Simulated Online Music Composing Lessons: developing teaching models through action research

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Declaration

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed: .....

Date: 11/05/2024

STATEMENT 1

This thesis is the result of my own investigations, except where otherwise stated. Where correction services have been used the extent and nature of the correction is clearly marked in a footnote(s). Other sources are acknowledged by footnotes giving explicit references. A bibliography is appended.

Signed: .....

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STATEMENT 2

I hereby give consent for my thesis, if accepted, to be available for deposit in the University's digital repository**.**

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Abstract

The purpose of this research was to develop three models for the online teaching of music composing, along with creating a composing-specific technology, pedagogy, and content knowledge (TPACK) model from Mishra and Koeher's (2006) original TPACK model. The teaching models developed were synchronous (live teaching), asynchronous (teaching is pre-recorded), and synergistic (a hybrid of synchronous and asynchronous). The study, situated in an interpretivist paradigm, used a two-cycle action research approach. A year 9 class of 19 students consented to participate in the research, which collected data through bi-weekly questionnaires, semi-structured interviews, and a researcher diary. The teaching, upon which the research was based, took place in a simulated online environment within a physical classroom, where each student had access to a computer, headphones, the G Suite for Education, and BandLab. The findings explore the development of the models, where three music-specific online composing teaching models and a composing-specific TPACK model are presented. The research highlights that teaching composing online is possible, but that challenges, including communication and creating a sense of belonging within the online environment, exist. The students shared many positive views about online learning and were receptive to the changes made to the models after each cycle, including for example the addition of a second Google Meet call. The key themes foregrounded by this research were online music pedagogy, relationships, efficiency, and the misalignment of efficiency and connectedness, contributing to the literature around online music teaching. Based on the findings, the need for further research into how the teaching models and TPACK model interact, development of the composing -specific TPACK model, and testing of the models in a true online environment, are suggested. Moreover, the findings indicate the value of the models as a guide for educators in their own online music pedagogic practice. The three models for teaching online music composing and the composing-specific TPACK model are the major contributions of this research.

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Key Terms

The key terms in the research are defined as the thesis progresses. While not all key terms are listed below, it is useful to outline some of the key terms prior to the main text:

Composing - ‘Composing’ refers to the act of creating new music (e.g. the process of learning how to write, and the actual writing of, music within a lesson).

Composing lessons – A music lesson in which the desired outcome is the creation of new music.

Composition – A ‘composition’ is the musical product of composing (e.g. the final piece of music at the end of a series of composing lessons).

DAW – Digital audio workstation. Music software which can be used as a compositional tool. BandLab was the chosen DAW for this research.

Face-to-face – Any reference to face-to-face lessons is taken to mean lessons which are situated in a physical classroom.

Focus On Sound – A subscription based online software, offering asynchronous music lessons and tests for students.

Key Stage 3 (KS3) – Years 7, 8 and 9 in English secondary schools (ages 11 to 14).

Key Stage 4 (KS4) – Years 10 and 11 in English secondary schools (ages 14 to 16).

Latency – The delay before data transfer begins. In this research, latency refers to the time between an instrument/ voice being played on one computer, and the time delay before it is heard on another computer.

Non-music specialist – A professional teacher who was not trained as a specialist music teacher, and instead trained to teach a different subject.

Western notation – Musical notation where different rhythms and pitches are drawn on a five-line stave. This type of notation is regularly found in the West.

TPACK – Technology, pedagogy, and content knowledge model.

Chapter One - Introduction

1.1 Introduction

This study is concerned with exploring three different models for the online teaching of music composing lessons at Key Stage 3 (KS3), through two cycles of action research in a simulated online environment. The three different models are synchronous, asynchronous, and synergistic, defined and discussed in section 3.3, with the notion of a simulated online environment outlined in section 3.4.2. Additionally, this study explores the technology, pedagogy, and content knowledge (TPACK) model in relation to online music composing lessons, drawing attention to the importance of teaching with technology instead of through technology. The TPACK model and its importance is further explored in section 2.2.12.

This introductory chapter begins by presenting the background to the study, before outlining the research question and aims. Next, the KS3 curriculum and the challenges facing music education are explored, along with the setting and local context of this research. Finally, I clarify my positionality, give a brief overview of each chapter, and outline the claims for originality and significance of this research.

1.2 Background to this Study and the Pivot to Online Learning

While this study is not directly concerned with the Covid-19 pandemic, or the lockdown periods which followed, my experiences of teaching music online during the pandemic influenced the inception of this study. On Wednesday 18th March 2020, Prime Minister Boris Johnson announced that schools would close on Friday 20th March 2020 in response to the Covid-19 outbreak (Prime Minister's Office, 2020). These school closures created significant challenges for school leaders, teachers, and students worldwide. When schools reopened there were

additional challenges for music, with many schools discouraging musical activities from taking place amid concerns about how the virus spreads (DfE, 2020a). As all schools in England were required to provide online learning during the pandemic, it underscored the importance of online learning at the school level and highlighted how prepared schools and teachers were for teaching online lessons.

This study was prompted by my experiences as a secondary school musical teacher, teaching music online during the Covid-19 pandemic. I found that the online lessons I taught during the pandemic were quite different from those in the classroom, with composing rarely taught. While I was able to teach the more theoretical side of music online, teaching composing remained elusive. At the same time, the way my school approached online lessons changed from asynchronous during the first set of school closures to synchronous in the second set of school closures. A lack of research into teaching online music composing lessons and the differing approaches to teaching online were influential in pursuing this topic.

In addition, I had previously carried out a research study into the online teaching of music lessons at General Certificate of Secondary Education (GCSE) level during the Covid-19 school closures (Rogers, 2021). As a result of this case study, I made several context specific findings regarding online composing lessons:

1) Students did not receive one-to-one composing support online, as they do in the classroom.
2) Technology was a significant factor, with one student taking part in lessons from their phone and experiencing difficulties.
3) Online composing lessons were enjoyable (largely due to them meaning a break from listening lessons).
4) A lack of familiarity with online composing software caused issues.
5) Students not having access to a musical keyboard was different to how they compose at school.

Amongst the recommendations from Rogers (2021) was the need for further research into online composing teaching, which this thesis seeks to address.

1.3 Research Aim and Questions

This study has one research question and four aims, and contributes to the academic field around the teaching of online composing lessons. The research question and aims are as follows:

Research Question
How can teaching models be developed for the online teaching of Key Stage 3 (KS3) music composing lessons in England?

Research Aims
1) To develop three models of teaching online music composing lessons to KS3 students.
2) To compare three different models of teaching online music composing lessons to KS3 students.
3) To explore the merits and challenges of each model from the points of view of the students and teacher-researcher.
4) To develop the academic field in relation to the teaching of music composing lessons and the technology, pedagogy, and content knowledge (TPACK) model.

The TPACK model forms the conceptual and analytical framework applied in this study. The TPACK model is explored more in chapter two and its use explained fully in chapter three, and is used to investigate how the technology in this study integrates with the chosen content and pedagogy.

1.4 Key Stage 3 Music Education in England

The KS3 National Curriculum for music, its relationship with GCSE music, and some of the issues facing KS3 music education are explored in this section.

The KS3 National Curriculum (DfE, 2013) is a short document, with room for interpretation and freedom of exactly what to teach and how to teach it. composing forms a part of the music KS3 National Curriculum:

> *'Pupils should be taught to improvise and compose; and extend and develop musical ideas by drawing on a range of musical structures, styles, genres and traditions'* (DfE, 2013: 2).

There is an important distinction to be made between *composing* and *composition*. *Composing* is taken to mean the process by which new music is created or existing music is reimagined, leading to a new musical work. A *composition* is that completed musical work. Therefore, music composing lessons, the focus of this study, are lesson in which students are taught how to write new musical works. In the case of this research students learned how to compose a club dance piece (action research cycle one) and a minimalism piece (action research cycle two), leading to the creation of two musical compositions each.

The KS3 National Curriculum states that pupils 'should' (DfE, 2013: 2) be taught to compose, but it fails to explain why. This speaks to a wider consideration about why music should be taught in schools at all. Mills (2002) goes some way to explain both why music should be taught in schools, and why composing specifically. Mills asserts that music is all around us in everyday life, but that there is considerable misunderstanding of how to play an instrument, how to compose music, and of people thinking they are not musical. Including music in the school curriculum helps people to understand the music which shapes their lives, and spreads the joy of music and music making to all school age children, not only those who can afford private music lessons. Music in schools broadens the musical perspectives beyond one's own culture, by engaging with composing, listening to, and performing music from around the world (Mills, 2002). Swanwick and Cavalieri Franca (1999) argue that the skills required for composing, performing, and listening, are different, but that they complement one another and as such should all be included in a well-rounded musical education. They provide the following example of how composing, performing, and listening interact with one another:

> *'A child listens to an ostinato and manages to use this device in a composition. Perhaps the same child also perceives the expressiveness of a large crescendo in a recorded piece of music and may want to incorporate this in a performance. This will only be successful if he or she has master technique necessary to play a graduated crescendo.'* (Swanwick & Cavalieri Franca, 1999: 6).

In this example, the child has the skill to audibly identify a musical device (ostinato), understands how to incorporate it while composing, recognises the expressive nature of a crescendo, and can play a crescendo in a performance of their own. Perhaps this performance is of the same musical composition in which they incorporated the ostinato, thus demonstrating how the three main facets of a musical education as set out in the National Curriculum (DfE, 2013) can interact with one another.

While composing in music is generally accepted as an 'essential process' (Cavalieri Franca, 1998: 59), due to it being the process by which a musical work is created and as an intrinsically beneficial part of music education, there are those who argue otherwise. For example, Fletcher (1987) suggests that very few students continue composing after they complete their state mandated music education as it is too challenging, and that there are very few composers who are remembered in history. However, Fletcher's view on composing somewhat misses the point of composing as part of a musical education: performers would have no music to play if no one learned how to compose; people do not only compose in order to become famous and be remembered in years to come; and while composing can be difficult, as with any subject it can be scaffolded to meet the needs of students (Cavalieri Franca, 1998: 59).

The number of students opting to study music at GSCE has fallen in recent years, with music GCSE entries declining by 34% since 2010 and 42% of schools no longer entering any students for GCSE music (Cultural Learning Alliance, 2024). GCSE and A-Level music consists of three components: performance, composition, and appraising. These three components are often used by teachers to frame KS3 music curriculums. Regardless of whether a student continues with their musical education at GCSE or not, composing music is a rewarding activity which should be encouraged. Through their inclusion in the KS3 National Curriculum for music (DfE, 2013) and the Model Music Curriculum (DfE, 2021a), the government are suggesting that performance, composing, and appraising constitute a rounded music education.

Music in the curriculum has a ‘declining status’ (Daubney et al., 2019: 14), largely due to the exclusion of music from the English Baccalaureate (EBacc) accountability measure and weighting of the Progress 8 measure towards EBacc subjects (Cultural Learning Alliance, 2024). There is a direct correlation between the introduction of the EBacc and Progress 8 and a decline in the uptake of music at GCSE (Cultural Learning Alliance, 2024). Additionally, music education has experienced significant funding cuts in recent years, impacting programmes such as ‘Sing Up’ (Cultural Learning Alliance, 2024). In 2009/2010, local authorities were allocated £82.5m to spend on music education (equivalent to £127m in 2024, when adjusted for inflation), whereas the funding level for music education in 2024/2025 is just £76.1m (Music Mark, 2024). Additionally, Arts Council England had their budget cut by approximately 30% between 2010 and 2023, and local authority arts funding lost approximately 33% of its value between 2010 and 2018 (Musicians’ Union, 2024).

1.5 School and Local Context

The school where this research took place is a large inner-London secondary school where I work as a music teacher and head of year. The school employ four full time classroom music teachers, and between us we provide one-to-one instrumental lessons alongside classroom lessons. The school is rated ‘outstanding’ by Ofsted and has approximately 2900 pupils on roll. Around 80% of pupils speak English as an additional language (DfE, 2020b), and approximately 50% of students are eligible for free school meals (DfE 2020c). The school is in an inner-London borough where around 50% of the children live in poverty (Trust for London, 2020).

Pupils receive 1 hour of music per week in years 7, 8, and 9, with the option to specialise in or discontinue the study of music at the beginning of year 10. If pupils opt to study music for GCSE, they receive 2 hours of music per week. One of these hours is a classroom lesson, while the other is an instrumental lesson. The music provision at this school is well resourced, with five teaching rooms, a recording studio, and eight practice rooms.

1.6 My Positionality, Values, and Beliefs About Music Education

I approached this research from the position of a secondary school music teacher, and one who sees the value of music remaining in the curriculum regardless of the challenges. While some research suggests that music should be in the curriculum because it leads to higher academic attainment (Gill, 2020), I believe that music should be in the curriculum because of its intrinsic value. This includes music lessons building on students' natural affinity for music, engaging with music of their own cultures and of others, the broadening of musical perspectives, but most importantly because I want children to grow as musicians (Mills, 2005). It is because of my position that I am undertaking this research, as I want pupils to succeed in their musical education regardless of the teaching medium. I believe that all students should have the opportunity to receive music lessons, despite their geographical location and access to specialist teachers. This study into the teaching of online composing lessons is my contribution to that cause.

