (2021a, 2021b); Nikolaou (2023); Palaigeorgiou and Pouloulis (2018); Navarro Ramón and Chacón-López (2021); Sutela et al. (2021); Tomlinson (2015, 2018); Veloso (2017); West (2019); Zalar et al. (2015)
	GAM	Improvisation games	Structured, playful activities are intended to enhance and cultivate improvisation enjoyably and engagingly.	Secondly, the teacher created in the classroom a place inspired by Egypt and later, by India, conducting activities such as talking about countries, dressing up and games to improvise (Navarro Ramón & Chacón-López, 2021).	9	de Bruin (2018a, 2019a); Hedden (2017); Lukács et al. (2022); MacGlone et al. (2021a); Nikolaou (2023); Navarro Ramón and Chacón-López (2021); West (2019); Zalar et al. (2015)

Appendix B-3 Learning Outcome

Category	Abbr	Sub-category	Description	Example	Frequency (N)	Reference
Affective outcome	CON	Confidence	Developing a belief in one's abilities to perform and create music.	'I can't imagine that our first gig at […] was particularly good, but it boosted our confidence.'(Black, 2017)	43	Bernhard and Stringham (2016); Black (2017); Corcoran (2021); de Bruin (2018a, 2018b, 2019b, 2022); Healy and Albert (2025); Hedden (2017); Hickey et al. (2016); Juntunen et al. (2015); Langley (2018); Liu (2025); MacGlone et al. (2021a, 2021b); MacGlone and Gravem Johansen (2024); Marino and Chinn (2023); Ng (2021, 2022, 2023); Nikolaou (2023); Norgaard (2016); Norgaard et al. (2019); Palaigeorgiou and Pouloulis (2018); Palmer (2016); Pellegrino et al. (2019); Piazza and Talbot (2021); Navarro Ramón and Chacón-López (2021); Regier (2022); Rowe et al. (2015); Russell and Woodward (2024); Smith (2024); Snell and Azzara (2015); Sutela et al. (2020, 2021); Sutherland and Smith (2022); Terauchi (2022); Tomlinson (2018); Varvarigou (2017a, 2017b); Verneert et al. (2024); West (2019); Yao and Qin (2024)
	EMO	Emotional Express	Exploring and expressing emotions using musical improvisation.	The results point toward a view according to which the expressive content of improvisation gets specified and personalized during the very act of improvisation itself. (Huovinen & Keipi, 2022)	28	Augustyniak (2015); Cremades-Andreu and Lage-Gómez (2024); Cuervo and Campayo (2024); de Bruin (2022); Hedden (2017); Ho (2022); Huovinen and Keipi (2022); Johansen (2018); Juntunen et al. (2015); Lage-Gómez and Cremades-Andreu (2019); Larsson and Öhman (2018); Liu (2025); MacGlone et al. (2021b); MacGlone and Gravem Johansen (2024); Ng (2021); Nikolaou (2023); Palaigeorgiou and Pouloulis (2018); Rowe et al. (2015); Russell and Woodward (2024); Smith (2024); Sutela et al. (2020, 2021); Sutherland and Smith (2022); Terauchi (2022); Tomlinson (2015); Varvarigou (2017a); West (2019); Zalar et al. (2015)
	ENJ	Enjoyment / Joy	Achieving pleasure and satisfaction from engaging in improvisational activities.	According to one teacher, it was noticeable that students who do not take instrument lessons especially enjoyed the lesson (T1). (Verneert et al., 2024)	24	Black (2017); Corcoran (2021); Cossey (2024); Cremades-Andreu and Lage-Gómez (2024); Hanson (2023); Healy and Albert (2025); Hedden (2017); Juntunen et al. (2015); Lage-Gómez and Cremades-Andreu (2019); Larsson and Öhman (2018); Mateos-Moreno and Erlanson (2022); Nikolaou (2023); Palaigeorgiou and Pouloulis (2018); Pellegrino et al. (2019); Navarro Ramón and Chacón-López (2021); Rowe et al. (2015); Sutherland and Smith (2022); Terauchi (2022); Tomlinson (2015, 2018); Varvarigou (2017a); Verneert et al. (2024); Wall (2018); West (2019)

	MOT	Motivation	Increasing the desire to engage in and persist with musical activities.	Surveys at the end of the first year showed that the majority of the students grew to enjoy improvisation well enough that half of the students were improvising during their personal practice sessions, and every student expressed an intent to use improvisation in their future teaching. (Pellegrino et al., 2019)	24	Black (2017); Cossey (2024); Cremades-Andreu and Lage-Gómez (2024); de Bruin (2019a); Healy and Albert (2025); Hedden (2017); Lage-Gómez and Cremades-Andreu (2019); Marino and Chinn (2023); Mateos-Moreno and Erlanson (2022); Nikolaou (2023); Palaigeorgiou and Pouloulis (2018); Pellegrino et al. (2019); Piazza and Talbot (2021); Navarro Ramón and Chacón-López (2021); Rowe et al. (2015); Snell and Azzara (2015); Sutherland and Smith (2022); Terauchi (2022); Tomlinson (2015); Varvarigou (2017b); Verneert et al. (2024); Wang (2023); Yao and Qin (2024); Zhang (2023)
	SEL	Self-awareness	Acquiring understanding of one's emotions, strengths, and developmental areas through improvisation.	This manifested in the students' identity and confidence, but also a profound liminality and learning triggered by the new ensemble dynamic (de Bruin, 2022)	23	Black (2017); Corcoran (2021); Cuervo and Campayo (2024); de Bruin (2018a, 2019a, 2019b, 2022); Healy and Albert (2025); Huovinen and Keipi (2022); Lage-Gómez and Cremades-Andreu (2019); Ng (2021, 2022); Smith (2024); Snell and Azzara (2015); Sutela et al. (2021); Sutherland and Smith (2022); Terauchi (2022); Varvarigou (2017a); West (2019); Yao and Qin (2024); Zalar et al. (2015); Zhang (2023)
	REF	Reflection / Meaning Making	Reflecting on own learning, expression, or experience during improvisation and construct personal understanding and meaning from it.	In PEA, the pupils' previous experiences and the present situation are considered in order to understand the meaning-making process (Larsson & Öhman, 2018).	15	Black (2017); de Bruin (2018a, 2018b, 2019a, 2019b); Johansen (2018); Lage-Gómez and Cremades-Andreu (2019); Larsson and Öhman (2018); Ng (2023); Rowe et al. (2015); Russell and Woodward (2024); Smith (2024); Sutela et al. (2020); Sutherland and Smith (2022); Tomlinson (2018)
	FLO	Flow	A state of effortless immersion, creative liberty, or intrinsic reward during improvisation. It involves emotional engagement and a sense of fluency in real-time creative processes.	S1: (More attempts for 1 minute, finally stops). Wow that felt great, I just lost sense of time and indulged myself (de Bruin, 2018b).	9	Augustyniak (2015); de Bruin (2018b, 2019b); Johansen (2018); Juntunen et al. (2015); Lage-Gómez and Cremades-Andreu (2019); Mateos-Moreno and Erlanson (2022); Veloso (2017); Verneert et al. (2024)
Behavioral outcome	ENG	Engagement	Actively participating and, being involved in, or	We worked on jazz improv stuff and stuff	25	Black (2017); Corcoran (2021); Cremades-Andreu and Lage-Gómez (2024); de Bruin (2018b); Healy and Albert (2025);

			interested in the improvisational activities.	outside of what I was playing in school... stuff that was not the boring band parts that you get used to as trombone players (Healy & Albert, 2025).		Hedden (2017); Ho (2022); Lage-Gómez and Cremades-Andreu (2019); MacGlone et al. (2021a, 2021b); Marino and Chinn (2023); Nikolaou (2023); Norgaard et al. (2019); Palaigeorgiou and Pouloulis (2018); Pellegrino et al. (2019); Piazza and Talbot (2021); Snell and Azzara (2015); Sutela et al. (2020, 2021); Sutherland and Smith (2022); Tomlinson (2015); Varvarigou (2017a, 2017b); Verneert et al. (2024); West (2019)
	RIS	Risk-Taking	Willingness to experiment and try new ideas without fear of mistakes.	As PMTs grew confident improvising collaboratively, they began to take more risks by breaking away from behavioral conventions established in earlier CFMI sessions to venture into unfamiliar territory (Ng, 2022).	15	Black (2017); de Bruin (2018a, 2018b, 2019a, 2022); Hanson (2023); Hedden (2017); Hickey et al. (2016); Ng (2021, 2022); Snell and Azzara (2015); Tomlinson (2015); Varvarigou (2017a); Veloso (2017); Verneert et al. (2024)
	AUT	Autonomy	Applying initiative and making independent decisions in musical improvisation reflects learners' self-regulation, creative choices, and reduced reliance on external guidance.	Students with a few touches felt the ownership of attractive musical effects, and that fascinated them (Palaigeorgiou & Pouloulis, 2018).	12	Black (2017); Corcoran (2021); Lage-Gómez and Cremades-Andreu (2019); Ng (2023); Palaigeorgiou and Pouloulis (2018); Rowe et al. (2015); Savage and Harry (2024); Smith (2024); Snell and Azzara (2015); Sutela et al. (2020, 2021); Wall (2018)
	ADA	Adaptive Skills	Adjusting one's approach in response to changing musical contexts or challenges.	They could also adopt, adapt, or discard the strategies at will based on their learning needs and preferences (Ng, 2023).	7	Black (2017); de Bruin (2019a); Lage-Gómez and Cremades-Andreu (2019); Ng (2022, 2023); Sutela et al. (2021); Sutherland and Smith (2022)
Cognitive outcome	KNO	Musical Knowledge / Technical Skills	Improving knowledge of music theory and instrumental techniques. (e.g., aural skills, note reading, technique, and theory knowledge)	Seven participants mentioned an improved ability to recognize musical elements when listening to music, enabling them to better understand how these musical elements work together to create a	42	Augustyniak (2015); Black (2017); Cossey (2024); de Bruin (2018b, 2019a, 2019b, 2022); Hanson (2023); Healy and Albert (2025); Hedden (2017); Hickey et al. (2016); Johansen (2018); Lage-Gómez and Cremades-Andreu (2019); Larsson and Öhman (2018); Liu (2025); Lukács et al. (2022); MacGlone and Gravem Johansen (2024); Marino and Chinn (2023); Mateos-Moreno and Erlanson (2022); Ng (2023); Norgaard (2016); Palaigeorgiou and Pouloulis (2018); Palmer (2016); Pellegrino et al. (2019); Navarro Ramón and Chacón-López (2021); Rowe et al. (2015); Russell and Woodward (2024); Savage and Harry (2024); Snell

			whole (Russell & Woodward, 2024).		and Azzara (2015); Sutela et al. (2020, 2021); Sutherland and Smith (2022); Terauchi (2022); Tomlinson (2015, 2018); Varvarigou (2017a, 2017b); Wall (2018); West (2019); Yao and Qin (2024); Zalar et al. (2015); Zhang (2023)
CRE	Creativity	Generating innovative musical ideas and solutions during improvisation.	The posttest data demonstrate that a considerable increase in the level of creativity after the musical combinatorics course is noted in the category of "improvisation, composition, and theory," which confirms the influence of musical improvisations on creative skills; however, an increase in this indicator was expected (S. Wang, 2023).	36	Augustyniak (2015); Black (2017); Cremades-Andreu and Lage-Gómez (2024); de Bruin (2018a, 2018b, 2019a, 2019b, 2022); Hanson (2023); Hedden (2017); Ho (2022); Huovinen and Keipi (2022); Johansen (2018); Juntunen et al. (2015); Lage-Gómez and Cremades-Andreu (2019); Langley (2018); Larsson and Öhman (2018); MacGlone et al. (2021a, 2021b); Ng (2021, 2023); Nikolaou (2023); Palaigeorgiou and Pouloulis (2018); Navarro Ramón and Chacón-López (2021); Savage and Harry (2024); Snell and Azzara (2015); Sutherland and Smith (2022); Terauchi (2022); Tomlinson (2018); Varvarigou (2017a, 2017b); Wang (2023); West (2019); Yao and Qin (2024); Zalar et al. (2015); Zhang (2023)
CRI	Critical Thinking / Decision Making	Evaluating situations and making educated decisions when improvising.	Both teachers were observed to nurture the social nature of learning, responding in the moment, consciously directing the music curriculum toward the students' experience, and engendering creative and critical thinking while exploring collaborative construction of knowledge (J. M. West, 2019).	25	Augustyniak (2015); Black (2017); Cossey (2024); de Bruin (2018a, 2018b, 2019a, 2019b, 2022); Hanson (2023); Hedden (2017); Huovinen and Keipi (2022); Johansen (2018); Larsson and Öhman (2018); MacGlone and Gravem Johansen (2024); Nikolaou (2023); Norgaard (2016); Palaigeorgiou and Pouloulis (2018); Russell and Woodward (2024); Sutela et al. (2021); Terauchi (2022); Tomlinson (2018); Varvarigou (2017a); Wall (2018); West (2019); Yao and Qin (2024)
PRO	Problem-solving	Developing strategies to overcome musical challenges and achieve desired outcomes.	Music improvisation was a way to solve problems by the transmodal redesign of diverse experiences brought into the	10	Cossey (2024); de Bruin (2018a, 2018b, 2019b); Pellegrino et al. (2019); Tomlinson (2015, 2018); Veloso (2017); Wall (2018); Wang (2023)

