Investigating effective practice in teaching instrumental music via

videoconferencing to students aged 8 to 12

Arianne Tan

Submitted in partial fulfilment of the requirements

for the degree of

Master of Education (Research)

School of Education

University of New England

Oct 2022

Abstract

Using a social constructivist theoretical framework, this study investigated the teaching and learning of instrumental music lessons through videoconferencing to children aged 8 to 12.

I acted as a teacher-researcher, monitoring student learning behaviours in instrumental music lessons and documenting effective teaching practices that produced positive learning behaviours in student participants. Students were assigned a musical scale and repertoire suited for their musical standards to perform, which they subsequently practised for four weeks. The music performance evaluation was designed to assess student learning outcomes based on their progress throughout the course of the research.

Eight students between the ages of 8 and 12 were selected from a private school in Canberra, ACT. Over the course of four weeks, the recruited students participated in four 30-minute instrumental music lessons through videoconferencing. Based on their ages, student participants were placed into two groups. The first group consisted of children aged 8 to 10, and the second group consisted of students aged 11 to 12.

Positive learning behaviours and effective learning outcomes among students of both ages were documented and linked to the teaching approaches employed in terms of developing effective practices for teaching instrumental music via videoconferencing. Ultimately, the two age groups displayed comparable levels of achievement and positive learning behaviours, suggesting that there were no major differences between the 8 to 10 and 11 to 12 age groups.

Declaration

This thesis was submitted to the University of New England, Armidale, for a Master of Education (Research) degree. The thesis was my work and it had never been presented before to fulfil the requirements for an award at this or any other higher education institution.

The conduct of this research presented in this thesis has received ethics approval from the University of New England's Human Research Ethics Committee (HREC), approval number HE21-232.

To the best of my knowledge and belief, the thesis contains no previously published material written by another person except where indicated. Due acknowledgement has been made in the text to all other material used. The thesis is less than 30,000 words in length, exclusive of the reference list and appendices.

Signature: _____   Date: 20 October 2022

Table of contents

Chapter 3: Research methodology

Chapter 4: Data analysis and results

List of tables

List of figures

Chapter 1. Introduction

Setting the scene

Teaching and learning instrumental music via videoconferencing is a growing trend around the world, particularly to assist the continuous provision of quality instrumental music lessons to children in primary schools ages 8 to 12. As the technical configuration of a camera, microphone, speaker, personal computer, and videoconferencing software is now frequently available in a single device, it has never been easier to connect teachers and students in real-time.

Supporting children's instrumental musical learning via videoconferencing may be a new experience for some parents and teachers. This form of teaching was less common before the COVID-19 pandemic. During the pandemic, teaching and learning instrumental music through videoconferencing became part of an ever-expanding list of activities dubbed the 'new normal'.

To achieve favourable learning results, it is critical to support each student's continuous musical development and improvement. The overarching concern is to ensure consistently positive learning experiences for all students regardless of the medium and modality.

As part of the coursework for this degree, I completed a pilot study to evaluate appropriate techniques and methods in teaching instrumental music lessons via videoconferencing to satisfy the requirements for both quality and continuity in students' lessons. From the standpoint of a teacher/researcher, I investigated teaching practices in instrumental music lessons via videoconferencing. In the context of this study, the participating children were

learning violin and piano, however, the findings are likely to be applicable beyond these two instruments. Qualitative data was gathered to investigate student behaviours and learning results. The data served as a stepping-stone for identifying the critical improvements in delivering instrumental music lessons via videoconferencing.

Problem statement

Teaching instrumental music through videoconferencing is a challenging process that necessitates technological expertise, subject matter knowledge, pedagogy, and an understanding of student learning behaviours. Working with students of various ages and Australian Musical Examination Board (AMEB) grade levels required personalised lesson plans to build performance skills and music knowledge appropriate to their current level of musical growth and competency (Colwell et al., 2015; Seidel & Shavelson, 2007; Tomei, 2007).

According to Janssen and Lazonder (2016), many teachers have reported being hesitant about the use of videoconferencing for lesson delivery owing to apprehension about the unknown and scepticism about the benefits of the medium. These teachers perceive video conferencing as a threat to their interaction with students, and many were unwilling to engage pupils over the screen. The main reasons being students' musical accomplishment and learning development may suffer as a result of a lack of in-person engagement (Arruda, 2013; Rucsanda et al., 2021).

Teachers and students who use videoconferencing technology frequently complain about having to solve issues that disrupt course delivery such as internet connection, video delay, limited visual controls and inadequate sound management. From teachers' perspective, it was

time consuming to explore the functionality of new technical tools, and to plan music activities and study materials that was suitable for teaching via videoconferencing (Biasutti et al., 2021).

Studies found that while students were thrilled about technological developments, their learning may be jeopardised if the equipment proved too difficult to use effectively (Gillies, 2008; Nsairat et al., 2022).

Importance of the study

Instrumental music lessons delivered via videoconferencing have been shown to improve student learning results and encourage independent learning potential (Melton, 2014). However, students have expressed anxiety and concerns towards the unfamiliar way of learning and uncertainties associated to learning via videoconferencing (Rucsanda et al., 2021). This study looked at effective teaching techniques for delivering an engaged and conducive instrumental music learning experience via videoconferencing to students aged 8 to 12. These approaches included minimising technological drawbacks, studying student learning behaviours, designing teaching strategies that encouraged student engagement in lively discussion as exhibited in face-to-face learning, and monitoring and assessing student learning outcomes. Continuous improvement in instrumental music lessons via videoconferencing was critical to students' continued development, good learning behaviours, and successful learning outcomes with their musical instruments (Green, 2010).

This project will contribute to the existing evidence base for instrumental music lessons delivered via videoconferencing (Al-Samarraie, 2019; Hannum, 2009; Husson & Waterman, 2002; Yazici, 2013; Park, 2021), and will promote the delivery of a fully-interactive and

positive experience by minimising technological drawbacks and building a more flexible, effective, and natural teaching delivery structure in which students are encouraged to participate.

Scope and objectives of the research

This study investigated whether primary school students aged 8 to 10 and 11 to 12 demonstrated differences in learning behaviours and outcomes in instrumental music lessons via videoconferencing. Students were divided according to age groups as it was recognised that the older age group was often at a transition point in their learning pathways, with competing demands on their time and shifting interests as they progressed through primary school (Mays et al., 2018).

Statement of the research questions (RQ)

Two research questions guided this study as follows:

RQ1. Does student learning achievement and behaviour in instrumental music lessons via videoconferencing differ according to age groups 8 to 10 and 11 to 12?

RQ2. What constitutes effective practice in instrumental music lessons via videoconferencing for students aged 8 to 10 and 11 to 12?

Conceptual framework

The design of this study was informed by a review of the literature on teaching instrumental music via videoconferencing as shown in figure 1.1:
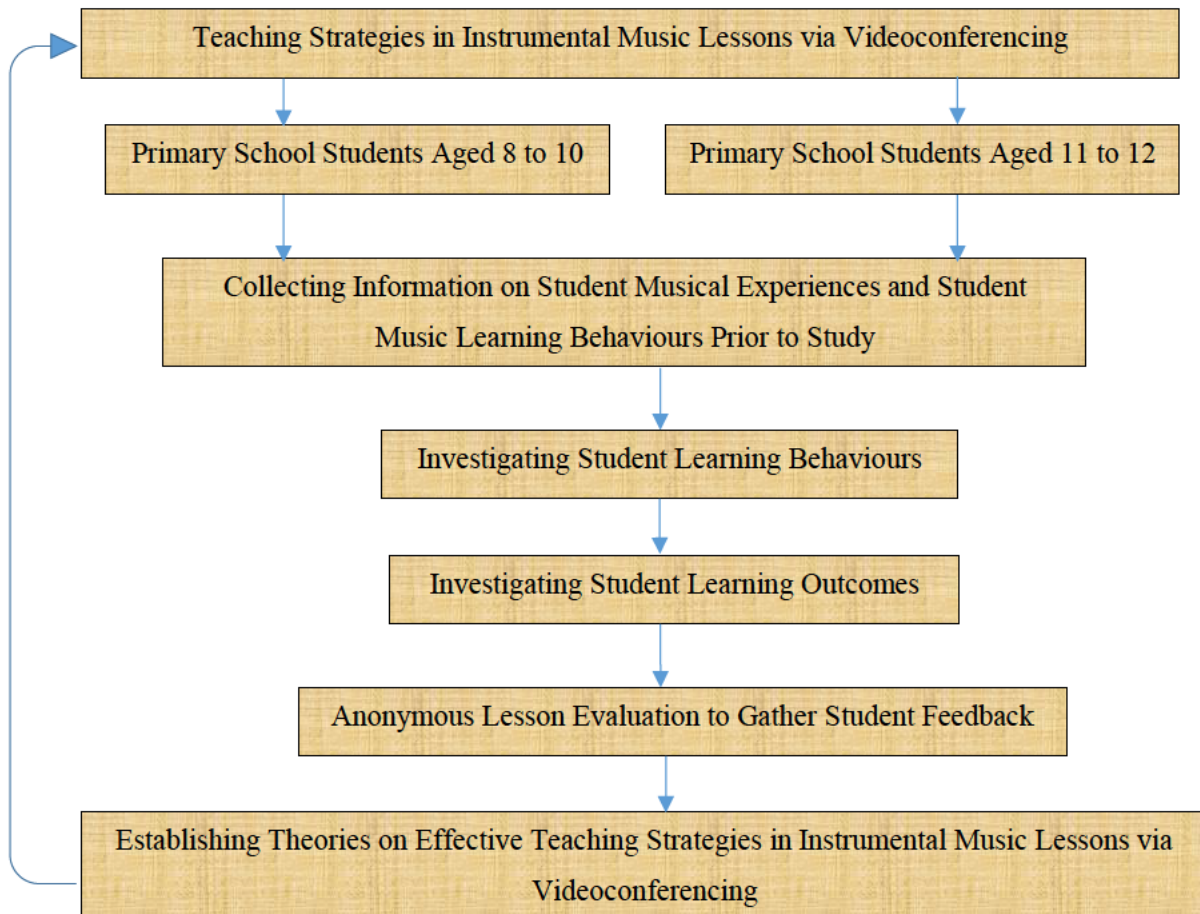
Figure 1.1. Diagram for the study design.

The study design was based on a combination of literature review and my experience as an instrumental music teacher. I took the role of a teacher-researcher in this study. Student participants were divided into two groups according to their ages, followed by completing a past musical experiences questionnaire before the first lesson began. Students' parents then completed questionnaires regarding their child's learning behaviours in instrumental music lessons pre-study. Various data collection methods were utilised to investigate students learning behaviours and learning outcomes pre-post study. Student participants were asked to

complete an anonymous lesson evaluation post-study and to share feedback regarding their experiences over four instrumental music lessons via videoconferencing. Finally, theories on effective teaching strategies were established by analysing all data collected throughout the study.

The conceptual framework consists of four major steps:

    (1) observation and description of an occurrence,

    (2) formulation of analyses to explain the occurrence,

    (3) evaluating the analysis by comparing the findings in multiple data collection methods,

    (4) establishment of a theory based on repeated verification of the findings (Fiske, 1979).

The first six rows were created to help with steps (1) to (3). The seventh row was designed to fulfil step (4), which was to construct successful teaching practices in instrumental music lessons via videoconferencing. The conceptual framework clarified how the relationships between each element might evolve during the study in response to reflexive fieldwork.

Limitations

The numerous controlled factors in a research context may not necessitate the same concerns as in a regular instrumental music lesson setting, such as music textbook selection, curriculum pace, and restricted extra resources. The range of music lesson materials taught in this study was limited by the research duration. The AMEB Level 1 syllabuses for violin and piano were selected for all student participants as it was the most appropriate syllabus based on the students' age, proficiency, and learning style (Agay, 1981). Students were encouraged, however, to explore music pieces outside of their AMEB curriculum in order to strengthen their independent learning skills.

As per the school's privacy policy, viewing of the audio and video recordings was limited to the researcher alone. The researcher was entirely responsible for grading student music performance assessments pre-post study. Fiske (1979) stated that the average scores of three judges with two evaluations per judge in the categories of 'technique' and 'overall performance' are suitable assessment measures of student performance. The researcher was the only source for assessing the student musical performances which may raise concerns about the reliability of the judgements. To address this issue, the AMEB syllabus was employed exclusively in this study.

According to the AMEB syllabus (2022 Manual of Syllabuses, 2021), only one examiner is necessary to assess students in the AMEB examinations at Level 1 (Grade 1 to 4). The examiner assigns a 5-point rating scale to determine students' technical music skills and overall music performance to ensure the reliability of the student musical performance evaluation. A score of 5 denotes an excellent grade, whereas a 1 denotes a poor grade. The AMEB syllabus includes assessment criteria for both repertoire and technical works for examiners to use when assessing instrumental music students at Level 1 (Grade 1 to 4).

The AMEB syllabus was utilised throughout the instrumental music lessons via videoconferencing in this study. As a result, one examiner was regarded to be sufficient for assessing students' overall technical music skills and performances pre-post study.

Chapter 2. Literature review

Introduction

This review of the literature began with Lev Vygotsky's social learning theory, followed by a brief discussion of recent meta-analyses that combined studies on synchronous distance education. This is then followed by a narrower focus on research that was most relevant to this study, namely, instrumental music lessons via videoconferencing. The literature review concludes with some consideration of conventional instrumental music lessons to identify transferrable teaching techniques which can inform instrumental music lessons via videoconferencing. The search criteria yielded forty pieces of literature on four recurring elements:

1) learning outcomes,

2) student behaviours,

3) interactive learning activities, and

4) teaching strategies.

The most prevalent data comparison methods in the reviewed literature were experimental and descriptive studies (Phipps & Merisotis, 1999).

Theoretical framework

Lev Vygotsky's social learning theory, social constructivism, asserts that individuals actively participate in the construction of their knowledge. Vygotsky argued that engaging with people in their culture and social circumstances is the primary means through which we learn. The application of social constructivism in this study was centred around the dynamics of personal interaction during private instrumental music lessons. According to social

constructivism, effective teaching and learning rely heavily on interpersonal communication and discussion, with the major focus on the student's interpretation of the task (Schreiber & Valle, 2013).

The Zone of Proximal Development (ZPD) is perhaps the most widely used concept in education. The ZPD is generally defined as the difference between what a student can achieve on their own and what they can achieve with the help of a teacher, parent, or more knowledgeable helper. This affirms that the teacher plays an essential role in one-on-one instruction, but that careful consideration must be given to the level of difficulty associated with the task. Guiding a child through the steps of sight reading is an example of ZPD. Once the child has mastered these steps, he or she can work independently on note reading. The difference between actual and potential development levels characterises the ZPD in a learning environment (Jacobs & Usher, 2018; Sage, 2022).

Teachers can create age-appropriate curriculum and teaching techniques by understanding what children can accomplish on their own and what they can accomplish with assistance. This allows teachers to gradually delegate students with increasing responsibility to perform tasks independently. Scaffolding is the process of guiding a young learner from being unable to complete a task to being able to do so by asking questions, interacting with the learner, and providing guidance (Jacobs, 2015; Kostogriz & Veresov, 2021; Wood, Bruner, & Ross, 1976).

Constructivist teaching is based on certain core ideas that characterise how constructivist classrooms differ from traditional classrooms. From a review of the literature, five of these core principles can be summarised as follows:

1. Teachers actively seek and value student perspectives.

In contrast to traditional approaches where students are expected to deliver the one correct response that the teacher is searching for, students in a constructivist classroom are encouraged to expound on their ideas and use evidence to back up their claims. Teachers may encourage students to articulate their learning through dialogue and questioning.

2. Classroom activities put student assumptions to the test

Students are encouraged to investigate challenges to promote engagement. Constructivist education is all about widening student perspectives and surfacing their evolving understandings.

3. Teachers present relevant issues

Constructivism is concerned with investigating complex, real-world situations that allow students to interact with the content. Tying learning to concepts or situations that are relevant to students' lives and interests can help boost motivation and increase knowledge of content.

4. Teachers design lessons based on big ideas

Understanding cause and effect, critically assessing texts, and inquiry-based investigation are all important ideas for students to acquire. Learning in constructivist classrooms is designed to promote conceptual consolidation and technical proficiency.

5. Teachers evaluate student learning in the context of daily instruction

Assessment in constructivist settings is generally formative as the focus is on allowing students to implement feedback at the moment. This is particularly common in the context of instrumental music lessons where the teacher models how a phrase or passage should sound.