One of the key findings from my previous research (Rogers, 2021) into the online teaching of GCSE music was the challenges with teaching online composing lessons when compared with appraising and performance lessons, providing motivation to focus on composing teaching models in this new research. In short, during the Covid-19 pandemic composing lessons were not taught to any great extent in my school due to a lack of knowledge within the music department.

1.7 Structure of the Thesis

This thesis is set out in six chapters. Chapter one presents the background to the study, my positionality, and outlines the research aims and question. The second chapter is the literature review, which critically analyses relevant research in the areas surrounding online music composing teaching and identifies gaps in the literature. Chapter three of this thesis is the methodology. Here the theoretical orientation is documented, the three teaching models outlined, and the action research approach explained. The data collection and analysis methods are detailed, along with the role of the students, before my own reflexivity and positionality is considered. Chapter four of this study presents the findings. This chapter begins by

chronologically outlining the changes made to the three teaching models over two cycles of action research, followed by the TPACK model findings. In chapter five, the impact of this study from a music education perspective and a research perspective is discussed and the main themes of this research are explored. The final chapter of this thesis, chapter six, is the conclusion. The findings in relation to the four research aims and research question are explored, and the three teaching models and a composing specific TPACK model are presented. Several contributions to the academic field of online music education and TPACK are outlined, along with reflections on the research, and the limitations of this research are explained. This chapter ends with recommendations for future research.

1.8 Claims for Originality and Significance

My research demonstrates how three original models for the online teaching of music composing at KS3 were developed, along with a music composing specific TPACK model. The key themes explored in this research are online music pedagogy, online relationships within music composing lessons, efficiency and inefficiency, and efficiency and connectedness.

The research contributes to the literature around online music composing lessons and the TPACK model, highlighting the opportunities and challenges with teaching music composing online. The teaching models provide suggestions for teaching music composing online, which can be used and adapted to the context of other educators, while the composing specific TPACK model acts as a template for lesson planning and continuous professional development (CPD). Prior to this research, no such teaching models or composing specific TPACK model existed.

1.9 Summary

In this introductory chapter the topic of online music education was introduced, the background of the study was set out along with information about the school and local context, and the aims and research question were presented. The structure of secondary school music education in

England was then outlined, before considering the Covid-19 pandemic and my own positionality. This chapter concluded with a chapter-by-chapter breakdown of the thesis. The next chapter explores literature relevant to this study.

Chapter Two - Literature Review

2.1 Introduction

In this chapter I critically examine the literature relevant to this study, in what Trowler terms ‘mobilising previous research to your advantage’ (2018: 3). I searched for and selected literature using online libraries based on key terms derived from the research question and aims (Trowler, 2018). This included but was not limited to literature around music education, online teaching, music pedagogy, composing pedagogy, and the use of educational technologies, along with the TPACK model as a conceptual frame.

I considered Trowler’s (2018) key factors when selecting literature:

1. The research question and aims.
2. The methodological approach.
3. Conceptual and theoretical resources.
4. Knowledge claims.

One purpose of a literature review is to provide research with ‘validity and reliability’, by thoroughly reviewing the existing academic field (Cohen et al., 2011: 181). By exploring what is already known in a field of study, the research in question can be placed into context and its contribution viewed in relation to previous work (McNiff, 2017).

2.2 Literature Review

2.2.1 A Short History of Music Education in England

Before considering the current state of music education, it is useful to summarise how music education has developed. At its inception, music teaching in England revolved around the training of church choirs. While these lessons began rather informally, by the 1660's specialist teachers were being engaged to teach singing lessons (Rainbow, 1967). In the 1780's, singing lessons became more widely available due to the development of charity, grammar, and industry schools. In particular, the teaching of singing to approximately 300,000 Sunday school children from 1780 contributed significantly to music education in England, influencing other schools to include the teaching of singing in their curriculums (Rainbow, 1967). In 1880, when music became a curriculum subject with the advent of compulsory schooling, music education was concerned with testing students' knowledge of musical symbols, recalling facts, and singing (HMSO, 1880; Hallam & Creech, 2010).

In the early 20th century, listening to the 'great classics' of music via the radio or gramophone supplemented singing activities in the classroom (Goehr, 1992). The use of broadcasts was not well received by music educators, citing poor pedagogy, and led to music teachers desiring greater freedom in their teaching (Cox, 2011).

Following the Second World War, His Majesty's Inspectorate established a 'singing plus' music curriculum (Finney, 2016). This involved singing a specific repertoire and led to a narrow musical education. A statement by the Scottish Education Department in 1955 attempted to expand the repertoire schools were using in lessons, calling on schools to include music that students were interested in (Finney, 2016). This was not particularly successful, and frequently resulted in a patronising attitude towards popular music by teachers (Finney, 2016).

In 1968, the *Enquiry 1* report found that 34% of girls and 48% of boys considered music in school to be 'boring', 'useless' (School Council, 1968), and irrelevant to them (Finney, 2016). In

contrast, the same report highlighted that popular music was important to students (School Council, 1968), and because of this the School Council announced that music in schools needed to be more relevant to students' lives (HMSO, 1972). Music in school was in danger of becoming exclusive (Finney, 2016), and most students considered it unimportant (School Council, 1968). Music was far from alone in a fight for relevance at this time, with Religious Studies facing similar challenges in schools due to a move to a more secular society (Gillard, 1991).

Leading a change in music education in the early 1970's was John Paynter and his Schools Council Secondary Music Project (Paynter, 2008). As a result of this project, 'music-making' became central to classroom music, integrating performing, composing, and listening. Paynter's *Sound and Silence* promoted the use of sound with symbol, as opposed to symbol alone, challenging the convention that children needed to learn how to read music (Finney, 2016). This concept of music making in classroom lessons was continued by Swanwick and his *teaching music musically* (Swanwick, 1999) approach. The work of Paynter and Swanwick meant that musical learning moved from being almost solely knowledge based to a much more creative endeavour.

The 1988 Education Reform Act resulted in the introduction of the National Curriculum, which included music (Education Reform Act, 1988). This gave music a concrete place in the curriculum for all 5- to 14-year-olds, and brought with it new assessment, testing, and inspection procedures (Finney, 2016). The challenges of the 50's, 60's and 70's continued however, and there was little evidence that the subject had become more popular with students (Finney, 2016). The government reacted with the National Strategy for Music at KS3, resulting in The Paul Hamlyn Foundation setting up Musical Futures (Finney, 2016). Musical Futures provided teachers with a different way of offering music at KS3, focusing on an informal approach which recognised the musical preferences and identities of students (Finney, 2016). The Musical Futures informal approach, as developed by Professor Lucy Green, involves learning by listening and copying, working alongside friends, using real world music (as opposed to music specifically composed for learning), and integrating composing, listening, performing, and improvising (Musical Futures, 2024). Pre-Musical Futures, students typically learned through

notation and verbal communication, learned through instruction from adults, followed a progression from simple to more complex concepts, and differentiated between composing, listening, performing, and improvising (Musical Futures, 2024). The government also responded to the National Strategy for Music at KS3, allocating £332 million to the development of music in schools and launching programmes such as 'Sing Up' (Finney, 2016). The most recent national curriculum for music was launched in 2013.

The challenges faced by music education include the idea that music lessons are either inaccessible and largely irrelevant to the students who take them, or that lessons are an exclusive club for a small number of students who do find them relevant (Finney, 2016). In my research, an increased relevance to students comes from using DAWs online to reflect professional practice, while the online nature of the lessons potentially provides greater access to students.

In the next section I reflect on the current challenges faced by music educators in England.

2.2.2 Music Education in England: Current Debates and Challenges

After setting out the background to music education in England, I now turn to contemporary debates and challenges. Music education in England is under a 'sustained and brutal attack' (Lord Black, 2019: 10), fighting for its place in the curriculum and to be seen as a legitimate choice for students taking the subject at GCSE and beyond. For the non-music specialist, GCSE and A-Level music consist of three components: performance, composition, and appraising. At KS3, there is a National Curriculum for Music (DfE, 2013), a two-page document which provides a great deal of flexibility (or arguably, ambiguity) for teachers.

Music is a statutory requirement up to the end of KS3. However, the English Baccalaureate (EBacc) accountability measure has impacted on schools' abilities to provide the statutory music curriculum (Daubney et al., 2019). The EBacc is a suite of subjects that all students in English schools are encouraged to take at GCSE level (DfE, 2019b). Music is a notable omission from the EBacc, with many (including Daubney et al. (2019) and Lord Black (2019)) arguing the case

for music to be included, and the Cultural Learning Alliance (2024) calling for the complete abandonment of the EBacc and Progress 8. How students perform in EBacc subjects is a school performance measure (Daubney et al., 2019), resulting in schools focusing their efforts on these subjects. By not including music schools are less inclined to fund music education, so the breadth and balance of the wider curriculum suffers (Daubney et al., 2019). Since the introduction of the EBacc in 2010, GCSE music entries have declined by 34% (Cultural Learning Alliance, 2024), with a small resurgence between 2018/19 and 2021/22 of 0.3% (DfE, 2023). However, tensions exist between the EBacc and the Office for Standards in Education, Children's Services and Skills (Ofsted). Ofsted state that music should be an integral and important part of a school's curricular and extracurricular activities (Ofsted, 2021a), while at the same time the EBacc challenges the importance of music in schools through its omission. The length of KS3 also differs from school to school, depending on the priorities of each establishment, but there is limited specific data on the exact number of schools in England offering a 2-year KS3 music curriculum. The approach to the duration of KS3 can vary significantly between schools, with some opting for a 2-year KS3 and others maintaining a traditional 3-year model. According to Ofsted, some schools in England have been moving towards a 2-year KS3 to extend Key Stage 4 (KS4) and provide additional time for GCSE preparation. However, this trend is more prevalent in core academic subjects, and the duration of KS3 for subjects like music may vary depending on individual school policies (Ofsted, 2020). In a study consisting of 25 secondary schools, Ofsted found that there was a significant variation in the amount of curriculum time allocated to KS3 music (Ofsted, 2023). Additionally, as academies and free schools (approximately 75% of all secondary schools in England, (DfE, 2019)) are not required to adhere to the National Curriculum, only to offer a 'broad and balanced' curriculum (DfE, 2022b), the Incorporated Society of Musicians (ISM) question how the government plans to ensure that music does not disappear altogether (2018).

There has been a reduction in music teachers since 2011, from 8,043 in 2011/2012 to 7,184 in 2022/2023, potentially limiting schools' ability to offer as many taught hours of music and contributing towards fewer schools entering students for GCSE music (Cultural Learning Alliance). Music has a 'declining status' (Daubney et al., 2019), and there is a correlation between the introduction of the EBacc and Progress 8 and fewer students opting to study music

at GCSE (Cultural Learning Alliance, 2024). Since the EBacc was introduced in 2010 GCSE numbers have fallen by 34% (Cultural Learning Alliance, 2024), including a 12.5% drop in GCSE music entries from 2022 to 2023 (ISM, 2023). The number of taught hours at KS4 has also declined for music, with a 12% reduction in curriculum time between 2011/12 and 2018/19 (Cultural Learning Alliance, 2024). However, while the number of taught hours at KS3 fell by 11% between 2011/12 and 2018/19, by 2022/23 the number of taught hours had recovered 2011/12 levels (Cultural Learning Alliance, 2024). Along with a reduction in curriculum time, many schools have made music optional from year 9 (ISM, 2017). Only 62% of students received music education in year 9 in 2016/ 2017, down from 84% in 2012/2013 (ISM, 2017). Perhaps the most striking admission that the government is sidelining music, along with other arts subjects, since the introduction of the EBacc is the reduction in music teacher recruitment targets. In 2010/11, the government exceeded its music teacher recruitment target by 19%, but by 2015/16 this target was missed by 26% (Cultural Learning Alliance, 2024). While there was a small increase in the number of trainee music teachers in the pandemic and post-pandemic years of 2019, 2020, and 2021, this was followed by a drop off 37% (Cultural Learning Alliance, 2024). However, since the introduction of the EBacc in 2010 the government has significantly reduced its music teacher recruitment targets, to reflect the reduced requirement for music teachers (Cultural Learning Alliance, 2024). That the government were not able to meet their own recruitment targets, even when reduced, is worrying enough, but a reduction in those recruitment targets is effectively an admission of sidelining music, and the arts, education. There is previous form for the introduction of new technologies resulting in fewer music teachers. Cuban (1986:34) describes how televised music lessons in 1950's America resulted in fewer music teachers being hired by schools, with music lessons being taught by anyone that could press play on a television set. However, this research seeks to provide teachers with a new avenue for teaching and does not seek to replace them.

Funding cuts have greatly impacted many areas within music education, including bursaries for trainee teachers, cuts to music hub funding, and cuts to programmes such as 'Sing Up' (ISM, 2021; Cultural Learning Alliance, 2024). As highlighted in 1.4, the budget for local authorities to spend on music education has significantly reduced since 2009/10, again suggesting a sidelining of music education by the government (Music Mark, 2024). In addition to this, Arts Council

England had their budget reduced by 30% between 2010 and 2023 (Musicians' Union, 2024), once again coinciding with the introduction of the EBacc. In a small scale study, Ofsted (2023) also found that many schools were reducing how much they were able to subsidise instrumental music lessons, due to pressures on school budgets.