				classroom (Tomlinson, 2015).		
Social outcome	COL	Collaboration	Working together in musical activities to achieve shared goals, foster mutual support, and strengthen communal bonds and a shared sense of belonging.	It is also interesting that students highlighted the value of teamwork since ImproviSchool inherently requires the constant collaboration and coordination of all class members. (Palaigeorgiou & Pouloulis, 2018)	34	Augustyniak (2015); Black (2017); Corcoran (2021); Cremades-Andreu and Lage-Gómez (2024); Cuervo and Campayo (2024); de Bruin (2018a, 2019a); Hanson (2023); Healy and Albert (2025); Ho (2022); Lage-Gómez and Cremades-Andreu (2019); Larsson and Öhman (2018); MacGlone et al. (2021a); MacGlone and Gravem Johansen (2024); Ng (2021, 2022, 2023); Nikolaou (2023); Palaigeorgiou and Pouloulis (2018); Pellegrino et al. (2019); Savage and Harry (2024); Sutela et al. (2020, 2021); Sutherland and Smith (2022); Terauchi (2022); Tomlinson (2015, 2018); Varvarigou (2017a, 2017b); Veloso (2017); Verneert et al. (2024); Wall (2018); West (2019); Zalar et al. (2015)
	COM	Communication skill	Effectively conveying ideas and listening to others in both musical and verbal forms.	They also emphasized how, through this group interaction, they developed interpersonal and leadership skills such as taking others' opinions on board, communicating within a group, and building awareness in playing with others (Varvarigou, 2017a).	21	(Black, 2017; Hedden, 2017; Huovinen & Keipi, 2022; P. Juntunen et al., 2015; Lage-Gómez & Cremades-Andreu, 2019; Larsson & Öhman, 2018; Lukács et al., 2022; MacGlone et al., 2021a; Ng, 2021, 2022, 2023; Sutela et al., 2021; Sutherland & Smith, 2022; Terauchi, 2022; Tomlinson, 2015, 2018; Varvarigou, 2017a, 2017b; Veloso, 2017; Wall, 2018; Zalar et al., 2015)
	EMP	Empathy	The ability to perceive, interpret, and respond sensitively to the emotions, intentions, and expressions of others through shared musical interaction.	From these comments, it is evident that this activity provided an opportunity to nurture empathy, respect for others, and self-understanding. (Terauchi, 2022)	8	Corcoran (2021); Cuervo and Campayo (2024); Huovinen and Keipi (2022); MacGlone and Gravem Johansen (2024); Ng (2021, 2022); Sutela et al. (2021); Terauchi (2022)

Appendix B-4 Improvisation Activity

	Authors (year)	Level of study	Improvisation forms and techniques	Tools & Mediums-Specific improvisation & Physical response	Reflection on Learning & Creating	Interdisciplinary Improvisation	Improvisation Games
1	Augustyniak (2015)	Secondary	COI; FRE; IWC; CAR; RR	INS; VOC; E&D	IM; EXR; LP		
2	Bernhard and Stringham (2016)	Higher	COI; IWC; MRV; CAR; RR	INS; VOC	CMS	MOV	
3	Black (2017)	Secondary	COI; IND; FRE; IWC; JCB		EXR		
4	Corcoran (2021)	Primary and community	COI; MRV; JCB; RR	INS	IM; LP		
5	Cossey (2024)	Multiple levels	IWC; MRV; CAR	INS; E&D		FUS	STO
6	Cremades-Andreu and Lage-Gómez (2024)	Secondary	COI	INS; PER; E&D		FUS	STO
7	Cuervo and Campayo (2024)	Secondary	COI	INS; VOC		MOV; FUS	
8	de Bruin (2018a)	Higher	IND; FRE; IWC; CAR	INS	CMS; IM; EXR; LP		GAM
9	de Bruin (2018b)	Higher	IND; FRE; IWC; CAR; JCB	INS; VOC	CMS; IM; EXR		
10	de Bruin (2019a)	Higher	COI		CMS; EXR; LP		GAM
11	de Bruin (2019b)	Higher	IND	INS	CMS; EXR		STO
12	de Bruin (2022)	Higher	COI; FRE	INS			
13	Hanson (2023)	Higher	COI; IWC	INS			
14	Healy and Albert (2025)	Higher	COI; FRE; IWC; JCB	INS	LP		
15	Hedden (2017)	Higher	COI; FRE; RR	INS; VOC; PER	CMS; IM	MOV; FUS	STO; GAM
16	Hickey et al. (2016)	Higher	COI; IND; FRE; CAR; JCB; RR	E&D	IM	FUS	STO
17	Ho (2022)	Secondary	COI; IND; IWC	VOC; E&D		MOV; FUS	
18	Huovinen and Keipi (2022)	Higher	FRE; IWC	INS	EXR		STO
19	Johansen (2018)	Higher	FRE; IWC; MRV; JCB	INS			
20	Juntunen et al. (2015)	Primary and secondary in conservatoire	COI; FRE	INS; E&D			STO

21	Lage-Gómez and Cremades-Andreu (2019)	Secondary	COI; FRE; JCB	INS; VOC; PER	CMS; EXR	FUS	
22	Langley (2018)	Secondary	COI				
23	Larsson and Öhman (2018)	Primary	COI; FRE; MRV	INS; PER	CMS; IM	MOV; FUS	STO
24	Liu (2025)	Higher	IWC; MRV; RR	INS; E&D	IM		
25	Lukács et al. (2022)	Primary	FRE	VOC	CMS	MOV	GAM
26	MacGlone and Gravem Johansen (2024)	Higher	COI; IND; FRE; IWC; MRV	INS	CMS	MOV; FUS	
27	MacGlone et al. (2021a)	Pre-school	COI; FRE	VOC; PER	CMS; IM	MOV; FUS	STO; GAM
28	MacGlone et al. (2021b)	Pre-school	COI; FRE; IWC	INS	CMS; EXR	MOV; FUS	STO
29	Marino and Chinn (2023)	Secondary	COI; IWC; JCB	INS			
30	Mateos-Moreno and Erlanson (2022)	Not mention	IND	INS	IM; LP		
31	Ng (2021)	Higher	COI; FRE; IWC; CAR; RR	INS; PER	LP		
32	Ng (2022)	Higher	COI; FRE; MRV; CAR; JCB; RR	INS; VOC; PER	CMS; IM; EXR		
33	Ng (2023)	Higher	COI; FRE; IWC; MRV; CAR; RR	INS	CMS; IM; EXR; LP	MOV	
34	Nikolaou (2023)	Higher	COI; IND; FRE; IWC; CAR	INS; VOC; PER	CMS; EXR; LP	MOV; FUS	STO; GAM
35	Norgaard (2017)	Secondary	IND; FRE; IWC; JCB	INS			
36	Norgaard et al. (2019)	Secondary	COI; IWC; CAR; JCB	INS			
37	Palaigeorgiou and Pouloulis (2018)	Primary	COI; FRE; IWC	INS; VOC; PER; E&D	CMS; EXR	MOV; FUS	STO
38	Palmer (2016)	High school & College	COI; FRE; IWC; MRV; JCB	INS			
39	Pellegrino et al. (2019)	Higher	COI; FRE; IWC; MRV; CAR; JCB	VOC	CMS; IM; LP		
40	Piazza and Talbot (2021)	Higher	COI; MRV				
41	Navarro Ramón and Chacón-López (2021)	Primary	COI; IND; FRE; IWC	INS		FUS	STO; GAM

42	Regier (2022)	Secondary	JCB				
43	Rowe et al. (2015)	Music school	IND; FRE; IWC; MRV; RR	INS; E&D	IM; EXR; LP	FUS	
44	Russell and Woodward (2024)	Higher	COI; IWC; JCB	INS; VOC	LP		
45	Savage and Harry (2024)	Secondary	COI	INS	LP		
46	Smith (2024)	Higher	FRE	INS		FUS	
47	Snell and Azzara (2015)	Higher	COI; FRE; IWC; CAR; JCB	INS	CMS; IM; LP		
48	Sutela et al. (2020)	Secondary special education	COI; FRE			MOV	
49	Sutela et al. (2021)	Secondary special education	COI; CAR	INS		MOV	STO
50	Sutherland and Smith (2022)	Higher	COI; IWC	INS	CMS		
51	Terauchi (2022)	Primary	COI; FRE; IWC; MRV	INS; VOC; PER; E&D	CMS; IM	MOV; FUS	
52	Tomlinson2015)	Pre-school	COI; FRE; IWC	INS; VOC; PER		MOV; FUS	STO
53	Tomlinson (2018)	Primary	COI; FRE; MRV	INS; VOC; PER		MOV	STO
54	Varvarigou (2017a)	Higher	COI; IWC; MRV; RR	INS	IM; EXR; LP		
55	Varvarigou (2017b)	Higher	COI; FRE; IWC; MRV	INS	IM; EXR; LP		
56	Veloso (2017)	Primary	COI; IND; FRE	INS; PER	IM; EXR	MOV; FUS	STO
57	Verneert et al. (2024)	Secondary	COI; FRE; IWC; CAR	INS; VOC; PER	CMS	MOV; FUS	
58	Wall (2018)	Primary	COI; IND; FRE; IWC; MRV; CAR; JCB; RR	INS	CMS; IM; EXR; LP		
59	Wang (2023)	Higher	MRV	INS			
60	West (2019)	Kindergarten and adult	FRE; IWC; MRV	INS; PER	CMS; EXR; LP	MOV; FUS	STO; GAM
61	Yao and Qin (2024)	Higher	COI; IND; IWC; MRV	INS		MOV	
62	Zalar et al. (2015)	Primary	COI; IWC; MRV	INS		MOV	STO; GAM
63	Zhang (2023)	Higher	COI; IWC; MRV	INS; VOC		FUS	

Note: COL = Collective improvisation, IND = Individual improvisation, FRE = Free improvisation, IWC = Improvisation with constraints, MRV = Melodic or rhythmic variation, CAR = Call and response, JCB = Jazz Combo / Blues improvisation, RR = Repetitive riffs, INS = Instrument improvisation, VOC = Vocal improvisation, PER = Percussion-based improvisation, DIT = Electronic / Digital Tools, CMS = Coaching & Mentorship & Scaffolding, EXR = Exploring & experimenting & Reflecting, IM = Imitation & Modeling, LP = Listening & Personalizing, BIM = Body-based improvisation, FUA = Fusion with other art forms, STO = Story or role-based improvisation, GAM = Improvisation games, Empty cell = no specific information in the article about the topic.

Appendix B-5 Learning Outcome

	Authors (year)	Affective outcomes	Behavioral outcomes	Cognitive outcomes	Social outcomes
1	Augustyniak (2015)	EMO; FLO		KNO; CRE; CRI	COL
2	Bernhard and Stringham (2016)	CON			
3	Black (2017)	CON; ENJ; MOT; SEL; REF	ENG; RIS; AUT; ADA	KNO; CRE; CRI	COL; COM
4	Corcoran (2021)	CON; ENJ; SEL	ENG; AUT		COL; EMP
5	Cossey (2024)	ENJ; MOT		KNO; PRO; CRI	
6	Cremades-Andreu and Lage-Gómez (2024)	EMO; ENJ; MOT	ENG	CRE	COL
7	Cuervo and Campayo (2024)	EMO; SEL			COL; EMP
8	de Bruin (2018a)	CON; SEL; REF	RIS	CRE; PRO; CRI	COL
9	de Bruin (2018b)	CON; REF; FLO	ENG; RIS	KNO; CRE; PRO; CRI	
10	de Bruin (2019a)	MOT; SEL; REF	RIS; ADA	KNO; CRE; CRI	COL
11	de Bruin (2019b)	CON; SEL; REF; FLO		KNO; CRE; PRO; CRI	
12	de Bruin (2022)	CON; EMO; SEL	RIS	KNO; CRE; CRI	
13	Hanson (2023)	ENJ	RIS	KNO; CRE; CRI	COL
14	Healy and Albert (2025)	CON; ENJ; MOT; SEL	ENG	KNO	COL
15	Hedden (2017)	CON; EMO; ENJ; MOT	ENG; RIS	KNO; CRE; CRI	COM
16	Hickey et al. (2016)	CON	RIS	KNO	
17	Ho (2022)	EMO	ENG	CRE	COL
18	Huovinen and Keipi (2022)	EMO; SEL		CRE; CRI	COM; EMP
19	Johansen (2018)	EMO; REF; FLO		KNO; CRE; CRI	
20	Juntunen et al. (2015)	CON; EMO; ENJ; FLO		CRE	COM
21	Lage-Gómez and Cremades-Andreu (2019)	EMO; ENJ; MOT; SEL; REF; FLO	ENG; AUT; ADA	KNO; CRE	COL; COM
22	Langley (2018)	CON		CRE	
23	Larsson and Öhman (2018)	EMO; ENJ; REF		KNO; CRE; CRI	COL; COM
24	Liu (2025)	CON; EMO		KNO	
25	Lukács et al. (2022)			KNO	COM
26	MacGlone and Gravem Johansen (2024)	CON; EMO		KNO; CRI	COL; EMP
27	MacGlone et al. (2021a)	CON	ENG	CRE	COL; COM
28	MacGlone et al. (2021b)	CON; EMO	ENG	CRE	
29	Marino and Chinn (2023)	CON; MOT	ENG	KNO	
30	Mateos-Moreno and Erlanson (2022)	ENJ; MOT; FLO		KNO	
31	Ng (2021)	CON; EMO; SEL	RIS	CRE	COL; COM; EMP
32	Ng (2022)	CON; SEL	RIS; ADA		COL; COM; EMP