Constructivism empowers students by emphasising the learning process rather than merely

providing them with information (Schreiber & Valle, 2013).

Synchronous distance education

Synchronous distance education allows for real-time interaction between teachers and students, allowing for immediate feedback and discussion (Andrews & Klease, 1998, p. 91). It acts as a means for incorporating technological literacy, critical thinking, dialogue, collaborative problem solving, independent learning, and cultural awareness into existing curricula (Lawson & Comber, 2010).

Russell (1999), conducted one of the most extensive meta-analyses of synchronous distance education with 355 annotated bibliography entries, and Allen et al. (2004), reviewed a total of 39 synchronous distance education articles. They both revealed findings of improved student learning behaviours, student satisfaction, exam performance, and academic grades in synchronous distance learning, in comparison to conventional face-to-face schooling.

Peacock et al. (2012) highlighted that synchronous distance education empowers students' self-reflecting capabilities. Synchronous distance education supports students to develop a personal and dynamic learning space. It increases student effort, capacity, satisfaction, sacrifice and gratitude. The most common difficulties encountered during the delivery of synchronous distance education were reported to be equipment failures and insufficient teacher preparation before class delivery.

Researchers such as Al-Samarraie (2019), Hannum (2009), Husson and Waterman (2002) and Yazici (2013) suggested the comparative research approach has been overused and suggested that greater insights could be achieved through a qualitative approach. Qualitative

approaches could be utilised to gain a more in-depth understanding of synchronous distance education teaching strategies and their direct influence on student learning behaviours (Simonson, Schlosser, & Orellana, 2019).

Jopling (2019) proposed three educational techniques to improve student engagement and interaction in a meta-analysis of 17 studies that analysed one-to-one tuition via videoconferencing from elementary to tertiary education levels:

1. Connecting new information to the student's relevant experience
2. Collaboration in lesson planning between teacher and student
3. Exchanging roles between teacher and student.

Hastie, Chen, and Kuo (2007, p. 286) recommended emphasising the clarity of instruction and encouraging independent thinking as the best instructional method in synchronous distance education.

Even though numerous researchers reported compelling results in favour of synchronous distance education, Phipps and Merisotis (1999) raised various issues in several synchronous distance education studies as follows:

1) a lack of control for relevant variables such as technological set-up,
2) non-random sampling, reliability, and validity of the measuring tools of student behaviours and outcomes,
3) an emphasis on individual learning achievement rather than the overall academic experience (Farber, 1998; Kosarzycki et al., n.d.; Russell, 1999), and
4) a lack of consideration for individual student learning styles.

These studies collected data to investigate the experiences, such as effective teaching strategies via videoconferencing, comparing student learning behaviours pre and post study using the Peacock et al. (2012) evaluation framework, and identifying approaches to reduce technological interruptions.

Instrumental music lessons via videoconferencing

Independent music teachers were among the first in the performing arts to use videoconferencing for educational reasons (Madeja, 2004). As a result, the number and suitability of music technologies created for videoconferencing have increased, as have presentations of videoconferencing teaching approaches at national music conferences (Duffy & Healey, 2017; Hartnett & Gross, 2009; Shoemaker & Pike, 2013). However, research on videoconferencing for instrumental music classes is, by comparison, underrepresented (Brändström et al., 2012; Dammers, 2009; Duffy & Healey, 2017; Moore, et al., 2015; Orman & Whitaker, 2010; Riley, 2009; Shoemaker & Pike, 2013). The extant literature on synchronous remote education in classroom settings cannot be automatically applied to videoconferencing-based instrumental music lessons. The reason for this is due to the distinct nature of instrumental music lessons, which rely greatly on the quality and precision of audio and visual transmission.

The most relevant literature for instrumental music lessons via video conferencing was that which specifically addresses students aged 8 to 12 and focused on teaching practices and pedagogical expertise. Bronwyn and Tait (2005), Duffy and Healey (2017), and Moore et al. (2015) all observed a comparable advantage in eliminating distance and cost as a deterrent to excellent instrumental music lessons via videoconferencing in various geographical locations. There were similar drawbacks noted, such as limited visual stimuli and latency in video

and/or audio transmission. An important recommendation was for teachers to obtain musical scores before each class to have a visual copy of the music during student performances.

Riley (2009) spent two years in Mexico observing elementary-level singing lessons through videoconferencing and collecting data through teacher reflections, student performances, and researcher narratives. Reported obstacles included frequent technical interference or lag in sound and video transmissions, pedagogical restrictions owing to physical contact obstacles, and the difficulties of singing synchronously. The positive outcomes included increased student participation, cultural exchange, and access to quality lessons without the need to travel. Riley (2009) advocated for comprehensive planning and flexibility in lesson plans for videoconferencing lessons, as well as a continued study on online music lessons between two nations to expand cultural and musical interaction opportunities.

Dye (2007) observed instrumental music tuition through videoconferencing of secondary school music band students and compared behavioural occurrences using an evaluative framework devised by Siebenaler (1997, p. 6). Siebenaler's methodology used the "teacher presentation - student response - teacher feedback" structure to measure student involvement, attention and understanding of the content delivered. Dye's (2007) assessments were based on the quality and correctness of the student's answers to the teacher's questions and their attention and focus throughout performances. Dye (2007) then conducted open-ended interviews before and after the case studies. In the post-case study, student behaviour during instrumental music tuition via videoconferencing revealed a rise in verbal engagement, music-related enquiries, student music performance, and interaction between the teacher and students. Dye (2007) also cited obstacles such as communication, visual constraint, and the inability to be physically aided as part of the lesson. As a result, Dye (2007) advised investing

in high-quality videoconferencing equipment and conducting extensive instructional preparation before classes.

Dammers (2009) highlighted the affordances of videoconferencing software, such as the built-in functionality of file sharing and recording in a case study of nine individual middle-school online trumpet lessons. Aside from the visual constraint of fingerings, the online trumpet instruction was equivalent to traditional face-to-face teaching. It was a one-time occurrence of audio transmission latency induced by unreliable internet access. When compared to conventional face-to-face sessions, the trumpet teacher modified his teaching approach for videoconferencing lessons, such as increased planning and interactive questioning.

Orman and Whitaker (2010) investigated six saxophone and tuba lessons delivered through videoconferencing to three different students. The data revealed an overall increase in performance time, verbal communication, and positive feedback from the teacher. However, there have been reports of visual restrictions and poor audio quality.

Shoemaker and Pike (2013) evaluated note-reading accuracy for entry-level music students separated into two lesson groups: 1) conventional face-to-face lessons and 2) instrumental music tuition via videoconferencing. Over the course of eight weeks, the instrumental music teacher gave weekly fifteen-minute lessons. The researcher observed variability in the note-reading improvement across both groups. Student engagement and independent learning skills, on the other hand, improved in the group of instrumental music students who learned via videoconferencing.

Brändström et al. (2012) investigated individual guitar lessons of three secondary-level students and eleven masterclasses taught through videoconferencing. The overall feedback from the students indicated that this was a favourable experience as a useful supplement to face-to-face lessons. Teachers and students were unable to play together owing to latency in audio transmission and the difficulty to sustain a synchronous beat. Brändström et al. (2012) emphasised the need for a detailed lesson plan. Simultaneously, the capacity to be flexible during a lesson was critical for instrumental music instruction delivered via videoconferencing.

A summary of the literature on instrumental music tuition through videoconferencing found similar results:

1. greater student involvement and satisfaction as compared to the regular, face-to-face music lesson,

2. technical problems of audio and video transmission latency and lowered sound quality,

3. advice for teachers to have a well-planned lesson and a flexible mentality in a videoconferencing lesson.

The current study will present data on all three aspects discussed above and compare student music performances pre-post study. Students' musical abilities will be evaluated based on their technical music skills, rhythms, dynamics, articulations, and general music knowledge. Comparing student music performances pre-post study will provide an overview of independent learning skills and learning outcomes across different age groups and music grade levels.

Face-to-face instrumental music lessons pedagogy

Studies on the pedagogy of face-to-face instrumental music lessons will provide relevance for videoconferencing-based instrumental music lessons. According to McPherson (1995), learning achievement in instrumental music may be measured using five unique musical abilities: performance, sight-reading, aural, memory, and improvisation skills; hence, the teaching approach selected below demonstrated improvements in one of the five skills.

Siebenaler (1997) indicated a correlation between the tempo of teachers' verbal communication and increased student accomplishment. Critical and constructive feedback from teachers resulted in improved teaching efficacy. Students' total instrumental music exam scores improved as a result of straightforward instruction, teacher modelling, and demonstration (Kostka, 1984; Lorah & Mikzsa, 2019; Speer, 1994).

According to Greer, Madsen and Madsen (1975), allowing students to make mistakes and learn from them actively enables two modes of communication by asking questions, and cultivating students' creative thinking abilities through new musical activities such as music composition and improvisation.

Özevin (2018) devised a methodical instrumental music program consisting of four stages: imitation, exploration, improvisation, and creation excites children's innate musical potential. This program was shown to establish a musical learning environment that is similar to children's play environments, in which they will be motivated to participate in expanding their musical knowledge. This pedagogical approach was designed to foster students' independent learning activities.

According to Rife, Shneke, Lauby, and Lapidus (2001), the enthusiasm connected with musical learning activities influences student engagement in lessons. According to Pegg (2008), teaching young beginners using their preferred method of learning enhances their retention of content and willingness to remain enrolled in instrumental music lessons. Learning styles are also an important consideration for personalising instruction. A visual learner, for example, may choose to study musical repertoire through note reading as their strength is pattern identification, which gives them an edge in sight-reading. A kinaesthetic learner might opt to mimic the teacher's demonstration as their strength is their quick preservation of muscle memory and repeating actions. An auditory learner may prefer to learn by listening to the composition and then recreating the same melody on their musical instrument as their strength is their ability to play by ear, replicate a tune they've heard, and acquire intonation accuracy rapidly. Incorporating students' preferred learning styles into lessons can improve their overall learning progress, promote effective learning outcomes, and foster their continued enthusiasm for instrumental music lessons (Pegg, 2008).

According to the reviewed literature, teaching strategies have a direct impact on students' learning behaviours and learning outcomes. The surge of videoconferencing for instrumental music lessons and the limited research on effective online teaching strategies provided a rationale for this study.

Student learning outcomes in face-to-face instrumental music lessons

When students initially enrol in or transfer to an instrumental music teacher, it is crucial to evaluate their existing musical knowledge and performance standard. It establishes a baseline against which future learning may be measured, allowing student progress, and learning outcomes to be monitored. Music knowledge and performance standards are generally

assessed via auditions and/or sight reading, and performance levels are scored using a grading scale (MENC Committee on Performance Standards, 1996).

Experienced teachers who tailored interactive music teaching materials to students' musical abilities and learning profiles advanced students' practical playing and boosted students' self-esteem, confidence, contentment, and productivity. Rife, Shneke, Lauby and Lapidus (2001) noted how students can be inspired to continue taking instrumental music lessons when they can see their progress.

Van Wezel (2015) showed how a child's auditory skills and hand-eye coordination improve when a sound is introduced before seeing the musical symbol notated. According to the sound before symbol method, children learned music best when it was taught to them by ear first, followed by note reading and practical playing. Children who do not receive adequate auditory training frequently struggle with sight reading, particularly notes and rhythmic understanding (Van Wezel, 2015). During the repertoire analysis, different musical elements of a piece were examined including duration, dynamics, articulation, structure, melody, tempo, key signatures, genre, and composer. Students developed a clear understanding of the relationship between musical expressions, performance mechanisms, technical skills, and the work's underlying theme in the process. Repertoire analysis was a continual mapping process for students to understand the work visually, complementing the sound before symbol method. Van Wezel (2015) found that the most effective process was to demonstrate how to perform a musical composition first from an aural perspective and then from a visual perspective.

Agay's seminal work (1981) on scales contributed to the development of tonal awareness, note knowledge, finger agility, finger strength, the synchronisation of two hands, and the thumb under technique in children. Scales are the basis of many western repertoires, and they often appear in musical compositions across diverse genres. Scales and other repetitious devices are essential to help students improve their playing abilities, key signature knowledge, and musical concepts.

Chapter 3. Research methodology

Introduction

"In a very real sense, every piece of research is unique and calls for a unique methodology. We, as the researcher, have to develop it" (Crotty, 1998, pp. 13-14). Crotty's quote inspired the conduct of a pilot study prior to the research. The research approach was revised and adjusted to better meet the research setting after a series of reflections and feedbacks collected from the pilot study design. This chapter begins with a brief review of the pilot study, then the research methods and data analysis process utilised in this study to investigate the relationship between effective teaching strategies, learning behaviours, and learning outcomes in students aged 8 to 12.

Pilot study

I launched an action research pilot study to investigate teaching approaches and student learning outcomes of instrumental music lessons via videoconferencing as a coursework requirement in preparation for the proposed topic. According to the pilot school's privacy policy, teaching and watching the audio and video recordings were restricted to the researcher alone. As a result, my role in the pilot study was as both a teacher and a researcher.

Pilot study procedures

From April to May 2020, a pilot study comprising 72 student participants from three private schools and three public schools in Canberra, ACT, was performed over four weeks. Each student received a weekly 30-minute individual instrumental music lesson to evaluate the feasibility of the research design, the teaching methods of the instrumental music contents, the stability of the internet connection, and the functionality of the technology, including the

video conferencing software. To facilitate the videoconferencing instrumental music lessons, entry-level videoconferencing equipment was set up. The setup included a camera, microphone, speaker, PC, and Zoom videoconferencing software.

The following are some examples of music teaching resources that were used in the pilot study's instrumental music lessons via videoconferencing. I have selected the C major scale from the elementary and preliminary grades, *Hirschberg's Fisherman* (elementary) and *Richert's Bouncing ball* (preliminary). The selected musical scales and repertoire in AMEB Level 1 included *G major scale, Plesiosaurus* (Preliminary Grade)*, Beyer's Etude* (Grade 1), *Berceuse* (Grade 2), *Elgar's Andantino* (Grade 3) and *Hadyn's Allegro* (Grade 4). The selected musical scales and repertoire in AMEB Level 2 included *F minor arpeggios, Bach's Invention* (Grade 5), *Heller's Etude* (Grade 6) and *Debussy's Minstrels* (Grade 7).

Research paradigm and research design

This investigation employed qualitative research methods. Descriptive qualitative data was collected as the primary source for data analysis to investigate the problem systematically, accurately, and objectively (Cohen et al., 2002). The qualitative study is located within the interpretivist paradigm. In the interpretivist paradigm, a researcher is a subject observer (Newsome et al., 1988) who participates in the activities and identities of the implications of actions expressed within specific social settings (Janse van Rensburg & Hoffman, 2004). The participation-observation approach within the interpretive paradigm is a method of inquiry to understand the occurrences and reflect on the discoveries (Ferguson, 1993).

In this study, the participation-observation approach was employed to investigate and gain in-depth knowledge of the experiences. This approach allowed me to observe, analyse, and understand the experiences from both the researcher's and participants' perspectives and communicate and interact directly with the study participants (Ferguson, 1993; O'Donoghue, n.d.; Xinping, 2002).

Collecting data on student musical learnings through teacher-researcher observations, student feedback via anonymous lesson evaluation, and parental input via survey were examples of ways to explore student learning behaviours. Researchers may also compare student pre-post study music performance assessment scores to investigate student learning outcomes and overall progress. Researchers should collect various qualitative data to compare, identify and illustrate recurring patterns or idiosyncrasies that they would not have observed otherwise (Xinping, 2002).

Method

Weekly 30-minute instrumental music lessons were held via videoconferencing once a week over four weeks. I employed the interpretative framework of social constructivism in my research of student perceptions by asking open-ended questions. This technique enabled student participants to express themselves freely. As the researcher, I listened carefully to students' perspectives and interpreted the findings based on their age, musical background, and AMEB music grade level. The analysis of their experiences provided a wealth of information regarding their overall learning behaviours and learning outcomes as well as new insights into effective teaching strategies and overall research. The social constructivist framework proved to be an effective means of comprehending the perspectives and subtleties that shaped the unique environments of the student participants.

Audio and/or video were recorded in all instrumental music lessons via videoconferencing to enable viewing and reviewing as required. It allowed the researcher to then retrospectively analyse the learning behaviours and learning outcomes of students aged 8 to 12.