There have been several efforts to revive music education in England over the past decade, including the Henley Review and the National Plan for Music Education (NPME). The Henley Review, also known as the Music Education in England Report, was a review of music education in England in 2011 (Henley, 2011). Henley (2011) highlighted the challenges music education was facing, such as funding, the EBacc, issues regarding training, retention and recruitment, and an equal access to music provision. The funding issues arose largely from the introduction of the EBacc, with headteachers prioritising funds for EBacc subjects (Musicians' Union, 2019). The Henley review also suggested a minimum provision for music education in English schools, summarising that schools should be providing students with regular high-quality music lessons, covering performing, composing, listening, reviewing, and evaluating. These recommendations are strikingly like the National Curriculum for music, so that Henley feels the need to highlight these seemingly obvious points as recommendations suggest they are not currently being met.

The NPME was launched in 2012 with the aim of addressing the Henley Review (DfE, 2011). It introduced Music Hubs, designed to provide equal music provision nationally by augmenting and supporting school music teaching (DfE, 2011). The Music Hubs introduced in 2011 were given four core roles (DfE, 2011: 9):

1. Provide every child with the opportunity to learn a musical instrument through whole-class ensemble teaching programmes for a minimum of one term each year.
2. Create opportunities to play and perform in ensembles.
3. Provide clear and affordable progression routes.
4. Ensure that pupils sing regularly.

However, music hubs have faced significant challenges. In particular, academisation has meant that schools have increased autonomy over their music provision, so they are under no statutory

obligation to make use of music hubs even though Ofsted demand that schools must (Musicians' Union, 2014). These policy tensions result in a patchy music provision (DfE, 2021c).

In March 2021, the Department for Education (DfE) released the much-delayed (Gibbons, 2021) non-statutory Model Music Curriculum (MMC) (DfE, 2021a). The aim of the MMC is to help all pupils in KS1-3 access high quality music lessons, while also helping teachers to plan and reduce workload (DfE/ Gibb, 2019). Despite the challenges faced by schools due to the introduction of the EBacc, the MMC sets out that at KS3 students should receive a minimum of one hour per week of music lessons (DfE, 2021a). There is tension between the two government policies: the MMC advocates for music lessons, and the EBacc does not. This has contributed to negative feelings in music educators (ISM, 2021). Anderson acknowledges how the design of a school music curriculum (written by each individual department) at KS3 is 'realised within political contexts' (2022: 12), exemplified here by the MMC, EBacc, and National Curriculum.

There are many mixed feelings surrounding the MMC, from music teachers and commentators alike (ISM, 2021), but no data which presents the opinions of parents or students yet. On one hand, many educators are happy that the MMC advocates for the consistent teaching of music in the curriculum, and that it outlines the purposes of music in the curriculum (i.e., that there is a broad and balanced curriculum encompassing music-making, learning an instrument, taking part in ensembles, and sharing music beyond the classroom) (ISM, 2021). However, one function of the MMC is to provide guidance to non-specialist teachers, which it fails to do so to an appropriate and detailed enough degree (ISM, 2021). While there are issues with the MMC, a government document highlighting the importance of music in the curriculum, and what that curriculum might look like, is a positive step for music education in England.

In June 2022, the delayed National Plan for Music Education 2 (NPME2) was published (DfE, 2022a). The plan promised much:

- Every school should have a music lead or head of department and music development plan.
- £25 million investment in musical instruments and equipment.

- £79 million spent on funding music hubs until 2025.
- A fund to support disadvantaged students.
- Professional development designed in conjunction with music hubs and schools with high quality provision.
- Establish music hub centres of excellence.
- All music hubs must publish an inclusion strategy and designate an inclusion lead.

These ambitions are not major developments over the previous plan and do little to ease the strain on music teachers. Firstly, while the claims appear to reflect current priorities for music education, they, much like the MMC, are non-statutory. As such, schools are under no obligation to follow the recommendations. Secondly, many of the promises are already a reality. For example, most schools already have a head of department and a music development plan. Thirdly, a £25 million investment in musical instruments and equipment, and £79 million to keep music hubs open, is a fraction of the education budget. Together, these investments do very little to aid music teachers, as they do not address the declining numbers of teachers or students at GCSE, or address the EBacc, and brings into question once again how much the government values music. There is much in the NPME2 regarding music technology, most notably here:

> *'All music educators have a stronger understanding of the role of technology in teaching music, including as a creative tool, and in enhancing teaching and in making music more accessible and inclusive.'* (NPME2, 2022: 9)

Knowingly or unknowingly, this is almost a direct reference to the technology, pedagogy, and content knowledge (TPACK) model in that it references teachers developing their understanding of how technology should be used for the teaching of music. The report also acknowledges how essential technology is to teaching music in schools. The TPACK model is discussed later in this chapter and in chapter three, but this report strengthens the argument that the TPACK model is an appropriate tool for my research. Interestingly, the above paragraph seems to reduce the term 'technology' to meaning information computer technology and excludes the vast amounts of other technology which can be used in music education, such as guitar pedals and electric drum kits. However, the NPME2 does not mention online learning, except for one reference to online

digital audio workstations (DAWs). Given the Covid-19 pandemic this seems like a glaring omission.

In March 2022 the ISM released a report for the 10th anniversary of the first NPME (ISM, 2022), based on their own survey of 508 music teachers in England. This report continued to be highly critical of the government's approach to music education, with 93% of respondents saying that the EBacc was having a detrimental impact on music education, and 99% of respondents agreeing that music teachers should have been consulted before the NPME2 was published. This suggests that music educators have very little confidence in the government to produce an effective plan. The ISM report highlighted issues with a narrowed KS3 curriculum, lack of funding, and the EBacc. The respondents were also very clear in what they want from the NPME2, and by extension the government's approach to music education in England: an increase in and ring-fencing of funding for music education, a higher subject profile for music (via inclusion in or removal of the EBacc), and to be consulted on the NPME2 before publication.

The current issues challenging music educators and students highlighted in this section are summarised table 1, along with suggestions as to how my research may contribute to alleviating those issues. However, it is not an aim of my research to solve these wider issues for the music education community.

Challenge	Research Contribution of *Simulated Online Music Composing Lessons: developing teaching models through action research*
Music is not one of the EBacc subjects, resulting in schools reducing their music provision.	With reduced provision in schools, online learning may become necessary to ensure students receive a music education.
Roughly 50% of schools offer a 2-year KS3, meaning students receive one year less of music lessons.	My research looks at KS3, and it is KS3 where provision is being cut. Online learning may become an option to facilitate music education to those who desire it for their third year of KS3.
GCSE and A-Level numbers have fallen by 25% and 47% since the introduction of the EBacc in 2010 and funding cuts.	Less specialist teachers and fewer offerings of GCSE and A-Level music may mean that students look towards other avenues for their music education, such as online.
Cuts to teacher training results in fewer music specialists, music hubs, and specific programmes such as 'Sing Up'. EBacc has also resulted in schools giving music departments smaller budgets.	Fewer teachers may mean that schools who require specialist teachers cannot get them and may instead turn to specialist remote teachers.
Concerns about tensions between the MMC, EBacc and Ofsted. Non-specialist teachers will struggle to implement the MMC.	Reduces the need for non-specialists to teach music if online lessons are available from a specialist teacher.

Table 1 – Challenges in music education

While the situation in music education appears dire, there are some positives. For example, while some schools reported that their access to music education was inconsistent, other schools suggested that their music provision was now more inclusive and diverse than in previous years (Zeserson et al., 2014). This strengthens the argument that access to good music education is at best inconsistent (Savage, 2021).

In the next section, I explore the historical underpinnings of distance learning in education and music education, and how these relate to challenges faced by music teachers and students in England.

2.2.3 Distance Learning in Education and Music Education

Closely related to the history of music education is the development of distance education. I begin by examining the historical background of distance education with a focus on music education, before exploring distance learning in music education today.

There is some debate around the term 'distance education' (Johnston, 2020), largely due to distance learning evolving considerably (Johnston, 2020). Johnston (2020: 2) outlines three 'eras' of distance learning:

1728 to present – Correspondence courses which use the postal service.
1921 to present – Telecommunication courses delivered via the radio, television, and phone.
1989 to present – Online courses which use computers via the internet.

As a result of this, Johnston (2020: 4) argues that there is no single definition for distance learning and that three different definitions are required:

1. *'Virtual Network Education: A self-directed, autonomous learning experience using technology…where students have great autonomy and flexibility, but less direct teacher contact and direction.*
2. *Cloned Content Education: A school or instructor-directed learning experience using technology that connects students to pre-developed content, where students have less autonomy but more flexibility to learn asynchronously, and they contact the teacher as needed.*
3. *Remote Classroom Education: An instructor-led learning experience using technology to extend the synchronous classroom experience across distances, where students have less autonomy and less flexibility, but have more direct teacher contact and direction.'*

However, Johnston (2020) acknowledges that most examples of online learning do not fit into these three definitions, suggesting that these definitions are too specific. Arguably, Johnston's definitions are examples of distance learning, not definitions of the concept, and are somewhat like the asynchronous, synchronous, and synergistic models discussed in chapter three.

Instead, a contemporary definition of distance learning can be drawn together from different sources. Distance education suggests a separation between the teacher and students (Johnston, 2020), with technology being used as a bridge between the teacher and learner (National Centre for Educational Statistics, 2019; Keegan, 2013). Lessons should be taught by an educational organisation, with the ability to have two-way communication and personalised feedback (Simonson & Seepersaud, 2019). Therefore, my own definition of distance education, an amalgamation of the above, is adopted for this study:

Distance learning occurs when technology is used by an educational establishment to bridge a geographical separation between a teacher and learner(s). The teacher and learner are still able to communicate with each other, and the teacher can provide personalised feedback.

While distance learning can involve the use of technology, television, the radio, and phones, online learning is more specific. Therefore, this definition of online learning will be used:

Online learning occurs when the internet is used by an educational establishment to bridge a geographical separation between a teacher and learner(s). The teacher and learner can communicate with each other, and the teacher can provide personalised feedback.

Much distance learning now takes place online, but that has not always been the case. At its inception 130 years ago, lesson materials and student work were sent between the student and teacher through the post, which developed into lessons being taught through radio broadcast, television, and the internet (Lease & Brown, 2009).

Distance learning and music education have a rich history in the UK and have long been intertwined. One of the first technologies used in distance education was the gramophone

(Symes, 2004). When the Education Department of the Gramophone Company was founded in 1919 (Scholes, 1947), their first broadcast (through the British Broadcasting Company (BBC)) was a music lesson. These broadcasts were further formalised through the forming of the Central Council for Schools Broadcasting (CCSB, later becoming the School Broadcast Council (SBC)), with the help of the BBC (Barclay, 2021). This led to Walford Davis developing the idea of using gramophones and radio to teach music lessons, as a solution to a shortage of music teachers (Cox, 1997). Davis was a pioneer of radio-based music education, and from 1922-1934 he was responsible for 428 broadcast lessons (Scholes, 1947). While some argue that Davis's lessons were predictable, reflected his musical tastes, existed to counter modern musical influences, and were of dubious quality, there can be no doubt that Davis succeeded in disseminating music education (Cox, 1997). After Davis's successful but much critiqued radio music lessons, in the 1950's Driver stepped into the fold and developed a different approach that was music and movement centred, with a renewed focus on designing child-friendly radio lessons (Cox, 1996). These lessons were subject to their own controversy, with some questioning whether music or movement was being given priority (Cox, 1996). It is possible that a similar critique of online learning will emerge, debating whether the music or the technology is being given priority in lessons. At the same time, it was suggested that the BBC could learn from what was happening in the United States of America by including whole-class instrumental teaching into their radio lessons (Cox, 1996). The legacy of radio broadcast music lessons is that they were celebrated for providing more people than ever with access to music lessons, but they also came in for much criticism. For example, *The Musical Times* (1941) argued that radio lessons were 'disembodied' versions of classroom lessons, highlighting issues with pedagogy and engagement. As is discussed later, these issues with pedagogy and engagement still exist for online learning (Morgan, 2022).

In 1957 the BBC began to broadcast educational television programmes under the umbrella of 'BBC Schools', and in 1970 first aired a programme called *Music Time*. *Music Time* was aimed at primary school children, presumably because primary schools had less access to specialist teachers than secondary schools. Distance music education has a history of using the latest technology to make lessons available more widely. The BBC Schools broadcasts, be it through radio or television, were extremely popular and rose from around 5000 teachers using broadcasts

in 1935 to over 32000 by 1971 (Barclay, 2021). It was not until 1988, when the government established the National Curriculum, that the BBC stopped producing distance learning resources. The use of the latest technology continues today with the use of the internet and the wide availability of personal devices. However, many of the same issues, such as challenges with engagement, pedagogy, and access to specialist teachers (Daubney et al., 2019), persist.

In the 21st century many institutions offer distance and online learning. Since it opened in 1971 The Open University has seen more that 2 million students enrol (Tresman, 2002), and it offers a range of online music courses. Many other UK universities also offer online music courses, with 76% of universities offering at least one online degree (University of Birmingham, 2020). While online learning as a business model has been successful, evident from the success of The Open University, Lentell (2012) suggests that some universities in the UK lack a clear understanding of online learning pedagogy. Although Lentell is referring to university education, their study highlights a general lack of understanding of online learning pedagogy. A clear understanding of online learning pedagogy in relation to online music composing at KS3 is what this study seeks to address.