33	Ng (2023)	CON; REF	AUT; ADA	KNO; CRE	COL; COM
34	Nikolaou (2023)	CON; EMO; ENJ; MOT	ENG	CRE; CRI	COL
35	Norgaard (2017)	CON		KNO; CRI	
36	Norgaard et al. (2019)	CON	ENG		
37	Palaigeorgiou and Pouloulis (2018)	CON; EMO; ENJ; MOT	ENG; AUT	KNO; CRE; CRI	COL
38	Palmer (2016)	CON		KNO	
39	Pellegrino et al. (2019)	CON; ENJ; MOT	ENG	KNO; PRO	COL
40	Piazza and Talbot (2021)	CON; MOT	ENG		
41	Navarro Ramón and Chacón-López (2021)	CON; ENJ; MOT		KNO; CRE	
42	Regier (2022)	CON			
43	Rowe et al. (2015)	CON; EMO; ENJ; MOT; REF	AUT	KNO	
44	Russell and Woodward (2024)	CON; EMO; REF		KNO; CRI	
45	Savage and Harry (2024)		AUT	KNO; CRE	COL
46	Smith (2024)	CON; EMO; SEL; REF	AUT		
47	Snell and Azzara (2015)	CON; MOT; SEL	ENG; RIS; AUT	KNO; CRE	
48	Sutela et al. (2020)	CON; EMO; REF	ENG; AUT	KNO	COL
49	Sutela et al. (2021)	CON; EMO; SEL	ENG; AUT; ADA	KNO; CRI	COL; COM; EMP
50	Sutherland and Smith (2022)	CON; EMO; ENJ; MOT; SEL; REF	ENG; ADA	KNO; CRE	COL; COM
51	Terauchi (2022)	CON; EMO; ENJ; MOT		KNO; CRE; CRI	COL; COM; EMP
52	Tomlinson2015)	EMO; ENJ; MOT	ENG; RIS	KNO; PRO	COL; COM
53	Tomlinson (2018)	CON; ENJ; REF		KNO; CRE; PRO; CRI	COL; COM
54	Varvarigou (2017a)	CON; EMO; ENJ; SEL	ENG; RIS	KNO; CRE; CRI	COL; COM
55	Varvarigou (2017b)	CON; MOT	ENG	KNO; CRE	COL; COM
56	Veloso (2017)	FLO	RIS	PRO	COL; COM
57	Verneert et al. (2024)	CON; ENJ; MOT; FLO	ENG; RIS		COL
58	Wall (2018)	ENJ	AUT	KNO; PRO; CRI	COL; COM
59	Wang (2023)	MOT		CRE; PRO	
60	West (2019)	CON; EMO; ENJ	ENG	KNO; CRE; CRI	COL
61	Yao and Qin (2024)	CON; MOT; SEL		KNO; CRE; CRI	
62	Zalar et al. (2015)	EMO; SEL		KNO; CRE	COL; COM
63	Zhang (2023)	MOT; SEL		KNO; CRE	

Appendix C

Interview guide

- Can you describe your current teaching situation? (e.g., grade levels, number of students, weekly lesson frequency)
- Which specific pedagogical approaches do you use (e.g., Orff, Kodály)?
- Which creative activities do you use in your class, and why? (e.g., composition, improvisation)
- How do you incorporate improvisation activities into your lessons?
- What challenges do you and your students face when implementing improvisation activities?
- Which improvisation activities do you find work well for your students, and why?
- How do you think improvisation activities influence your students, if at all?
- Do you evaluate students' improvisation products or provide feedback?
    - If yes, how?
    - If not, why?
- Which pedagogical approaches for teaching improvisation would you recommend?
- Are there any themes or experiences that we didn't address that you believe are essential for this interview?

Do you have anything to add or clarify?

Appendix D List of information of participants

ID	Gender	Age – Teaching experience (years)	Grade	Location	Instrument (Main - Second)	Improvisation Background
PMT1	F	26 – 2	4	Den Haag	Singing – Piano	Informal – She improvised (singing and play the piano) with her jazz-pianist father since childhood. She did not receive formal training before bachelor. At the Conservatory, she continued in ensemble and singing lessons, exploring jazz, blues, pentatonic, and text-based improvisations. Now she uses it for composition and teaching ideas. She feels comfortable but still self-critical.
PMT2	F	20 – 3	3	Amsterdam	Singing – Violin	Moderate (recent trained in jazz) – Transitioned from classical to jazz violin. She enjoys vocal and instrumental improvisation. Her first formal training was through jazz lessons. She applies simple story-based improvisation in private teaching.
PMT3	F	25 – 4	4	Utrecht	Flute – Piano, Singing	Minimal – Classically trained, limited experience before study. First exposure through Kobranie (vocal painting) and solfege hand-sign improvisations in year 1. Finds solo improvisation freeing, but group contexts anxiety-provoking. Applies light tonal exploration with flute students but seeks more theory and training to teach confidently.
PMT4	M	22 – 3	3	Tilburg	Bass Guitar – Drums	Informal – Played in family jam sessions since childhood (mainly drumming); later explored bass and free group improvisation; connects music improv with theater background; limited formal training, mostly self-initiated.
PMT5	F	26 – 1	3	Zwolle	Singing – Piano, Guitar	Moderate – Band experience with pop/rock improvisation; first formal course on improvisation (Indian, jazz, folk, bluegrass); scatting and vocal painting in bachelor; now uses improvisation for teaching piano/songwriting and body percussion in secondary school.
PMT6	M	22 – 2	4	Leiden	Classical Guitar – Piano	Moderate (multi-instrumental) – Self-taught piano and drums; early blues improvisation on guitar; later studied experimental/atonal improvisation in “music phenomenon” and “experimental improvisation” courses.
PMT7	F	21 – 2	3	Maastricht	Clarinet – Saxophone	Minimal – Classical background; first improvisation in theory lessons using pentatonic and jazz scales; initially anxious but learned to accept “no mistakes” mindset.
PMT8	M	29 – 10	4	Rotterdam	Piano – Carinet	Limited (classical) – Arranged for wind band and occasionally improvised at home; learned basic blues-scale improvisation in piano practicum and vocal painting workshops.
PMT9	M	22 – 3	3	Groningen	Piano – Drums	Advanced (jazz focus) – Four years of jazz piano; improvises weekly in jazz combos and elective free-improv classes; strong harmonic awareness and ensemble interaction.
PMT10	F	26 – 2	4	Enschede	Piano – Flute	Moderate (semi-classical) – Classical training; early melodic improvisation within known pieces; later practiced ensemble jamming and pop-rock arrangements during bachelor.

Appendix E Questionnaire dimensions and items

Constructs		Items
Attitude toward studying improvisation	AS1	Improvisation makes my study more satisfying.
	AS2	I like improvisation in my study.
	AS3	I feel more motivated for my studies when I improvise.
	AS4	Improvisation makes my study more effective.
	AS5	Improvisation is an effective way to enhance my musical development.
	AS6	Improvisation improves my musical abilities.
Attitude toward teaching improvisation	AT1	The use of improvisation will make my teaching more satisfying.
	AT2	I will certainly use improvisation in my future teaching.
	AT3	Students will be more motivated for my future teaching when I use improvisation activities.
	AT4	Because of the use of improvisation activities, my future teaching will become more efficient.
	AT5	I feel challenged to teach improvisation effectively in the future.
	AT6	The use of improvisation will improve my future teaching.
Attitude toward inclusion of improvisation	AI1	I feel it is important for me to learn to improvise in my bachelor's studies.
	AI2	I feel it is important for music teachers to include improvisation in their teaching.
	AI3	I feel it is important for music teachers to include improvisation in primary school.
	AI4	I feel it is important for music teachers to include improvisation in secondary school.
Self-efficacy for improvisation	SEI1	I am able to accomplish most of the improvisation tasks I set for myself.
	SEI2	When facing difficult tasks of improvisation, I am certain that I will accomplish them well.
	SEI3	In general, I think that I can obtain outcomes of improvisation activities that are important to me.
	SEI4	I believe I can succeed in improvisation activities to which I set my mind.
	SEI5	I am able to successfully overcome improvisation challenges.
	SEI6	I am confident that I can perform effectively on various improvisational tasks.
	SEI7	Compared to other people, I can improvise very well.
	SEI8	Even when the task is tough, I can improvise quite well.
Self-efficacy for teaching improvisation	SETI1	I am confident in using a variety of improvisation strategies as a future teacher.
	SETI2	I am confident in providing an alternative explanation or example of improvisation in my future teaching when students are confused.
	SETI3	I am confident in scaffolding good improvisation activities for my students.
	SETI4	I am confident in implementing various strategies of improvisation activity in my future teaching.
	SETI5	As a future teacher, I am confident in responding to difficult questions of improvisation from my students.
	SETI6	As a future teacher, I am confident in adjusting the difficulty of improvisation tasks to the proper level for students' needs.
	SETI7	My students will easily grasp the improvisation skills I teach.
	SETI8	I am confident in providing appropriate improvisation challenges for very capable students.

Appendix F Structural paths

IV		DV	Pre-service teacher							In-service teacher					
			Estimate	SE	z	pvalue	p_sig	beta		Estimate	SE	z	pvalue	p_sig	beta
ANG	→	INT_MOT	0.109	0.384	0.284	0.777		0.045	–	-0.350	0.134	-2.614	0.009	**	-0.201
ANX	→	INT_MOT	0.159	0.354	0.451	0.652		0.066		0.109	0.127	0.854	0.393		0.062
JOY	→	INT_MOT	2.303	0.315	7.310	0.000	***	0.957	+	1.318	0.130	10.156	0.000	***	0.758
ANG	→	EXT_MOT	0.171	0.399	0.430	0.667		0.069		-0.211	0.129	-1.634	0.102		-0.129
ANX	→	EXT_MOT	0.436	0.373	1.169	0.243		0.175		0.099	0.124	0.803	0.422		0.061
JOY	→	EXT_MOT	2.506	0.362	6.920	0.000	***	1.007	+	1.244	0.124	10.059	0.000	***	0.760
ANG	→	AMT	0.294	0.139	2.110	0.035	*	0.268	±	0.628	0.105	5.991	0.000	***	0.491
ANX	→	AMT	0.080	0.132	0.612	0.541		0.073		-0.075	0.093	-0.809	0.419		-0.059
JOY	→	AMT	-0.149	0.087	-1.715	0.086		-0.136	–	-0.413	0.068	-6.043	0.000	***	-0.323
ANG	→	AT	-0.128	0.414	-0.309	0.757		-0.048		-0.255	0.133	-1.916	0.055		-0.138
ANX	→	AT	0.363	0.390	0.931	0.352		0.136		-0.012	0.128	-0.096	0.924		-0.007
JOY	→	AT	2.572	0.369	6.963	0.000	***	0.962	+	1.469	0.141	10.419	0.000	***	0.794
ANG	→	SE	0.189	0.166	1.141	0.254		0.116	–	0.271	0.115	2.344	0.019	*	0.150
ANX	→	SE	-0.404	0.164	-2.463	0.014	*	-0.248	±	-0.296	0.112	-2.648	0.008	**	-0.164
JOY	→	SE	1.159	0.140	8.253	0.000	***	0.712	+	1.517	0.129	11.787	0.000	***	0.841
INT_MOT	→	SN	0.187	0.082	2.270	0.023	*	0.264	±	0.332	0.072	4.637	0.000	***	0.362
EXT_MOT	→	SN	0.388	0.091	4.286	0.000	***	0.568	+	0.426	0.075	5.658	0.000	***	0.438
AMT	→	SN	-0.058	0.079	-0.729	0.466		-0.037	–	-0.130	0.059	-2.210	0.027	*	-0.104
SE	→	TE_Engagement	1.054	0.120	8.769	0.000	***	0.864	+	1.553	0.167	9.303	0.000	***	0.942
SE	→	TE_Instruction	0.862	0.099	8.718	0.000	***	0.814	+	1.164	0.113	10.260	0.000	***	0.903
SE	→	TE_Management	1.896	0.355	5.344	0.000	***	0.951	+	1.977	0.284	6.961	0.000	***	0.963
SN	→	Intention	0.784	0.145	5.406	0.000	***	0.545	+	0.977	0.123	7.915	0.000	***	0.569
INT_MOT	→	Intention	0.454	0.121	3.753	0.000	***	0.447	±	0.294	0.098	3.010	0.003	**	0.187
EXT_MOT	→	Intention	-0.016	0.107	-0.144	0.885		-0.016		0.111	0.097	1.139	0.255		0.066
AMT	→	Intention	-0.212	0.090	-2.353	0.019	*	-0.095	±	-0.219	0.070	-3.134	0.002	**	-0.102
AT	→	Intention	-0.038	0.098	-0.389	0.698		-0.042	–	0.207	0.088	2.361	0.018	*	0.140
SE	→	Intention	-0.727	0.505	-1.438	0.150		-0.484		-0.747	0.578	-1.292	0.196		-0.492
TE_Engagement	→	Intention	0.091	0.118	0.765	0.444		0.074		0.023	0.124	0.189	0.850		0.025
TE_Instruction	→	Intention	0.036	0.107	0.341	0.733		0.026		0.110	0.107	1.029	0.303		0.093
TE_Management	→	Intention	0.311	0.180	1.726	0.084		0.412		0.307	0.165	1.860	0.063		0.415

Note: IV = Independent variables, DV = Dependent variables.Cells are marked to indicate cross-group differences in statistical significance: + indicates consistent significance across groups, ± indicates significance in both groups with different strength levels, and – indicates divergent significance patterns between groups (significant in one group only).