Participants

Eight primary school student participants were recruited: four students aged 8 to 10 and four aged 11 to 12. Students were divided into age groups as it was recognised that the older age group is often at a transition point in their learning pathways, with competing demands on their time and shifting interests as they progress through primary school (Mays et al., 2018).

The recruitment process took place using convenience sampling as I had prior knowledge of all of the students through my ongoing role as an instrumental music teacher via face-to-face lessons in the same school located in Canberra, ACT. The student participants varied in musical experiences, musical instruments, and musical training levels from elementary to the AMEB Level 1 (Grades 1 - 4). The AMEB grades categorise students based on their musicianship and technical skills. Elements assessed in the technical music skills include intonation, rhythm, tone, phrasing, and articulation.

Students were categorised into two age groups; 8 to 10 and 11 to 12. The student participants attended instrumental music lessons from home via videoconferencing using a personal computer that had the necessary software installed. Students studied the musical instrument from a distance with the teacher-researcher. The teacher-researcher delivered instrumental music lessons via videoconference using verbal and written communication, teaching demonstration, and visual tools such as file sharing, screen sharing, and a digital whiteboard.

Students took part in four 30-minute instrumental music lessons via videoconferencing, once a week for four weeks, as per the lesson plan. Each lesson required students to have their musical instruments and music learning materials ready. A new musical scale and repertoire of students' current music grade level, selected via their music learning materials, was introduced every fortnight.

Following on from the pilot study, examples of musical scales and repertoire in the elementary and preliminary grades were the *C major scale*, *Hirschberg's Fisherman* (elementary) and *Richert's Bouncing ball* (preliminary). The musical scales and repertoire in AMEB Level 1 often included the *G major scale*, *Plesiosaurus* (Preliminary Grade), *Beyer's Etude* (Grade 1), *Berceuse* (Grade 2), *Elgar's Andantino* (Grade 3) and *Hadyn's Allegro* (Grade 4).

Each lesson was supervised by the student's parent or guardian. Before the study, parents and student participants signed informed consent documentation.

Data collection method

Pre-post study student music performance assessment, musical experiences questionnaire, anonymous lesson evaluation survey, pre-post study questionnaire for parents, and field notes by the teacher-researcher were used to collect data for this study. These methods generated qualitative transcript data (see Figure 3.1).
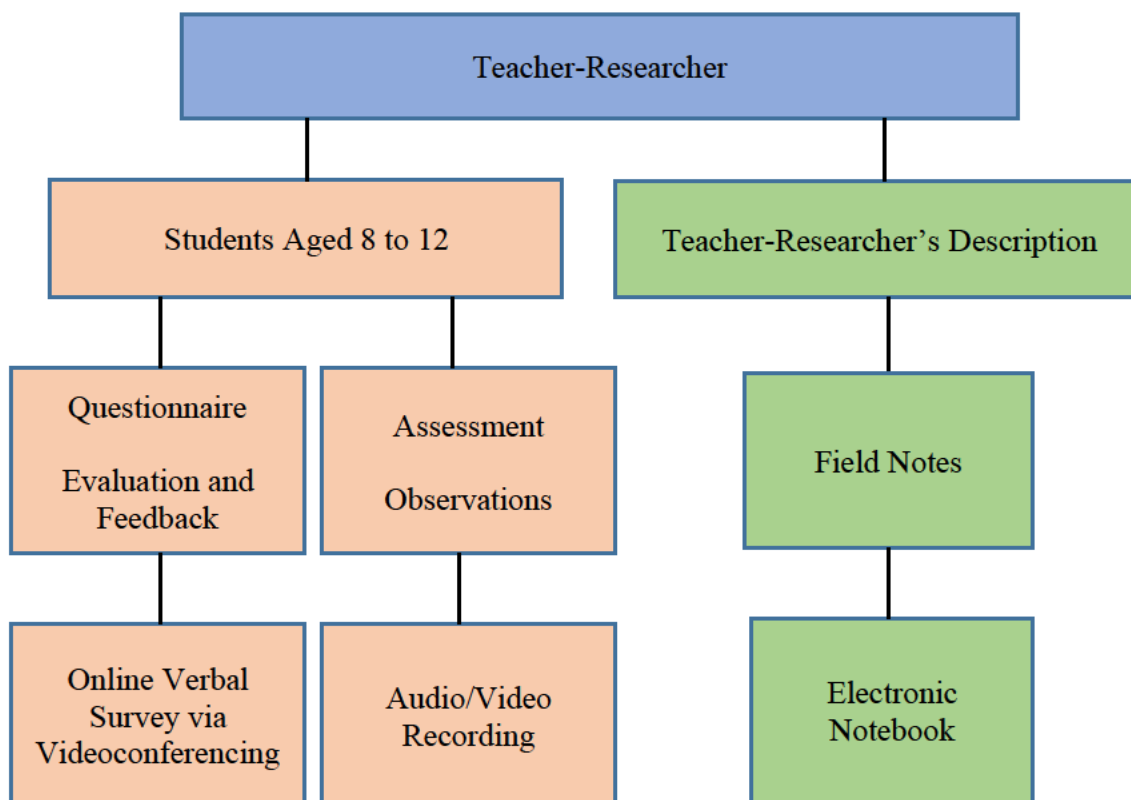
Figure 3.1. The flowchart for data collection.

Assessment of student music performances pre-post study

The assessment criteria for student music performances pre-post study are outlined in Appendix A. Students took the pre-test via videoconferencing at the commencement of the first instrumental music lesson and the post-test at the end of the fourth lesson. At the start of the first lesson, students were given a musical scale and repertoire. In the assessment of music performances pre-post study, students played the same musical scale and repertoire. Students' technical music skills, such as intonation, rhythm, tone, phrasing, articulation, and overall performance, were evaluated numerally with a score between 1 and 5. The pre-test and post-test measured the learning progress of each student throughout the four sessions in which the musical knowledge covered throughout the study period formed part of the assessment criteria.

Students were not always familiar with the repertoire and music materials for the pre-test so they sometimes used prior musical knowledge to study and perform the piece chosen by the researcher. Student music performances were expected to have improved by the time they took the post-test, depending on the musical knowledge they had learned and the time they had set aside for practice. The pre-test and post-test results indicated the overall improvement in student learning outcomes. Effective teaching strategies were developed based on consistent improvement in student learning outcomes across all ages. These strategies are outlined in Chapter 6.

Fiske (1979) suggested that an individual judge's average dependability was insufficient and that a panel of seven judges was necessary to get a reliability score of +/- 0.40. In other words, musicians were neither consistent nor dependable assessors. Similar findings have been seen in other investigations (Bergee, 2003; Hewitt, 2007; Zdzinski & Barnes, 2002). Fiske (1979) also proposed that just two music performance assessment variables were useful, namely, 'overall performance' and 'technique'. Other variables are often highly connected and hence unnecessary. Fiske (1979) proposed a reasonable performance evaluation based on the average scores of three judges, with two evaluations per judge per performer on 'technique' and 'overall performance'. The requirement for seven judges was unrealistic. Three experienced judges should rate students' technical music skills and overall musical performance on a 5-point scale, with 5 being excellent and 1 being poor.

Under the guidance of the AMEB syllabus (*2022 Manual of Syllabuses*, 2021), only one examiner is required to be present for the Level 1 (Grade 1 to 4) AMEB examinations. One examiner is deemed to be sufficient to reliably assess a student's technical music skills and overall musical performance by assigning a 5-point rating scale, with 5 being excellent and 1

being poor. The AMEB structures the instrumental music learning program with a specific repertoire and technical works. There are guided marking measures and evaluation guidelines for each repertoire and technical work for examiners to assess AMEB, instrumental music students. The guided marking measures ensure that one music examiner is sufficient for assessing students in Level 1 (Grade 1 to 4) of the AMEB syllabus.

In this research, the AMEB syllabus was taught exclusively to students in instrumental music lessons via videoconferencing. Hence, one examiner was sufficient to assess students' technical music skills and overall performances pre-post study.

Each student's standard of achievements was assessed based on their understanding and control of technical music skills, and their ability to demonstrate control consistently in the music performances. The students' overall performances were judged on their confidence and performance behaviours.

Student musical experiences questionnaire

Before commencing this study, student participants completed the musical experiences questionnaire verbally via videoconferencing. The questionnaire gathered information on student musical experiences, such as the types of musical instruments they learned, the years they studied instrumental music, and their AMEB grade level (see Appendix B).

The collected data was used to evaluate the efficacy of teaching strategies in instrumental music lessons delivered via videoconferencing to students with varied musical backgrounds. The learning outcomes of students were analysed by comparing the improvement in the assessment scores of student music performances pre-post study.

Anonymous lesson evaluation survey to gather student feedback

Students provided anonymous lesson evaluation via an online Google form survey at the end of the fourth instrumental music lesson via videoconferencing. The anonymous lesson evaluation forms collected data on student feedback, including areas for improvement, favourite and disliked teaching styles, satisfaction levels, and other remarks (see Appendix C).

Students provided comments on the instructional sections of all four lessons and recommended adjustments to the teaching strategies. A series of open-ended questions allowed students to elaborate on their thoughts while simultaneously offering comprehensive feedback to the teacher-researcher to promote more effective instrumental music lessons via videoconferencing.

Pre-post study questionnaire for parents

The pre-study questionnaires were completed by parents via videoconferencing at the start of the first instrumental music lesson, and the post-study questionnaires were completed towards the end of the fourth lesson (see Appendix D). The pre-post study questionnaires examined student learning behaviours pre-post study. These questionnaires applied Peacock et al.'s (2012) assessment framework, categorising student learning behaviours into five elements, namely; effort, capacity, satisfaction, sacrifice, and gratitude for learning a subject. According to Peacock et al. (2012), synchronous distance education improves the five assessment framework aspects by enhancing students' self-reflective skills and fostering a personal and dynamic learning environment.

The variations in student learning behaviours before and after the study were utilised to improve teaching strategies in instrumental music lessons via videoconferencing as outlined in Chapter 6.

Researcher's descriptive field notes

During each instrumental music lesson, descriptive field notes were collected including descriptions of teaching observations via videoconferencing. For example, a summative review of student learning behaviours, what students do and say, and the activities in which students participated throughout the observed event. The field notes kept track of what was occurring throughout the study and documented the progress of the research.

Table 3.1 summarises the alignment of the research questions with the data collection methods.

Table 3.1

Alignment of the research questions with the data collection methods.

Research questions	Data collection methods	Types of data
RQ1. Does student learning achievement and behaviour in instrumental music lessons via videoconferencing differ according to age groups 8 to 10 and 11 to 12? **RQ2.** What constitutes effective practice in instrumental music lessons via videoconferencing for students aged 8 to 10 and students aged 11 to 12?	1. Field notes 2. Questionnaire for parents 3. Assessment of music performances 4. Musical experiences questionnaire 5. Anonymous lesson evaluation survey	Qualitative data

Instrumental music lessons via videoconferencing

Students learned a new musical scale and repertoire appropriate to their music grade levels during a 30-minute lesson once a week for four weeks. The emphasis was on helping students develop their independent learning skills, musicianship, and technical music skills. Technical music skills include intonation, rhythm, fingerings, tempo, dynamics, and articulation (Colwell et al., 2015). According to Heinrich et al. (2020), high-quality instructional and technical support digital tools can put students in the 'driver's seat' allowing them to control their usage of digital programmes based on their educational interests and requirements.

Zoom videoconferencing software was utilised to conduct all instrumental music lessons via videoconferencing. All of the instrumental music students participated in their lessons via a Zoom videoconferencing link that connected them immediately to the virtual meeting room for real-time instrumental music lessons. The students' parents were present throughout the videoconferencing sessions.

Before the first lesson, student participants used the Zoom videoconferencing software to practise with the teacher-researcher. The trial run assisted student participants with Zoom videoconferencing setup and other technical operations. This procedure was done as preparation to ensure that students' home internet connections were robust, reliable, and adequate to support 30-minute videoconferencing sessions without technical interruption.

Procedure

Before the study began, the parents and the student participants completed and submitted a consent form. Before commencing the study, student participants completed a musical experiences questionnaire with information on their gender, age, and years of instrumental music study.

The research setting for this study was a video conferencing environment. Convenience sampling (Schneider & Cady, 1965) was used to select instrumental music students from a school in Canberra, ACT to participate in this study. My current position as an instrumental music teacher in these schools aided in the establishment of rapport with the student participants and allowed for a naturalistic observation perspective (Lincoln & Guba,1985) for this study.

Students took part in four 30-minute instrumental music lessons via videoconferencing, once a week for four weeks, as per the lesson plan. A camera, microphone, speaker, personal computer, and the Zoom video conferencing software were part of the videoconferencing setup. Parents attended each lesson to assist in providing information about students' learning needs and supported students' music learnings during instrumental music lessons via videoconferencing.

Qualitative data was gathered during teacher involvement and observations to investigate student learning behaviours and outcomes in instrumental music lessons via videoconferencing. Data collection instruments included a pre-post study assessment of student music performances, an anonymous lesson evaluation survey to obtain student comments, a pre-post study questionnaire for parents, and the researcher's field notes.

Even though student participants consented to participate in this study, they were informed at the beginning of each lesson that they may change their minds and withdraw at any point throughout the study without consequences, as indicated in the consent form, assent form and ethics approval. To address the potential power imbalance between teacher and student, all lessons were attended by students' parents or guardians, who were informed that they had the right to withdraw their child at any time without repercussions. In addition, I no longer teaching instrumental music to the students who took part in this study.

Chapter 4. Data analysis and results

Introduction

This chapter begins with an overview of the data analysis methods, followed by an overview

of findings, the teaching delivery method used in instrumental music lessons via

videoconferencing, student learning behaviours and student learning outcomes pre-post

study, reliable technological setup, adjustments in student learning behaviours in each lesson,

the impact of learning instrumental music lessons via videoconferencing on student learning

outcomes, and discussions of incorporating repertoire analysis into teaching delivery.

Analysis of the data

Qualitative data were analysed using exploratory data analysis (EDA) and qualitative

secondary data analysis (SDA) to explore the correlation between variables, discover trends,

patterns, and underlying structures, and summarise their key elements for further analysis.

"Various analytic procedures provide a way of drawing inductive inferences from data and

distinguishing the signal - the phenomenon of interest, from the noise - statistical

fluctuations, present in the data" (Hazra, 2022, p. 394).

The EDA compared pre-post study data by organising, coding, visual analysis, graphical

representation, and table creation to test assumptions and visualise patterns in the dataset.

Tables and graphs made it easier to recognise outliers.

The SDA procedure helped manage the qualitative data using coding and thematic analysis,

to identify data with similar meanings and/or themes. Subsequently, the data was then

categorised into meaningful segments to establish a "framework of thematic ideas" (Gibbs

2007). The process involved six steps, namely; familiarisation, coding, generating themes, reviewing themes, defining themes, and naming themes (Gibson & Brown, 2009).

The weekly coding of data took place concurrently with the data analysis which helped to maintain familiarity with the data through immersion. Codes were assigned to the data based on the teaching strategies used and the impact on student learning behaviours (Saldana, 2016). Subsequently, existing codes were classified into themes applicable to the research problem and given a core code in the reviewing process. In the theme defining and naming phase, a final analysis was carried out by evaluating and grouping the core code, then forming a conclusion and writing up the event observed (Cohen et al., 2002). Following that, qualitative data findings were compared to enhance the reliability of the study through triangulation (Lincoln & Guba, 1985).

Overview of findings

This section communicates the findings from the qualitative data analysis processes, which were based on data collected during instrumental music lessons via videoconferencing. The data collected in this study served as a vehicle for investigating student learning outcomes, participation, and learning behaviours in the delivery of instrumental music lessons via videoconferencing. Taking these objectives into account, the chapter will begin by summarising overall findings, then report in greater detail on analyses addressing the two research questions related to the learning behaviours and learning outcomes of primary school students aged 8 to 10 and 11 to 12, followed by teaching strategies deemed effective in instrumental music lessons delivered via videoconferencing.

Student participants ranged in age from 8 to 12 years old and had varying prior instrumental music study experiences. Students were divided into two groups based on their age. Over the course of four weeks, students ages 8 to 10 (n = 4) and 11 to 12 (n = 4) received weekly 30-minute instrumental music lessons via videoconferencing. During these lessons, student learning behaviours and student-teacher interactions were observed and recorded. Throughout the study, student participants interacted with the teacher-researcher primarily in the instrumental music lessons via videoconferencing from their homes, with no physical contact. In the first lesson, all students took a pre-study music performance assessment, and they worked on their musical skills over four weeks of instrumental music lessons via videoconferencing. After four weeks of lessons, student participants took a post-study music performance assessment.

