Australian music education training and teaching practice: and investigation of ICT resourcing and application in the face of future challenges

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ABSTRACT

Covid-19 disrupted the way in which music teachers taught across education settings. It challenged and opened up new possibilities to think about pedagogy, content, assessment, and delivery. This paper forms part of a national study Reimaging the future: music teaching and learning, and ICT in blended environments in Australia. The authors are tertiary music educators working in initial teacher education (ITE) programs. In this paper, they discuss two questions: what can be learnt from teachers across education settings as they embraced pedagogical challenges? What are the implications for future focused classrooms? A mixed methodology were employed drawing on quantitative and qualitative data through an anonymous Qualtrics survey. The data reported were collected in Phase One March-April 2021 (N=105) and Phase Two December 2022-February 2023 (N=108) using thematic analysis to identify and analyse patterns of meaning. Three emergent themes: changes across teacher practice, collaborating and connecting practice through ICT, shifts in teacher confidence and competence are discussed. The study highlights the changes and reform required for ITE programs as students prepare for future focussed classrooms that meet the demands of the 21st Century. The findings may resonate with other countries, and generalisations to other learning areas cannot be made. Recommendations are offered that highlight the need for ITE programs and in-service for teachers to rethink, reframe and reimagine the latitude of ICT resourcing and application in music teaching.

KEYWORDS: *C*ollaboration connecting; ICT; Teacher confidence and competence; Music Education; Teacher practice; Synchronous and asynchronous delivery

Formación y práctica docente en educación musical australiana: investigación de los recursos y la aplicación de las TIC de cara a los desafíos futuros

RESUMEN

El Covid-19 alteró la forma en que los profesores de música enseñaban en todos los entornos educativos. Este hecho desafió y abrió nuevas posibilidades para pensar sobre la pedagogía, el contenido, la evaluación y la ejecución. Este artículo forma parte de un estudio nacional denominado Reimaginando el futuro: enseñanza y aprendizaje de música y TIC en entornos mixtos en Australia. Los autores del estudio son educadores musicales que trabajan en programas de formación inicial docente. En este artículo, los autores abordan dos preguntas: ¿qué se puede aprender de los docentes de todos los entornos educativos al aceptar los desafíos pedagógicos? ¿Cuáles son las implicaciones para las futuras aulas? En esta investigación se ha empleado una metodología mixta basada en datos cuantitativos y cualitativos a través de una encuesta anónima de Qualtrics. Los datos reportados se recopilaron en la Fase Uno, de marzo a abril de 2021 (N=105) y en la Fase Dos, de diciembre de 2022 a febrero de 2023 (N=108), utilizando análisis temáticos para identificar y analizar patrones de significado. Se discuten tres temas emergentes: cambios en la práctica docente, colaboración y conexión de la práctica a través de las TIC, cambios en la confianza y competencia de los docentes. El estudio destaca los cambios y reformas necesarios para los programas de formación inicial a medida que los estudiantes se preparan para su futuro profesional haciendo frente a las demandas del siglo XXI. Los hallazgos pueden tener eco en otros países y no se pueden hacer generalizaciones a otras áreas de aprendizaje. Se ofrecen recomendaciones que resaltan la necesidad de programas en formación inicial y prácticas para que los docentes repiensen, replanteen y reimaginen la amplitud de los recursos y la aplicación de las TIC en la enseñanza de la música.

PALABRAS CLAVE: colaboración conectando; TIC; confianza y competencia del maestro; Educación musical; práctica docente; entrega sincrónica y asincrónica

Introduction

Teacher training in Australia has undergone significant growth and development because of a national system of Higher Education. It moved from the apprentice model (Aspland, 2005) "to a 'professionalising' of teaching and the consequent formalising of teacher training programs" (Yeigh & Lynch, 2017, p.114). Initial teacher education (ITE) programs or pre-service teacher education forms an essential part of schooling and education in Australia, preparing teachers to enter the profession. All programs of study require State accreditation across seven Graduate Teaching Standards (see AITSL, 2017) ensuring early career teachers are classroom ready. All schools and ITE programs are guided by the Australian Curriculum across each State and Territory (ACARA, 2023). Content for ITE programs are prepared by academic specialists who

teach across a variety of modes and activities (Ingvarson et al., 2014). Hence, preparing quality teachers with specific teacher learning opportunities are essential as it impacts student performance (Wang et al., 2011).

When Covid-19 disrupted the way in which teachers taught across education settings it also opened new possibilities for educators to add value to what was previously done in classrooms and in ITE programs (Basilaia & Kvavadze 2020; Biasutti et al., 2022; de Bruin & Merrick, 2023; Grasso et al., 2021; Li et al., 2019; Martin et al., 2021; Poellhuber et al., 2021). Information and Communications Technology (ICT) was a game changer that enhanced professional opportunities for teachers. Conversely, it exposed the lack of training and support for teachers which also caused stress and anxiety (Fernández-Batanero et al., 2021). Music educators had to manage and cope with "an emergency 'sticking plaster' to a sudden 'hole'" as classes were taught online (Ellis et al., 2020, p. 569). They had freedom to adapt, adopt, and be innovative in their teaching (Adam & Metljak, 2022; Lorenza & Carter, 2021; Merrick & Joseph, 2022). This had ramifications for ITE and in-service programs to rethink, reframe, and reimagine what, why, how, and when of teaching.