Appendix G Indirect effect paths

Pre-service teacher					In-service teacher				
Effect	**Estimate**	**CI_Lower**	**CI_Upper**	**Sig_CI**	**Effect**	**Estimate**	**CI_Lower**	**CI_Upper**	**Sig_CI**
ind_JOY_EXTMOT_SN_INTENT	0.518	0.146	1.022	YES	ind_JOY_INTMOT_INTENT	1.046	0.280	2.661	YES
ind_JOY_INTMOT_SN_INTENT	0.427	0.107	0.922	YES	ind_JOY_EXTMOT_SN_INTENT	0.763	0.242	1.831	YES
ind_EXTMOT_SN_INTENT	0.417	0.194	0.733	YES	ind_EXTMOT_SN_INTENT	0.304	0.115	0.613	YES
ind_JOY_INTMOT_INTENT	0.387	0.007	0.849	YES	ind_JOY_SE_INTENT	-0.840	-3.772	0.587	NO
ind_INTMOT_SN_INTENT	0.324	0.114	0.650	YES	ind_SE_TE_ALL_INTENT	0.713	-0.388	3.223	NO
ind_ANG_AMT_INTENT	-0.137	-0.434	-0.016	YES	ind_SE_TEmgmt_INTENT	0.587	-0.275	2.688	NO
ind_JOY_AMT_INTENT	0.090	0.010	0.193	YES	ind_JOY_INTMOT_SN_INTENT	0.337	-0.047	1.082	NO
ind_JOY_SE_INTENT	-1.131	-4.319	0.612	NO	ind_ANX_SE_INTENT	0.292	-0.557	1.998	NO
ind_SE_TE_ALL_INTENT	0.769	-0.319	2.879	NO	ind_INTMOT_SN_INTENT	0.146	-0.014	0.360	NO
ind_SE_TEmgmt_INTENT	0.606	-0.060	2.121	NO	ind_ANG_SE_INTENT	-0.137	-1.695	0.809	NO
ind_JOY_AT_INTENT	0.304	-0.059	0.797	NO	ind_ANX_EXTMOT_SN_INTENT	0.134	-1.962	2.927	NO
ind_ANX_SE_INTENT	0.220	-0.576	1.278	NO	ind_JOY_AT_INTENT	-0.098	-1.120	0.609	NO
ind_ANG_SE_INTENT	-0.201	-1.266	0.650	NO	ind_SE_TEeng_INTENT	0.095	-0.198	0.484	NO
ind_JOY_EXTMOT_INTENT	0.138	-0.235	0.539	NO	ind_ANX_INTMOT_INTENT	0.074	-3.572	5.091	NO
ind_SE_TEinstr_INTENT	0.128	-0.179	0.529	NO	ind_ANG_AMT_INTENT	-0.062	-0.265	0.059	NO
ind_AMT_SN_INTENT	-0.127	-0.353	0.012	NO	ind_ANG_EXTMOT_SN_INTENT	0.052	-2.967	2.376	NO
ind_ANG_INTMOT_SN_INTENT	-0.114	-1.832	0.130	NO	ind_ANG_INTMOT_INTENT	0.048	-5.320	4.076	NO
ind_ANG_INTMOT_INTENT	-0.104	-1.803	0.125	NO	ind_AMT_SN_INTENT	-0.045	-0.224	0.085	NO
ind_ANG_EXTMOT_SN_INTENT	-0.089	-2.068	0.206	NO	ind_JOY_EXTMOT_INTENT	-0.040	-0.934	0.780	NO
ind_ANG_AMT_SN_INTENT	-0.079	-0.303	0.009	NO	ind_JOY_AMT_INTENT	0.032	-0.014	0.123	NO
ind_ANG_AT_INTENT	-0.053	-1.101	0.136	NO	ind_SE_TEinstr_INTENT	0.031	-0.261	0.351	NO
ind_JOY_AMT_SN_INTENT	0.052	-0.006	0.159	NO	ind_ANX_INTMOT_SN_INTENT	0.024	-0.998	1.390	NO
ind_ANX_EXTMOT_SN_INTENT	0.042	-0.238	1.954	NO	ind_ANX_AMT_INTENT	-0.017	-0.164	0.154	NO
ind_ANX_INTMOT_SN_INTENT	0.036	-0.203	1.700	NO	ind_ANG_INTMOT_SN_INTENT	0.016	-1.481	1.131	NO
ind_SE_TEeng_INTENT	0.036	-0.405	0.762	NO	ind_ANX_AT_INTENT	-0.014	-2.381	0.989	NO
ind_ANX_INTMOT_INTENT	0.033	-0.195	1.657	NO	ind_ANG_AMT_SN_INTENT	-0.013	-0.091	0.047	NO
ind_ANG_EXTMOT_INTENT	-0.024	-0.657	0.168	NO	ind_JOY_AMT_SN_INTENT	0.007	-0.013	0.063	NO
ind_ANX_AMT_INTENT	0.017	-0.067	0.276	NO	ind_ANX_EXTMOT_INTENT	-0.007	-1.196	1.233	NO
ind_ANX_EXTMOT_INTENT	0.011	-0.156	0.622	NO	ind_ANG_AT_INTENT	0.005	-1.143	2.502	NO
ind_ANX_AMT_SN_INTENT	0.010	-0.045	0.180	NO	ind_ANX_AMT_SN_INTENT	-0.004	-0.073	0.042	NO
ind_ANX_AT_INTENT	-0.002	-0.206	1.001	NO	ind_ANG_EXTMOT_INTENT	-0.003	-1.230	1.229	NO

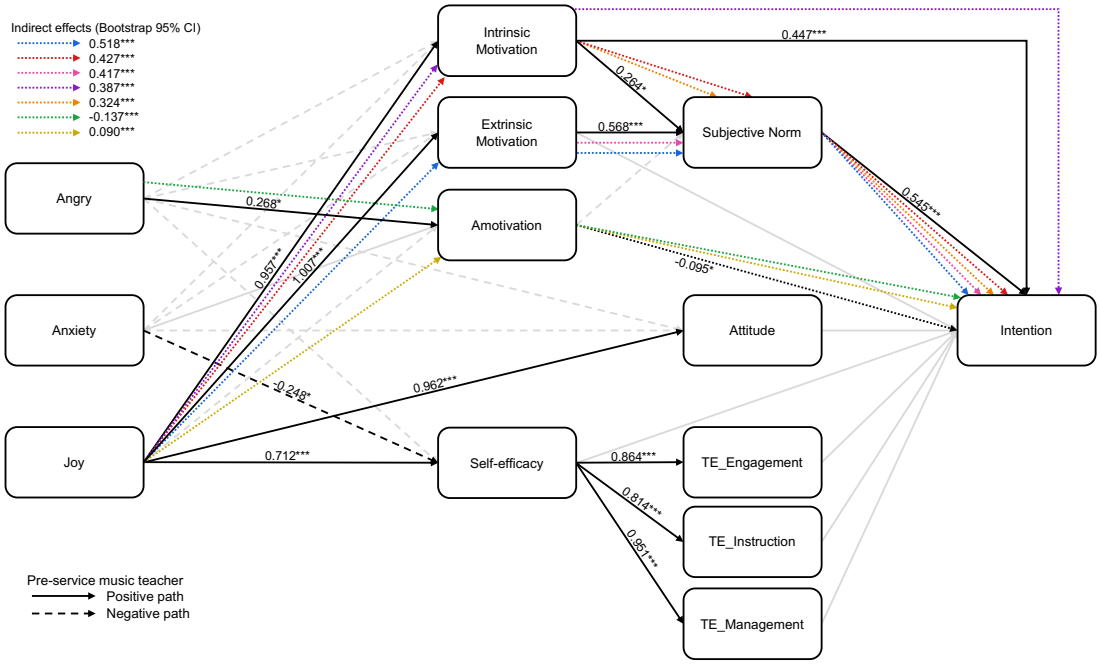
Appendix H Items assessed for each variable

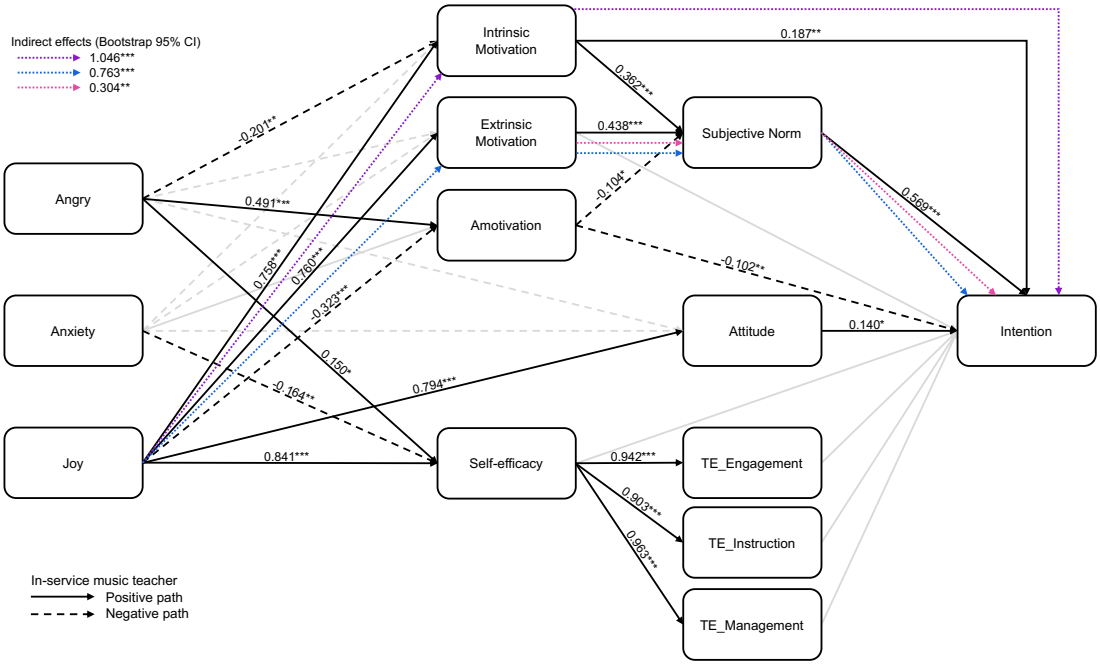
Construct	No.	Item
Familiarity with the national curriculum		How familiar are you with the content of the National Curriculum in music?
Verbal persuasion/support		Rate the support of improvisation activity provided by your course / teacher / education / colleague at your school.
Mastery experience		Rate your satisfaction with your improvisation skill.
Self-efficacy	SE1	I am confident about my own improvisation.
	SE2	Improvisation would not challenge me.
	SE3	I would be comfortable to improvise.
Joy	JOY1	I generally enjoy guiding improvisation activities.
	JOY2	I generally have so much fun in improvisation activities that I gladly prepare and lead them in my lessons
	JOY3	I often have reasons to be happy while I guide improvisation activities.
	JOY4	I generally guide improvisation activities with enthusiasm
Anxiety	ANX1	I generally feel tense and nervous while guiding improvisation activities
	ANX2	I am often worried that my guiding of improvisation activities isn't going so well
	ANX3	Preparing to improvise activities for teaching often causes me to worry.
	ANX4	I feel uneasy when I think about guiding improvisation activities.
Anger	ANG1	I often have reasons to be angry while I guide improvisation activities.
	ANG2	I often feel annoyed while guiding improvisation activities.
	ANG3	Sometimes I get really mad while I guide improvisation activities.
	ANG4	Guiding improvisation activities generally frustrates me.
Attitude	AT1	The use of improvisation makes my teaching more satisfying.
	AT2	I like to use improvisation activities in my teaching.
	AT3	Students are more motivated by my teaching when I use improvisation activities.
	AT4	Because of the use of improvisation activities, my teaching will become more efficient.
	AT5	I feel challenged to lead improvisation activities effectively.
	AT6	The use of improvisation improves my teaching.
Intrinsic motivation	INT1	Because this represents a meaningful choice to me.
	INT2	Because this is an important goal to me.
	INT3	Because I enjoy doing it.
	INT4	Because it's fun.
Extrinsic motivation	EXT1	Because I'm supposed to do so.
	EXT2	Because the improvisation activity of my teaching is very important
	EXT3	Because the improvisation activity of my teaching plan obliges me to do it
	EXT4	Because improvisation activity is required.
Amotivation	AMT1	I don't see the relevance of carrying out this task.