The pre-post study music performance assessment comprised of performing a given musical repertoire and sight-reading a musical scale. Parents also completed an identical pre-post study questionnaire on their child's learning behaviours to aid comparisons to the changes in their child's learning behaviours.

The pre-test and post-test scores of instrumental music students ages 8 to 10 and 11 to 12 were analysed and compared. Other variables, such as previous musical experiences and pre-study learning behaviours, were evaluated about students' overall development and learning outcomes. The aim was to identify effective teaching strategies for students with a diverse musical background in instrumental music lessons delivered via videoconferencing. The context included teaching delivery method, technology benefits and obstacles, student learning behaviours during lessons, and student behavioural changes before and after the study.

Teaching delivery method

In the first week, as the teacher-researcher, I utilised just verbal communication to teach instrumental music via videoconferencing. In the second and third weeks, the oral was augmented with written comments using the whiteboard tool within Zoom. The fourth week included a mix of verbal, written, and teacher demonstrations. Siebenaler's (1997) assessment paradigm of "teacher presentation - student response - teacher feedback" (p. 6) was used twice in each lesson. Following the 'teacher presentation', students responded to music-related questions. Students were expected to deliver correct answers based on what the teacher-researcher had taught them in the lesson. The procedure sought to assess students' comprehension of new knowledge through the accuracy of their replies, as well as how varied methods of teacher presentation influenced the rate of achievement.

To examine the effect of teaching strategies on student learning behaviours in instrumental music lessons via videoconferencing, transcripts of audio and/or video recordings, field notes, and pre-post study questionnaires were compared. Five variables were used to assess student learning behaviours, namely; effort, capacity, satisfaction, sacrifice, and gratitude (Peacock et al., 2012).

The first week's verbal lessons returned one correct student response (25%) in the 8 to 10 age group and two correct student responses in the 11 to 12 age group (50%). Lessons delivered in the second and third weeks using a combination of verbal and written communication with the Zoom video conferencing tools yielded the same results of two accurate student responses in the 8 to 10 age group (50%) and three accurate student responses in the 11 to 12 age group (75%).

During the fourth week's presentation, a combination of verbal communication, written communication, and teacher demonstration of the musical instrument was employed. This resulted in four correct student responses (100%) in the 8 to 10 age group, and four correct student responses (100%) in the 11 to 12 age group. Figure 4.1 is a bar graph comparing different teaching approaches and the accuracy rate of student responses:
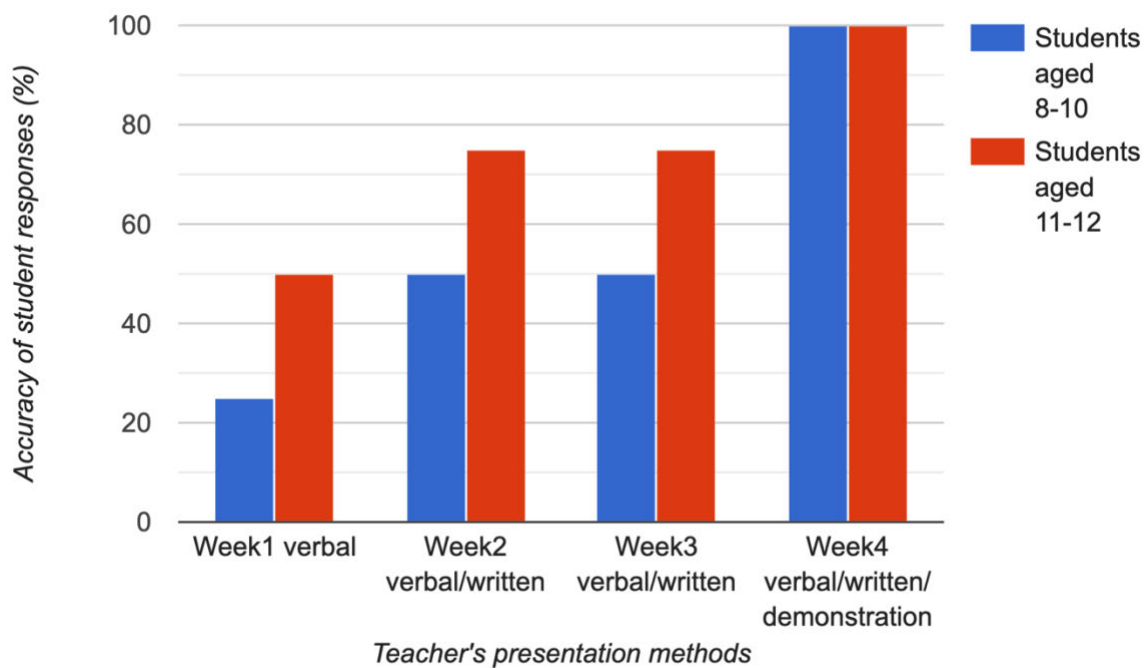
Figure 4.1. Presentation methods and accuracy of student responses.

Figure 4.1 shows that a mix of verbal, written, and teacher demonstration was the most efficient method of teaching instrumental music via videoconferencing. During verbal only teaching delivery, or both verbal and written teaching delivery, students aged 8 to 10 were consistently 25% less accurate in their responses than students aged 11 to 12. However, students aged 8 to 10 had caught up with students aged 11 to 12 and achieved a 100% accuracy of student responses during verbal, written, and teacher demonstration delivery. The findings were as follows:

- Students aged 11 to 12 showed a greater rate of accuracy in student responses throughout the study than students aged 8 to 10.

- Students aged 11 to 12 maintained a 75 % accuracy rate during verbal and written teaching delivery.

- Students aged 8 to 10 maintained a 50% accuracy rate during verbal and written teaching delivery.

- Students aged 8 to 10 and 11 to 12 both reported a 25% increase in accuracy when just verbal and written instructions were used.

The most effective method of teaching instrumental music via videoconferencing was a combination of verbal, written, and teacher demonstration. It produced the highest accuracy rate in student responses among students aged 8 to 10 and 11 to 12, and exhibited increased student participation and focus throughout the lessons (Hastie, Chen, & Kuo, 2007; Siebenaler, 1997). According to the data collected, teaching strategies used during instrumental music lessons via videoconferencing had a direct influence on student learning behaviours. Through my observations and notes, it was evident that Zoom videoconferencing features such as the digital whiteboard and screen sharing functionality increased students' attention during verbal and written instruction.

Student learning behaviours

On the first and final days of this study, a pre-post study questionnaire was administered verbally to parents. The questionnaire had a 100% response rate, resulting in eight responses in the pre-study questionnaire and eight responses in the post-study questionnaire (see Appendix B). The pre-post study questionnaire responses were subjected to an open-axial-selective coding process to identify student learning behaviours using the five elements

specified in the Peacock et al. (2012) evaluation framework. Figure 4.2 compares the

responses gathered in the selective codes of the pre-post study questionnaires with examples

of participant responses provided in Table 4.1.
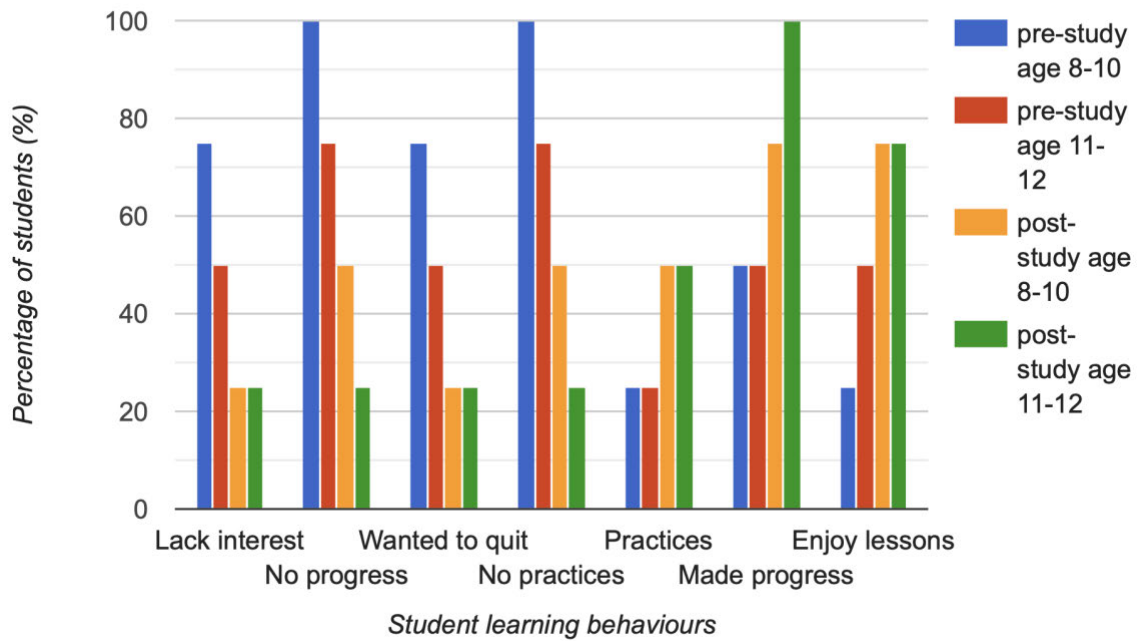
Figure 4.2. Comparison of parent responses to student learning behaviours.

Table 4.1

Examples of participant comments in each selective code.

Selective codes	Examples of participant comments in pre-post study questionnaire
Lack of enthusiasm	
Reward schemes required to motivate students' music practice.	"One hour of practicing for 30 minutes on the TV" "He gets $5 if he practises every day for a week" "Two lollies for each piece she practised twice"
Students lack interest to attend instrument music lessons.	"She constantly forgets to bring her lesson book" "She forgets to bring her musical instrument"
Students wanting to quit learning musical instrument.	"She only attends lessons if I bring her to the Zoo" "He was reluctant to attend lessons" "He asked to play a sport instead"
Lack of effort	
Students did not progress much in the musical instrument.	"She is a fast learner but never practises, imagine if she does!" "Rarely practise at home"
Enthusiasm	
Students looking forward to weekly instrumental music lessons.	"She wants to learn a new piece every week" "He loves music lesson day"
Putting in effort	

Learning a piece independently outside of instrumental music lessons.	"He voluntarily teaches his brother a duet he found online" "She learns music from YouTube and the internet"
Students practicing the musical instrument without being told	"She plays music to relieve stress from academics" "He practises music throughout the day"

The comparisons in Figure 4.2 revealed a substantial decrease in negative student learning behaviours (rows 1–4) and an increase in positive student learning behaviours (rows 5–7). Post-study, there was a 50% rise in students aged 8 to 10 who looked forward to their weekly instrumental music lessons and no longer needed an incentive plan to stimulate music practising. There was also a substantial 75% rise in students aged 11 to 12 who transitioned to putting effort into their musical instrument practice outside of the lessons.

According to Rife, Shneke, Lauby, and Lapidus (2001), supportive parents have a positive impact on their child's instrumental progress through verbal encouragement, compliments, and paying greater attention to their child's musical performance during lessons. The value of parental presence has been emphasised by McPherson (1995) and Rife, Shneke, Lauby, and Lapidus (2001). Parents who were physically present with their children during instrumental music lessons via videoconferencing resulted in more effective home practices through the dynamics of learning together.

Dr Shinichi Suzuki, the creator of the Suzuki method, supports the notion of parents taking an important role in their children's instrumental music development. Parents have the greatest influence on a child's surroundings and parental engagement is critical in creating an

atmosphere that supports and fosters children's learning and growth. A child will generally continue to put in more effort if they believe that they are capable of learning new musical knowledge and doing well. In contrast, if a child does not receive any encouragement from their surroundings, particularly their parent, they may become discouraged quickly and choose to avoid learning or practising their musical instrument in future (Fryer, 1987).

A parent's part in fostering a continuing supportive music learning environment for their child may include accompanying their child to instrumental music lessons, taking music practice notes on their child's behalf, and then guiding their child through music practice following lessons. Dr Suzuki advocated for cultivating a child's love for music as well as encouraging aural engagement with the musical melody, rather than solely focussing on mastering performance on musical instruments (Thornton, 1983).

According to the findings of the current study, instrumental music lessons delivered via Zoom videoconferencing provided opportunities for the music teacher, parents, and children to learn together. Learning together in this manner resonated with the underlying constructivist framework and John-Steiner's (2000) notion of mutual zones of proximal development (MZPD). The MZPD provided opportunities for the teacher-researcher and parents to be involved in the process of guiding young learners. Effective teaching and learning were primarily reliant on interpersonal communication and discussion, with a major focus on the student's interpretation of the task (Schreiber & Valle, 2013). Post-study, the number of students who were not making progress had reduced. Learning together increased the number of students who were looking forward to their instrumental music lessons and simultaneously reduced the number of students who were initially disinterested in studying their musical instruments.

In the current study, the presence of parents was a key positive influence on the number of students who practised their musical instruments without being told and without an incentive programme. The presence of parents increased students' enthusiasm to study something outside of the music course material.

The data collected from the 'yes' or 'no' questions in the pre-post study questionnaire compared five distinct student learning behaviours (Peacock et al., 2012). Table 4.2 shows the responses to five different categories of student learning behaviours pre-post study:

Table 4.2

Responses to five different student learning behaviours.

Student learning behaviours	Pre-study 'yes'		Post-study 'yes'	
	Age 8-10	Age 11-12	Age 8-10	Age 11-12
Effort	1	2	3	3
Capacity	1	3	2	4
Satisfaction	2	3	4	4
Sacrifice	1	1	3	2
Gratitude	1	2	3	4

The findings in Table 4.2 are consistent with the findings in Figure 4.2 and are as follows:

- An overall increase in positive learning behaviours of students aged 11 to 12 post-study.

- A 50% increase in gratitude of students aged 11 to 12 for the opportunity to learn a musical instrument post-study.

- A 50% rise in satisfaction, sacrifice, and gratitude for students aged 8 to 10 post-study.

- There were no increases in effort or capacity for students aged 8 to 10 post-study.

- 100% satisfaction was recorded in both the aged 8 to 10 and 11 to 12 student groups post-study.

- Both the aged 8 to 10 and 11 to 12 student groups showed an improvement in student engagement, enjoyment of playing a musical

instrument, and a greater willingness to continue instrumental music learning post-study.

Figure 4.3 is a bar graph based on data from Table 4.2 to depict the percentage difference in student learning behaviours pre-post study in both the 8 to 10 and 11 to 12 age groups:
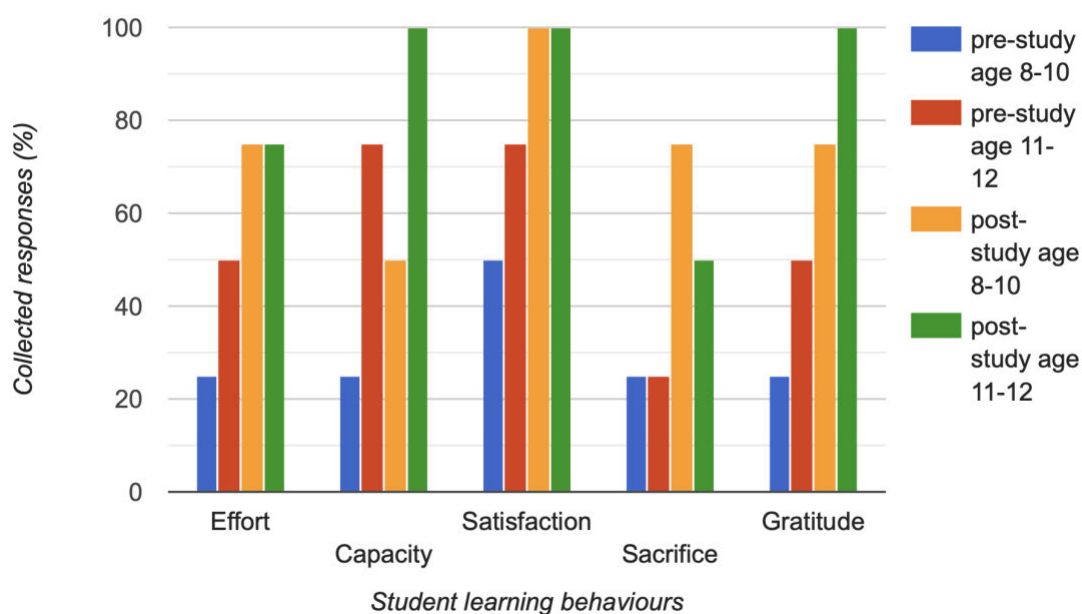
Figure 4.3. Student learning behaviours pre-post study.