The authors are tertiary music educators based at two different metropolitan universities in Melbourne (Australia). Since 2020 they observed an increased connection with professional music organisations, school partners and between universities, all of which contribute to ITE practices (Ellis et al., 2020). We began a national study in 2021 Reimaging the future: music teaching and learning, and ICT in blended environments in Australia that explored music teacher practice during and after the pandemic. This research seeks to inform curriculum design and ITE practice in Australia and beyond as teaching online is different to teaching face-to-face (Joseph, 2021; Li & Han, 2021; Schiavio et al., 2021).

Throughout the pandemic, the importance of connectedness, relationships and social interactions were pivotal as teachers used different pedagogy and technological tools (Wang, 2008) to maintain continuity within remote and distance learning (Terrien & Güsewell, 2021). The increased social interactions in online learning supported student interactions, particularly when the sense of community was restricted (Kalmar et al., 2022). Despite the pandemic disrupting connection amongst communities, ICT facilitated interactions between individuals, enabling people from diverse locations to find common ground and share creative ventures (Yang et al., 2020). Online forums facilitated by Teams and Zoom (Audet et al., 2021; Johnson & Merrick, 2020) and other forms of social media communication (Sobaih et al., 2020; Thorgersen & Mars, 2021) allowed students, teachers, and communities to remain connected beyond the traditional music classroom mode (Güsewell & Terrien, 2021), via synchronous (same time) and asynchronous (at different times) delivery modes (Hernández, 2020; Koutsoupidou, 2014).

As the landscape changed around the world, educators were forced to modify pedagogy to maintain learner engagement as students required mor help from their teachers to work independently

(Sason & Kellerman, 2022). This saw an increase in student centred behaviour, self-regulation and sustained effort while completing work (Greene et al., 2018;

Montgomery et al., 2019). In response, teachers continually modified curriculum, learning environments, and assessments, to sustain student access through ongoing adaption of practice (de Bruin & Merrick, 2023). Changes in the teaching process saw an elevated level of student responsibility emerge, with increased application of planning and strategy use to facilitate task completion (Sason & Kellerman, 2022). The pandemic fostered pedagogies "that engage student thinking and collaboration with each other in online learning activity" (de Bruin & Merrick, 2023, p. 155).

The change in teaching saw a shift from face-to-face delivery to a new paradigm which embraced a more hybrid approach, drawing on elements of blended, traditional, flipped, and e-learning modes (Nethsinghe et al., 2022; Montgomery et al., 2019; Schiavio et al., 2021). Teachers embraced multimedia and web-based resources, integrating these tools through innovative synchronous delivery to support learning (Li et al., 2021). This period saw an increased use of online video material via YouTube and Vimeo (Cayari, 2011) gaining popularity as a resource to support the online teaching and learning (Merrick & Joseph 2023; Rahmatika et al., 2021). Educators demonstrated that they were future-focused, anticipating obstacles and planning ahead (Fitzgerald, 2021).

A critical factor that influenced ICT usage during this time were levels of computer confidence, which can impact how teachers engage with technology (Hatlevik, 2017). As educators engaged in the process of online teaching and learning practitioners were integrating technologies across varied modes of instruction in diverse locations (Ferdig et al., 2020; Joseph et al., 2022; Merrick & Wilson, 2023). This change in practice confirmed the potential afforded by this mode of ICT based learning (Garrison & Kanuka, 2004). As the pandemic continued, teacher confidence and competence grew as an outcome of necessitating online delivery, combined with the expectation for teachers to facilitate inclusive and accessible learning opportunities for students (Ní Dhuinn & Garland, 2022).

Covid-19 amplified the shift to use digital technologies and enabled students to stay connected, engaged, and motivated with educators across learning settings (Fullan et al., 2020). The navigation of unchartered territory during the pandemic has created a whole new world of opportunity through which to explore the connections between pedagogy and technology. This paper adds to the wider body of knowledge about improving music teaching practice. The research questions that drove this paper explored: what pedagogical challenges did Australian music teachers encounter and how did they adapt their practice? And what are the implications for future focused classrooms?

Methods

We received formal approval to conduct our study from the Human Ethics Advisory Group at Deakin University. We contacted peak music professional organisations through email to participate in our study (Australian Society for Music Education, Association of Music Educators, Australian Band and Orchestra Directors' Association National, Australian National Council of Orff Schulwerk, Kodály Australia, Australia

New Zealand Association for Research in Music Education and Midnight Music). We used purposive sampling as an easy and quick way to collect information from music educators as a representation of music teachers in Australia (Gay et al., 2012). The Plain Language Statement (PLS) were emailed to the organisations. It outlined the project and upon consent, the organisations disseminated the PLS and survey hyperlink to the survey to members (early childhood, primary, secondary, tertiary, and instrumental teachers) via their website, homepage, member emails, and news bulletins.