Compared to undergraduate and graduate level online learning (Tresman, 2002), less well established is online learning at KS3. Even though teaching online at secondary school is currently rare, many schools do augment their teaching by using cloud-based platforms such as Google Classroom (NAHT, 2020), meaning that students do have some familiarity with blended learning. Blended learning is defined as learning which takes place on a continuum between fully online and fully face-to-face teaching (Fisher et al., 2021). Google Classroom allows teachers to create dedicated online spaces for their classes, where they can upload information, videos, and assign homework or quizzes. One way that blended learning in the classroom might be facilitated by Google Classroom is by posting videos of a piano piece being performed, which students can refer to when learning the piece instead of asking their teacher. Equally, Google Classroom might also be used in the classroom to complete self-marking quizzes or for students to upload their completed work to.

Online learning in the UK has been used at school level to provide education to students who live in difficult to reach regions or may not have access to specialist teachers. For example, the E-sgoil project was launched in 2016 to provide lessons to secondary schools on the Western Isles of Scotland, due to a shortage of subject specialist teachers (E-sgoil, 2016). However, there is no information regarding pedagogy beyond a description of the equipment used.

While distance learning is less well established at school-level, the Covid-19 pandemic forced schools to move to a distance learning model between 2020 and 2022, at very short notice and with little staff training or expertise. Many different models were used by schools in England, from sending physical workbooks home to live online lessons. There were multiple challenges faced by schools when implementing online learning, and some benefits. Challenges for educators included deciding what students should be taught, how they should be taught, making sure that devices and internet access was available to all, and an uncertainty as to how long students would be out of schools. My research goes some way to addressing these challenges for future school closures by suggesting how music composing at KS3 could be taught online, using as little specialist equipment as possible to be accessible to as many students as possible. There were some affordances however, such as the innovation and creativity shown by teachers in working out how to teach lessons under challenging circumstances, and greater use of the internet to potentially enhance traditional teaching practices. My research expands on this by exploring pedagogical approaches to teaching online, as opposed to the haphazard approach taken by many during the Covid-19 pandemic.

Morgan (2022) highlights some of the major challenges with teaching online lessons in relation to the Covid-19 pandemic, many of which are applicable to online teaching in general. However, a caveat to Morgan's research is that it is based on document analysis and there was no direct interaction with educators or students. The challenges that Morgan described are outlined below, along with explanations of how my research may contribute to resolving them (table 2).

Problem	Potential contribution to resolution from *Lessons Composing: developing teaching models through action research*
Dull instruction due to students passively listening to videos and presentations.	My research explored different teaching models, which included a more passive teaching model (asynchronous) and other less passive teaching models (synchronous and synergistic). Active learning was considered in all models.
Isolation caused by lack of interaction with peers in lessons.	The initial teaching models used in my research offered students the opportunity to share their work with others in the class, and the 'chat' function of the video calling software was enabled to allow for relevant conversations to take place.
Obstacles caused by poverty, including lack of connectivity.	My research took place in a classroom which was equipped for online learning, so lack of connectivity was not an issue. While this does not address issues around poverty and connectivity, conducting the research in an environment which does have connectivity means that the number of students who can take part is broadened.
The importance of 'active learning' strategies to promote engagement.	Morgan promotes creative tasks to help with engagement in online lessons. My research included creative tasks in the form of music composing. The challenges and advantages of each teaching model in relation to teaching a creative task was explored in my research.

Table 2 – Problems and contributions

Online learning in music education has been used to address some of the challenges faced by educators and students, namely a lack of access to specialist teachers (for example, in the E-sgoil initiative). Online learning is an evolving and ever-changing form of education, and with each new technology comes more opportunities to make education either widely available, or more exclusive. It is worth noting that the global online music learning market was recently valued at $136.2 million and is anticipated to grow to $656.7 million by 2030 (NASDAQ, 2022). This is an indication of the uptake of online music lessons, justifying research into this area.

This section outlined the historical background to distance learning and online music, particularly in relation to music education, including events which resulted in much of the world moving to distance education. In the next section the technology relevant to music education is explored.

2.2.4 Technology in Music Education

This section focuses on the use of technology in music education. In this research, the word 'technology' is taken to mean digital technologies. While there have been many advancements in other aspects of music technology such as instrument design (for example, the invention of the stop action pipe organ in the 1400's (Thistlethwaite & Webber, 1999)), that is not the focus here. Frierson-Campbell & Froehlich (2022) suggest that the application of technology in the face-to-face and virtual music classroom is more important than ever.

Technology forms a large part of young people's lives and can be used to engage young people in music education (Mackrill & Daubney, 2016), which is recognised by the government through its inclusion in the national curriculum for music (DfE, 2013). Technology in music education is ever changing, and it would be impossible to document all instances of music technology being used in education today. With new technologies comes new pedagogies (Fullan and Langworthy, 2013), and this is what makes technology in education so exciting while also providing an opportunity for interpretation and differences in the quality of teaching and teacher knowledge.

The TPACK model discussed later in this chapter seeks to address this, and by exploring three teaching models for online composing my research aspires to reduce the differences in quality of online teaching. As Higgins et al. (2012) suggest, a key aspect of using technology in the classroom is how effectively it is used to aid teaching and learning.

The use of technology in the music classroom has changed significantly. What began with early synthesisers, cassette recorders and portable keyboards is now computer suites, recording studios and MIDI keyboards (Mackrill & Daubney, 2016). Technology has been exclusively used to teach music lessons in the past, such as through closed-circuit television broadcasts (Cuban, 1986). Sandy (2001: 28) offers a useful chronology for technology in music education, which I have updated in brackets:

> *'Recorded sounds: LP to CD* (and more recently to streaming)
> *Visual images: film strip to DVD* (likewise, now to streaming)
> *Electronic instruments: organ to musical instrument digital interface (MIDI)*
> *Recording: wire recorders to digital multitrack*
> *Computers: Simple programs to world wide web'* (and now tablets)

It is now commonplace in English schools to have at least one music classroom with a suite of PCs and a DAW (Mackrill & Daubney, 2016), and many schools augment their music provision with online applications such as BandLab and Focus on Sound. In my own experience, the secondary schools I have worked in all had dedicated music computer suites with MIDI keyboards, and my current workplace also has iPads and a subscription to Focus on Sound. However, with the inclusion of more technology comes troubleshooting issues (Mackrill & Daubney, 2016), which the teacher must know how to resolve. There is also the potential for drag-and-drop music software to reduce the opportunities for developing musical understanding (Mackrill & Daubney, 2016), so the use of technology must be meaningful and facilitate, not curtail, creativity and learning.

Much research and use of technology in music education is based around the interests and expertise of individual teachers, such as Riley's (2013a) research into the uses of iPads in music classrooms and Criswell's (2011) research into using iPads for composing and performance. This is largely due to the ambiguity of the KS3 music national curriculum, because while the use of

technology is included (DfE, 2013), it does not stipulate what technology to use, how it should be used, or how often it should be used. There is great variation in the amount of technology being used and the purpose of technology in the music classroom, ranging from Criswell's (2011) use of iPads for composing, the Drake Music Project's (Youth Music, 2011; Himonides, 2018) use of technology to aid students with complex needs, and using Lego and Raspberry Pi computers to build musical instruments (Gold et al., 2022).

My research makes use of online, cloud-based DAWs. DAWs are an industry standard way of composing music and are widely used in schools, and improved internet speeds means that composing online with others is becoming widely practised by professionals (Biasutti, 2018). Online DAWs are also considerably less expensive than software DAWs, and as such are less of a burden on departmental budgets. Therefore, my research has the potential to develop teacher understanding of how these online and industry used approaches to music technology can be applied in a school setting, using software accessible to all music departments.

With an outline of the history of technology in music education, and an overview of how distance education has developed in music, I now turn to different models for online teaching.

2.2.5 Models of Online Teaching

This section considers some of the different teaching models used for online learning, before focusing more specifically on online teaching in music education and the location of my research in the current evidence base.

Synchronous and asynchronous are the primary approaches to online lessons. In synchronous online lessons learning takes place at the same time as teaching (e.g., a 'live' lesson through a video conference software), and in asynchronous lessons learning takes place at a different time to teaching (e.g., a pre-recorded lesson) (Solomon & Verrilli, 2020). Table 3 outlines some of the benefits and limitations of each, as derived from Solomon and Verrilli (2020):

	Synchronous	Asynchronous
Benefits	- Simulates face-to-face lessons. - Can check for understanding and respond in real time. - More engaging than asynchronous lessons.	- Teachers have more control over learning. - Students can decide where and when they learn. - One lesson can be used across multiple classes.
Limitations	- Logistically complex for both teachers and students. - Issues with screen fatigue. - Technology issues.	- Limited ability to assess engagement. - Cannot check understanding in real time. - Little sense of connectedness between students.

Table 3 – Synchronous and asynchronous learning

Solomon and Verrilli have arrived at these benefits and limitations through a combination of their own opinions and conversations with teachers. They have not conducted an empirical study regarding the benefits and limitations of online lessons, and as such their list cannot be viewed as exhaustive. However, their benefits and limitations are broadly consistent with much of the research regarding online lessons, expanded upon later in this chapter. As both models have limitations, Solomon and Verrilli (2020) suggest that synergistic models (summarised in table 4), which incorporate elements of both, mitigate many of the challenges. These synergistic models are based on casual conversations with teachers who are implementing them, calling into question the robustness of their research and findings.

Model 1	Model 2
1. Teacher records a lesson for students across different classes to watch. 2. Students submit work directly to their class teacher. 3. Class teacher provides feedback through Google Classroom and a bi-weekly phone call. 4. Students who are struggling attend a live session with their teacher.	1. Schools offer asynchronous lessons. 2. Supplementary live lessons are used to support all students.

Table 4 - Synergistic models of online teaching

My research compared synchronous, asynchronous, and synergistic models and explored the merits and challenges of each.

The definitions for synchronous, asynchronous, and synergistic teaching models are (Soloman and Verrelli, 2020):

Synchronous – Learning happens at the same time as teaching, but in different places.

Asynchronous – Learning happens at a different time to teaching, and in different places.

Synergistic – Learning takes place on a continuum between synchronous and asynchronous learning.

With asynchronous teaching methods comes the additional challenge of creating lesson content (such as filming and editing videos and recording audio clips) and ensuring that the audio and video quality is sufficient (Johnson, 2020). Similarly, a key part of synchronous teaching is the preparation that the teacher does in advance, although this may be no more work than a teacher faces when teaching face-to-face lessons (Johnson, 2020).

There are many variations of synchronous and asynchronous models, particularly within higher and further education. Examples of asynchronous models include the 'asynchronous model for online teaching, learning and assessment' (Ghilay & Ghilay, 2013), 'asynchronous learning networks' (Hiltz & Goldman, 2005), 'computer supported collaborative learning' (Miyake, 2007) and 'e-learning' (Andrews and Haythornthwaite, 2007). Synchronous models have also been developed, such as the 'instant e-teaching framework model for live online teaching', designed to emulate a face-to-face classroom (Safei et al., 2011). Various other models of online learning include massive open online courses (MOOCs) and competency-based models (Hill, 2012), as well as the many variations of blended-learning (which incorporate elements of online and face-to-face tuition).

Most of these models have been developed for higher education, but models for school-age children do exist. For example, Alice Springs School of the Air is an online school in Australia's sparsely populated Northern Territory. They offer virtual lessons in online classes of four students to one teacher, and students interact with teachers and other students through websites, video lessons, and email (Schibsted, 2006). However, the generous ratio of four students to one teacher is unlikely to be replicated in other virtual classrooms. As such, while this online provision reportedly works well (Schibsted, 2006), is not a realistic model for larger online classes.

Johnson (2020) identifies a variety of potential approaches for teaching music online, any of which could be integrated into synchronous, asynchronous, or synergistic lessons. While Johnson identifies these models in the context of music education, they are not explored in relation to music composing lessons specifically. The models that Johnson draws attention to are:

1. The student-centred model – Students are responsible for their own learning and are based around collaboration and interactive activities. This model relies largely on asynchronous tools, such as discussion boards.

2. The teacher (as-expert) centred model - The teacher develops the course content, learning activities, and what the students will learn. Lessons are in a lecture style, after which

students are guided through tasks. Johnson (2020) alleges that this model lends itself well to online projects, which might include online composing.

3. The subject-centred model. In this model, the teacher and students engage with learning about the subject together. This may take the form of creating podcasts, conducting discussions, and completing group projects.

There is no reason why the teaching approach cannot change each lesson, or even change within a single lesson depending on the task at hand. The reason for deciding on a particular model might depend on a teacher's pedagogical views, such as whether the teacher believes they should be teaching information directly to students, or that students should have the opportunity to discover topics for themselves. In practice, teachers may not actively consider different teaching approaches, with their approach being somewhat intuitive.

Evidently, there is no universal model for online teaching. Instead, there are as many different models as there are situations in which online teaching is required. With such a variety of teaching models but very few specific examples for KS3 music education, it is unrealistic to expect a music educator to understand how to teach online composing lessons. It is this gap in the literature that my research seeks to fill.