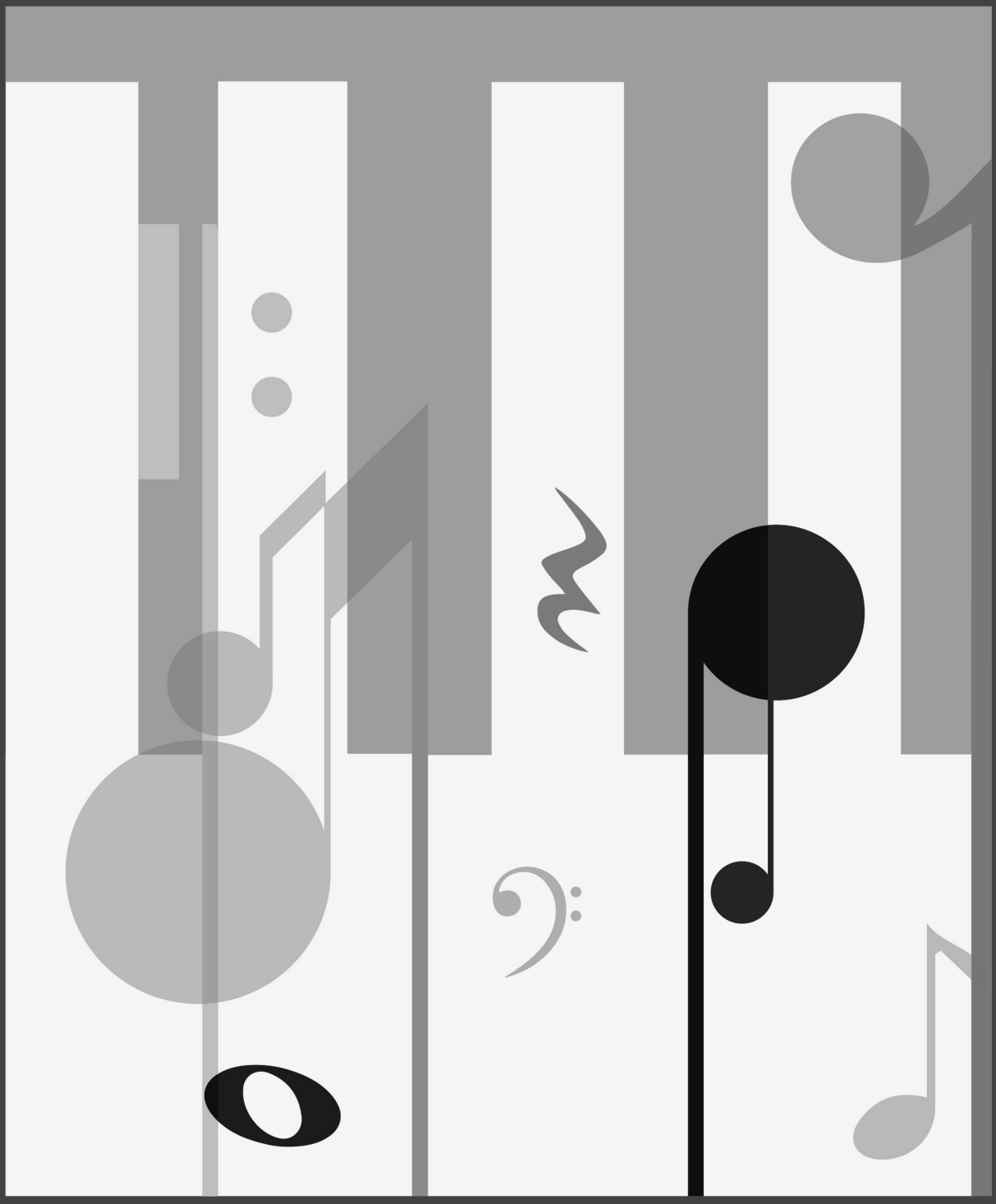
	AMT2	I don't see the reason.
	AMT3	I don't see its purpose.
Teacher efficacy (TE)	TE1	I am confident in controlling students' disruptive behaviors during improvisation activities.
	TE2	I am confident in motivating students who show low interest during improvisation activities.
TE_Engagement: TE2, 3, 4, 11	TE3	I am confident in getting students to believe they can do well in improvisation activities.
TE_Instruction: TE5, 9, 10, 12	TE4	I am confident in helping my students value improvisation activities.
TE_Management: TE1, 6, 7, 8	TE5	I am confident in scaffolding good improvisation activities for my students.
	TE6	I am confident in getting my students to follow classroom rules during improvisation activities.
	TE7	I am confident in calming a student who is disruptive or noisy during improvisational activities.
	TE8	I am confident in establishing a classroom management system with each group of students during improvisation activities.
	TE9	I am confident in using a variety of improvisation strategies as a teacher.
	TE10	I think I am confident in providing an alternative explanation or example of improvisation in my teaching when students are confused.
	TE11	I am confident in supporting practicing improvisation.
	TE12	I am confident in implementing various strategies of improvisation activity in my teaching.
Subjective norm	SN1	People who influence my behavior think that I should use improvisation activities.
	SN2	People who are important to me will support me in using improvisation activities.
	SN3	People whose views I respect support the use of improvisation activities.
Behavioral intention to use	BIU1	I intend to guide improvisation activity in the future
	BIU2	I expect that I will guide improvisation activity in the future.
	BIU3	I plan to guide improvisation activity in the future.
Attitude for future persistence	AP1	Having considered the time I have spent and the stress I have experienced, I am still willing to lead improvisation activities in my lesson.
	AP2	Given freedom to choose, I shall not guide improvisation activities in my teaching.

Note: Participants scored all items on Five-point Liker scales: Verbal persuasion/support and Mastery experience (1—Nonexistent, 2—Poor, 3—Adequate, 4—Good, and 5—Excellent); Self-efficacy (1 - Strongly Disagree to 5 - Strongly Agree); Emotions (1 - Strongly Disagree to 5 - Strongly Agree); Attitudes (1 - Completely inapplicable to 5 - Completely Applicable); Motivations (1 - Completely inapplicable to 5 - Completely Applicable); Subjective norm (1 - Strongly Disagree to 5 - Strongly Agree); Teacher efficacy (1—Nothing, 2—Very Little, 3—Some Influence, 4—Quite A Bit, and 5—A Great Deal); Behavioral intention to use (1 - Strongly Disagree to 5 - Strongly Agree); Attitude for future persistence (1 - Strongly Disagree to 5 - Strongly Agree.

Appendix I Direct and indirect effects predicting pre-service and in-service music teachers' intention to implement improvisation activities.







Summary
& Samenvatting
& 总结

Summary

Chapter 1. General Introduction

Creative activities are an important part of music education. They provide students with opportunities to express themselves and develop their own musical concepts. As one of the core creative practices of music education, improvisation not only enhances creativity, musical understanding, and self-confidence but also promotes exploration, cooperation, the enjoyment of music, and the experience of flow. Given its numerous benefits, improvisation has been widely advocated by researchers and music educators and is included in many national curriculum standards. However, improvisation is often absent in actual classroom teaching. This dissertation aims to gain comprehensive insight into this field through empirical evidence, classroom practice, teachers' preparation, and their readiness and willingness to implement improvisation.

Chapter 2. Mapping the evidence: a systematic review of improvisation

In this chapter, the systematic literature review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Moher et al., 2009; Page et al., 2021). The review had research questions:

(1) What improvisation activities are applied in music education?

(2) What are the learning outcomes of improvisation activities in music education?

In total, 63 peer-reviewed articles published between 2015 and 2025 were included for further analysis. Using an inductive approach to classify activity types and a deductive approach to code learning outcomes, this review develops a structured classification of the classroom.

Classroom improvisation activities consist of five components: (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. The four domains of learning outcomes are affective, behavioral, cognitive, and social. These findings might encourage educators and curriculum designers to broaden their improvisation practice and link it to intended learning outcomes, thereby improving the relevance and quality of their music education practice.

Chapter 3. Exploring classroom practice: current situation and implementation challenges

The third chapter examines how improvisation is implemented and evaluated by primary music classrooms. This chapter focuses on teachers' practical practices and understandings in specific teaching situations by answering:

(1) How do teachers implement improvisation activities in class?

(2) How do teachers evaluate these improvisation activities in class?

This chapter adopted a qualitative research design that combined semi-structured interviews, classroom observation, and field notes with eight Dutch primary music teachers. The result showed that improvisation is not absent from primary school music classes. On the contrary, teachers generally organize different forms of improvisation, especially in vocal, instrumental, rhythmic, and movement improvisation. Improvisation is often incorporated into teaching, close to stories and children's experiences, with clear boundaries and task structures. In other words, improvisation in the classroom is more of a kind of creative activity that can be guided and supported, rather than free play away from the teaching goal. The findings further showed that the music teacher participants in this study were more likely to consider improvisation a tool for students to experience, rather than a goal.

Teachers generally believed that a supportive and safe classroom atmosphere, a clear activity structure, and a student-centered organization are important prerequisites for effective improvisation. Teachers evaluated students' improvisation products by encouraging self-reflection, organizing peer feedback, or compliments to younger students. Recognized benefits include engagement, self-confidence, musical expression, and collaboration. This chapter also reveals challenges when including improvisation, such as classroom discipline, limited repertoire, time, instruments, and classroom space.

Through triangulation of different data sources, this chapter comprehensively shows the current situation of improvisation in primary music classrooms, as well as identifies teachers' implementation characteristics and the practical challenges of improvisation in primary school music education.

Chapter 4. Pre-service teacher preparation: attitude and self-efficacy toward improvisation

This chapter explores pre-service music teachers' readiness to implement improvisation activities. Teachers face the challenge of value improvisation but feel less confident in it. This study focuses on the gap between valuing and feeling confident about improvisation. The research developed a conceptual model examining how attitude toward studying improvisation (AS), attitude toward teaching improvisation (AT), and attitude toward including improvisation (AI) function as predicting variables, with self-efficacy for improvisation (SEI) as a mediating construct, and self-efficacy for teaching improvisation (SETI) as the outcome variable.

In total, 123 pre-service music teachers completed the online questionnaire, and 10 follow-up semi-structured interviews. Participants were music education students at 10 conservatories and

universities of applied science in the Netherlands. This study used One-way ANOVA, t-tests, and Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze the data.

Only the gender difference was significant in the group comparison. Male students reported higher AS, SEI, and SETI. In the structural model, both AS and AT significantly predicted SEI, whereas only AT predicted self-efficacy for teaching improvisation. SEI served as a mediator between AT and SETI. This showed that pre-service teachers may have different starting points and development paths when facing improvisation. AT is more likely to promote their confidence in their own improvisation ability first. In contrast, the attitude toward teaching orientation is more directly related to whether they implement improvisation in the classroom.

The key was building confidence in "I can do it" and transferring "I can teach it". While self-efficacy for improvisation served as a basis for self-efficacy for teaching improvisation, pedagogical content knowledge connected to improvisation is necessary to convert personal improvisational skills into effective teaching. Teacher education programs may include peer learning opportunities, progressive mastery experiences, and encouraging environments that embrace mistakes.

Chapter 5. Multiple pathways of intention formation: comparing in-service and pre-service teachers

This chapter employed a mixed methods design to explore intention formation and compare differences between pre-service and in-service music teachers. Based on the Integrative Model of Behavior Prediction, this chapter aimed to answer the following research questions:

(1) How do emotions influence teachers' intentions to guide improvisation activities in teaching through attitude, self-efficacy, teacher-efficacy, motivations, and subjective norms?
(2) To what extent do attitude, self-efficacy, teacher-efficacy, motivation, 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?

The questionnaire was completed by 605 Chinese music teachers (227 in-service and 378 pre-service teachers). Twelve individuals participated in the follow-up interview. Multigroup structural equation modeling (MG-SEM) showed that joy was the most stable predictor and the most closely related to high motivation, a positive attitude, and a strong sense of efficacy in both groups, underscoring its key role. Anxiety mainly affected teachers' confidence, while anger was more related to amotivation and diminished intrinsic motivation among in-service teachers. Subjective norms were the strongest predictors of intention for both teacher groups, indicating that institutional requirements and expectations from others (e.g., school leaders and peers) effectively promote teachers' intention to implement improvisation activities. Improvisation was more likely to occur in

visible settings, such as teaching competitions (i.e., formal competitive teaching events) and public lessons (i.e., lessons taught for observation and demonstration). In some cases, it was like a required component rather than a stable practice in daily classroom teaching. Time constraints, workload, and limited improvisation experience continued to limit the routine implementation of improvisation activities.

Chapter 6. General discussion

Improvisation is present across diverse formats, including technology, tools, reflection, and game design, and yields affective, behavioral, cognitive, and social learning outcomes. However, classroom practice is more complex. Improvisation was not completely absent in the classroom; it appeared in more structural and fragmented formats. A safe atmosphere is the most pre-condition for successful scaffold improvisation. Including improvisation in teaching required more than endorsement, but also on teachers' readiness and willingness. Readiness is based on self-efficacy, formed through attitudes toward studying and teaching improvisation, and on teaching confidence in designing, supporting, and scaffolding improvisation activities. The key is the transformation from "I can improvise" to "I can teach improvisation". Teachers' emotions, motivations, subjective norms, attitudes, and efficacy beliefs also played critical roles. Subjective norms were the most direct predictor of implementation intention, while joy effectively promoted motivation, attitudes, and efficacy beliefs.

The results of the studies described in this dissertation also have some limitations. The empirical data mainly came from the Netherlands and China, limiting generalizability. Self-selection bias may also be present. Chapters 4 and 5 adopted a cross-sectional design, which made it difficult to capture the dynamic processes of teachers' readiness and implementation intentions changing over time. In addition, during interviews, the data may have been affected by social expectations. Finally, the examination of teachers' emotions in the fifth chapter focuses on joy, anxiety, and anger and does not fully present the complexity of teachers' emotional experience or its sources.

Based on the results, some suggestions for music education practice are provided at the end of this dissertation. For music teachers, start with short activities, such as call-and-response, simple rhythm, and movement improvisation. Tasks with clear boundaries and links to existing teaching content can help reduce pressure. For teacher educators and curriculum designers, adding practical opportunities, such as peer teaching, reflection, and feedback, alongside emotional support for facing uncertainty. For school leaders and policymakers, providing classroom space, instruments, and opportunities for continuous professional development is essential.

Samenvatting

Hoofdstuk 1. Algemene inleiding

Creatieve activiteiten vormen een belangrijk onderdeel van muziekonderwijs. Ze bieden leerlingen de mogelijkheid om zichzelf muzikaal uit te drukken en eigen muzikale ideeën te ontwikkelen. Als een van de kernpraktijken binnen creatief muziekonderwijs draagt improvisatie niet alleen bij aan creativiteit, muzikaal begrip en zelfvertrouwen, maar bevordert zij ook exploratie, samenwerking, muziekplezier en flowervaringen. Vanwege de vele voordelen wordt improvisatie veelvuldig aangemoedigd door onderzoekers en muziekdocenten en is zij opgenomen in veel nationale curriculumstandaarden. Toch blijft improvisatie in de dagelijkse onderwijspraktijk vaak achterwege. Dit proefschrift beoogt via empirische data, de klaspraktijk, de voorbereiding van docenten, en hun bereidheid en intentie om improvisatie in hun onderwijs te implementeren, een overkoepelend inzicht in dit onderzoeksveld te bieden.

Hoofdstuk 2. Het in kaart brengen van het bewijs: een systematische review van improvisatie

In dit hoofdstuk is een systematische literatuurreview uitgevoerd volgens de *Preferred Reporting Items for Systematic Reviews and Meta-Analyses*-richtlijnen, oftewel de PRISMA-richtlijnen (Moher et al., 2009; Page et al., 2021). De review is geleid door de volgende onderzoeksvragen:

(1) Welke improvisatieactiviteiten worden toegepast in muziekonderwijs?
(2) Welke leeruitkomsten worden in verband gebracht met improvisatieactiviteiten in muziekonderwijs?