Participation in the Qualtrics survey was voluntary and anonymous. The wider study survey included closed and open questions. Closed questions involved respondents ticking a box to indicate for example State and Territory of location, qualification, age, gender, year level taught, work status, and technology training. In addition, open ended questions were posed to provide respondents the opportunity to reflect truthfully on their practice (Cohen et al., 2017). Open-ended questions allowed for description of exemplars of pedagogies that were used in blended teaching and learning environments. Open-ended questions included for example:
- the types of music technologies being employed in blended spaces.
- ways initial teacher education programs and professional learning can better prepare students and teachers for a reimagined future post COVID.
- ways in which how teachers modified, adapted, and innovated their music practice.
- whether their sense of confidence and motivation impacted their use of technology?

Data were gathered in Phase One (March-April 2021, N=105) and Phase Two (December 2022-February 2023, N=108). As the survey were gathered anonymously, it is therefore not possible to know whether the same person responded in Phase One and Phase Two. Hence no specific correlation can be made to a respondent. Our data for this paper is unlike Grasso et study al's (2021, p. 5) where they "designed qualitative data collection questions to explore surprising or contradictory quantitative results", in addition we invited music educators to participate in a survey and not purposefully select participants. Rather, we found thematic analyses (TA) a useful way to identify and analyse patterns of meaning that emerged in the open ended responses from participants (Maguire & Delahunt, 2017). As a qualitative method, "TA facilitates the gleaning of knowledge of the meaning made of the phenomenon under study by the groups studied and provides the necessary groundwork for establishing valid models of human thinking, feeling and behaviour" (Joffe, 2012, p. 210). We drew on descriptive statistics to analyze quantitative data (Grasso et al., 2021). Mixed methods allowed us to collect, analyse, and interpret quantitative and qualitative data (Creswell & Clark, 2017).

We followed Braun and Clarke's (2006) 6-step framework to analyse and code our data. Firstly, becoming familiar with the data by independently reading and re-reading the data. Secondly generating initial codes, thirdly searching for themes, fourthly reviewing themes, fifthly collaboratively defining our themes, and sixthly reporting and writing up the findings. In addition, these participant responses were coded,

tallied, and grouped into categories to better understand participant usage of different software to understand how these were employed in their teaching (Maguire & Delahunt, 2017). We independently read and coded the data before discussing emergent patterns. We made notes in the margins and coded our data before agreeing on three emergent themes (Changes across teacher practice; Collaborating and connecting practice through ICT; Shifts in teacher confidence and competence) which are presented in the findings and discussion.

Findings

In this section of the paper, we report what Australian music teachers were doing in Phase One as they embraced the pedagogical challenges of the pandemic and what they did in Phase Two to sustain and improve their practice. The findings demonstrate how ITE programs can learn from the experiences of music teachers across education settings, informing future focused classrooms. These are reported and discussed under the three themes.

In Phase One we asked teachers: what types of productivity and music software and APPs they were using while teaching online?
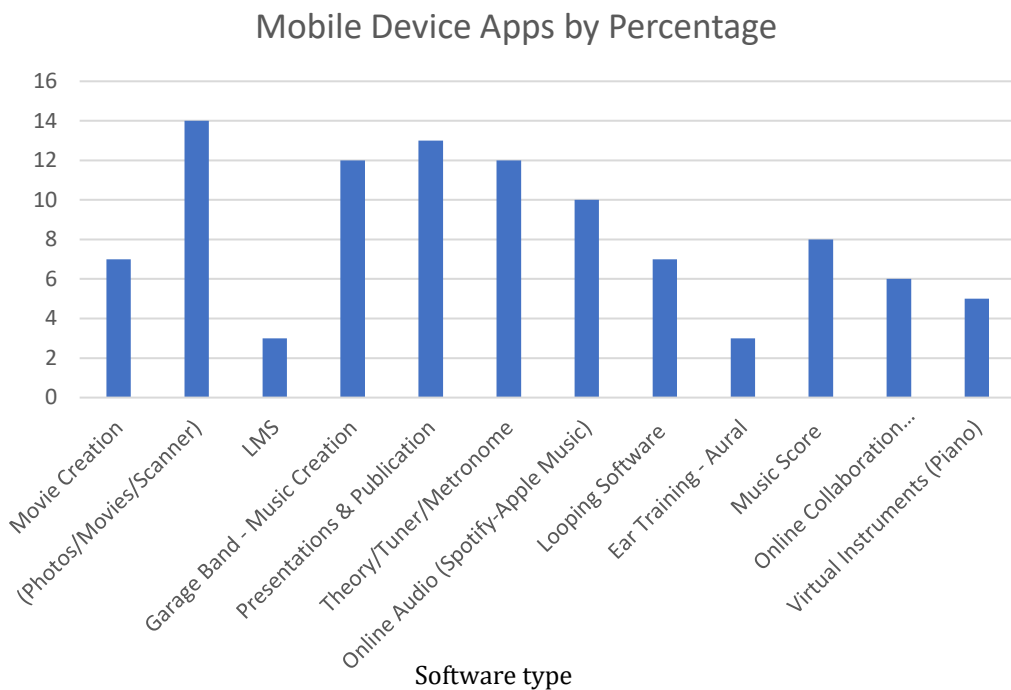
Figure 1

Software Usage (Computer)