The Education Endowment Foundation (EEF) (2020) supports the claim above, indicating that there is limited research regarding school aged online lessons for any subject. Ofsted (2021b) conducted similar research and came to the same conclusion. These reviews also found that the limited literature might not be applicable to the latest developments in technology, due to the technology in music education and distance learning changing considerably over the years.

Having outlined various online teaching models, I next discuss online music education.

2.2.6 Online Whole Class Music Lessons

This section is concerned with online whole class music lessons. All the studies explored are small scale, calling into question the limited evidence which they provide. However, a small scale does not mean that their findings are not useful, as they are rigorous studies from recognised names in the field of online music education. While there are limitations to the individual studies, many of them come to similar conclusions which suggests their findings may be generalisable to other contexts.

Much of the research discussed in 2.2.6, 2.2.7, and 2.2.8 was not undertaken in England, and as such there are contextual considerations to be considered before exploring the available research into online music education from around the world. These contextual considerations, and a comparison with music education in England, are outlined here. Much of the research took place in America, where there is no national curriculum for any subject, including music. Instead, many schools follow the 2014 music standards as set out by the National Association for Music Education (NAfME, 2014). While the national curriculum in England breaks music education into composing, performing, and listening, the American music standards instead use the terms creating, performing, and responding. The American music standards place a greater emphasis on performance within music education, with composing playing a smaller role unless chosen as an elective subject (NAfME), with music education in England being more equally divided between composing, performing and appraising as per the GCSE music examination structure. Some of the research referenced below took part in Japan, which has some similarities and differences to music education in English schools. Music education forms part of the curriculum in Japanese schools, just as it does in English schools, but while music education in English schools is mostly (but not entirely) concerned with Western classical and popular music, Japanese schools place an emphasis on both Western music and traditional Japanese music. The Japanese national curriculum for music is available on the Ministry of Education, Culture, Sports, Science and Technology (MEXT) website (2008). In Mexico, music is not compulsory at all stages of education and is more prominent in private and specialised schools. However, where regional music is part of cultural identity there is an effort to include folk music in public education, but in these cases music education is mainly limited to music performance. As such,

music composing is not a formal focus for most students, with a limited amount of time dedicated to arts teaching in Mexican schools (Pliego Carrasco, 2011) and very little musical education in general (Gonzalez-Moreno & Carrillo, 2023). While policies in Mexico highlight the importance of developing creative skills, there is no given guidance or approach for teaching music composing in Mexico (Gonzalez-Moreno & Carrillo, 2023). In Finland, music education is compulsory up to the age of 16, but there is a larger focus on fostering a lifelong engagement with music as opposed to focusing on preparing students for music examinations, emphasising a holistic and inclusive approach to music education where music is integrated into daily life and local communities (NAfME, 2021). Finally, music education in Australia is somewhat like that of England in that it does prepare students for music exams at the age of 16 (should the student wish to take them), but there is a greater focus on indigenous music (along with Western music) and the curriculum varies by state. However, as with the English national curriculum the Australian national curriculum for music does include composing (Australian Curriculum, 2018). The differences in music education across the countries discussed highlights the different motivations for including music the schooling for each country, and should be considered when reading the research in this and the following sections. Different reasons for including music education, different levels of exposure to music education, and different amounts of importance placed on composing, may mean that the experiences of online music education in each country may be different to the experiences of online music education in England, and again speaks to the contextual nature of my study.

One example of whole class online music lessons taking place was in Mexico, taught by American teachers, with between one to four teachers and ten to fourteen pupils (Riley, 2007). Several benefits were reported, such as that pupils got access to lessons they would not otherwise have received, that it exposed the pupils to new technologies, and that students were enthusiastic. There were also challenges, including difficulties in demonstrating musical ideas to the class, a time delay, behaviour management, and issues with technology. The teachers said that they covered less content than in face-to-face lessons, could not provide pupils with individual attention, taught university-style lectures, struggled to learn student names, and that it was challenging to identify which pupils had and had not understood concepts. Despite these issues, Riley concluded that videoconferencing has the potential to be an effective medium for teaching

music lessons. 17 years later, since Riley's study, the technology has advanced and perhaps the study was prescient in identifying the potential for effective music teaching online. The numerous issues cited seemed to suggest that the engagement and enthusiasm of pupils is what made the lessons successful.

Similarly, online music lessons were taught to remote Finnish villages with the aim of simulating face-to-face lessons (Maki, 2001). The lessons were designed to give a rounded music education, encompassing history, theory, singing, and instrumental tuition. Maki found that the teaching of music history and theory was successful, but a time delay between the teacher and pupils made it difficult to perform music together. While there were challenges, Maki declared the experience as having been positive. Why this experience was positive is not made explicitly clear, but Maki suggests that music history and theory tuition was just as effective as face-to-face, with the addition of pupils being able to use the internet for resources and the teacher being able to set assignments online. It is also suggested that as the school had received no music tuition at all for 15 years this added to the positive experience. Music history and theory were deemed successful because they were taught in a similar manner to face-to-face tuition, whereas the technical difficulties with instrumental tuition meant it was less successful. A notable omission from Maki's research is a lack of composing teaching.

There is some research into graduate and postgraduate online music education pedagogy. Johnson's (2017) research found that teachers preferred "the act of experiencing music" as a teaching method, as opposed to a "flat" teaching approach, in online lessons. A "flat" approach predominantly consists of lectures, whereas "experiencing music" involves performance and/ or composing. Keast (2009) supports Johnson's "experiencing music", saying that students should experience learning and not be taught in "static" ways. In relation to this, Koutsoupidou (2014) suggests that online music lessons can be taught via synchronous platforms like Google Meet, or asynchronous platforms like Moodle. Koutsoupidou found that teacher perceptions of the success of online music courses depended on whether the course was being taught using synchronous or asynchronous tools. Koutsoupidou established that teachers were enthusiastic about asynchronous methods, but those involved with synchronous methods were more sceptical due to

technical issues. Here, success seems to be linked with ease of teaching, with the technically reliable approach of asynchronous methods preferred.

Most of the research so far covers synchronous methods, possibly through a desire to replicate face-to-face teaching as closely as possible, suggesting that asynchronous and synergetic models have not been explored to the same extent. My research will explore asynchronous and synergistic teaching, as well as synchronous teaching, adding to the limited available literature.

2.2.7 Online Instrumental Music Lessons

Instrumental music lessons have been taught online for several years. Students who live in remote areas often have limited access to specialist instrumental teachers, which drastically impacts on their musical development (McPherson, Davidson, & Faulkner, 2012), so the impetus to solve this issue has been around for longer than the need to research whole class online music lessons. Online instrumental music lessons are relevant to my study because they demonstrate that one component of a musical education, performing, can be taught online, and because any research into online music education may provide useful information regarding pedagogy, technology, and content which may be relevant to online composing lessons.

One example is research into online trumpet lessons which took place between an eighth-grade student and a professor, which found that the online lessons were successful with some advantages over face-to-face lessons (Dammers, 2009). The advantages included accessibility (both parties could be in their homes), online file sharing, and increased engagement. It is interesting to note that progress is not listed as part of the success criteria here (although increased engagement may possibly lead to progress). There were issues however, including a delay between the audio and video which made it challenging for the teacher and student to perform together. The professor also reported that lessons felt impersonal, and that they could not suggest improvements to a student's technique due to the quality and position of the pupil's camera. Many of the same issues that Dammers (2009) found have been echoed by other researchers, such as Brändström et al.'s (2012) research into online guitar tuition and Callahan et

al.'s (2013) research into online piano lessons. This suggests that these issues are known, but have not yet been resolved.

Pike and Shoemaker (2013) found that teaching beginner pianists to sight read through video lessons was as successful as face-to-face tuition. In this study, nine students were taught sight-reading through face-to-face lessons and ten students were taught through live online video lessons. While the small scale of this study could mean the findings are somewhat tenuous, it is possible that aspects of online music lessons might be more successful than face-to-face lessons.

There is evidence that online teaching impacts pedagogy. Dye (2007), Maki (2001) and Lockett (2010) all found music teachers do less musical modelling online, with more questioning taking place instead. Educators found teaching concepts verbally more successful because it is easier to explain concepts online than demonstrate ideas via performance. KS3 music contains practical elements as well as appraising skills, so these findings suggest online teaching may result in more time being spent on appraising skills and less on musical performance. In a small-scale study involving six American middle-school students, Dye (2007) also found the behaviour of students, how they communicated, and the communication of instructions was like face-to-face lessons.

A final example of online distance instrumental lessons is from Australia. The Internet Melbourne Conservatorium of Music (iMCM) project saw students at a regional school given online instrumental lessons by specialist teachers from the Conservatorium (Stevens, McPherson, & Moore, 2015). The research focused on the use of technology and pedagogy, highlighted recommended hardware and software to use for online instrumental tuition, and developed online instrumental teaching pedagogical techniques (Stevens, McPherson, & Moore, 2015). Unsurprisingly, much of the specific hardware and software recommended has since been superseded. While the technological recommendations may no longer be relevant due to the technology being superseded, Stevens et al. (2015) claim there are pedagogical lessons to be learned. For example, the study concluded that videoconferencing was an effective means of conducting instrumental lessons online (how this conclusion was reached is unclear), with teachers gaining specific, if undisclosed in this case, pedagogical tools for online teaching.

An aspect which has not yet been discussed, and relates to both online whole class and one-to-one music lessons, is the impact that online learning has on student-teacher relationships. University-style lectures, and the issues this causes with learning student names (Riley, 2007), and lessons feeling impersonal (Dammers, 2009), suggest that online learning can negatively impact on student-teacher relationships. However, much of the research discussed concerns new relationships between students and teachers, while my research explores pre-existing relationships between me and the student participants.

After exploring selected key studies from the limited research available regarding whole class and instrumental online music tuition, I next turn to the focus of this study, online composing lessons.

2.2.8 Online Composing Lessons

While there is some research into online music lessons, very little research has taken place which specifically considers online composing lessons. No research has taken place into online composing lessons at KS3, with some research at undergraduate level. My research seeks to address this gap.

To help explain the lack of research into online composing lessons, a survey of 474 American school music teachers found that 78.7% of music teachers rarely or never taught online composing lessons during the Covid-19 pandemic (Hash, 2021). Hash's research suggests this might be because teachers were not equipped to teach composing online and found that non-practical music lessons took place more frequently (such as music theory and music history), and that may be because they were easier to facilitate (Maki, 2001). However, Hash does not directly ask teachers why they did not teach composing online, nor how those teachers who did teach composing lessons approached them. That Hash found so few teachers taught composing online goes some way to explain why there is so little research into this field. However, it also helps

justify the need for and significance of my research: teachers may not have taught composing online simply because they did not know how to.

Research by Riley (2013) saw three American teachers teach melody writing to ten students in Japan over the course of two lessons. The teachers reported that it was challenging to form relationships with students (see Riley, 2007), that there were technological issues, and that it took longer than expected to cover material. However, Riley considered the project a success due to students composing well-formed melodies and hypothesised that with technological advances online lessons will further improve. This was a small piece of research which took place over just two lessons and has not been repeated, but the findings are nonetheless interesting because the lessons did result in the students creating new music.

A recent study, comprising 15 American and European music conservatory teachers, explored teachers' perspectives of music lessons during the Covid-19 lockdown (Biasutti et al., 2021). While Biasutti focused mainly on performance and appraising lessons, there was some mention of composing. Namely, the teachers reported that students were not continuing to compose during online lessons, instead doing listening tasks or other activities. The teachers cited difficulties with teaching composing online, such as an inability to demonstrate concepts on the piano (similar to the issues with modelling in whole class and instrumental online lessons), as a reason for not doing them. These students missed out on a portion of their musical education due to moving to an online platform and a lack of online teaching expertise. The need to avoid students being disadvantaged in their music education in this way provides further justification for my research.

A larger study by Crawford (2017) examined online and blended music lessons in Australian schools. In this study, blended learning meant that some of the learning took place online and some of the learning took place face-to-face. The study consisted of 20 year 7 and year 8 classes, with around 440 students and 20 teachers, and focused on a rounded (composing, performing, and appraising) music curriculum. In Crawford's research, students used a free piece of music software called Audacity and were guided in creating their own composition through 'a range of interactive and visual music learning resources' (Crawford, 2017: 199). The content of these

composition lessons, and the resources used, are not detailed. However, student 1 reported that the music created in these lessons 'sounds like real music', with student 18 saying that 'being able to work like a real songwriter is pretty cool'. Student 18 recognises that much music is composed online and appreciated this being reflected in their music lessons. Crawford's study is like my research in many ways, but uses a blended learning approach instead of only online teaching and does not compare different teaching models. Crawford suggests one model which worked in one context, whereas my research compared multiple models for teachers to adapt for their context.

Away from schools, Biasutti conducted a pilot study exploring different strategies of collaborative online music composing with adults, using synchronous and asynchronous tools (Biasutti, 2018). While Biasutti investigated online music composing, their study did not examine composing in an educational context and instead focused on competent musicians who compose as a hobby. However, it is interesting to note that the composing task was completed online thus demonstrating that music can be composed in an online environment, although how composing was approached online is not described.

The challenges highlighted within this chapter regarding online music lessons and how my research may contribute to a resolution are summarised in table 5.