Student learning outcomes

Students took the pre-test via videoconferencing at the commencement of the first instrumental music lesson and the post-test at the end of the fourth lesson. At the start of the first lesson, students were given a musical repertoire and musical scale. In the music performance assessment pre-post study, students were expected to play the same musical scales and repertoire. Their technical music skills, such as intonation, rhythm, tone, phrasing, articulation, and overall performance, were assessed and scored.

The pre-test and post-test were developed to assess learning progress over the course of four instrumental music lessons via videoconferencing. The assessment criteria included musical knowledge gained over the course of this study.

In the pre-test, students were not required to know the repertoire or music materials in advance. They were, however, required to sight-read the piece using prior musical skills and knowledge. It was predicted that students would improve in the post-test due to increased musical knowledge and understanding. This was subsequently confirmed through the pre-test and post-test scores which were compared to determine the overall improvement in the student learning outcomes. Effective teaching practices were demonstrated through consistent improvements in the learning outcomes of students aged 8 to 12. The standard of student achievement was determined by students' understanding and control of technical music skills during performances and assessed on confidence, performance behaviours, and audience engagement.

Table 4.3 compares the pre-post study music performance assessment scores with age, formal musical experiences, and informal musical experiences:

Table 4.3

Music performance assessment scores pre-post study.

Student groups	Age	Formal musical experiences (Y/N)	Informal musical experiences (Y/N)	Overall pre-study score	Overall post-study score	Overall improved score
Aged 8 to 10						
Student 1	8	Y	Y	*4*	5	1
Student 2	9	Y	*N*	*3*	4	1
Student 3	10	Y	*N*	*3*	4	1
Student 4	10	Y	*N*	*3*	5	2
Aged 11 to 12						
Student 5	*11*	*Y*	*Y*	*4*	*5*	1
Student 6	*11*	*Y*	*N*	*3*	*5*	2
Student 7	*12*	*Y*	*Y*	*4*	*5*	2
Student 8	*12*	*Y*	*N*	*3*	*5*	2

The findings which are depicted in Table 4.3 are as follows:

- Overall, students aged 11 to 12 had a higher post-study average score of 5 than students aged 8 to 10, who had an average score of 4.5.

- Students aged 8 to 10 and 11 to 12 with both formal and informal musical experiences, had a higher average pre-study music assessment score of 4.

- Students aged 8 to 10 and 11 to 12 who had formal but not informal musical experiences received a lower average pre-study music assessment score of 3.

- Three students in the 8 to 10 age group improved their overall score by 1.

- One student in the age range of 8 to 10 had an overall improved score of 2, with an average overall improved score of 1.25.

- Three students in the 11 to 12 age group improved their overall score by 2.

- One student in the 11 to 12 age group had an overall improved score of 1 with an average overall improved score of 1.75.

According to the data in Table 4.3, students aged 8 to 10 and 11 to 12 with both formal and informal music learning experience scored higher on the pre-study music assessment than students with a solely formal music learning experience. However, the overall improved scores of students aged 8 to 12 varied and were not reliant on students' past formal and informal musical experiences or age group. Students of both ages achieved higher post-study scores, demonstrating positive learning outcomes in instrumental music lessons delivered via videoconferencing.

Technological setup

There were technological disruptions, such as latency in audio and/or video transmissions, which were caused by unreliable internet connections. The reliability of the Wi-Fi and Ethernet connections differed noticeably. Ethernet connections were substantially more reliable than Wi-Fi connections. During instrumental music lessons via Zoom videoconferencing, students connected via Ethernet were less likely to encounter latency in audio and/or video transmissions.

The study's entry-level video conferencing setup was adequate and satisfactory for the existing videoconferencing environment for instrumental music lessons. A side view was the optimal camera angle for maximising visual observations. It allowed the teacher-researcher to

monitor the student's hand and fingering postures, as well as the student's body posture and sight-reading of the music.

Having established the validity of the research methodology and subsequent presentation and analysis of the data, answers to the research questions can now be presented as follows:

RQ1. Does student learning achievement and behaviour in instrumental music lessons via videoconferencing differ according to age groups 8 to 10 and 11 to 12?

This was a small-scale study consisting of eight student participants. At the start of their first instrumental music lesson via videoconferencing, each student participant was given a musical scale and repertoire appropriate to their AMEB music grade level to perform. Each student received a score from 1 to 5 based on their overall music performance and technical music skills. A score of 1 indicated poor overall performance and technical music skills, while a score of 5 indicated excellent overall performance and technical music skills.

At the end of the fourth instrumental music lesson via videoconferencing, each student performed the same musical scale and repertoire as given in their first lesson. Each student participant received a score between 1 and 5 at the end of their performance, based on their overall music performance and technical music skills.

The scores investigated student learning outcomes in instrumental music lessons via videoconferencing over four weeks. A higher music performance score in the fourth lesson compared to the first lesson indicated positive learning outcomes and showed that the student participants progressed and improved over the course of four weeks.

The learning outcomes and behaviours of students aged 8 to 10 and 11 to 12 were compared, observed, and documented. Students in both age groups showed a higher post-study score indicating overall positive learning outcomes in instrumental music lessons via videoconferencing. Students aged 11 to 12 achieved a higher average music assessment score of 5 post-study than 8 to 10 who earned an average score of 4.5.

Students aged 8 to 10 and 11 to 12 who had formal and informal musical experiences achieved a higher average pre-study music assessment score of 4. In comparison, students aged 8 to 10 and 11 to 12 who had formal but not informal musical experiences achieved a lower average pre-study music assessment score of 3.

Three students in the 8 to 10 age group achieved an overall improved score of 1. One student in the 8 to 10 age group achieved an overall improved score of 2, and an average overall improved score of 1.25. Three students in the 11 to 12 age group achieved an overall improved score of 2. One student in the 11 to 12 age group achieved an overall improved score of 1, an average overall improved score of 1.75.

Students aged 8 to 10 and 11 to 12 with formal and informal music learning experience reported a higher pre-study music assessment score than those who only had a formal music learning experience. Overall, students aged 11 to 12 achieved an overall higher average music assessment score post-study than students aged 8 to 10 — overall improved scores of students aged 8 to 10 and 11 to 12 varied. The improved scores were not dependent on students' age or former formal and informal musical experiences.

Students aged 8 to 10 and 11 to 12 demonstrated overall positive learning behaviours in instrumental music lessons via videoconferencing. Positive student learning behaviours recorded during instrumental music lessons via videoconferencing included students' prolonged concentration, increased enthusiasm, more effort put towards their musical instruments, and higher student music learning satisfaction.

Data collected via the pre-post study questionnaire reported an increase in aged 8 to 12 students' effort, capacity, satisfaction, sacrifice and gratitude towards their musical instruments post-study. For example, there was a 50 % increase in both aged 8 to 10 and 11 to 12 students' gratitude towards the opportunities to learn a musical instrument post-study. 100% of satisfaction was reported post-study in both 8 to 10 and 11 to 12 age groups for positive learning experiences in instrumental music lessons via videoconferencing. In addition, both 8 to 10 and 11 to 12 age groups showed an overall increase in student engagement, enjoyment in learning a musical instrument, and a higher desire to continue instrumental music learning post-study.

The learning behaviours of students in both groups were influenced by the teaching approaches and musical activities. There was no variation in learning behaviours between students aged 8 to 10 and 11 to 12.

Adjustments in student learning behaviours

The teacher-student interaction and lesson participation transformed from a monologue to a much more dialogic one as the weeks passed. Students aged 8 to 10 and 11 to 12 became more comfortable with learning via videoconferencing and learned how to speak more clearly and deliberately as the weeks proceed. Students gained confidence in discussing their

playing, learning processes, and reflection on growth by being able to more effectively define the topics or challenges they wished to address in their music performances. Their ability to address technological and connectivity issues has also increased.

This taught me that students ages 8 to 12 did not always need to be directed and that I could trust them and promote their development as independent learners and critical thinkers. This supported the ZPD principle that the teacher played an important role in one-on-one instruction, but that the amount of difficulty associated with the activity must be carefully considered. The ZPD was demonstrated by guiding and demonstrating to a child the basics of learning a new repertoire. Once the child had mastered these techniques, he or she could then work on performing the repertoire independently (Jacobs & Usher, 2018; Sage, 2022).

My perspectives and behaviours as a teacher then shifted to reflect a contextualist approach, in which students learned via my creation of a supportive atmosphere in which shared understandings could be developed (Goor, 2012; Wang, 2022). My varied teaching methods influenced students' learning. Students were able to participate more actively in the learning process as my teaching style and pedagogical reflexes matured to recognise them as critical thinkers and interlocutors.

I recognised the value of enhanced connections with students, as well as collaborative and student-centred approaches that increased a student's potential to achieve desirable goals in both instrumental music lessons and beyond. By interacting as equals, we generated a distinct learning dynamic. The student and I's connection altered; we were there to help, guide, and learn from one another. This was a unique experience for both the student and me, and I believe it has influenced us both positively. Students are more involved in their instrumental music lessons and musical growth than ever before.

RQ2. What constitutes effective practice in instrumental music lessons via videoconferencing for students aged 8 to 10 and 11 to 12?

A student who struggles with instrumental music learning is frequently associated with ineffective teaching techniques rather than the mode of delivery (Gantan et al., 2015; Kostka, 1984; Lorah & Miksza, 2019; Rife et al., 2001; Siebenaler, 1997; Speer, 1994; Yarbrough & Price, 1989).

To address both technological and pedagogical obstacles in instrumental music lessons via videoconferencing, detailed lesson planning and a flexible approach were recommended. During instrumental music lessons via videoconferencing, the proposed teaching approach involves more planning, preparation, lesson structure, and questioning than conventional face-to-face lessons.

Traditionally, a teacher's presentation employing the "teacher presentation - student response - teacher feedback" cycle (Siebenaler, 1997, p.6) was thought beneficial in increasing students' overall learning behaviours and learning outcomes. However, the teaching tactics were less effective in an instrumental music lesson delivered via video conferencing. In this study student engagement rates varied for instrumental music students ages 8 to 10 and 11 to 12. Using just verbal communications in the teaching process was found to be adversely associated with students' overall engagement and learning behaviours, as well as having the lowest accuracy rate in student responses to the teacher's questions.

In this study, a mix of verbal, written, and teacher demonstration in teaching delivery was connected to improved accuracy of student responses to the teacher's instructions in both the 8 to 10 and 11 to 12 age groups. After a new musical scale was delivered with verbal, written,

and teacher demonstration, all four students in the 8 to 10 group performed it with accuracy in intonation and fingerings. Two out of four students aged 8 to 10 struggled when fingering accuracy was taught only through verbal and written communication without teacher demonstration.

Two out of four students in the 11 to 12 age group achieved accuracy in intonation and fingerings for the new musical scale without the teacher's demonstration. The remaining two students, aged 11 to 12, displayed dissatisfaction and discouragement in their learning behaviours, after multiple unsuccessful attempts to achieve precision in fingerings and intonation.

Over four weeks, it was observed that instrumental music students in both 8 to 10 and 11 to 12 age groups required a different allocation of written instruction and teacher demonstration. It depended on the context of the musical knowledge taught during each lesson. Where possible, verbal or written communication should be combined with teacher demonstration in instrumental music lessons via videoconferencing to improve students' overall learning outcomes and nurture students' positive learning behaviours and ongoing interest in their musical instruments (Daniels, 2020). The current study built on Siebenaler's (1997) findings that verbal, written and teacher demonstration in the delivery of instrumental music lessons is effective. However, the data in the current study showed how the same pedagogical mix can be beneficial in instrumental music lessons via videoconferencing.

The teaching methods of musical rhythms were recommended to be adjusted in instrumental music lessons via videoconferencing due to the physical distance between the teacher and instrumental music students. For instance, performing rhythms synchronously with the

teacher was deemed ineffective. It may affect rhythmic accuracy due to latency in audio and/or video transmissions. Students should be asked first to listen, and then copy the teacher's rhythm demonstrations by clapping or tapping their musical instruments. The same model should be applied to teaching musical intonation and other musical activities requiring aural and visual accuracy.

Digital teaching aids and resources such as the digital whiteboard, shared screen, theory games, digital audio and/or video recordings were also recommended to be used as supplementary during instrumental music lessons via videoconferencing to support and enhance aged 8 to 12 students' concentration and to nurture their ongoing interest in learning their musical instruments.

Physical cues were also recommended along with the teacher's verbal instructions to ensure two-way communication between teacher and students in instrumental music lessons via videoconferencing. For example, the physical cue of thumbs-up indicates 'I understood the explanation' and thumbs-down for 'I did not understand the explanation' in learning new musical knowledge.

Keeping a checklist during the lesson ensured a smooth transition between each musical activity in instrumental music lessons via videoconferencing. The list was shown at the beginning of a lesson to prepare students on which musical activities to expect, the aims for each lesson and the weekly music learning plan. For example, the lesson may start with scales warm-ups, followed by rhythmic clapping, aural training, note reading, and then repertoire playing. It supported students' concentration as students anticipated their favourite musical activities.

Students should be trained to take responsibility by taking notes about the musical pieces to practise, parts to focus on, summarising the teacher's verbal messages, and circling their mistakes. These physical notes that students made supported their musical practices post-lesson each week and ensured their productive progress throughout the week before attending

Impact on student learning outcomes

The students and I participated in thoughtful learning by enabling each other to be active and dialogic participants in the learning process, rather than depending on instrumental demonstration and rote modelling and copying. This enabled the development of a more supportive teacher-student relationship based on trust and mutual understanding, allowing me to guide student thought and activity while also encouraging the emergence of new ideas, aspirations, and creative possibilities. This had a positive impact on how these interactions moulded the lessons, as frequent discussions and an openness to elaborate allowed the student's voices and perspectives to be heard and valued.

Enabling students to express their musical thoughts and processes allowed them to blossom from that sense of connection, which also reminded me of what should happen more in my teaching. Rather than bombarding students with technical music skills and performance material, I concentrated on going deeper into each piece. We were all grateful for the opportunity to research aspects of music that we would not have had time to investigate otherwise. My students devoted more time to thinking and analysing the work, rather than a repetitive practice to prepare for performance assessments.

Repertoire analysis

Effective teachers incorporate repertoire and teaching resources to assist students to understand how music relates to their life experiences. It became vital to analyse the music students played as it not only increased appreciation of the music but also allowed students to study it thoroughly. Understanding the shape and structure of a new piece, before rushing to the musical instrument to perform it, helped students learn it faster and retain what they had learned over time.

Analysis of a new piece including the genre, tempo, character indications, time signature, structure, and composer, benefited the students with their engagement and learning. Understanding the genre assisted students in comprehending the piece's history and significance. A Minuet, for example, should be performed with elegance. The tempo at the start of a composition, such as Adagio, Moderato, and Andante, signified the overall pace of the repertoire. Some may also allude to the primary character using terms like 'giocoso' and 'cantabile', which reflected the tone and atmosphere of the piece.

The analysis of musical form revealed the structure of the work. The tri-partite, for example, has three major parts, whereas the bi-partite has two main sections. During such instances, we were no longer debating which finger goes where, but rather discovering new details about the repertoire. Students who gained a broad musical understanding began to think critically about music. They began analysing and writing their musical works. Critical thinking processes may be extended to various disciplines and become second nature to students. Musical analysis improved the ability of each student to recognise relationships between notes and identify phrases, which increases their engagement with a piece of music and added enjoyment to the learning process.

<center>**Chapter 5. Discussion**</center>

This study sought to help build an evidence base of insights into the effectiveness of instrumental music lessons via videoconferencing. Whilst lessons via videoconferencing have become increasingly accessible in many academic disciplines, the uptake of this practice for instrumental music lessons has not been as extensive (Allen et al., 2004; Bernard et al., 2009; Rucsanda et al., 2021). Despite the fact that the COVID-19 pandemic has driven considerable contemporary interest in this field, the research findings remain inconsistent on whether teaching instrumental music lessons via videoconferencing should be further explored and developed in the future. (Dammers, 2009; Dye, 2007; Park, 2021; Nsairat et al., 2022).