Computer Software used by Percentage
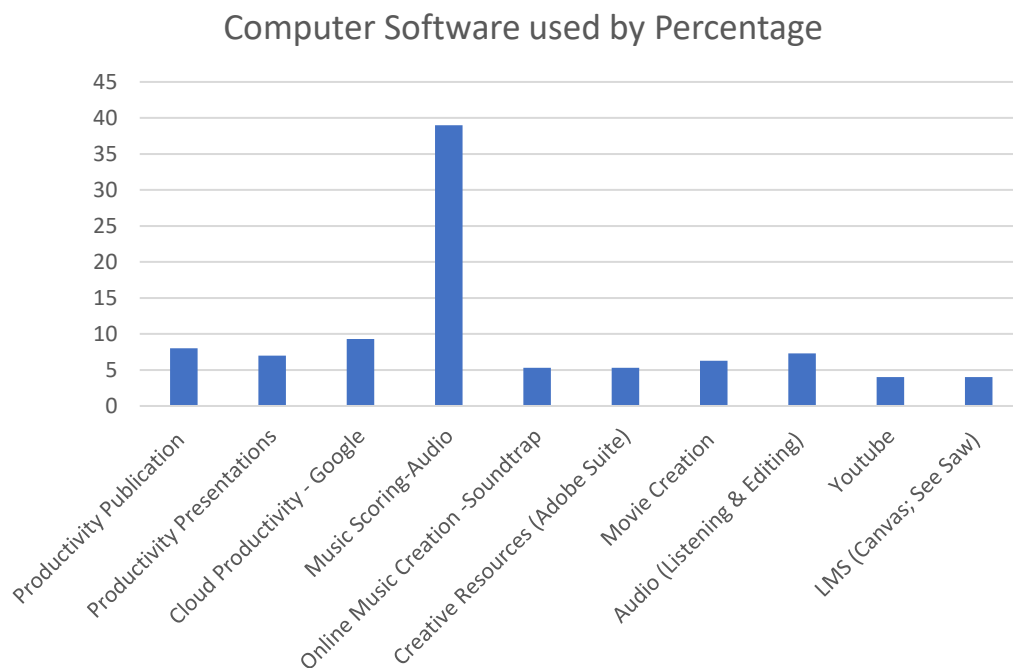
These percentages highlight how teachers used selective software on their (Laptop computers) to engage students as they maintained the delivery of classroom music. Many used software to create scores and audio resources (39%) integrating productivity software (9%), presentation software (7%), audio resources (7%), YouTube (4%), (publication software 8%) and Movie creation tools such as iMovie and Camtasia (6.3%). These responses highlight how teachers utilised a range of software as they adapted their practice during by drawing on different technology resources.

Figure 2

App Usage (Mobile Devices)

The percentage usage of the 'Apps' employed by teachers when using mobile devices (phones and tablets) paints a very different picture to the data presented above in Figure 1. The type, size, and capacity of the device appeared to influence teachers' use of 'APPs' in relation to specific music tasks i.e., metronome, tuner, theory (12%), combined with accessing online audio (10%), various images, scanning tools and movies (14%). Different to laptop computer usage, APPs such as Garage Band (12%) and movie creation tools (7%) were used differently. Teachers also engaged with specific music 'APPs' such as Virtual Instruments (5%), Aural training (3%), and looping software (7%) in their teaching.

In Phase Two we asked teachers what types of software they were using and how frequently they were integrated in their teaching as they returned to their classrooms.

Figure 3

Teacher Software usage and preference
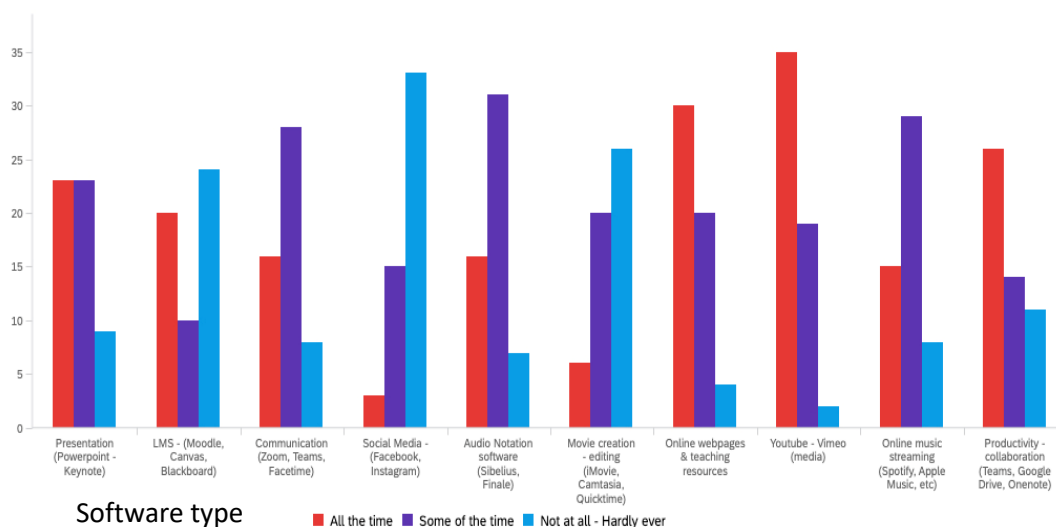
The data in Phase Two of the study provided a different picture to the usage patterns that emerged in Phase One. This data suggests that teachers appear to have adopted a more comprehensive, integrated approach in their choice and application of technology. Here they combined productivity tools and software with music software, and a range of online resources. More teachers are engaging and integrating media and music tools into their use of presentation software such as Keynote and Powerpoint. There has also been a substantial increase and sustained application of online web resources, online video (YouTube and Vimeo), combined with increased use of online music streaming, providing a more integrated picture of technology use as part of teachers' day-to-day practice. The data also highlights more sustained use of productivity software, ongoing use of movie creation tools and audio-notation software. This data suggests that music educators continued to integrate technology more regularly as they returned to the classroom. Teachers experimented with different tools and responded to the needs of students in their classrooms.