In totaal werden 63 peer-reviewed artikelen, gepubliceerd tussen 2015 en 2025, opgenomen voor verdere analyse. Met behulp van een inductieve benadering voor het classificeren van typen activiteiten en een deductieve benadering voor het coderen van leeruitkomsten ontwikkelt deze review een gestructureerde classificatie van improvisatiepraktijken in de klas.

Improvisatieactiviteiten in de klas bestaan uit vijf componenten: (1) improvisatievormen en -technieken, (2) hulpmiddelen en medium specifieke improvisatie, (3) reflectie op leren en creëren, (4) interdisciplinaire improvisatie, en (5) improvisatiespellen. De vier domeinen van de leeruitkomsten zijn: affectieve, gedragsmatige, cognitieve en sociale leeruitkomsten. Deze bevindingen kunnen docenten en curriculumontwikkelaars stimuleren om improvisatiepraktijken te verbreden en explicieter te verbinden met beoogde leeruitkomsten en daarmee de relevantie en kwaliteit van muziekonderwijs te versterken.

Hoofdstuk 3. Klaspraktijken verkennen: huidige situatie en uitdagingen voor implementatie

Het derde hoofdstuk onderzoekt hoe improvisatie wordt geïmplementeerd en geëvalueerd in het primair muziekonderwijs. Dit hoofdstuk richt zich op de praktische werkwijzen en inzichten van docenten in concrete onderwijssituaties aan de hand van de volgende onderzoeksvragen:

(1) Hoe implementeren docenten improvisatieactiviteiten in de klas?
(2) Hoe evalueren docenten deze improvisatieactiviteiten in de klas?

Dit hoofdstuk maakt gebruik van een kwalitatief onderzoeksontwerp waarin semigestructureerde interviews, lesobservaties en *fieldnotes* werden gecombineerd. Aan het onderzoek namen acht Nederlandse muziekdocenten deel uit het primair onderwijs. De resultaten laten zien dat improvisatie niet afwezig is in het primair muziekonderwijs. Integendeel, docenten organiseren verschillende vormen van improvisatie, met name vocale, instrumentale, ritmische en bewegingsgerichte improvisatie. Improvisatie wordt daarin vaak geïntegreerd in het onderwijs; het sluit aan bij verhalen en ervaringen van kinderen, en er worden duidelijke grenzen en taakstructuren aan gekoppeld. Met andere woorden, improvisatie in de klas verschijnt eerder als een begeleide en ondersteunde creatieve activiteit dan als vrij spel dat losstaat van onderwijsdoelen. De bevindingen laten verder zien dat de deelnemende muziekdocenten improvisatie vooral beschouwen als een middel waarmee leerlingen ervaringen kunnen opdoen en minder als een doel op zichzelf.

Docenten benadrukten dat een ondersteunende en veilige klassensfeer, een duidelijke activiteitenstructuur en een leerlinggerichte organisatie belangrijke voorwaarden zijn voor effectieve improvisatie. Zij evalueerden de improvisatie van leerlingen onder meer via zelfreflectie, het organiseren van peerfeedback, en het geven van complimenten, vooral aan jongere leerlingen. De door docenten herkende voordelen van improvisatie omvatten betrokkenheid, zelfvertrouwen, muzikale expressie en samenwerking. Tegelijkertijd maakt dit hoofdstuk ook zichtbaar dat de implementatie van improvisatie gepaard gaat met uitdagingen, zoals klassenmanagement, beperkingen in het repertoire, tijdsdruk, en beperkte instrumenten en fysieke ruimte in de klas.

Door de triangulatie van verschillende databronnen biedt dit hoofdstuk een rijk beeld van de huidige situatie van improvisatie in het primair muziekonderwijs. Daarnaast duidt het belangrijke implementatiekenmerken van docenten en praktische uitdagingen die samenhangen met improvisatie in het primair muziekonderwijs.

Hoofdstuk 4. Voorbereiding van aanstaande docenten: attitudes en self-efficacy ten aanzien van improvisatie

Dit hoofdstuk onderzoekt de bereidheid van aanstaande muziekdocenten om improvisatieactiviteiten te implementeren. Veel docenten vinden improvisatie waardevol , maar voelen zich er niet altijd zeker over. Deze studie richt zich daarom op de kloof tussen het waarderen van improvisatie en het vertrouwen om ermee te werken. Er werd een conceptueel model ontwikkeld waarin gedragingen ten aanzien van het bestuderen van improvisatie (AS), gedragingen ten aanzien van het onderwijzen van improvisatie (AT) en gedragingen ten aanzien van het opnemen van improvisatie in het onderwijs (AI) functioneren als voorspellende variabelen. *Self-efficacy* (vertrouwen in eigen kunnen) voor improvisatie (SEI) werd opgenomen als mediërende construct, en *self-efficacy* voor het onderwijzen van improvisatie (SETI) als uitkomstvariabele.

In totaal vulden 123 aanstaande muziekdocenten een online vragenlijst in en namen 10 van hen deel aan semigestructureerde follow-upinterviews. De deelnemers waren studenten muziekeducatie aan tien conservatoria en hogescholen in Nederland. Voor de data-analyse werden *One-Way ANOVA's*, t-toetsen en *Partial Least Squares Structural Equation Modeling* (PLS-SEM) gebruikt.

In de groepsvergelijking bleek alleen gender een significante factor te zijn. Mannelijke studenten rapporteerden hogere scores op AS, SEI en SETI. In het structurele model voorspelden zowel AS als AT significant de *self-efficacy* voor improvisatie, terwijl alleen AT de *self-efficacy* voor het onderwijzen van improvisatie voorspelde. SEI fungeerde als mediator tussen AT en SETI. Dit wijst erop dat aanstaande docenten verschillende startpunten en ontwikkelingspaden kunnen hebben wanneer zij met improvisatie worden geconfronteerd. Een positieve houding ten aanzien van het leren of bestuderen van improvisatie lijkt vooral eerst het vertrouwen in de eigen improvisatievaardigheid te bevorderen. Daarentegen is een onderwijsgerichte houding directer gecorreleerd met de vraag of docenten improvisatie in de klas kunnen en willen implementeren.

De kern ligt in het opbouwen van vertrouwen in "ik kan improviseren" en het vervolgens overbrengen daarvan naar "ik kan improvisatie onderwijzen". Hoewel *self-efficacy* voor improvisatie een basis vormt voor *self-efficacy* in het onderwijzen van improvisatie, is vakdidactische kennis met betrekking tot improvisatie noodzakelijk om persoonlijke improvisatievaardigheden om te zetten in effectief onderwijs. Lerarenopleidingen kunnen hieraan bijdragen door *peer learning*, geleidelijke ervaringen van bekwaamheid en een stimulerende leeromgeving te bieden waarin fouten maken wordt gezien als onderdeel van het leerproces.

Hoofdstuk 5. Meerdere routes naar intentievorming: een vergelijking tussen docenten en docenten-in-opleiding

Dit hoofdstuk maakt gebruik van een *mixed-methods* onderzoeksontwerp om intentievorming te onderzoeken en verschillen tussen aanstaande en zittende muziekdocenten te vergelijken. Gebaseerd op het *Integrative Model of Behavior Prediction* beantwoordt dit hoofdstuk de volgende onderzoeksvragen:

(1) Hoe beïnvloeden emoties de intenties van docenten om improvisatieactiviteiten in hun onderwijs te begeleiden via gedragingen, self-efficacy, teacher-efficacy, motivatie en subjectieve normen?
(2) In welke mate voorspellen gedragingen, self-efficacy, teacher-efficacy, motivatie en subjectieve normen direct de intentie van docenten om improvisatieactiviteiten in hun onderwijs te implementeren?
(3) Is er een significant verschil tussen de paden van muziekdocenten en muziekdocenten-in-opleiding ?

De vragenlijst werd ingevuld door 605 deelnemers, onder wie 227 muziekdocenten en 378 docenten-in-opleiding. Twaalf personen namen deel aan follow-upinterviews. Uit de *multigroup structural equation modeling* (MG-SEM) bleek dat vreugde in beide groepen de meest stabiele emotionele factor was en het sterkst samenhing met sterke motivatie, een positieve attitude en een sterk gevoel van *efficacy*. Dit onderstreept de belangrijke rol van plezier als bevorderende factor. Angst had vooral invloed op het zelfvertrouwen van docenten, terwijl boosheid bij zittende docenten sterker samenhing met de afwezigheid van motivatie en een verminderde intrinsieke motivatie.

Subjectieve normen waren voor beide groepen de sterkste voorspellers van intentie. Dit wijst erop dat institutionele verwachtingen en verwachtingen van anderen, zoals schoolleiders en collega's,

de intentie van docenten om improvisatieactiviteiten te implementeren effectief kunnen bevorderen. Improvisatie bleek vooral voor te komen in zichtbare contexten, zoals onderwijswedstrijden (i.e. formele competitieve onderwijssituaties), en openbare lessen (i.e. lessen die worden gegeven ter observatie of demonstratie). In sommige gevallen werd improvisatie daardoor eerder als een verplicht onderdeel ingezet dan als een stabiele praktijk in het dagelijkse klaslokaal. Tijdgebrek, werkdruk en beperkte improvisatie-ervaring bleven belangrijke factoren die de routinematige implementatie van improvisatieactiviteiten beperkten.

Hoofdstuk 6. Algemene discussie

Improvisatie komt voor in uiteenlopende vormen, waaronder technologiegebruik, hulpmiddelen, reflectie en spelontwerp, en wordt in verband gebracht met affectieve, gedragsmatige, cognitieve en sociale leeruitkomsten. De klaspraktijk is echter complexer. Improvisatie is niet volledig afwezig in de klas, maar verschijnt vaak in meer gestructureerde en gefragmenteerde vormen. Een veilige sfeer vormt een van de belangrijkste voorwaarden voor succesvolle, ondersteunde improvisatie. Het opnemen van improvisatie in het onderwijs vereist meer dan alleen positieve waardering. Docenten moeten ook gereed en bereid zijn om het uit te voeren. Deze *readiness* is gebaseerd op *self-efficacy*, gevormd door gedragingen ten aanzien van het bestuderen en onderwijzen van improvisatie, en op het vertrouwen van docenten om improvisatieactiviteiten te ontwerpen en ondersteunen. De kern is de transformatie van “ik kan improviseren” naar “ik kan improvisatie onderwijzen”. Emoties, motivatie, subjectieve normen, gedragingen en vertrouwen in eigen kunnen van docenten spelen hierbij eveneens een belangrijke rol. Subjectieve normen bleken de meest directe voorspeller van implementatie-intentie, terwijl vreugde de motivatie, gedragingen en *efficacy* overtuigingen effectief bevorderde.

De resultaten uit de studies kennen ook een beperking. De empirische gegevens kwamen voornamelijk uit Nederland en China, waardoor de generaliseerbaarheid beperkt is. Er kan ook sprake zijn van een zelfselectiebias. Hoofdstuk 4 en 5 maakten gebruik van een cross-sectioneel onderzoeksontwerp, waardoor het moeilijk is om de ontwikkeling van de bereidheid en intentie tot implementatie van docenten in de loop van de tijd te volgen. De interviewgegevens kunnen beïnvloed zijn door het gevoel om sociaalwenselijke antwoorden te moeten geven. De analyse van de emoties van docenten in Hoofdstuk 5 richtte zich op plezier, angst en boosheid, waardoor de complexiteit van de emotionele ervaringen van docenten en de bronnen daarvan wellicht niet volledig is weergegeven.

Op basis van de bevindingen worden enkele suggesties gedaan voor de praktijk. Voor muziekdocenten kan improvisatie beginnen met korte activiteiten, zoals call-and-response, eenvoudige ritmische opdrachten en bewegingsimprovisatie. Het is raadzaam prioriteit te geven aan taken met duidelijke grenzen en improvisatie te integreren in bestaande lesinhouden, opdat de druk voor docenten en leerlingen wordt verminderd. Voor lerarenopleiders en curriculumontwikkelaars is het belangrijk om praktische leermogelijkheden te bieden, zoals *peer learning*, reflectie en feedback, in combinatie met emotionele ondersteuning bij het omgaan met onzekerheid. Voor schoolleiders en beleidsmakers is het essentieel om voldoende klaslokaalruimte, instrumenten en mogelijkheden voor voortdurende professionele ontwikkeling te bieden.

总结

第一章 概述

创造性活动是音乐教育的重要组成部分，它为学生提供了表达自我和发展个人音乐理念的机会。作为音乐教育中的核心创造性实践之一，即兴编创不仅能够提升创造力、音乐理解和自信心，还能够促进探索、合作、音乐享受以及心流体验。鉴于其诸多益处，即兴编创长期以来受到研究者和音乐教育工作者的广泛倡导，并被纳入多个国家的课程标准之中。然而，即兴编创在实际课堂教学中的应用仍然相对有限。本论文旨在通过实证研究、课堂实践分析以及对教师准备程度、实施意愿与实施准备度的考察，全面探究音乐教育中的即兴编创。

第二章 证据梳理：即兴编创的系统性文献综述

本章采用系统性文献综述方法，并遵循系统综述与荟萃分析优先报告项目（PRISMA）规范。研究主要围绕以下两个问题展开：

（1）音乐教育中开展了哪些类型的即兴编创活动?

（2）音乐教育中的即兴编创活动产生了哪些学习结果?