Advantages and challenges from teacher's perspectives

Teaching instrumental music via videoconferencing was a relatively new method of lesson delivery, affording new opportunities for exploration of innovative teaching techniques and styles. Data collected via field notes, audio, or video recordings demonstrated that teaching instrumental music via videoconferencing relies heavily on the verbal-instructional model. It requires the teacher to possess an in-depth knowledge of the lesson materials to ensure smooth delivery of the teaching presentation (Newman et al., 2007). This led to essential pre-lesson planning and construction of learning activities that fit into the videoconferencing teaching and learning environment.

According to Haynes (2010), reflecting on the effectiveness of your own practice increases the quality of teaching. Teachers potentially discover new knowledge and identify the areas students may face challenges in during their lesson preparation. Being aware of student

learning needs in advance provides opportunities for the teacher to target the topic and offer extra emphasis during the delivery of the content.

A visible challenge to instrumental music lessons via videoconferencing was the diminished opportunities for physical interaction. Based on the comparison of data collected via field notes, audio and/or video recordings, the barrier of physical interaction mainly affected beginner instrumental music students aged 8 to 10. Although the teacher-researcher demonstrated the position of fingers and other music playing techniques via the screen, two students in the 8 to 10 group demonstrated a need for physical assistance. For example, locating a particular note on the music, identifying an accurate intonation on the violin, and playing a correct combination of fingering and strings on the violin. This phenomenon required the assistance of parents at the lessons to physically move students' fingers to the correct spot of their musical instruments.

Advantages and challenges from the students' perspectives

The self-view camera in the Zoom videoconferencing software was a key benefit of studying instrumental music via videoconferencing. It gave students aged 8 to 12 a clear glimpse of their musical instrument playing.

The data collected through audio and/or video recordings revealed a consistent pattern in how the self-view camera functioned as a mirror. It helped instrumental music students better comprehend their posture and playing style. The self-view camera continuously reminded students of their positioning.

The teacher-researcher helped three violin students to make adjustments to their music-playing technique. Two violin students were aware of their technical mistakes after getting the first corrective notice via the self-view camera. They corrected themselves before obtaining further instruction from the teacher-researcher. An unduly extended left thumb, unequal bow division during slurred notes, crooked bow stroke, slouching, and a collapsed left wrist were among the technical mistakes and fixes.

The phenomenon of students being self-aware of their technical errors after the first reminder was observed in instrumental music lessons via videoconferencing but not in conventional face-to-face instrumental music lessons. According to Galamian (2017), fixing students' music playing techniques was time-consuming and arduous. Instrumental music teachers had to frequently remind their students of the adjustments necessary for the new habit to replace the old habit and become natural in their students' music playing.

Instrumental music lessons via videoconferencing have surely hastened the improvement of students' music playing techniques by allowing them to continually evaluate their posture and other areas that need work during lessons using the self-view camera. This assertion was confirmed by a parent's spoken comment; "my child used to learn a piece every four weeks, and now he accomplished it in half the time."

In addition, after four instrumental music lessons, an anonymous lesson evaluation was held to gather student feedback. Two students reported their improved verbal articulation, especially when presenting musical knowledge. "I think I got a more deep comprehension of the musical knowledge since I was compelled to describe the notion vocally," an 11-year-old commented.

In contrast, two young novices, ages 8 and 9, encountered modest difficulties learning a musical instrument via videoconferencing due to their inability to verbalise their questions and their difficulty in fully understanding the teacher's spoken instruction. Their parent was expected to intervene, interact with the teacher on their behalf, encourage their child's learning, and converse with the teacher about their child's questions.

Student evaluation of instrumental music lessons via videoconferencing

In the current study, student participants primarily expressed favourable sentiments regarding instrumental music lessons via videoconferencing, learning to read music, play their musical instruments with digital demonstration, and student-teacher interaction. Overall, students expressed satisfaction and excitement in taking instrumental music lessons via videoconferencing, particularly because of the computers and technology involved. This study confirms earlier research results that students enrol in instrumental music lessons because they were enthusiastic about learning to play. Students continue to take lessons because they enjoy and get satisfaction from playing (Rife, Shneke, Lauby, & Lapidus, 2001).

Technological issues

Lessons delivered through a Wi-Fi connection had a greater rate of technical interference than those delivered over an Ethernet connection, such as latency in audio and video transmissions. Previous research has found that technological challenges have a detrimental influence on students' involvement, learning behaviours, and learning outcomes (Brändström et al., 2012; Dammers, 2009; Orman and Whitaker, 2010). However, this study found that the instances of technical faults were only minimal and therefore could be considered temporary distractions.

The factors which proved to be the most important were the teaching delivery methods used by the teacher during the presentation, such as verbal only, a combination of verbal and written, or a combination of verbal, written, and teacher demonstrations. These factors were shown to influence student engagement, learning behaviours, and learning outcomes, such as the accuracy of student responses.

Chapter 6. Conclusion

Recapitulation

This research was the first step in investigating the complex teaching process of instrumental music lessons via Zoom videoconferencing. It sought to improve the positive learning behaviours and engagement of instrumental music students aged 8 to 12. It gathered information on effective teaching practices that increased the positive learning behaviours and engagement of instrumental music students aged 8 to 12. This study lays the groundwork for future research into factors that enhance positive educational outcomes in instrumental music lessons via videoconferencing for primary school students aged 8 to 12.

There were no differences in overall learning outcomes between instrumental music students aged 8 to 10 and 11 to 12. As a result, both age groups may benefit from instrumental music lessons via videoconferencing and implement the teaching practices suggested. It was advised, however, that other aids, such as parental support, be present for the group of aged 8 to 10 instrumental music students to assist them in quickly absorbing the teaching and information communicated by the instrumental music teacher via videoconferencing.

The teaching strategies utilised in instrumental music lessons via videoconferencing revealed no differences in learning behaviours between students aged 8 to 10 and 11 to 12.

The teaching methods that used verbal, written, and teacher demonstration produced the highest levels of student engagement and satisfaction. These methods can be used as a practical guide for future instrumental music lessons via videoconferencing. Student engagement and satisfaction were lowest when just verbal communication was used for instruction. It was suggested that verbal communication be supplemented with teaching demonstrations or other hands-on activities. The combination was effective in assisting

students to absorb the new musical information presented and in maintaining students'
interest throughout the lessons.

All students expressed satisfaction with the lessons. In the evaluation and post-study musical
skills assessment, students exhibited fundamental instrumental music achievement skills.
There were other advantages to videoconferencing instrumental music lessons, such as
enhanced flexibility of students' learning environments and increased digital assistance in the
delivery of instrumental music lessons, contents, and guided musical activities.

In line with prior research, the findings of this study supported the validity of studying
instrumental music lessons via videoconferencing. The improved scores for student learning
outcomes, higher student engagement during lessons, positive student learning behaviours,
and survey results of total student satisfaction with their instrumental music lessons held via
Zoom videoconferencing demonstrated this consistency.

The major factors in compiling the effective teaching strategies for teaching instrumental
music lessons via videoconferencing were observations of student learning behaviours,
analysis of students' anonymous lesson evaluations, collection of student feedback, and
improvements in student learning behaviours. The positive learning outcomes of the students
provided considerable evidence that studying instrumental music lessons via
videoconferencing was effective and valuable.

My teaching approach as a teacher was improved because of the recorded teaching delivery
and student-teacher interactions. They provided new priorities to my lesson preparation, such
as greater verbal clarity and the incorporation of teacher demonstration in the delivery of

instrumental music lessons. Overall, both the student participants and I had a positive experience with the instrumental music lessons delivered via Zoom videoconferencing software.

Transitioning to learning instrumental music via videoconferencing

While conventional instrumental music lessons are generally taught face-to-face with interactive musical tasks, the switch to learning via Zoom videoconferencing had no negative effect on student learning behaviours. The Zoom videoconferencing platform featured instrumental music-specific teaching aids. When compared to pre-study, student participants demonstrated improved learning behaviours and learning outcomes.

Latency in video and audio transmission, as well as poor video and audio quality, have been issues in learning instrumental music via videoconferencing. These happened due to the speed of the home internet, the quality of individual videoconferencing configurations, the overall capacity of the videoconferencing platform and the lack of physical proximity.

Other minor hurdles occurred, such as a shortage of personal musical instruments, a lack of a quiet and undisturbed area ideal for instrumental music lessons via videoconferencing, and an impossibility to rehearse duet works owing to synchronicity issues between two participants. These difficulties hampered musical activities such as group and orchestra rehearsals.

Opportunities for students to perform on stage or in front of the public were limited because they were receiving instrumental music lessons via videoconferencing. Students were offered the option of recording their music performances at home in the form of individual audio and

video recordings. Each student's recorded performance was then blended into a single concert marathon and distributed to the student participants. In the case of the orchestra and ensemble, student members first recorded their musical parts. When each musical performance was submitted to the teacher, it was edited to create a virtual ensemble by overlaying individual music performances. These alternative activities encouraged social relationships between students through virtual group music production and enriched the interpersonal experiences of studying instrumental music via videoconferencing.

Individual lessons were more productive and convenient while learning instrumental music via videoconferencing. However, it could be less successful in group classes requiring synchronised music playing, such as ensemble and orchestra rehearsal and performance.

Overall findings and recommendations

This study found comparable results to previous studies on teaching and studying instrumental music via videoconferencing. The commonalities included enhanced student involvement, higher student satisfaction, technical obstacles such as latency, poor sound quality, audio and visual synchronisation issues, and advice for teachers to have a well-planned lesson but a flexible mentality while conducting instrumental music lessons via videoconferencing.

Recommendations for improving student learning experiences include creating an interactive instrumental music learning environment and reducing technological disruptions. Instrumental music teachers are encouraged to create a system that is more adaptable, effective, and natural. Such a framework is critical to enable students to participate in a lively conversation throughout the lesson.

This study found no difference in learning results between student participants aged 8 to 10 and 11 to 12. In the fourth instrumental music lesson, both age groups increased their music performance scores and exhibited growth in learning. The findings supported the claim that students aged 8 to 10 and 11 to 12 may benefit from instrumental music lessons via videoconferencing. The effective teaching techniques presented in this study apply to students aged 8 to 12. For students aged 8 to 10, further parental help is advised, such as supporting students in quickly absorbing the instruction and information communicated by the teacher in instrumental music lessons via videoconferencing.

The teaching strategies utilised in instrumental music lessons via videoconferencing revealed no differences in learning behaviours between student participants aged 8 to 10 and student participants aged 11 to 12. During lessons, a mix of verbal, written, and teacher demonstrations resulted in the highest levels of student engagement and satisfaction. The sole-verbal teaching method had the lowest levels of student involvement and satisfaction. It was suggested that oral communication be supplemented with teaching demonstrations or other hands-on activities. The combination was effective in increasing student engagement and assisting students in comprehending new musical knowledge.

Through Zoom videoconferencing, all students expressed their satisfaction with the overall teaching. Students fared better in the post-study music performance assessment. The flexibility of the student's learning environment, the incorporation of digital technologies in the delivery of instrumental music content, and guided exercises were some of the advantages of instrumental music lessons via videoconferencing.

By articulating effective teaching strategies that have directed positive learning behaviours and learning outcomes in students, effective practices for teaching instrumental music lessons via videoconferencing were produced. In addition to effective teaching strategies, effective practices for instrumental music lessons via videoconferencing included delivery strategies and other characteristics critical to ensuring an effective teaching and learning experience.

This study adds to the corpus of research on the teaching of instrumental music lessons via videoconferencing by evaluating instrumental music lessons via videoconferencing as a feasible alternative to conventional face-to-face lessons. It also addresses the gap in how students' continuous learning may be further enhanced through the creation of effective practices in teaching instrumental music via videoconferencing to students aged 8 to 12.

Recommendations for future research

The current study was limited to instrumental music lessons delivered via Zoom videoconferencing. The Zoom videoconferencing platform was well suited for this research as it has a 'music and professional audio' option, which is meant to produce professional-grade audio and maximise all types of sound and music use applications.

To use this feature, select the 'Show in-meeting option to enable the original sound' checkbox under 'Music and professional audio' to activate the audio function as shown in Figure 6.1:

Suppress background noise   Lear

⦿ Auto
◯ Low (faint background sound)
◯ Medium (computer fan, pen tap
◯ High (typing, dog barks)

Music and Professional Audio

☐ Show in-meeting option to enable "Original Sound" ⓘ

> This option automatically disables Zoom noise suppression, removes high pass filtering, and removes automatic gain control. It is recommended for playing music and for studio-like environments with higher quality microphones, speakers, or audio interfaces. It is not recommended for use in noisy environments or for general meetings use.

Figure 6.1. Audio quality settings in Zoom.

The 'Music and professional audio' feature streams high-quality audio from a single Zoom client to one or more listeners and is well-suited to performing arts and music teachers, composers, and anyone else searching for professional-grade sound through the Zoom videoconferencing platform.

The 'Music and professional audio' option enhanced the original audio quality by disabling echo cancellation and post-processing, reducing audio compression, and improving audio codec quality. Future research might look at the influence of taking instrumental music lessons on various videoconferencing platforms with different audio settings. Furthermore, researchers may explore in-depth learning outcomes including musical skills such as musical scales and obtain detailed feedback on student satisfaction. Investigating and comparing face-to-face instrumental music lessons to videoconferencing instrumental music lessons may provide answers to further questions, such as how to effectively prepare students for the transition between both learning modes.

Future studies might also extend the duration of the research in instrumental music lessons via videoconferencing. The ages of the participants could also be extended to include students such as young novices, teens, or adults with past instrumental music learning experiences, as well as a broader teacher pool with more and less instrumental music teaching experiences.

Researchers may also investigate group instrumental music lessons, a wider range of musical instruments, and student participation in other online creative activities. Researcher into videoconferencing could also benefit group activities such as orchestra, ensemble, musical bands, and chamber music.

Another benefit of technology is that students may revisit recorded lessons to reinforce their instrumental music learning. Researchers might look at how technology can provide students with easy-access resources, quicker learning, and fun opportunities to review what they've learned. It enables students to deepen their understanding of difficult musical concepts and obtain new musical knowledge, which is very important in the complex repertoire.

Another area worth investigating is the impact of videoconferencing on teaching and learning instrumental music lessons, the development of independence, self-efficacy, and strategies to reduce anxiety and tiredness. As technology progresses, instrumental music instruction through videoconferencing will continue to be influenced. As a result, the videoconferencing experience for instrumental music lessons should continue to represent equal advancement. The teaching approaches identified in this study as most beneficial for teachers and students may be revisited as technology develops in the future.

Guidelines for effective videoconferencing setup

I recommend Zoom videoconferencing software for delivering instrumental music lessons via videoconferencing since teachers have far greater control over audio setup and optimisation. Zoom videoconferencing software can detect stereo signals, allowing it to be more adaptable when transmitting both voice and audio. Furthermore, Zoom has a 'High fidelity music mode' option that adjusts echo cancellation, disables post-processing, and removes audio compression to provide higher quality audio for meetings related to performing arts, instrumental music lessons, song composition, and more.

To activate the 'High fidelity music mode,' navigate to 'Music and professional audio' and click the 'Show in-meeting option to enable original sound from the microphone checkbox. It is recommended to leave 'Echo cancellation' enabled in these settings to avoid feedback. From here, you may enable 'High fidelity music mode' and 'Stereo audio'.

An appropriate microphone setup is necessary to teach a musical instrument electronically. Teachers might begin by experimenting with their computer's built-in microphone and speakers. In the sound settings or control panel, adjust the input and output volumes, and then experiment with the optimal placement for their laptop. Teachers might record trial instrumental music lessons on video and audio to learn how to improve the camera's visual and audio quality.

In addition to using the computer's internal microphone and speakers, teachers may achieve better outcomes by upgrading to a USB microphone with a headphone output, volume control, and desktop stand. The Rode NT-USB Studio Condenser USB Microphone was used in this study.

Teachers should always utilise a wired Ethernet connection while holding instrumental music lessons via Zoom videoconferencing where possible. Most Zoom connectivity issues were caused by poor and shaky Wi-Fi networks.

I have noticed that the optimal camera angle for all portable musical instruments, such as the guitar, violin, clarinet, and so on, is high up and points slightly downwards towards the musician. Musicians must ensure that the camera angle is adequate for the students or teacher to see the fingers. If the camera angle is too low, the musician's hand will cover their fingers, obscuring them from the students or teacher. While playing non-portable musical instruments such as the piano, a slightly higher angle location to the side and rear of the musician improves visibility of hand positions, fingerings, and posture.