Challenges For Teachers and Students	**Potential contribution to resolution from *Simulated Online Music Composing Lessons: developing teaching models through action research***
Demonstrating musical ideas/ musical modelling.	My research explored how musical modelling can be achieved in different teaching models.
Issues with technology, especially in synchronous teaching.	Development of a composing specific TPACK model, helping to improve the technological understanding of teacher, puts teachers in a better position to resolve technological issues.
Performing along with students.	My research does not seek to address issues related to musical performance.

University style lectures leading to lessons feeling impersonal.	By using technology in a way which encourages participation, such as chat functions, the models aim to make lessons feel less like lectures. The creative tasks which were completed also reduced the lecture feel, explored later in the research. The models also include feedback from the teacher and peers, helping lessons to feel less impersonal.
A lack of understanding regarding how to teach online composing lessons.	The primary purpose of my research was to develop an understanding of how composing lessons can be taught online, which can then be disseminated to other educators and applied and adapted to their context.

Table 5 - Challenges and contributions to online music lessons

Some of the issues in the table above are consistent with the general issues with online learning during the Covid-19 pandemic, which Morgan (2022) highlights. This suggests that Morgan's challenges have subject specific equivalents, which my research aims to address in relation to music composing at KS3. The music specific challenges and those identified by Morgan are mapped in table 6.

Music Challenges	**Morgan (2022) Challenges**	**Link**
University style lectures leading to lessons feeling impersonal. A lack of understanding regarding how to deliver online composing lessons.	Dull instruction due to students passively listening to videos and presentations. Isolation caused by lack of interaction with peers in lessons.	Uninspiring lessons, moving away from face-to-face pedagogy and resulting in feelings of isolation. Caused by a lack of understanding in how to teach online lessons, combined with technical challenges.

Demonstrating musical ideas/ musical modelling.		
Performing along with students.	The importance of 'active learning' strategies to promote engagement.	Performing as an active learning strategy, one common in face-to-face settings, is unable to be achieved due to technical challenges with latency. However, there is acknowledgment from music educators that performing with students is important and with suggestions that this challenge is a source of frustration.
Issues with technology, especially in synchronous teaching.	Obstacles caused by poverty, including lack of connectivity.	Many of the issues in online teaching come from problems with connectivity. This is particularly so in synchronous lessons, where students must have access to the internet and a device at a particular time, this can be difficult if they are sharing a device with a sibling or only have access to low-bandwidth internet.

Table 6 – Links between music specific challenges and Morgan's online challenges

It is evident that much of the existing research into online music teaching takes an interpretivist, qualitative approach, with less taking a positivist, quantitative approach. Both have their positives and challenges, explored more in the methodology chapter (section 3.2), but regardless of the approach researchers are reporting the same issues. This may be because the researchers are not taking an action research approach: they are identifying positives and challenges, but are failing to instigate change. My research aims to bring about change in online composing lessons through action research, as discussed in the next chapter.

With an understanding of the current challenges faced in music education, the place of technology in music education, and the current research into online music lessons, it is now appropriate to consider music, composing, and online pedagogy.

2.2.9 Music and Composing Pedagogy

The term 'pedagogy' is widely contested, with multiple definitions (Watkins & Mortimore, 1999). In this study, pedagogy is defined as 'any conscious activity by one person designed to enhance learning in another' (Watkins & Mortimore, 1999: 13).

Central to much music pedagogy is the concept of *teaching music musically* (Swanwick, 1999), which involves immersing students in musical activities (Spruce, 2016). There are different pedagogical approaches to teaching composing, and even though composing is the least well understood aspect of the music curriculum by teachers (Devaney, 2017), composing in schools is commonplace.

While immersion in music is seen as an important aspect of music pedagogy, there are barriers regarding composing in secondary schools. For example, there are limited opportunities for students to hear their compositions performed (Devaney, 2020), students are often taught to compose using Western notation, many teachers lack support and CPD in how to teach composing lessons, and composing is undervalued when compared with performance (Eastburn et al., 2019).

The concept of 'immersion in music' is open to interpretation, and how each educator facilitates immersion will differ depending on their context. Immersion in music equates to students being 'fully engaged in music as composers and performers underpinned by strong listenership' (Spruce, 2016: 82). Spruce (2016) offers an example of musical immersion in a lesson which includes some composing:

1. The progression from Pachelbel's Canon is played to students by the teacher.

2. Students improvise vocally above this progression.
3. Students sing/ play one note from each chord.
4. Students add linking/ passing notes between the notes from step 3.
5. Freely improvise tunes based on step 4.
6. Students compose and notate their own melody.

There are several practical approaches for teaching composing lessons, such as those suggested by Randles and Sullivan (2013) regarding K-12 (4–18-year-old) students in America. While their advice is based on recommendations from several sources, Randles and Sullivan do not appear to have researched the impact of the suggested approaches. It is difficult to conclude if their suggestions, such as helping students to begin composing by giving them initial ideas which they then develop (taken from Belkin, 2008), are useful.

Using digital technology and music production practices in the classroom is appropriate (Tobias, 2013), with Meintjes (2005) suggesting that in professional recording situations the creative and artistic vision is realised by those with technological abilities. As such, developing online composing practices will help prepare students for real-world situations. Using music technology in the classroom is an accepted pedagogical approach (Wise, 2010), so extending that use into online lessons is logical.

Computer-mediated composing pedagogy has been investigated by Chen and O'Neill (2020), who examined 44 14–16-year-old students in Hong Kong and focused on composing practices, engagement, and pedagogy. Chen and O'Neill (2020) explored the concept of 'de-composing' (listening to a piece of music and recording parts into a computer) and 're-composing' (using these parts to create a new piece of music). They reported that de-composing and re-composing helped to inspire students who were struggling for inspiration, and it helped students to understand different elements of music (e.g., pitch) (Chen & O'Neill, 2020). Chen and O'Neill (2020) concluded that de-composing and re-composing was a useful pedagogical approach for teaching composing as it sustained engagement. They argued that technology made the processes of de-composing and re-composing accessible, and there is no reason why this technology-based composing approach could not work online. However, there were some limitations to this study.

Firstly, the process of de-composing required students to be able to re-record musical ideas themselves and many students will not be equipped to do this. Secondly, their study only considered the students' perspectives of de-composing and re-composing, with no mention of teacher experiences.

Arguably, using technology for composing is more inclusive than traditional composing techniques (such as writing music by hand on a stave), as a knowledge of Western notation is not required (Wise, 2010, Chen, 2012). As such, composing is no longer the preserve of 'musical geniuses' (Folkestad, 1998) and is accessible to students of any ability (Crow, 2006), provided they have access to the appropriate technology. The increased accessibility of technology, largely due to it becoming more affordable, means that using technology to compose has become commonplace in English secondary schools (Devaney, 2020). As accessibility to technology increases, so does the opportunity for online composing lessons.

One approach to teaching composing lessons using technology is to have students follow a chronological series of tasks (Berkley, 2004). In this approach, the teacher plays an important role in developing each student's understanding of composing (Berkley, 2004). Wise (2016) conducted research with three teachers in English secondary schools who implemented such an approach, which included highly structured composing tasks (following step-by-step instructions to learn a particular composing technique) using technology. However, Wise (2016) suggests that this approach could result in students becoming competent with technology but not necessarily developing their composing skills.

The section has outlined some approaches to using technology as part of music composing pedagogy, and the next section explores how music pedagogy is similar, or indeed different, online.

2.2.10 Online Music Pedagogy

Teaching music online, as in the classroom, requires attention to be paid to pedagogy (Bowman, 2014). Jonassen et al. (1995) suggest that teacher involvement moves from 80% to 10-15% when teaching online university lectures, signalling a change in pedagogy. Jonassen does not clarify what 'teacher involvement' means, perhaps indicating that defining 'teacher involvement' is problematic. After all, greater or lesser teacher involvement does not necessarily mean 'better' or 'worse' lessons; it depends on the context.

Carol (2017) reported that music staff changed their pedagogical approach when moving to online lessons. While Carol's research was based on seven faculty members from an American university and may therefore have limited relevance to school-based lessons, it is interesting that these teachers moved away from the activities usually present in music classrooms (although what Carol presumes these to be is unclear). One such example of a change in pedagogy came through problem-solving, where a teacher struggled with a musical activity due to latency and as such moved to a different type of task. In Carol's research, the teachers were required to design and teach their own online music course. Each faculty member had vastly different experiences with online tuition, ranging from one teacher familiar with the technology, pedagogy, and content knowledge (TPACK) model (discussed later in this chapter), another teacher who had been an online student themselves, to a teacher with no online teaching or learning experience. There was evidence in Carol's research to suggest that training on how to teach music online would have been beneficial to the staff members, as they were all essentially learning while teaching. The online pedagogy everyone developed was unique to them, based on their own teaching philosophy and experience of online teaching or learning (Carol, 2017). Carol found there was no singular pedagogical approach to teaching online music lessons, but that there were similarities. This included 'creating opportunities for students to learn through interactive and social exchange (a socio-constructivist approach), which was found by faculty members to be the most promising method of engaging students' (2017: 453). However, the social exchange elements of pedagogy used by faculty members (such as the use of voice-notes) may not lend themselves to KS3 online music lessons, but how social exchange can be facilitated in online

composing lessons is a facet of my research. While the teachers in Carol's study did not use this term, it should be noted that all teachers reported using a synergistic approach.

My own case-study research into how GCSE music was taught online during the Covid-19 pandemic demonstrated a change in pedagogy (Rogers, 2021). The change in pedagogy occurred with the teacher teaching no performance lessons and only two composing lessons (using a different piece of software to what is used in school and teaching the students as a group as opposed to their usual one-to-one support). However, the teacher did similar activities to face-to-face lessons during online appraising lessons, such as listening to music. Like many music teachers, this teacher was experienced with teaching music in the classroom but had no online teaching experience. There are parallels between Rogers (2021) and Carol (2017), including moving away from performance based musical activities.

As has been seen in much of the research cited, approaches to teaching music lessons change when moving online. At times this was due to technical difficulties (such as latency, and the inability to perform music with the student at the same time, e.g. Riley (2007)), and because certain activities were deemed as being 'easier' to teach in an online environment. A common theme was teachers moving towards music theory and history (e.g. Maki, 2001) as opposed to practical music making, resulting in school level lessons reflecting university lectures. Whatever the change may be, pedagogy does change when moving online. Teachers do not always know how to manage or approach this change as the available CPD, initial teacher training (ITT), and current research into online pedagogical approaches are limited. My research aims to contribute towards alleviating the challenges that teachers face.

With much discussion about online learning in relation to music, it is now prudent to briefly explore online lessons in other subjects.

2.2.11 Online Teaching in Other Subjects

Research into online music education is limited, but there has been research into online teaching in other subjects. While it is not possible to explore every single piece of research relating to online learning, examples of synchronous, asynchronous, and synergetic online teaching at school level are explored. However, a thorough database search revealed that little research into online learning for any subject at school level has taken place in England, and as such the research discussed is from around the world.

Beginning with English lessons, Gong (2018) points out that there is a lack of good quality English teachers in rural China. In a limited piece of research, consisting of one rural and one urban primary school class, Gong explored the impacts of a synchronous teaching model. Gong's findings are encouraging, as they suggest that the synchronous model implemented promoted enthusiasm for English lessons in primary aged students. However, the model used is highly specific to the context and may not be applicable to other situations.

A larger study took place with 42 Canadian high school teachers, exploring their perspectives of synchronous and asynchronous teaching (Murphy et al., 2011). Interestingly, all but one of the teachers taught their lessons either asynchronously (12) or with a mixture of asynchronous and synchronous lessons (29). It is not clear if these teachers had a choice between teaching synchronously or asynchronously, but that most teachers used both suggests that a synergistic approach (a mixture of asynchronous and synchronous lessons) was effective. However, the proportion of time spent teaching through synchronous/ asynchronous methods differed for each teacher, with most spending more time using asynchronous teaching tools. Murphy et al. (2011) found that the primary contributor for effective online teaching was having teachers well-versed in online pedagogy. This goes some way to provide justification for my research, as it seeks to compare models for teaching online composing lessons which can then be used to improve the pedagogy of music teachers.

One article explored how 57 school-based agricultural education teachers in South Carolina coped with the move to synchronous online teaching during the Covid-19 pandemic (Eck et al.,

2021). Eck et al. (2021) found that all teachers used different video-conferencing software for their lessons, depending on their institution. The fact that each institution used different software is a reason why my research is not dependent on using specific software, but instead suggests models which can be applied to any video-conferencing software. As a result, the models can be adapted and applied to a broader range of practitioners, and not limited to a piece of software which is likely to be superseded in the future. Eck et al. also found that most teachers already had a basic knowledge of how to use video-conferencing software and their basic functions (such as creating and ending a meeting). As suggested in Eck et al. (2021) and Rogers (2021), this may be because the use of video-conferencing software and online learning environments are common in many schools. However, there is still room for improving teacher knowledge of the more advanced features available in video-conferencing software. Eck et al. (2021) recommend that teachers receive CPD regarding the teaching of online lessons and the relevant learning platforms, and one aim of my research is to support CPD for music teachers by suggesting online teaching models. Eck et al. (2021) also suggest the integration of technology and pedagogy (along with content) is essential for the successful teaching of online lessons. This is expanded upon further in the TPACK model, discussed in the next section.