Across Phase One and Phase Two of the study, we asked teachers to share illustrations of their teaching while working through the pandemic and beyond their return to the classroom.

We provide some responses to the following questions which were asked in both phases, which encompassed an array of different strategies and approaches in relation to three themes.

Changes across teacher practice

As a result of the pandemic, tertiary music educators worked locally and internationally with colleagues to improve their practice, encouraging their students to engage with like-minded peers to collaborate across learning spaces. One academic commented:

> In 2021 our pre-service music teachers did an online collaborative composing project with University of Aberdeen pre-service music teachers using the theme: My Life in Isolation World Apart or Same Difference? that built on ideas that we'd been developing in our teaching in 2020. They collected video footage and worked in groups to compose music using Soundtrap. The focus was on creative process and collaboration but there was a great musical outcome too.

Another academic said:

> My ITE students were able to engage with culture bearers/tertiary music educators from various part of the globe who identified as Indigenous Australian, Kenyan, New Zealander, Sri Lankan, Spanish). They authenticated the experience as my students learnt about different ways to teach, they learnt about the language, history, culture and music of the place.

In some instances, teachers employed blended and flipped approaches so that "students were able to work (online) with composition students on their piece using screen sharing (Zoom) where I could demonstrate possibilities on the screen". This was no different to students working at schools as one teacher was adaptive in their approach, saying

> as I don't have enough guitars for the whole class, I have had half the class learning guitar chords and strumming patterns, while the other half create a composition on Chrome Music Lab - Song Maker which lets all the students have a go in the lesson.

Another detailed their multi-faceted approach saying:

> My students learn through Google Classroom, using Slides and Docs. Their lessons are fully pre-recorded as video and/or audio files, which are supported by screenshots, text and images. This enables me to teach multiple grades and children with significant difficulties simultaneously because I am somewhat "cloned"! The tasks themselves are done in practical ways, (e.g., instruments) guided by the on-screen information.

It was apparent that teachers constantly used different technology, software and access points, all of which provided multiple layers through which to connect learning and make music, which in turn changed their practice. The notion of "screen casting and engaging students through a flipped classroom-style of teaching" provided a useful way to teach songs and soundscapes across diverse locations. One teacher said "using blended modes of delivery with on-campus delivery was useful, students used sounds from their phone or laptop using a range of software to contribute to the soundscape they created as first year B.Ed. (primary) students".

Music teachers commented on the extra workload and stress placed on them at the time of the pandemic and the subsequent change this had on their teaching. They used

ICT and various technologies to develop virtual teaching examples for lessons via video. Teachers felt the need to support learning by "creating demonstration videos for students to refer back to as they learnt new notes and chords" and how "students used music software to compose and hear their own music back which provided instant feedback". Another said "I have made more digital resources for self-directed learning, practice and early finishers. The school implementation of communication platforms like Teams have made this easier for students and staff". It was evident that many schools and Higher Education institutions used a range of platforms in different ways to support the needs of their students. The statement "I use padlet to collect, collate, and distribute links also using hookpad in secondary schools for chord practice" demonstrates teacher flexibility in preparation and delivery. This was confirmed when one teacher said, "having multiple points for students to access and engage with the curriculum is essential although it creates more work for the teachers".

Another said "using digital folios and running docs rather than physical workbooks was great. I found using online compositional tools helpful rather than physical instruments all the time". This gave students choice and agency over their learning. This was highlighted by another who outlined:

> I have leveraged my own content knowledge and resources to create high quality offerings that could be accessed online. I used Camtasia to create a follow along score of a Byrd motet that could be embedded into a slide deck. The technology follows the teaching, not the other way around.

This highlighted how teachers shifted their practice and employed technology to support the process of learning, rather than just creating a product.

Despite these affordances, one respondent realised that technology can be challenging, saying:

> maximising opportunities for student choice and co-creation of music through use of choice boards which link to pre-recorded content (either created by me or on YouTube) means less opportunities for creativity in the classroom, so I try to have a mix where students make choices with the online content and then I try to move that into a related non-screen activity.

This is a pressing issue when it comes to either hampering or fostering creativity, highlighting the challenge in balancing technology integration throughout the teaching process.

Many educators identified YouTube as a key teaching resource. They used it "to introduce a topic or set the scene". It became a necessity to use this to keep up with the times as one teacher said "YouTube is mostly responsible for the emerging New Musicology: Adam Neely, David Bruce Composer, Ben Levin, Rick Beato. All students are engaging in this, and we need to keep on top of it as well". Another found "YouTube is always used for Aural class activities, this helps students revise and improve their listening skills".