A music stand is an excellent tool for situating the gadget and camera angle. I normally set the music stand on a chair or a table to raise it to a suitable height. Ensure that all musical instruments have adequate lighting for optimal resolution and that neither the teacher nor the student is backlit or in shadow.

Common obstacles to avoid include neglecting to consider each student's past technological experiences, failing to integrate technology with adequate human connection, and offering insufficient technical help in setting up videoconferencing suitable for instrumental music lessons.

Guidelines for effective teaching strategies

The student musical experiences questionnaire (Appendix B) was a credible indication of student musical background. A questionnaire of this nature may be used for a variety of purposes, including forecasting what the student would be able to achieve at the time of the pre-test and post-test, and determining whether the demonstrated musical skills were a result of formal instruction or intrinsic aptitude. The questionnaire allowed the teacher to customise musical instruction to each student's musical strengths and weaknesses.

Recognising varying levels of readiness, ability, and musical background, adapting various modes of learning, and providing interactive musical activities can all help to improve the learning environment.

The ongoing requirement for clear, detailed instructions is one of the most critical parts of instrumental music lessons via videoconferencing. To maintain the flow of the lesson and make them as exciting as possible, any ambiguity or misinterpretation should be avoided. As such, teachers should always have a lesson plan on hand that specifies how the session will go. For example, a teacher can review the previous week's music curriculum before each lesson. The teacher may then teach a new musical skill or repertoire. A coherent teaching flow will assist both the teacher and the students in remaining focused.

Teachers may boost students' involvement in the learning process by using multimodal learning strategies including visual, auditory, and kinaesthetic learning. This may include teacher demonstration, verbal instruction, video, movement, and other hands-on music activities (Carbo et al., 1991). Multisensory learning is frequently included in music educational strategies such as those used by Suzuki, Carabo-cone, Dalcroze, Kodály, and Orff

Schulwerk (Tabuena, 2021).

Studies have shown that incorporating students' preferred learning styles into lessons can increase overall learning progress, promote effective learning outcomes, and support students' sustained interest during instrumental music lessons (Carbo et al., 1991; Pegg, 2008; Prashnig, 2008). Each learner processes and uniquely learns new knowledge. Visual, auditory, and kinaesthetic learning methods are the three most common cognitive learning types. Teachers should recognise students' diverse learning styles and incorporate the learning methods into instrumental music instruction.

Delivering instrumental music lessons via videoconferencing with a combination of teacher demonstration, verbal and written communication, and visual aids such as file sharing, screen sharing, and the Zoom digital whiteboard, resulted in the best student learning outcomes. Teacher demonstrations were essential for gaining a practical understanding of music, from performance to technical music skills, aural training, sight-reading, intonation, and posture. It can also be used to demonstrate a certain musical concept, such as staccato articulation or an expressive legato phrase in a musical excerpt. The teacher may then direct students to mimic the style or mood of the presented performance. As young students imitate auditory models before developing their musical skills, a high-quality aural representation of a musical concept is essential for them to fully comprehend the musical material (Bargreen, 2007; Fryer, 1987; Thornton, 1983).

Under this teaching approach, students had the best accuracy rate during the "teacher presentation - student response - teacher feedback" evaluation (Siebenaler, 1997). The "teacher presentation - student response - teacher feedback" technique was used to pose

questions to the student during or following an explanation. Student attentiveness and cognitive processing of the musical material delivered were assessed by having them repeat or interpret what was taught. Music knowledge, historical background of the repertoire, music performance approach, technical music skills, musical symbols, musical theory, and historical context were among the questions students answered. Teachers may also use this approach to assist students to internalise the music materials more effectively.

To assist with the acquisition of new musical skills, new sections should be repeated at least three times following the first introduction, once every 10 minutes. It is recommended that students practise the skills within 24 hours, then every day for a week. Students are particularly stimulated by the emphasis on hands-on musical activities, the thrill of creative accomplishment, and opportunities for personal expression. Students establish tangible musical talents by practising regularly and continuously rehearsing the skills until they became natural.

Along with musical knowledge, teachers should emphasise the development of students' independent learning skills. Students commented on how their independent learning abilities boosted self-esteem, positive learning behaviours, satisfaction with their work, confidence, gratitude, and motivation to put more effort into musical learning. Each student's ability to learn independently benefited them in quickly adapting to a new learning environment and acquiring new musical skills outside of the lessons.

Teachers are encouraged to utilise questions to steer students towards self-directed study to help them develop independent learning abilities. For example, encouraging two-way communication by asking open-ended questions and responding to students' enquiries in

ways that encourage them to analyse and solve problems on their own. Teachers should guide students through the process of musical discovery, creation, reasoning, reflection, communication, documentation, connection, and progress rather than just imparting musical information.

To achieve the aforementioned objectives, teachers may involve students in lesson planning. Teachers may encourage students to reflect on what they have learned. Maintaining a learning journal is one approach for motivating students to keep track of what they have learned. Recording a lesson may also help the teacher determine what needs to be improved.

Instrumental music lessons via videoconferencing may be both challenging and rewarding for those who want to enhance their musical knowledge and abilities. Students were particularly stimulated by the emphasis on hands-on musical activities, the thrill of creative accomplishment, and opportunities for personal expression. The intrinsically rewarding aspects of music served as a potent motivator for students to continue enrolling in instrumental music lessons via videoconferencing. These teaching methods increased students' post-study music performance assessment scores when compared to pre-study.

Guidelines for teacher effectiveness

Students should be taught to think critically to develop and refine their musical skills, which helps produce a positive learning experience. Methods of assessing musical performances can be used to promote the desire to practise; nevertheless, the goal of assessments should be to improve rather than to criticise. Students should be included in the evaluation process, and two-way communication should be established to allow for questions and answers. Students may then learn to think creatively, select, improve musical ideas, and reflect. Marking criteria

and grading scales are useful resources. Teacher feedback, whether spoken or written, in conjunction with marking criteria and grading scales, is an effective tool for indicating and supporting student musical progress.

Students devised and amended criteria for evaluating their own and others' musical performances. Teachers can help students develop and critique models by giving recordings of exceptional instrumental musical performances.

Teachers may encourage growth by offering students positive feedback on their performance as well as specific ideas for improvement. These remarks advise students on what they do well and where they might improve. Music teachers may assist students in developing their musical skills by providing constructive feedback while advocating improvements or revisions. Specific compliments elevated students' interest and enthusiasm for instrumental music study.

Introspective efforts such as keeping a reflective journal, recording lessons, and monitoring students' learning progress increased the efficacy of lesson delivery. Identifying an issue that necessitates action, assessing what would be different if the problem was addressed, expressing the problem in ways that demonstrate a purpose and strategy, and analysing what approach was necessary for a solution, were all critical aspects in completing teaching reflections.

Reflective journals and monitoring students' learning progress enabled informed instructional decisions to be made; recorded videos were utilised to analyse lessons and implement needed adjustments. Interviews, questionnaires, and surveys were recommended for gathering

students' perspectives for journaling and reflecting. By being more conscious of their preconceptions about teaching and learning, teachers will be able to modify their responses to situations, resulting in a more positive learning environment.

Instrumental music lessons via videoconferencing may be both challenging and rewarding for those who want to enhance their musical knowledge and abilities. In March 2020 billions of people around the world were forced to embrace videoconferencing in unprecedented ways. Understanding the affordances of videoconferencing for individual instrumental music lessons involves careful preparation and an understanding of the technology involved.

References

Agay, D. (1981). *Teaching piano: A comprehensive guide and reference book for the instructor*. Yorktown Music Press.

Allen, M., Mabry, E., Mattrey, M., Bourhis, J., Titsworth, S., & Burrell, N. (2004). Evaluating the effectiveness of distance learning: A comparison using meta-analysis. *Journal of Communication*, *54*(3), 402-420. https://doi.org/10.1111/j.14602466.2004.tb02636.x

Al-Samarraie, H. (2019). A scoping review of videoconferencing systems in higher education. *The International Review of Research in Open and Distributed Learning*. *20*(3), 122-135. https://doi.org/10.19173/irrodl.v20i4.4037

Andrews, T., & Klease, G. (1998). Challenges of multisite video conferencing: The development of an alternative teaching/learning model. *Australasian Journal of Educational Technology*, *14*(2), 89-96. https://doi.org/10.14742/ajet.1902

Arruda, P. D. (2013). Videoconferencing, affectivity and teaching-learning: Analysis of professors 'perception and students' feelings during videoconferencing. *International Journal for Infonomics*, *Special 1*(1), 844-853. https://doi.org/10.20533/iji.1742.4712.2013.0100

Auh, M-S. (1995). Prediction of musical creativity among selected variables for upper Elementary students. *Dissertation Abstracts International*, *56*, 3875A. (University Microfilms No. 9604632). Case Western Reserve University, USA, 1995 https://www.proquest.com/pqdtglobal/docview/304168690/abstract/FB5BDE6973054AB2PQ/1?accountid=17227

Auh, M-S. (1997). Prediction of musical creativity in composition among selected variables

      for upper elementary students. *Bulletin of the Council for Research in Music Education*,

      Special Issue, *No. 133*, 1–8.

      https://www.jstor.org/stable/40318831?seq=1#metadata_info_tab_contents

Australian Music Examinations Board (2021). *2022 Manual of Syllabuses*.

Bargreen, M. (2007, April 14). *Violin teacher Yuko Honda, 61, shared Suzuki legacy*. The

      Seattle Times. https://www.seattletimes.com/seattlenews/violin-teacher-yuko-honda-

      61-shared-suzuki-legacy/

Bergee, M. J. (2003). Faculty interjudge reliability of music performance evaluation. *Journal*

      of Research in Music Education, 51(2), 137-150. https://doi.org/10.2307/3345847

Bernard, R. M., Abrami, P. C., Borokhovski, E., Wade, C. A., Tamim, R. M., Surkes, M. A.,

      & Bethel, E. C. (2009). A meta-analysis of three types of interaction treatments in

      distance education. *Review of Educational Research*, *79*(3), 1243-1289.

      https://doi.org/10.3102/0034654309333844

Biasutti, M., Antonini Philippe, R., & Schiavio, A. (2021). Assessing teachers' perspectives

      on giving music lessons remotely during the covid-19 lockdown period. *Musicae*

      Scientiae, *26*(3), 585–603. https://doi.org/10.1177/1029864921996033

Brändström, S., Wiklund, C., & Lundström, E. (2012). Developing distance music education

      in Arctic Scandinavia: Electric guitar teaching and master classes. *Music Education*

      Research, *14*(4), 448-456. https://doi.org/10.1080/14613808.2012.703173

Bronwyn, B. A., & Tait, H. (2005). *Outreach, music pedagogy and the future with*

      technology. Riverina Conservatorium of Music.

https://www.academia.edu/6620221/Outreach_Music_Pedagogy_and_the_Future_wih_Technology

Carbo, M., Dunn, R. S., & Dunn, K. J. (1991). *Teaching students to read through their individual learning styles.* Allyn and Bacon.

Cohen, L., Manion, L., & Morrison, K. (2002). *Research methods in education*. Routledge.

Colwell, R., & Hewitt, M. (2015). *Teaching of instrumental music*. Routledge.

Crotty, M. (1998). *The foundations of social research*. Allen & Unwin.

Dammers, R. J. (2009). Utilizing internet-based videoconferencing for instrumental music lessons. *Update: Applications of Research in Music Education*, *28*(1), 17-24. https://doi.org/10.1177/8755123309344159

Duffy, S., & Healey, P. (2017). A new medium for remote music tuition. *Journal of Music, Technology and Education, 10*(1), 5-29. https://doi.org/10.1386/jmte.10.1.5_1

Dye, K. G. (2007). *Applied music in an online environment using desktop videoconferencing* [Doctoral dissertation]. Publication No. AAT 3259242. Columbia University. https://cpb-us-e1.wpmucdn.com/blog.stcloudstate.edu/dist/d/10/files/2017/01/Final-dissertation-Andy-Black-asynchronous-synchronous-q7u57f.pdf

Farber, J. (1998). The third circle: On education and distance learning. *Sociological Perspectives*, *41*(4), 797-814. https://doi.org/10.2307/1389671

Ferguson, D. L. (1993). Something a little out of the ordinary: Reflections on becoming an interpretivist researcher in special education. *Remedial and Special Education*, *14*(4), 35-43. https://doi.org/10.1177/074193259301400408

Fiske, H. (1979). Evaluation ability: Toward a model of specificity. *Bulletin of the Council for Research in Music Education, 59*, 27-31. https://www.jstor.org/stable/pdf/40317536

Flick, U. (2020). *Qualitative research kit: Doing triangulation and mixed methods*. SAGE Publications. https://doi.org/10.4135/9781529716634

Fryer, J. (1987). *The Suzuki method: A guide for parents*. Fontana.

Gibbs, G. R. (2008). *Analysing qualitative data*. SAGE.

Gillies, D. (2008). Student perspectives on videoconferencing in teacher education at a distance. *Distance Education*, *29*(1), 107-118. https://doi.org/10.1080/01587910802004878

Gibson, W., & Brown, A. (2009). *Working with qualitative data*. SAGE.

Goor, R. van. (2012). *Facing epistemic uncertainty characteristics, possibilities, and limitations of a discursive contextualist approach to philosophy of Education*. University of Amsterdam.

Green, L. (2010). Musical "learning styles" and "learning strategies" in the instrumental lesson: Some emergent findings from a pilot study. *Psychology of Music*, *40*(1), 42-65. https://doi.org/10.1177/0305735610385510

Greer, R. D., Madsen, C. H., & Madsen, C. K. (Eds.). (1975). Research in music behavior: Modifying music behavior in the classroom. *Teachers College Press.*

Hannum, W. (2009). Moving distance education research forward. *Distance Education*, *30*(1), 171-173. https://doi.org/10.1080/01587910902846020

Hartnett, R. J., & Gross, K. C. (2009, December). Innovative approaches to teaching analog

    and digital filter design concepts. In *39th IEEE Frontiers in Education Conference*.

    https://doi.org/10.1109/fie.2009.5350662

Hastie, M., Chen, N., & Kuo, Y. (2007, July). Best practice instructional design in the

    synchronous cyber classroom for early childhood students. In *Seventh IEEE*

    International Conference on Advanced Learning Technologies.

    https://doi.org/10.1109/icalt.2007.84

Hazra, K. (2022). *Teaching And Allied Support System Of Inclusive Education At School*

    Level In West Bengal. Kavya Publications.

Heinrich, C., Darling-Aduana, J., & Good, A. (2020, July 24). *Engaging Students in Digital*

    Learning. Harvard Education Publishing Group. https://www.hepg.org/blog/engaging-

    students-in-digital-learning

Hewitt, M. P. (2007). Influence of primary performance instrument and education level on

    music performance evaluation. *Journal of Research in Music Education, 55*(1), 18-30.

    https://doi.org/10.1177/002242940705500103

Houge, T., & Geier, C. (2009). Delivering one-to-one tutoring in literacy via

    videoconferencing. *Journal Of Adolescent & Adult Literacy*, *53*(2), 154-163.

    https://doi.org/10.1598/jaal.53.2.6

Husson, W. J., & Waterman, E. K. (2002). Quality measures in distance learning. *Higher*

    Education in Europe, *27*(3), 253-260. https://doi.org/10.1080/0379772022000014989

Jacobs, B. (2015). *Storyboard - Primary school children designing and making explanatory animations* [Doctoral dissertation]. The University of Melbourne. http://www.brendanpauljacobs.com/hardcopy.html

Jacobs, B., & Usher, A. (2018). Proximity as a window into the zone of proximal development. *Literacy Information and Computer Education Journal*, *9*(1), 2856-2863. https://doi.org/10.20533/licej.2040.2589.2018.0376

Janssen, N., & Lazonder, A. W. (2016). Supporting pre-service teachers in designing technology infused lesson plans. *Journal of Computer Assisted Learning, 32*(5), 456-467. https://doi.org/10.1111/jcal.12146

John-Steiner, V. (2000). *Creative collaboration*. Oxford University Press.

Johnson, R. B., & Christensen, L. (2016). *Educational research: Quantitative, qualitative, and mixed approaches*. SAGE Publications.