最终，共纳入 2015 年至 2025 年间发表的 63 篇同行评议实证研究。研究采用归纳法对活动类型进行分类，并采用演绎法对学习结果进行编码，构建了音乐课堂即兴编创活动的结构化框架。

研究发现，课堂即兴编创活动主要包括五个组成部分：（1）即兴形式与技巧；（2）工具与媒介特定的即兴活动；（3）学习与创作反思；（4）跨学科即兴活动；（5）即兴游戏。即兴编创的学习结果主要体现在情感、行为、认知和社会四个维度。研究结果有助于教师和课程设计者拓展即兴教学实践，并将具体活动与预期学习结果相联系，从而提升音乐教育实践的相关性和质量。

第三章 探索课堂实践：即兴编创的现状与实施挑战

本章探讨即兴编创在小学音乐课堂中的实施与评价情况，重点关注教师在具体教学情境中的实践方式与理解。研究问题包括：

（1）教师如何在课堂中实施即兴编创活动?

（2）教师如何评价课堂中的即兴编创活动?

本研究采用质性研究设计，对荷兰八位小学音乐教师开展半结构式访谈、课堂观察和田野记录。研究结果表明，即兴编创并未缺席小学音乐课堂。相反，教师普遍组织多种形式的即兴活动，尤其包括歌唱、器乐、节奏和动作即兴。课堂中的即兴活动通常与故事情境和儿童生活经验相结合，并具有明确的任务边界和活动结构。换言之，课堂中的即兴编创更是一种能够被引导和支持的创造性活动，而非脱离教学目标的自由游戏。研究进一步发现，教师更倾向于将即兴编创视为促进学生体验和学习的工具，而非独立的教学目标。

教师普遍认为，支持性和安全的课堂氛围、清晰的活动结构以及以学生为中心的组织方式，是有效开展即兴编创的重要前提。在评价方面，教师主要通过鼓励学生自我反思、组织同伴反馈以及对低年龄学生给予积极表扬等方式进行评价。教师认为，即兴编创能够促进学生的课堂参与、自信心、音乐表达能力和合作能力。同时，课堂纪律、曲目储备不足、时间限制、乐器资源有限以及空间不足等因素，也构成了实施即兴编创的主要挑战。

通过多种数据来源的三角验证，本章全面呈现了小学音乐课堂中即兴编创的实施现状、教师的实践特征以及面临的现实挑战。

第四章 职前教师培养：即兴编创态度与自我效能感

本章探讨职前音乐教师实施即兴编创活动的准备程度。尽管教师普遍认同即兴编创的重要价值，但往往缺乏实施信心。本研究聚焦于“重视即兴编创”与“具备实施信心”之间的差距。研究构建了一个概念模型，将即兴学习态度（AS）、即兴教学态度（AT）和即兴纳入态度（AI）作为预测变量，以即兴自我效能感（SEI；对自己进行即兴编创能力的信心）作为中介变量，以即兴教学自我效能感（SETI；对自己引导即兴编创活动能力的信心）作为结果变量。

共有来自荷兰 10 所音乐学院和应用科技大学的 123 名音乐教育专业学生完成问卷调查，另有 10 名学生参与后续半结构式访谈。研究采用单因素方差分析（One-

way ANOVA）、独立样本 t 检验（t-test）以及偏最小二乘结构方程模型（PLS-SEM）进行数据分析。

结果显示，仅性别差异达到统计显著，男性学生在即兴学习态度、即兴自我效能感和即兴教学自我效能感方面得分更高。PLS-SEM 结果表明，即兴学习态度和即兴教学态度均能显著预测即兴自我效能感，而只有即兴教学态度能够直接预测即兴教学自我效能感。即兴自我效能感在即兴教学态度与即兴教学自我效能感之间发挥中介作用。

研究表明，职前教师在面对即兴编创时具有不同的发展起点和成长路径。即兴学习态度首先促进其对自身即兴能力的信心，而即兴教学态度则更直接影响其未来是否在课堂中实施即兴活动。研究强调，实现从“我能即兴”到“我能教即兴”的转变至关重要。虽然即兴自我效能感是即兴教学自我效能感的重要基础，但与即兴编创相关的教学内容知识是将个人即兴能力转化为有效教学实践的关键。因此，教师教育项目应提供同伴学习机会、循序渐进的成功经验以及鼓励试错的支持性环境。

第五章 实施意向形成的多重路径：职前教师与在职教师的比较

本章采用混合研究方法，探讨音乐教师在教学中实施即兴编创活动意向的形成机制，并比较职前教师与在职教师之间的差异。研究基于行为预测整合模型，重点回答以下问题：

（1）情绪如何通过态度、自我效能感、教学效能感、动机和主观规范影响教师实施即兴编创的意向？

（2）态度、自我效能感、教学效能感、动机和主观规范在多大程度上直接预测教师的实施意向？

（3）职前教师与在职教师的意向形成路径是否存在显著差异？

共有 605 名中国音乐教师参与问卷调查，其中包括 227 名在职教师和 378 名职前教师，另有 12 名参与者接受后续访谈。多群组结构方程模型(MG-SEM)分析结果表明，愉悦情绪是最稳定的预测因素，与较高的动机、更积极的态度和更强的效能感密切相关。焦虑主要影响教师的信心，而愤怒则更多与在职教师的无动机状态和内在动机下降有关。主观规范是两类教师实施意向最强的预测因素，表明来自学校管

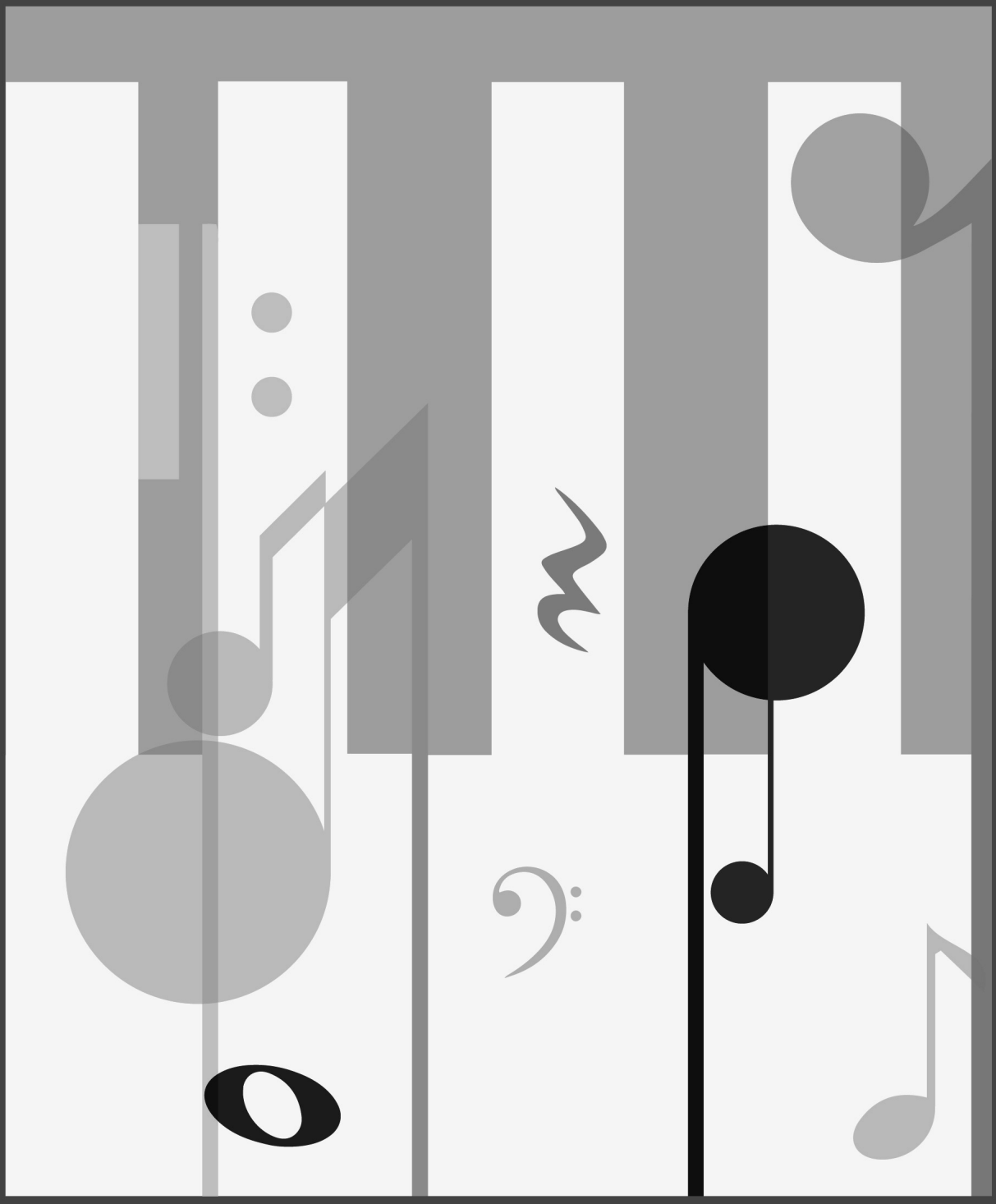
理者、同事等他人的期望以及制度要求能够有效促进教师实施即兴编创的意愿。研究还发现，即兴编创更容易出现在教学比赛和公开课等高可见度情境中。在某些情况下，即兴编创更像是一项必须完成的任务，而非日常教学中的稳定实践。时间压力、工作负荷以及即兴经验不足，仍然是限制教师常态化实施即兴编创的重要因素。

第六章 讨论和总结

研究发现，即兴编创以多样化形式存在于音乐教育之中，包括技术应用、工具使用、反思活动和游戏设计，并能够促进情感、行为、认知和社会层面的学习结果。然而，课堂实践比文献呈现的情况更加复杂。即兴编创并未完全缺席课堂，而是更多以结构化和碎片化的形式出现。安全和支持性的课堂氛围是有效开展支架式即兴活动的重要前提。在教学中融入即兴编创，不仅需要教师认同其价值，更需要教师具备实施的准备度和意愿。这种准备度建立在自我效能感基础之上，受到即兴学习态度和教学态度的影响，同时依赖于教师设计、支持和引导即兴活动的教学信心。其中，关键在于实现从“我能即兴”到“我能教即兴”的转变。此外，教师的情绪、动机、主观规范、态度和效能信念均在实施过程中发挥重要作用。其中，主观规范是实施意向最直接的预测因素，而愉悦情绪则能够有效促进教师的动机、态度和效能感。

本研究也存在一定局限性。实证数据主要来自荷兰和中国，研究结论的推广性受到一定限制。研究样本可能存在自我选择偏差。第四章和第五章采用横断面研究设计，难以捕捉教师准备度和实施意向随时间变化的动态过程。此外，访谈数据可能受到社会期望效应的影响。第五章仅考察了愉悦、焦虑和愤怒三种情绪，尚未全面呈现教师情绪体验的复杂性及其来源。

基于研究结果，本论文提出以下实践建议：对于音乐教师而言，可以从简短的即兴活动开始，例如问答式即兴、简单节奏即兴和动作即兴。具有明确边界并与现有教学内容相结合的任务，有助于降低实施压力。对于教师教育者和课程设计者而言，应增加同伴教学、反思和反馈等实践机会，并提供应对不确定性的情感支持。对于学校管理者和教育政策制定者而言，应提供充足的课堂空间、乐器资源以及持续专业发展的机会，以促进即兴编创在音乐教育中的常态化实施。



Curriculum Vitae

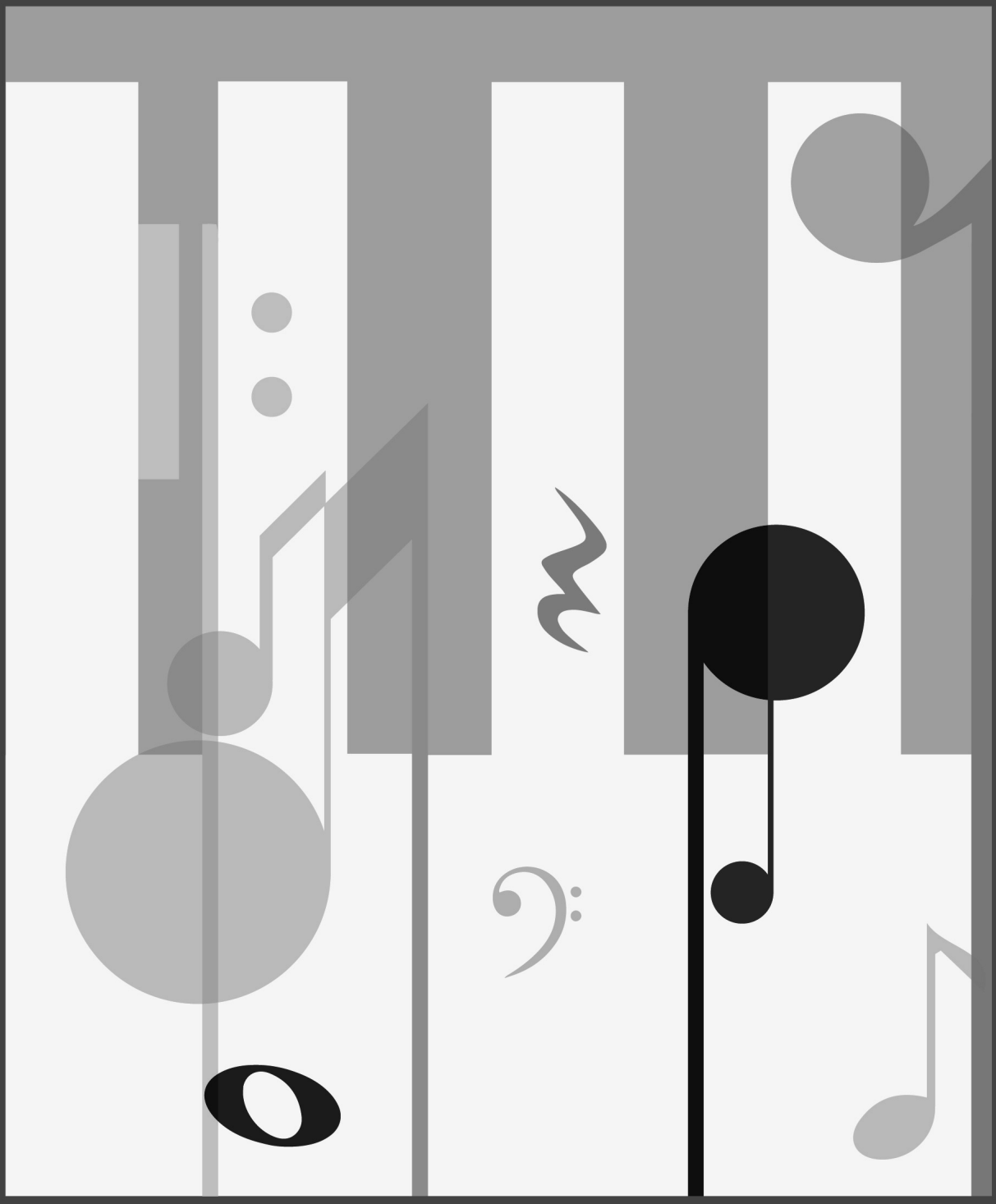
Curriculum Vitae

Cheng Hua was born on August 31, 1997, in JiangXi, China. She completed her high school at Fuzhou No. 1 High School, Jiangxi, before beginning her Bachelor's studies in 2017 at the Liszt Ferenc Academy of Music in Hungary. There, she studied Musical Creative Arts and Musicology, specializing in General Studies in Music, and obtained her Bachelor of Arts degree in 2020.