A tertiary educator said:

> With some of my pre-service teaching, I work with people who have little to no experience with music, let alone music technology. As such, I make a point of teaching students about certain musical applications that would have relevance

for their future teaching and are good examples of 'musical' APPs, as opposed to games etc.

Collaborating and connecting practice

Collaborations between students and staff enabled agency fostering increased independence for the leaner. This developed their capacity to self-regulate while completing a task. One person found "students are more willing and accepting of recording themselves at home for performance or composition assessment tasks". This example illustrates the way online learning fostered student flexibility allowing the personal choice of software used, and agency to use different approaches while recording themselves. Many teachers reported how they engaged with students "online for group ensemble rehearsals" which facilitated agency through participation. This was also supported in the data about APP and computer usage (see Figure 1 and Figure 2) where collaborative software featured regularly to support collaboration.

One teacher admitted that the shift in pedagogy online created different types of issues saying, "while I have experienced teaching one-to-one and small groups on Zoom, I had some unexpected pluses and minuses in relation to maintaining connection with students". Teaching online through Zoom or any other communication platform removes teacher presence making it difficult for the teacher to connect with individuals which was highlighted by another teacher saying "I cannot see whether students are engaged or present with many not turning on their cameras". This lack of connectivity provided insight into adaptive teaching approaches. One teacher identified "I continued using Zoom occasionally for lessons when students were isolating or unwell". Another found that the technology created a different type of motivation whereby "students were more open to doing theory lessons online, and I found it easier to be accepted by students and parents - they know what to do - I don't have to explain much!".

One person remarked "we use computers/technology every day and it is constantly changing" highlighting the shift in usage and access. Another person highlighted this wide-ranging use in education saying, "I now use Teams, videos and flipped classroom far more than I would in the past". It was interesting how many spoke of uploading "lesson content, outlines, and resources onto the school website to be shared amongst all music teachers for use within their classrooms" further displaying the integration of technologies for multiple learning tasks and connection points. This notion of transparency as one person said, "was previously done to a much lesser degree, but now this is standard practice in the Music Department at our school". This practice another person said meant "we place teaching and learning material online to be accessed by those who are away, where digital archives have replaced paper records of lessons which is far more sustainable". It was apparent from one person that "sustained frequent use of computers in music education lessons provide better connection with overall student learning". Another felt "setting class projects in conjunction with the students by helps me change the way I teach and assess".

Many respondents felt the creation of virtual teaching offered them a space to explore ways in which they taught and how they maintained connection. One said the "online teaching necessitated the creation of teaching resources (PowerPoint slides, videos, recordings) which I have continued to draw on once back in the class". Others shared similar views to this respondent saying, "I use videos as an instruction tool, it allows me to assist students individually". Another said, "I find the interactive screens allows students to move notes and symbols on a staff which I can watch and immediately provide feedback".

Shifts in teacher confidence and competence.

Teaching remotely during COVID-19 restrictions and when back in the classroom meant teachers reflected on their pedagogy and capacity to use ICT. A range of views about teacher confidence emerged, whilst most said they "grew in confidence and competence", one said, "teaching to blank tiles that never turn mics on, never turn cameras on and rarely input anything in the chat is hugely demoralising as a teacher". This was not an uncommon comment from respondents, sadly another person felt "I don't know that anything I do is successful online; as the feedback mechanisms usually hit a brick wall because teachers are not present".

Respondents shared contrasting views about the positive and negative aspects of the teaching landscape. One said "I have kept up some things like using PPT to teach music history and regularly using my phone to record student practice sessions for their analysis but other than that I have been focusing on building my students practice skills". Other views also emerged with one teacher stating that ICT was "more of the standard thinking underpinning a new order, a realignment of the need to be aware of and use technology more routinely. A necessity as we are using blended modes of delivery".

It was interesting to note how teachers encountered a range of different experiences, with some indicating increased ability and competence with ICT, with others still struggling. Some examples include:

> I prefer not to use much ICT in the classroom - learning online was not an easy thing to do so I took full advantage of having face-to-face teaching time. However, my skills at using compositional and arranging software increased during COVID so now I am more confident as I use that more in my classroom work and assessment tasks.
>
> I teach remote classes on a regular basis and need to be able to implement technology. But my confidence to use technology is not up to speed as I am not ITC savvy. It hampers my preparation which I feel impacts student learning.
>
> Teaching is still a challenge for me, but at least I have a bank of lessons I can upload for days when a casual relief teacher takes a class for me. This is useful when I am feeling overwhelmed and need some time away from work, which has been more frequent.

Teaching a music technology in ITE was extremely difficult, especially tasks that required many steps. In the end, asynchronous learning was the best option. I either used or recorded my own tutorial videos, set students tasks, and used the online chat time to answer questions and check in with student work.

Many respondents found their confidence grew as they shifted their practice to include "peer evaluations and feedback" and the use of "google forms for performance self-reflection and student mark estimation or peer feedback". This indicated an increased focus on self-regulatory behaviour and self-reflection, supporting student agency and independent learning, shifting the process away from the teacher. One teacher said "online teaching of music and self-reflection via video uploads combined with student discussion and regular peer and self-assessment, developed high quality performance". Interestingly, one person found "trying to get student feedback on Seesaw wasn't successful" but later described success, saying:

I found that voice recordings of my spoken feedback posted under student work was effective. It was quick, natural and genuine which was beneficial and personal. I found students would often "like" the voice recording of my feedback or even record a thank you message to send back to me.