Jopling, M. (2019). 1:1 online tuition: A review of the literature from a pedagogical perspective. *Journal of Computer Assisted Learning*, *28*(4), 310-321. https://doi.org/10.1111/j.13652729.2019.00441.x

Kosarzycki, M. P., Salas, E., DeRouin, R., & Fiore, S. M. (n.d.). 4. Distance learning in organizations: A review and assessment of future needs. *Advances in Human Performance and Cognitive Engineering Research*, *Vol. 3*, 69-98. https://doi.org/10.1016/s1479-3601(02)03004-7

Kostka, M. T. (1984). An investigation of reinforcements, time use, and student attentiveness in music lessons. *Journal of Research in Music Education*, *32*, 113-122.

Kostogriz, A., & Veresov, N. (2021). The zone of proximal development and diversity.

    Oxford Research Encyclopedia of Education.

    https://doi.org/10.1093/acrefore/9780190264093.013.1542

Lawson, T., Comber, C., Gage, J., & Cullum-Hanshaw, A. (2010). Images of the future for

    education? Videoconferencing: A literature review. *Technology, Pedagogy and*

    Education, *19*(3), 295-314. https://doi.org/10.1080/1475939x.2010.513761

Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry*. SAGE.

Lorah, J. A., & Miksza, P. (2019). Applications of moderation analysis for music education

    research. *Bulletin of the Council for Research in Music Education*, (220), 21–41.

    https://doi.org/10.5406/bulcouresmusedu.220.0021

Madeja, J. T. (2004). Music teaching style: Moving beyond tradition. *Music Educators*

    Journal, *90*(5), 51-51. https://doi.org/10.2307/3400024

Marconi, C., Brovetto, C., Mendez, I., & Perera, M. (2020, October). Learning through

    videoconference. Research on teaching quality. In *XIII Latin American Conference on*

    Learning Technologies. https://doi.org/10.1109/laclo.2020.00018

Mason, J. (2017). *Qualitative researching*. SAGE. McPherson, G. E. (2005). From child to

    musician: Skill development during the beginning stages of learning an instrument.

    Psychology of Music, *33*(1), 5-35. https://doi.org/10.1177/0305735605048012

Mays, D., Franke, S., Metzner, F., Wichmann, M., Pawils, S., Zielemanns, H., Schneider, L.,

    Jindal-Snape, D., & Boyle, C. (2018). School belonging and successful Transition

    practice. *Pathways to Belonging*, 168–187.

    https://doi.org/10.1163/9789004386969_010

Melton, R. (2014). *Objectives, competencies and learning outcomes: Developing instructional materials in open and distance learning*. Routledge.

MENC Committee on Performance Standards. (1996). *Performance standards for music: Strategies and benchmarks for assessing progress toward the national standards, grades prek-12*. Music Educators National Conference.

Merisotis, J. P., & Phipps, R. A. (1999). What's the difference? Outcomes of distance vs. traditional classroom-based learning. *Change: The Magazine of Higher Learning*, *31*(3), 12-17. https://doi.org/10.1080/00091389909602685

Moore, G., Stevens, R., & McPherson, G. (2015). *Published literature on research and deployment of music tuition*. https://aaee.net.au/wp-content/uploads/2020/10/AAEE2015-Moore_Stevens_McPherson-Videoconferencing_using_highly_interactive__pedagogy.pdf

Newman, D., Falco, J., Silverman, S., & Barbanell, P. (2007). *Videoconferencing technology in K-12 instruction: best practices and trends*. IGI Global. https://doi.org/10.4018/978-1-59904-331-9.ch002

Norusis, M. J. (2005). *SPSS 13.0 guide to data analysis*. Prentice Hall.

Nsairat, N., Fakhouri, H. N., Alsawalqa, R., & Hamad, F. (2022). Music students' perception towards music distance learning education during COVID-19 pandemic: Cross-sectional study in Jordan. *International Journal of Interactive Mobile Technologies (IJIM)*, *16*(06), 135–158. https://doi.org/10.3991/ijim.v16i06.27193

O'Donoghue, T. (n.d.). Extending the range of interpretivist studies. *Planning Your Qualitative Research Thesis and Project*, 95-96. https://doi.org/10.4324/9781351165563-7

O'Dowd, R. (2000). Intercultural learning via videoconferencing: a pilot exchange project. *ReCALL*, *12*(1), 49-61. https://doi.org/10.1017/s0958344000000616

Orman, E. K., & Whitaker, J. A. (2010). Time usage during face-to-face and synchronous distance music lessons. *American Journal of Distance Education*, *24*(2), 92-103. https://doi.org/10.1080/08923641003666854

Özevin, B. (2018). Humanistic, artistic and pedagogic aspects of Orff-Schulwerk music and dance pedagogy. *Journal Of Human Sciences*, *15*(1), 8. https://doi.org/10.14687/jhs.v15i1.4991

Park, Y. J. (2021). Online music education for sustainable development: Analysis of music learning videos in *E-hakseupteo*. *International Journal of Music Education*, *40*(3), 340–351. https://doi.org/10.1177/02557614211058800

Peacock, S., Murray, S., Dean, J., Brown, D., Girdler, S., & Mastrominico, B. (2012). Exploring tutor and student experiences in online synchronous learning environments in the performing arts. *Creative Education*, *3*(7), 1269-1280. https://doi.org/10.4236/ce.2012.37186

Pegg, L. (2008). *Auditory, visual, linguistic, kinaesthetic and synaesthetic modes of mental imagery in children's music memory processes*. University of Reading.

Phipps, R., & Merisotis, J. (n.d.). *What's the Difference? A Review of Contemporary Research on the effectiveness of distance learning in higher education.* Institute for Higher Education Policy.

Pike, P. D. (2016). Improving music teaching and learning through online service: A case study of a synchronous online teaching internship. *International Journal of Music Education*, *35*(1), 107-117. https://doi.org/10.1177/0255761415613534

Prashnig, B. (2008). *The power of diversity: New ways of learning and teaching through learning styles*. Network Continuum.

Rife, N. A., Shnek, Z. M., Lauby, J. L., & Lapidus, L. B. (2001). Children's satisfaction with private music lessons. *Journal of Research in Music Education*, *49*(1), 21-32. https://doi.org/10.2307/3345807

Riley, P. E. (2009). Video-conferenced music teaching: Challenges and progress. *Music Education Research*, *11*(3), 365-375. https://doi.org/10.1080/14613800903151580

Rucsanda, M. D., Belibou, A., & Cazan, A.-M. (2021). Students' attitudes toward online music education during the COVID 19 lockdown. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.753785

Russell, T. L. (1999). *The no significant difference phenomenon: A comparative research annotated bibliography on technology for distance education.* North Carolina State University.

Sage, K. (2022). *Zone of Proximal Development*. Routledge.

Saldana, J. (2016). *The coding manual for qualitative researchers*. SAGE.

Schneider, E. H., & Cady, H. L. (1965). *Evaluation and synthesis of research studies related to music education*. Ohio State University Research Foundation.

Schreiber, L., & Valle, B. (2013). Social Constructivist teaching strategies in the small group classroom. *Small Group Research*, *44*(4), 395–411. https://doi.org/10.1177/1046496413488422

Seale, C., Silverman, D., Gubrium, J. F., & Gobo, G. (2006). *Qualitative research practice: Concise paperback edition*. SAGE.

Seidel, T., & Shavelson, R. J. (2007). Teaching effectiveness research in the past decade: The role of theory and research design in disentangling meta-analysis results. *Review of Educational Research*, *77*(4), 454-499. https://doi.org/10.3102/0034654307310317

Shamoo, A. E., & Resnik, D. B. (2009). Responsible conduct of research. https://doi.org/10.1093/acprof:oso/9780195368246.001.0001

Shoemaker, K., & Pike, P. D. (2013). The effect of distance learning on acquisition of music sight-reading skills. *Journal of Music, Technology and Education*, *6*(2), 147-162. https://doi.org/10.1386/jmte.6.2.147_1

Shoemaker, K., & van Stam, G. (2010). A case of music education using eMusic via e-learning in rural Zambia. https://www.researchgate.net/publication/263848526_eMusic_a_case_of_music_education_via_internet_in_rural_Zambia

Siebenaler, D. J. (1997). Analysis of teacher-student interactions in the music lessons of adults and children. *Journal of Research in Music Education*, *45*(1), 6-20. https://doi.org/10.2307/3345462

Simonson, M., Schlosser, C., & Orellana, A. (2019). Distance education research: A review

    of the literature. *Journal of Computing in Higher Education*, *23*(2-3), 124-142.

    https://doi.org/10.1007/s12528-011-9045-8

Speer, D. R. (1994). An analysis of sequential patterns of instruction in music lessons.

    Journal of Research in Music Education, *42*(1), 14. https://doi.org/10.2307/3345333

Szent-Györgyi Albert. (1960). *Introduction to a submolecular biology: Albert Szent-Györgyi*.

    Academic Press.

Tabuena, A. C. (2021). Carabo-cone, Dalcroze, Kodály, and Orff Schulwerk methods.

    International Journal of Asian Education, *2*(1), 9–16.

    https://doi.org/10.46966/ijae.v2i1.88

Thomas, K. (2005). *Sounds of music*. Kendall Hunt.

Thornton, A. (1983). *A parent's guide to the Suzuki method*. Omnibus Press.

Tipton, P., Pulliam, M., Allen, S., & Sherwood, C. (2019). Lessons learned: Pointers for

    successfully teaching via videoconferencing. *Teaching And Learning in Nursing*, *6*(1),

    27-30. https://doi.org/10.1016/j.teln.2010.07.001

Tomei, L. (2007). *Online and distance learning: Concepts, methodologies, tools, and*

    applications: Concepts, methodologies, tools, and applications. IGI Global.

Van Wezel, M. I. (2015). *From sound to symbol: a critical analysis of contemporary*

    Australian music theory pedagogy (thesis). Australian National University. National

    Institute of the Arts. School of Music.

Wang, D. (2022). What is ZPD and what are the implications of ZPD for teaching? *Journal of Humanities and Education Development*, *4*(3), 242–244. https://doi.org/10.22161/jhed.4.3.29

Ward, W. A. (1970). *Fountains of faith; the words of William Arthur Ward*. Droke House.

Wood, D. J., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry, 17*(2), 89-100.

Xinping, Z. (2002). Interpretivist research, positivist research, and field research. *Chinese Education & Society*, *35*(2), 39-46. https://doi.org/10.2753/ced1061-1932350239

Yarbrough, C., & Price, H. E. (1989). Sequential patterns of instruction in music. *Journal of Research in Music Education*, *37*(3), 179. https://doi.org/10.2307/3344668

Yazici, T. (2013). Valuation of the music education problems by music teachers. *SED Journal of Art Education*, *1*(2), 130-147. https://doi.org/10.7816/sed-01-02-09

Zdzinski, S., & Barnes, G. (2002). Development and validation of a string performance rating scale. *Journal of Research in Music Education, 50*(3). https://journals.sagepub.com/doi/10.2307/3345801.

PRE-POST STUDY STUDENT MUSIC PERFORMANCE ASSESSMENT FORM

Research project: Instrumental music lessons via videoconferencing

This pre-post study student music performance assessment form evaluates students based on their technical music skills and overall music performances. The data were used to assess the effectiveness of teaching strategies and learning outcomes in instrumental music lessons via videoconferencing.

The data will also be used to confer the researcher's Master of Education (Research) degree. All information gathered was kept confidential, and any future reporting will remain unidentifiable.

Student's number:_____ **Musical instrument:** Music/ violin/ guitar/ clarinet (circle one)

Music performance assessment form: Pre-test / Post-test (circle one)			
Criteria	**Standards of achievement**	**Marks**	**Score**
	Does not demonstrate an understanding of technical music skills and control.	**Poor - 1**	
	Demonstrates limited technical music skills and control, with frequent and	**Fair - 2**	

Technical music skills	extended lapses.		
	Demonstrates inconsistent technical music skills and control, with several lapses.	**Average - 3**	
	Demonstrates competent technical music skills and control, with occasional lapses.	**Competent – 4**	
	Demonstrates excellent technical music skills and control.	**Excellent - 5**	
Overall performance	Performs with no confidence or appropriate performance behaviour, and no audience engagement.	**Poor - 1**	
	Performs with little confidence or appropriate performance behaviour, and minimal audience engagement.	**Fair - 2**	
	Performs in average confident manner, using appropriate performance behaviour occasionally, with inconsistent audience engagement.	**Average - 3**	
	Performs in a generally confident manner, using appropriate performance behaviour in most instances, with some audience engagement.	**Competent – 4**	
	Performs in a great confident manner, consistently using appropriate performance	**Excellent - 5**	

	behaviour, and engaging with the audience.		

Other comments:

Appendix B

The appendix is based on Auh (1995) and Auh (1997). Student participants were completing

the questionnaire electronically via the link below: https://forms.gle/pbXZVMNdiXBRgRbf9

Research project: Instrumental music lessons via videoconferencing

This questionnaire asks you questions about your musical experiences to help us understand

how they influence your learning. Your responses will not be seen by anybody outside of this

study.

Your responses will be used for research as part of my Master of Education (research) degree.

Name: **School year:**   **Age:**   **Gender:**

Formal musical experiences

1. What musical instruments have you taken private lessons for, in the past, or now?

Musical instruments	Years of study	AMEB grades	Now still taking lessons? (yes/no)
Instrument 1:			
Instrument 2:			

2. Were you part of the following musical activities? Put 'X' next to all the ones you are participating in.

Music bands   _____

Music orchestras   _____

School choirs   _____

Other musical activity (please specify)

_____

<u>Informal musical experiences</u>

3. Were you part of the following musical activities? Put 'X' next to all the ones you are participating in.

Church choirs

_____

Listening to music on the radio or the internet (YouTube, Spotify, etc.)

_____

Using educational music apps (Yousician, Simply Music, JoyTunes etc.)

_____

Playing online music games (Music Tiles 2, Magic Tiles, etc)

_____

Other musical activity (please specify)

_____

Appendix C

Student participants were completing the questionnaire anonymously and electronically at the end of the fourth lesson, via the link below: https://forms.gle/X7Lnd5Vx8FPkwT7b7

ANONYMOUS LESSON EVALUATION TO GATHER STUDENT FEEDBACK

Research project: Instrumental music lessons via videoconferencing

This form asks questions about what teaching styles you liked and disliked the most in lessons and what you think can be improved. This will help me improve the way I teach in future. No one outside of this research will see your answers.

I will be using your answers for the research as part of my Master in Education (research) degree.

Age: ………….

a) Which part of the music lessons did you like the most? Why?   ……………………………………………………………………………….
b) Which part of the music lessons did you disliked the most? Why?   ……………………………………………………………………………….
c) What do you find most difficult, learning music via videoconferencing?   ……………………………………………………………………………….
d) What do you find helpful, learning music via videoconferencing?   ……………………………………………………………………………….

e) What do you think should be changed or improved, in future lessons via videoconferencing?

…………………………………………………………………………

Five elements were included in the pre-post study questionnaire to investigate student learning behaviours (Peacock et al., 2012). Student participants were completing the questionnaire electronically via the link below: https://forms.gle/mbD6WiiXJhUEu8qu9

PRE-POST STUDY QUESTIONNAIRE FOR PARENTS

Research project: Instrumental music lessons using videoconferencing

This pre-post study questionnaire investigates your child's instrumental music learning behaviours before and after the research. The information you submit will be used as a reference to improve the teaching strategies for future instrumental music lessons via videoconferencing. The results of the pre-post study questionnaires will also be used to confer my Master of Education (Research) degree.

Your participation in the questionnaire is fully optional, and the responses will be kept secret, with any future reports remaining unidentifiable.

a) Student's school year: ………   c) Student's age: ………….

b) Student's gender: ……………   d) Student's AMEB grade: ……

Please answer the following questions using 'yes' or 'no', followed by providing a short description or an example:

a) Effort: Does the student put effort into instrumental music-related activities? Please elaborate:	

………………………………………………………………………	Yes/No
b) Capacity: Does the student fit in instrumental music-related activities whenever capacity comes up? Please provide an example: ………………………………………………………………	Yes/No
c) Satisfaction: Was the student happy with the progress they have made with their musical instrument? Please elaborate: ………………………………………………………………	Yes/No
d) Sacrifice: Did student make sacrifices for instrumental music related activities? Please provide an example: ………………………………………………………………	Yes/No
e) Gratitude: Was the student grateful for the opportunity to learn a musical instrumental? Please elaborate: ………………………………………………………………	Yes/No