2.2.12 Technology, Pedagogy and Content Knowledge (TPACK) Model

Having discussed the use of technology and pedagogy in music education, it is important to consider how these different elements interact. This is explored through the TPACK model, which was used as an analytical framework in this study.

What is the TPACK model?

The TPACK model addresses the integration of technology in the classroom, arguing that to use technology as an effective tool for learning it must be considered in conjunction with content and pedagogy (Bauer, 2013). The concept of TPACK was developed by Mishra and Koehler (2006) and is an extension of the pedagogical content knowledge (PCK) framework (Shulman, 1986).

Mishra and Koehler (2006) argue that it is appropriate to develop the original PCK framework as the use of technology in education has developed significantly.

The TPACK model provides an approach to developing and applying teacher knowledge of technology, as opposed to simply assuming that once the teacher has been taught about a technology that they will work out for themselves how to apply it (Bauer, 2013). As Mishra and Koehler (2006) say, introducing technology into the classroom is not the same as understanding its purpose, and this is what makes TPACK so important. The TPACK model understands technology must be integrated into teaching practice, not only applied, to develop effective teaching practices. The TPACK model is outlined in figure 1.

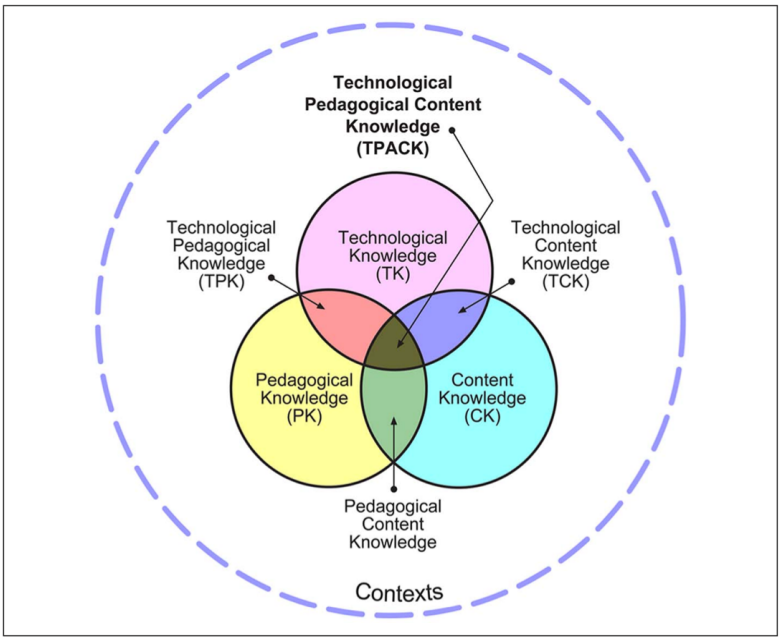


Figure 1 - The TPACK Model (Koehler & Mishra, 2009: 63)

Mishra and Koehler (2006: 1026) outline the individual and combined elements of TPACK as follows:

Content knowledge (CK) – Teacher knowledge of the subject.

Pedagogical knowledge (PK) – Teacher knowledge of teaching and learning, including how to plan lessons, behaviour management, and knowledge of how students learn.

Technological knowledge (TK) – Knowledge of different technologies and how to use them. TK often develops with time as new software and hardware are developed.

Pedagogical content knowledge (PCK) – Knowing what teaching approach is appropriate for the subject and context. PCK is concerned with how concepts are represented, what makes concepts easy or challenging to learn, student prior knowledge, and pedagogical techniques.

Technological content knowledge (TCK) – Knowledge of how lesson content may change due to technology. For example, music composing can be taught using traditional instruments, or through digital audio workstations (DAWs) on computers.

Technological pedagogical knowledge (TPK) – Knowledge of how technology may change teaching. This includes knowledge of different technological tools and how pedagogy changes depending on which tool is selected.

Technological and pedagogical content knowledge (TPACK) – Knowledge of different pedagogical approaches which uses technology to teach content, while considering the prior knowledge of students.

How has the TPACK model been used in music education?

In Bauer's (2013) research, technology emerged as the weakest component of TPACK for music teachers. Bauer suggests that music teachers who graduated more recently (a period undefined) may have taken part in classes which developed their technological knowledge, but that older educators may not have had this instruction (2013). This claim is not backed up with any evidence, but Bauer (2013) does acknowledge that even recent graduates may not have been on a teacher training programme which covered the use of technology in music education. Most teachers gain their technical knowledge through self-exploration, and those teachers who explore

technology as part of their own self-interest are more likely to integrate it into their teaching (Bauer, 2013; Baylor & Ritchie, 2002). This suggests that teachers who are exploring technology on their own are doing so in a haphazard way. Bauer (2013: 62) explains the importance of the TPACK model in integrating technology into music education:

> *'If music teachers have a fully developed understanding of the affordances and constraints of various technologies, and have thoughtfully considered ways in which those technologies interact with musical content, pedagogy, and the classroom environment, students may benefit from approaches to music study that can potentially enhance and even transform their learning experience.'*

While TPACK has been subject to research in the field of music education, it has not been applied to online music education. Macrides and Angeli (2018) argue that the existing TPACK framework is too generic to be of any use to subject teachers, and as such they developed a new TPACK framework which could be used to design classroom music lessons. Their argument that the TPACK model is too generic, and subsequent development of a more specific model, strengthens the argument for my research developing a TPACK model specific to online composing lessons.

Why is the TPACK model relevant to this study?

Mishra and Koehler (2006) argue that TPACK can be used to guide curriculum and lesson design, teacher development, and as an analytical framework. TPACK helps educators understand how to teach with technology (Mishra & Koehler, 2006). Much of the literature related to the online teaching of music lessons demonstrates a lack of understanding as to how to best integrate technology into lessons, and the TPACK model may be useful in addressing this. My own summary of how the TPACK model might resolve issues in online music lessons is presented in table 7:

Research	Issue	Improved TPACK could resolve this by…
Riley (2007)	1. Difficulty demonstrating musical ideas. 2. Unable to identify which students had/ had not understood concepts. 3. Challenging to provide students with individual attention.	1. Pre-empting concepts students may struggle to understand, and pre-recording help videos to be placed on a website for students to access during or after the lesson. 2. Using custom quizzes such as Google Forms to check for understanding in all pupils. 3. Scheduling individual check ins with students during lesson time, while other students engage in a task. Alternatively, the teacher could use the message function of the videoconferencing software and direct message individual students.
Maki (2001)	Time delay making it challenging for the teacher and student to perform together.	Pre-recording the teacher playing their part, so that the student can press play on the video and play along while the teacher listens. This would also allow the student to slow down the video and enable them to increase their performing speed in small increments by speeding up the video, as directed by the teacher.
Dammers (2009)	Difficult to provide advice on how to improve instrumental technique during lesson time due to quality of live streams and cameras.	Ask students to video themselves playing the piece at an angle directed by the teacher (for example if playing a woodwind instrument a side on view may help, and the teacher could demonstrate this camera angle), which could then be uploaded to a website such as Google

		Classroom. Typically, recorded videos are of a higher quality than live streaming as they do not rely on the speed of the internet connection.
Lockett (2010)	Less musical modelling, because explaining verbally is considered easier.	Pre-empting where musical modelling may be appropriate, recording musical modelling in advance, and putting them on a website such as Google Classroom for students to access when directed by the teacher.
Hash (2021)	Teachers not teaching online composing lessons during the pandemic, but still teaching other aspects of the music curriculum such as listening.	Using specialist software such as BandLab to teach composing lessons, with Google Meet used as a way of communicating, sharing musical ideas, and sharing screens.
Biasutti et al. (2021)	Inability to demonstrate musical ideas on the piano.	Using virtual pianos which mirror what a teacher is playing, which could then be shown to a student by using the screen share function of a videoconferencing software such as Google Meet.

Table 7 – My summary of how online music education challenges might be addressed through the TPACK model

TPACK has been chosen as the conceptual framework for this study as it specifies the types of knowledge (technology, pedagogy, and content) needed to integrate technology into online lessons. One facet of my research is to develop the TPACK model regarding online composing lessons, helping to create a set of design principles. This is important, because while teachers move to online teaching for a variety of reasons, they must have knowledge of how to integrate online technology with their content and chosen pedagogy. Students may already be disadvantaged (or perhaps advantaged) by having to move to online learning, and teachers not understanding how to best integrate technology in this environment will only disservice students.

As my research seeks to identify strengths and weaknesses of three models for the online teaching of music composing lessons, it will consider how different online teaching models interact with the content and pedagogy. The findings of this research could inform music teachers on ITT programs or through school-based CPD. The purpose of this research is not to develop content knowledge for online music composing lessons but does address the technological and pedagogical aspects of TPACK.

The TPACK model, and its use as an analytical framework, is further discussed in the methodology chapter (section 3.9.2) of this research. Having discussed and identified gaps in the literature concerning online music composing lessons, the justification for this study is explored next.

2.3 Justification for the Study

This research will contribute to a gap in knowledge regarding the online teaching of music composing lessons at KS3. A lack of research into the online teaching in secondary schools is highlighted by the EEF (2020) and Ofsted (2021b).

As a result of Covid-19, schools in England were closed for several months. While data does not exist which details exactly how long schools were closed for, as different schools reopened on slightly different dates (and for some students, such as the children of key works, schools never closed), most secondary school students missed approximately 7 months of in-person schooling between March 2020 and March 2021 (Roberts & Danechi, 2022). Never have schools in England been closed for such so long, so no research has been conducted into how teachers respond to such a situation. To be better prepared for similar scenarios it is important to gain an insight into different models of online teaching. While models of teaching for all areas of music lessons are important, my research focuses on online composing lessons as these are particularly under researched.

This study may also impact initial teacher training (ITT) providers and CPD within schools. Given the DfE's expectations for remote education, which include a requirement for schools to ensure that staff are trained in online teaching (DfE, 2020a), ITT providers and CPD in schools may need to consider their approach to developing educators for online teaching.

Online tuition may also be required in remote communities which do not have access to specialist teachers. My research will contribute to informing educators about how to teach composing lessons to these communities. Music in schools has a declining status (Daubney et al., 2019), and consequently there may be fewer specialist teachers even in populous areas or that schools begin to reduce their music provision, making online teaching a viable alternative. Another reason to encourage online composing is in relation to current professional practices. While much professional composing does take place in face-to-face environments, it is common for musicians to compose online (Biasutti, 2018). As such, teaching composing online reflects real world practices. Additionally, moving music composing into an online environment which can be accessed anywhere with an internet connection may encourage students to engage more with music-making outside of the classroom.

My research will offer three teaching models for consideration by educators. While the findings are context specific, they may provide justification to conduct a larger study which looks to strengthen the evidence base for recommendations.

2.4 Summary

This literature review has examined the history and current state of distance and music education, technology in education, online music lessons, music pedagogy, online music pedagogy, online learning in other subjects, and TPACK. Each of these, with the exception of the history of music education, are areas of significance for this research study and its aims. Finally, a justification case is put forward.

The literature review has highlighted four gaps in the literature, which I seek to address:

1. No research into online music composing lessons at KS3.
2. No models for teaching online music composing lessons at KS3.
3. A gap within the TPACK model specifically for online music composing lessons.
4. A wider gap regarding the teaching of online lessons in English secondary schools.

In the next chapter I consider the methodology for this research.

Chapter Three – Methodology

3.1 Introduction

Chapter two critically reviewed the literature relevant to this study, and identified gaps in knowledge related to the online teaching of music composing at KS3 and the TPACK model. In this chapter the theoretical framework, action research, data collection, and data analysis are considered. The data analysis pays particular attention to using the TPACK model as an analytical framework.

Ensuring consistency between a theoretical orientation and the methods implemented provides a strong basis for planning, undertaking, and evaluating a research project (Carter & Little, 2007), and this is expanded upon in a discussion about reliability, generalisability, and validity. Additionally, the three initial online teaching models are outlined, and the ethics surrounding my research project and importance of reflexivity are discussed.

3.2 Theoretical Orientation

Once a question has been established, research begins with the identification of a paradigm (Creswell, 2013). Crotty (1998: 4) provides a useful figure which displays the four elements of a research process, and how the different elements of my research inform one another can be viewed in figure 2.

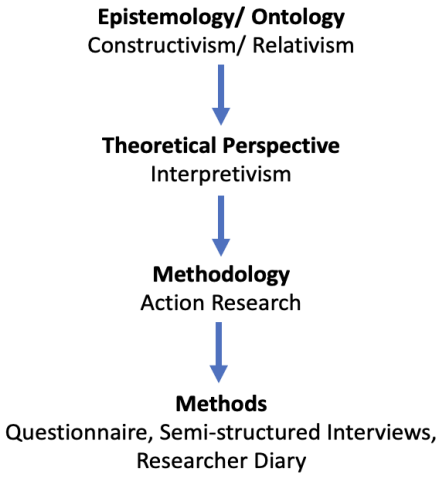


Figure 2 - Elements of my research process, modified from Crotty (1998:4)

While this model is simplistic and unidirectional, suggesting a singular path from epistemology and ontology through to methods, it is useful as a framework from which to decide if a research paradigm, methods, design, and question are consistent with one another.

I regularly witness students understanding the same phenomenon in different ways, such as multiple students being given the same stimulus for composing but producing very different music. As a result of my experiences, an interpretivist approach and constructionist view fit most genuinely with my world view. I therefore have approached this research in such a way as to understand how different teaching models are engaged with by individual students, to gain an insight into their experiences and thus enact change.