These shifts in practice show how teachers were thinking outside the box, displaying increased confidence to explore and try different ideas in their teaching. One person illustrated their increased ICT confidence particularly when using Certified Registered Teachers (CRTs) saying:

I record myself teaching mini lessons so this can then be used by the CRT's taking my classes and also recording myself teaching the songs for that lesson. I then leave space for students to respond or the CRT to pause the movie so students can still experience music as many CRTs do not have musical teaching skills, not even the basics.

Another said they were "using video to design online teacher training courses primarily for piano teachers covering topics like performance and pedagogy". The changes in ITE programs since the pandemic has transformed the modes of delivery giving students options to undertake blended learning and intensives with many more students opting for off-campus learning. Some music educators saw opportunities to ingrate ICT as a cross discipline experience. This is not uncommon in the primary school setting. One person shared:

My Year 4s are preparing some musical theatre pieces based on Japanese folk tales. It's a joint project between me and the Japanese teacher. We teach the students at separate times. The Japanese teacher gave me the songs from her book, and I put the music into Sibelius so that I could add note names and solfa and put the lyrics under the notes instead of off to the side. I've put the sheet music into a PowerPoint presentation that both the Japanese teacher and I can access. I use the slide show in class for the students to read the music and I add notes on the score and type questions. I added summaries of the students reflections and goals. This means that everything is there for us next time and is also accessible when the students are in their Japanese classes.

Discussion

Our discussion below focuses on three emergent themes in relation to how music teachers responded across education settings. It highlights how teachers embraced pedagogical challenges that they encountered to supported future focused classroom.

Changes across teacher practice

It was evident that the pandemic impacted teachers *modus operandi* in relation to what and how they taught as they swiftly moved to online teaching (Ellis et al., 2020). The varied findings that emerged highlighted how music teachers at schools and in Higher Education employed technology as a necessary conduit to cover content which subsequently changed how they taught during the pandemic and beyond. This is a key factor to include within ITE teacher preparation emphasising the need for increased focus on developing pedagogy, knowledge, strategy use, and skills to employ a wide range of ICT devices and software. Adaption is critical as music educators occupy different roles within the profession (Merrick, 2020).

Many participants often reported they lacked capacity to prepare, manage, and assess classes online, further highlighting the variations in capabilities that exist amongst practitioners. Developing increased teacher confidence is a central area for consideration. The shift in practice that emerged highlights how teachers employed a range of activities and tasks that fostered student independence and self-regulation (Greene et al., 2018), and enabled them to develop autonomy through authentic task completion. Teachers invested considerable time facilitating better outcomes for student learning (Sason & Kellerman, 2022). The ongoing exploration and integration of different technology and software provided opportunities to develop new resources, applying the use of audio and video in different ways (Merrick & Joseph, 2023). It is important to note that while these shifts occurred, teachers identified how this change impacted their professional role, which added to their workload and stress levels (Fernández-Batanero et al., 2021).

At tertiary level, data highlighted increased use of video conferencing (Zoom, Teams) which effectively supported ITE students, where learners were able to engage and interact with their peers and lecturer from the comfort of their homes (Abdelhafez, 2021). In this way tertiary educators modelled explicit teaching approaches that ITE students could employ while undertaking 'online placement'. Data showed that YouTube and online videos were the most accessed multimedia web-based resources when teaching remotely and in BSLEs (Merrick & Joseph, 2023; Rahmatika et al., 2021; Terrien & Güsewell 2021). Classroom teachers demonstrated a substantial shift in their acceptance, understanding, and application of ICT and software across both phases of the project.

Teachers availed themselves of different multi-media formats, software, and APPs, combined with different devices. They displayed flexibility across their practice, embracing innovative pedagogy that supported future focused teaching and learning (Fitzgerald, 2021). Future exploration would benefit from exploring how the specific

design features such as keypad design, device access, sound, connectivity, and screen size influences the how and why of teaching. Increased consideration of these factors are critical.

Collaborating and connecting practice

Participants continuously mentioned the importance of being connected with other like-minded teachers to share resources and talk about their practice during the changing landscape of the pandemic (Yang et al., 2020). Many teachers mentioned they were able to meet, share and connect with others using communication software like Teams and Zoom as a means of sustaining interaction and inclusion within their online teaching (Joseph & Merrick, 2022, 2023; Ní Dhuinn & Garland, 2022). Participants highlighted how they created performances, established learning forums, and developed collegial interaction amongst students, parents, and their school communities, supporting participant access 24/7. Teachers also described how ICT enabled an increased use of self-reflection and self-regulation within the learning process. This enabled deeper connection between the teacher and students. This was evident in music performance where video self-reflection was used regularly to refine and review work. This assisted interaction and further highlighted increased application of collaboration amongst groups of peers and teachers (Schiavio et al., 2021; Wass & Rogers, 2021). Group performances via collaborative APPs such as 'Accapella' and online collaboration software such as Soundtrap, also allowed individuals to participate and contribute individually to larger, collaborative works.