In 2020, she continued her studies at the Royal Conservatoire The Hague in the Netherlands, where she completed a Master of Music degree in Music Education in 2022. During her Master's studies, she developed a research interest in improvisation in music education, which later became the foundation of her PhD research.

In September 2022, Cheng began her PhD trajectory at ICLON, Leiden University Graduate School of Teaching, where her research focused on improvisation in music education, teacher preparation, and classroom practice. Her Bachelor's studies and PhD trajectory were supported by the China Scholarship Council. During her PhD trajectory, she attended courses provided by the Dutch Interuniversity Centre for Educational Research (ICO). She also participated in the Orff International Summer Course at the Mozarteum University Salzburg – Orff Institute in 2023, further developing her interests in creative activities in music education.

Throughout her PhD trajectory, Cheng actively presented her research at international conferences, including the International Society for Music Education (ISME) World Conference and the European Association for Music in Schools (EAS) Conference. In addition to her research activities, she has been a member of the National Female Choir of the Netherlands and serves on the Scientific Committee of the International Conference of Dalcroze Studies (ICDS).



Publications & presentations

Publications and presentations

Peer-reviewed scientific publications

Hua, C., Admiraal, W., Nieuwmeijer, C., & van der Rijst, R. (2026). Perceived readiness to improvise and to lead improvisation activities: A mixed-methods study on attitudes and self-efficacy in music teacher education. *Teaching and Teacher Education*, 181(October), 105689. https://doi.org/10.1016/j.tate.2026.105689

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He, H., Chen, S, & **Hua, C.** (2025). Adaptive or maladaptive music-listening coping strategy: How does neuroticism use music after experiencing a romantic relationship breakup? PLoS One, 20(8), e0331373. https://doi.org/10.1371/journal.pone.0331373

Manuscripts submitted for publication

Hua, C., Admiraal, W., Nieuwmeijer, C., & van der Rijst, R. (Under review). Improvisation in music education: A systematic mapping of activities and learning outcomes.

Hua, C., Admiraal, W., Nieuwmeijer, C., & van der Rijst, R. (Under review). Understanding teachers' intention to implement improvisation in the classroom: A multi-group study of pre-service and in-service music teachers.

Academic conferences and activities (selected)

2026 *Perceived readiness to improvise and to lead improvisation activities: A mixed-methods study of attitudes and self-efficacy in music teacher education.* Paper presentation, 37th International Society for Music Education (ISME) World Conference, Montréal, Canada.

2026 *Improvisation in music education: A systematic mapping of activities and learning outcomes.* Short paper presentation, 37th International Society for Music Education (ISME) World Conference, Montréal, Canada.

2025 *Unpacking musical improvisation: Implementation and evaluation by primary music teachers.* Round table, ICO Open Graduate Spring School, Blankenberge, Belgium.

2024 *Improvisation in higher music education: Pre-service music teachers' preparation and perspective.* Paper presentation, 36th International Society for Music Education (ISME) World Conference, Helsinki, Finland.

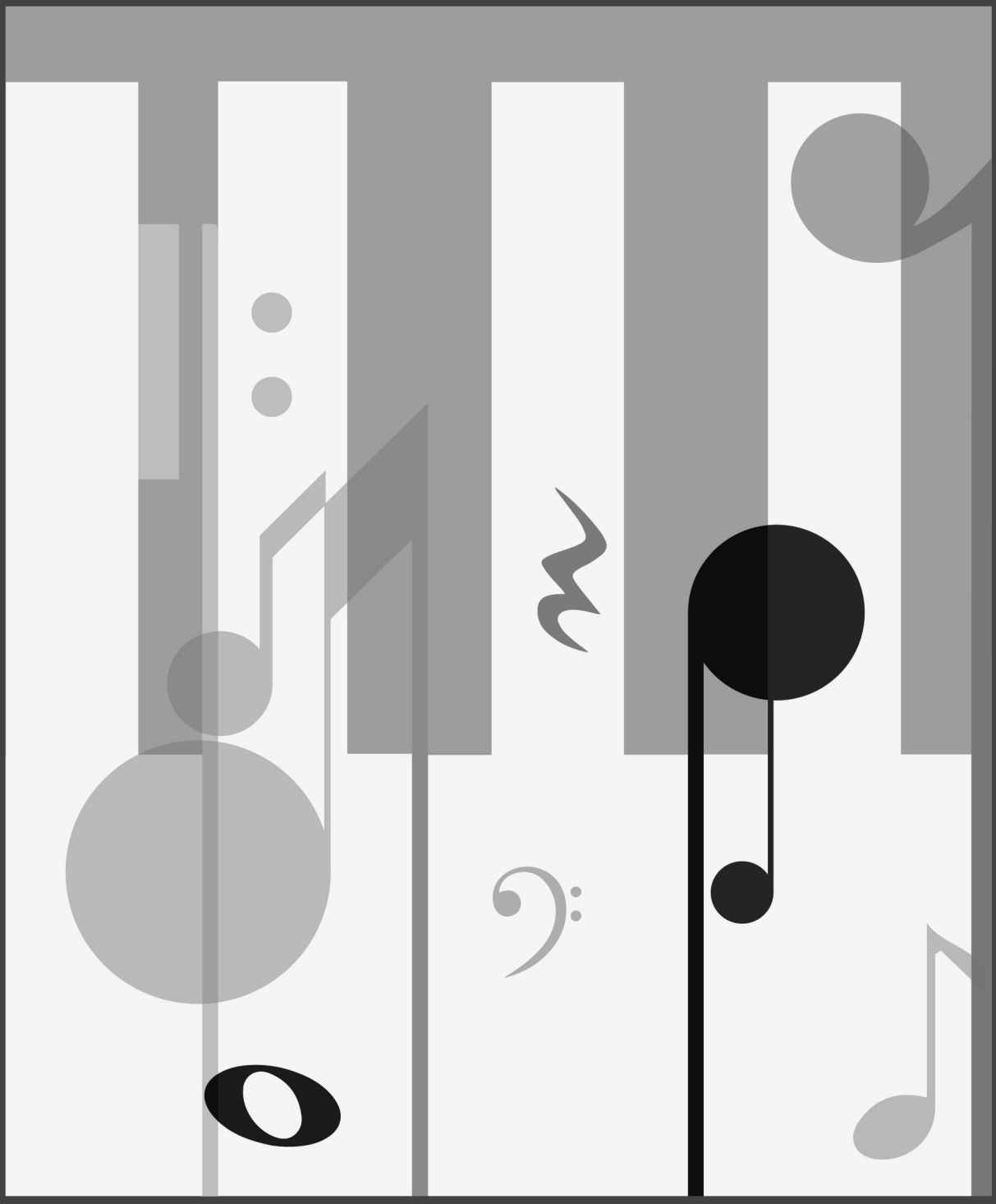
2024 *Can you improvise, can you teach? A mixed-methods study on attitudes and self-efficacy in music teacher education.* Paper presentation, 31st European Association for Music in Schools (EAS) Conference, Dublin, Ireland.

2023 *Orff International Summer Course 2023.* Attended, Mozarteum University Salzburg – Orff Institute, Salzburg, Austria.

2023 *Case studies in primary music teachers' implementation and evaluation of improvisation.* Poster presentation, 30th European Association for School music (EAS) / 9th International Society for Music Education (ISME) European Regional Conference, Lyon, France.

2023 *Unpacking musical improvisation: Implementation and evaluation by primary music teachers.* Pitch presentation, Crossing Bridge Symposium 2023 – A Sense of Freedom, Den Haag, The Netherland.

2022 *5th International Conference of Dalcroze Studies.* Attended, online.



Acknowledgements

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When I unexpectedly managed to schedule my defence in July, I felt excited, anxious, and a little overwhelmed all at once. As I write these acknowledgements, I am beginning to realise that this journey is truly coming to an end. Completing this dissertation would not have been possible without the guidance, kindness, and support of many people, to whom I would like to express my deepest gratitude.

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Wilfried, I was always amazed by how quickly you replied and how detailed and constructive your feedback was. You consistently respected my decisions and encouraged me to explore my own ideas, which helped me grow into a more independent researcher. Since you have been working in Norway since the beginning of my PhD, I have always looked forward to the times when we could meet in person, and I still do. I am very grateful for your humour, your sharp academic input, and your continuous encouragement.

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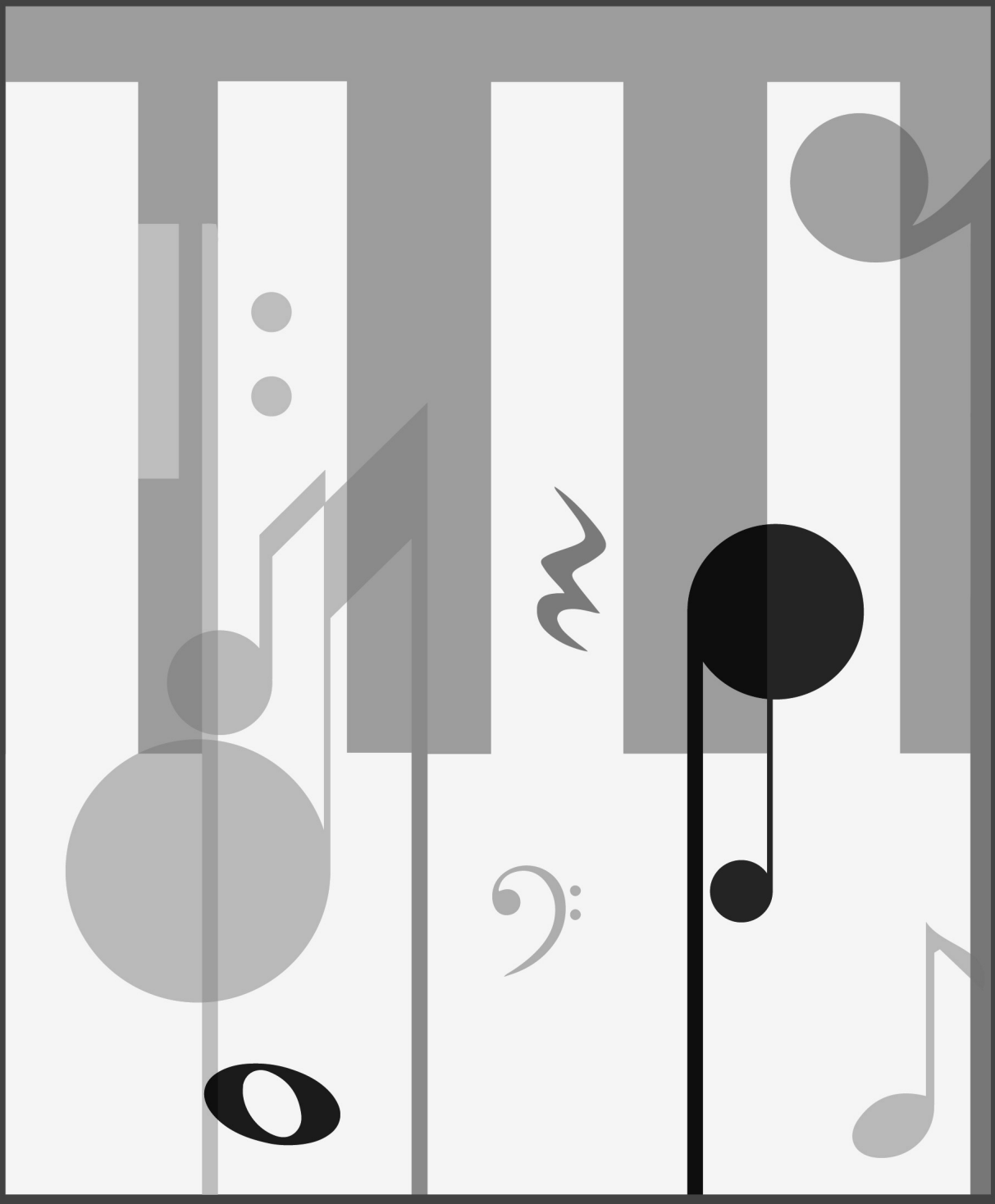
Den Haag, May 2026



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