The data reinforced the multitude ways in which teachers used software, devices, and resources to reimagine learning through innovative practice. It emerged that many teachers have retained these new approaches to online teaching, which they employ to complement their face-to-face practice, maintaining accessibility and engagement (Lawrence & Tar, 2018). Many teachers created a range of online forums to connect music educators during the pandemic which have now become regular practice (Basilaia & Kvavadze, 2020).

BSLE opened avenues for new learning encounters to co-exist, with teachers and students using various synchronous and asynchronous modes. The boundaries of learning were redefined, which created an increased sense of agency from learners and teachers alike as participants were able to engage with materials in different locations and at different times. Although some teachers identified technological and pedagogical challenges with BSLE, the forced shift that accompanied the early stages of the pandemic provided foundations for new blended approaches that became accepted delivery modes (Li et al., 2021; Merrick & Wilson, 2023).

Shifts in teacher confidence and competence

As teachers returned to the classroom it was evident that many music educators had reflected intentionally about their practice. Online learning via technology challenged teacher presence whereby educators questioned whether students were

grasping the content at all levels. Connectivity coupled with inequity of equipment for students and staff impacted their confidence to teach with technology (Hatlevik, 2017). Conversely, the findings also illustrated the intersection between ICT, software and music educators as they strived to make lessons meaningful (Ferdig et al., 2020) and meet varied student needs across different locations (Ní Dhuinn & Garland, 2022). Teachers also undertook professional learning as they embraced aspects of blended delivery in their teaching (Emo, 2021).

Data from both phases indicate an upward shift in the engagement with a range of devices, coupled with increased use of a variety of APPs and software. It is positive to see a divergence of technology and ICT being used in music, facilitating an interconnected learning environment amongst Australian teachers, students, and parents more widely (Fullan et al., 2020). The findings highlight an increase in confidence amongst teachers, coupled with an ever expanding repertoire of ICT knowledge and skill. They have demonstrated a willingness to engage with new tools, technologies and online learning frameworks, reflecting the rapidly connected world in which we live (Johnson, 2022) coupled with more empowered and innovative approaches to 221st century learning (Li & Han, 2021; Darling-Hammond et al., 2017).

The experiences and scenarios in this research highlight the existence of a very resilient, fearless group of teachers who displayed increased ICT confidence and knowledge to support the deliver quality music education. It is evident that these experiences bolstered teacher capacity, while also creating an increased alignment with key ICT based teaching standards (AITSL, 2017) that supported the professional growth of music educators.

Conclusion

The latitude of our study and Australian music educators' experiences since 2020 has implications for teacher training. While it was inspiring to see the innovative practice emerge across diverse education settings (instrumental, classmusic, ensemble), the sustained findings provide a clear picture of the substantial review required for ITE programs as students prepare for 'future focussed' 21st Century classrooms (Darling-Hammond et al., 2017; Fitzgerald, 2021, López-Peláez, 2020). Concurrently, tertiary educators and classroom practitioners will need to continually refine their practice (Martínez-Rodríguez & Fontal, 2020) and seek ongoing professional learning that employ blended learning frameworks (Emo, 2021).

This paper only focused on Australia, a limitation in itself, the findings may resonate with other countries. Generalisations about other learning areas cannot be made. We recommend:

- A revision of ITE course subjects to include explicit pedagogy and knowledge for using ICT and technology in music learning, including enhanced integration of audio-visual technologies to enhance teacher capacity.

- Increased access to AITSL accredited professional learning, supported by professional music organisations and technology companies to upskill teaching staff and ITE students.
- Enhanced infrastructure, administration and systems to support ICT usage for staff and students, including health and wellbeing programs to assist workload balance and burnout.
- Fair and equitable provision of equipment for staff, particularly for students from low socio-economic areas.
- An open-access online platform be established between music professional organisations, universities, and the Department of Education for music resources and good teaching practice to be shared freely.
- Targeted training in using different types of ICT (Mobile, laptop, tablets, etc) to ensure compatibility with student needs that align with expectations of a 21st Century global community.

From this study, we suggest future research be undertaken:

- Develop a longitudinal study that includes ITE students and music specialists to create an in-depth understanding of current practice to be incorporated into ITE programs.
- Explore cutting edge ICT and digital resources in music education coupled with quality teaching that resonates with 21st century pedagogies and learning environments.
- Examine the use of ICT in music education globally to better understand the ways in which teachers innovate, create and integrate technology within music classrooms around the world.

This study showcased what we are doing well in Australia highlighting the latitude of areas that need enhancement to ensure quality teacher training in the future. This study identified examples of good practice that include ICT, digital resources and software across a range of teaching activities to support performance, composition and listening. We agree with Fitzgerald (2021. p. 3) that "the core of thinking about the future of education and the role of teachers within it [requires] less focus on teaching content … and a greater emphasis on the development of skills (social and technical) and relational connections". Change impacting ITE will be contingent on educational reforms, professional collaboration, and partnerships and school systems. Changes in the education landscape must have currency and authenticity if Higher Education institutes are to prepare graduates for future music classrooms.

Conflict of Interest
The authors declare no conflict of interest. This is not a funded project.

Author Contributions
The authors have equally contributed to the conceptualization, methodology, data gathering and formal analysis of the survey. They have equally contributed to the writing and editing of the paper.

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