I have chosen to adopt an interpretivist approach as it best reflects the type of individualised data I wished to collect, the highly contextual approach to this research, and my direct involvement with the research and the participants (Oakley, 2000). The interpretivist approach of my research, 'characterized by a concern for the individual' (Cohen et.al, 2007: 21), allowed me to understand the subjective world of human experience and recognise multiple interpretations (Wisker, 2008) that different students had of each teaching model. The use of an interpretivist approach afforded me the flexibility of qualitative data collection methods, allowing me to collect rich, in-depth data in complex classroom environments. In the case of this research, when I ask '*how* can

teaching models be developed', the answer to that *how* can be found in the opinions and experiences of the individuals who have interacted with the models.

Ontology refers to what you are looking at in the world (Thomas, 2017) and the way you perceive yourself within it (Wisker, 2008). Participants may have different experiences of the same online learning situation resulting in more than one legitimate reality, which is consistent with relativism (Cohen et al., 2011). As becomes evident in the findings, some students prefer one teaching model, while other students disagree, making relativism appropriate for this research.

The ontological approach informs the epistemological viewpoint (Hitchcock and Hughes, 1995). Epistemology considers how we look at things (Thomas, 2017), providing a backdrop for deciding what kinds of knowledge are appropriate (Gray, 2017). Constructivism argues that a person's experiences within the world allows them to establish their own meaning, resulting in multiple accounts of the same phenomena (Gray, 2017). For each student to provide their own opinions about the different teaching models it was important to take an approach which allowed everyone to articulate their experiences, and thus this inquiry was constructivist in nature.

Constructivism in relation to online learning suggests that students experience their learning through 'interaction with the increased use of online technology' (Johnson, 2020). Creswell (2013) promotes a constructivist approach when applying qualitative data collection methods in an interpretivist paradigm. Constructivism fits my world view, as I believe that to develop a better understanding of online teaching models I must experience and interact with those models myself, along with my students. By interacting with the models from a teacher perspective, and students interacting with the models from a student perspective and following that through with a concern for the individual in my data collection and analysis, I can build a picture of the challenges and successes with these models by engaging with those who have experienced them. The idea of developing these teaching models, as set out in my research question, also lends itself to action research: development through cycles of enquiry. As Koshy (2010) states, action research is consistent with constructivism as it involves the construction of new knowledge.

Johnson (2020) suggests an online constructivist model for music education should incorporate opportunities to create music, analyse creations, and apply new knowledge. In online composing lessons, this translates to students composing their own music, listening to and critiquing their own and other students' music, and then applying this feedback. It also suggests that students may compose new music, then receive instruction about what to add to their composition (e.g., add a drumbeat). To remain consistent with constructivism, Johnson's suggestions were considered when developing the teaching models. Scaffolding ('support provided by a teacher/parent, peer, or a computer- or a paper-based tool that allows students to meaningfully participate in and gain skill at a task that they would be unable to complete unaided' (Belland, 2014: 505)) plays an important role in the application of constructivism in my research and is an important part of the teacher's role in online composing lessons.

Constructivism and socio-constructivism (Vygotsky, 1978) also often refers to learning taking place in collaboration (Johnson, 2020). While students in my research worked individually, there were opportunities for students to share their work and give/ receive feedback from the teacher and their peers. Therefore, while students do not compose collaboratively, through collective feedback they do work in a collaborative manner.

How interpretivism and constructivism provide a coherent framework is summarised in table 8.

Interpretivism	**Research Design**	Students were given the opportunity to work alone, and therefore had their own individual experiences of each teaching model.
	Data Collection	The data collection tools provided opportunities for students to express their individual experiences.
	Data Analysis	Each interview was coded individually, providing the opportunity for the opinions of individuals to be made clear while also making comparisons possible. Statistical inferences were not made from the questionnaire.

Constructivism	**Research Design**	Students could create music online while experiencing the models for themselves (Johnson, 2020), while also having opportunities to share their music and interact with others. I could interact with the models by teaching them. Directly and indirectly, the teaching models were interacted with by all participants through the development of the models in the action research cycle, because of the data collected influencing future iterations of the models. Scaffolding was integral to the teaching models and design of the lessons.
	Data Collection	The data collection tools allowed for students to articulate their own meaning in relation to their experiences with the teaching models. Students could provide their opinions through the questionnaire, and further expand on those opinions in the interviews. The interaction with the questionnaire also provided students an opportunity to reflect on their own development as composers while using these teaching models. The teacher could also construct their own meaning regarding the teaching models using a researcher diary.
	Data Analysis	Before any conclusions or findings were drawn, each piece of data was analysed individually.

Table 8 - Coherence in research

As a result of my theoretical orientation, I can map the research aims directly to the data collection methods and identify where the evidence to answer these aims, and the overall research question, is found (table 9). It is the experiences of the participants which provide the answers and evidence to address the research question and aims, consistent with interpretivism and constructivism.

Research Aim	Data Collection Method	Explanation
To develop three models of teaching online music composing lessons to KS3 students.	Questionnaire Semi-structured interview Researcher Diary	The data collection methods involved questions relating to suggested improvements to each model, allowing the feedback from students and myself to develop the models.
To compare three different models of teaching online music composing lessons.	Questionnaire Semi-structured interview Researcher Diary	Students were directly asked which model they preferred, and why. The same questions and prompts were used throughout the data collection, allowing for direct comparisons between models.
To explore the merits and challenges of each model from the points of view of the students and teacher-researcher.	Questionnaire Semi-structured interview Researcher Diary	The students, and I, were asked direct questions about the merits and challenges of each model in the questionnaire and researcher diary. These merits and challenges were then further

		explored in the semi-structured interviews and in my own reflexive practice.
To develop the academic field in relation to the teaching of music composing lessons and the technology, pedagogy, and content knowledge (TPACK) model.	Questionnaire Semi-structured interview Researcher Diary	The questionnaire and semi-structured interviews provide evidence of how my TPACK was used in a lesson, but reflections on my own TPACK largely came from the research diary. Together, student experience of my TPACK and my own critique evidence this aim.

Table 9 - Mapping research aims to data collection

In summary, my research is concerned with the individual, as this reflects my world view and experiences of teaching music. This concern for the individual, and the different experiences that they each may have of the teaching models, is reflected within the research design, data collection tools, and data analysis. As such, I have undertaken this research from an interpretivist paradigm with the understanding that both the participants and I can construct reality and knowledge from our own perspectives, contexts, and experiences.

Now that the theoretical models have been outlined, the next section presents the three initial teaching models for online learning.

3.3 The Online Teaching Models

Before expanding upon the action research approach adopted in this study it is necessary to outline the initial online teaching models: synchronous, asynchronous, and synergistic. A

teacher-centred approach, as suggested by Johnson (2020), forms the basis for all three of the models. This approach involves the teacher selecting the course content and learning activities, deciding what they want students to learn, and guiding the class through tasks. This approach has been chosen because music lessons benefit from using the teacher as an expert (Johnson, 2020). There is precedent for applying three different teaching models to a new piece of technology, with Cuban (1986) describing how three methods of teaching were used to explore television lessons.

It is possible to apply the teacher-centred approach to each model, as defined by Solomon and Verrilli (2020) in chapter two, for example:

Synchronous – The teacher can teach the lesson content live via video-conferencing software, such as Google Meet.

Asynchronous – The teacher can lead the lesson by using pre-recorded videos and uploading them to a virtual learning environment (VLE), such as Google Classroom.

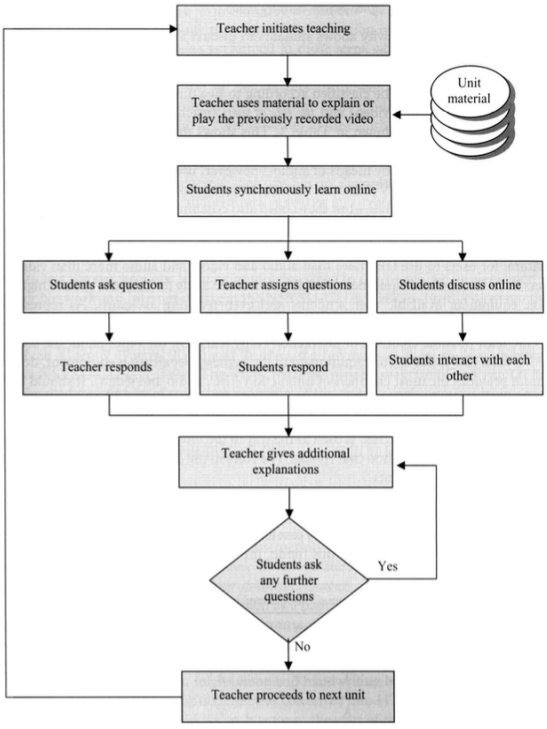
Synergetic – Parts of the lesson can be taught live via video-conferencing software, and key points which the teacher believes students may want to revisit can be filmed in advance and uploaded to a VLE.

While each teaching model is different, there are similarities between them including the concept of scaffolding and the types of activities. The overarching composing task remained consistent between the three models. Ultimately, within each model students learned and applied the knowledge and skills required to compose a new piece of music. While composing this music, regardless of the model, there was evidence of scaffolding and modelling from the teacher and opportunities for students to share their compositions with their peers to give and receive feedback.

The models below have been adapted for music composing lessons as there were no existing models to select. Creating and developing models is an aim of this research, so a starting point

for these models needed to be selected from existing research into online teaching. These models were selected due to their generic, non-specific (in terms of subject), nature. Another researcher may have selected different models to begin with, but a lack of any accepted models for online teaching meant that a decision about where to begin had to be made.

Table 10 outlines the three initial teaching models and how they were first adapted for music composing lessons.

Model	**Synchronous**
Original Model Name	A model for synchronous learning using the internet (Chen et al. 2005).
Explanation	
Adaptations for music composing lessons	1. Teacher quizzes students on previous week's work, responding via a chat function. 2. Teacher introduces new material and models it by sharing their screen.

	3. Teacher assigns task(s) to be completed. 4. Students can speak to the teacher via Google Meet if they have questions. 5. Teacher can give additional instructions and clarify misconceptions, students can ask questions and student work can be shared, as required. 6. Teacher calls the whole class together and invites some students to share their work, which the teacher and other students offer feedback on. After this, all students return to their work. 6. Teacher 'drops in' on individual student's work and provides feedback during the lesson. 7. Reflection on lesson via questionnaire.

Model	**Asynchronous**
Original Model Name	7 Principle Model (Ou et al., 2019).
Explanation	7 Principle Model: 1. Learning by example e.g. a pre-recorded video. 2. Learning by doing – interleaving videos with interactive exercises. 3. Adaptive feedback – providing feedback for students, likely between lessons. 4. Learning through reflection – integrating reflection activities. 5. 4-phase instruction principle (activation of prior knowledge, demonstration of skills, application of skills, integration of skills into real world activities). 6. Personalisation principle – making the learning feel personal by using a conversational rather than formal style, using effective on-screen coaches, and making the instructor visible.

<table>
<tr><td></td><td>7. Multimedia principle – using pre-prepared visuals, narrating words instead of having them as text, content as both words and graphics.

What it this could look like in a lesson:

<table>
<tr><th>Instructional phase</th><th>Component of video lesson</th><th>Instructional methods</th></tr>
<tr><td>Activation</td><td>Preview of the lesson</td><td>Learning through reflection</td></tr>
<tr><td>Demonstration</td><td>Presentation and discussion
of lesson topics</td><td>Learning by example</td></tr>
<tr><td>Application</td><td>Exercises
Exercise solutions
Assignments</td><td>Learning by doing
Adaptive feedback</td></tr>
<tr><td>Integration</td><td>Wrap-up
The cognitive connection
Reflection</td><td>Learning through reflection</td></tr>
</table>
</td></tr>
<tr><td>What it looks like in a music composing lesson</td><td>1. Activation – quiz on Google Forms related to previous week’s lesson. Students directed to read their feedback from the previous week’s work.
2. Demonstration - Video to introduce new composing technique/ task.
3. Application - Students to complete the task(s) and can refer to the demonstration video for help.
4. Integration – video to end the lesson, wrapping up what students have learned. Reflection on lesson via questionnaire.</td></tr>
</table>

Model	Synergistic
Original Model Name	The Flipped Classroom (FCR) (where ‘flipped’ refers to moving from face-to-face to online) (Rehman & Fatima, 2021).

Explanation	The FCR is an active learning pedagogical method that integrates a mixture of asynchronous and synchronous learning strategies. 1. Planning and peer review of FCR. 2. Asynchronous online guided learning phase (online videos, lecture, quiz). 3. Synchronous online phase (small group class, interaction, questions, case studies, summary). 4. Asynchronous online post session phase – recorded video of synchronous phase made available, PDF of the lesson presentation, post lesson quiz on VLE. 5. Asynchronous learning phase two – quiz, communication with teachers/ students to clarify concepts, survey. 6. Evaluation and reflection on online FCR model.
What it looks like in a music composing lesson	1. Begin with a quiz on Google Forms, relating to last week's lesson (asynchronous). Students directed to read their feedback from the previous week's work. 2. Introduce the new lesson material through a video (asynchronous). 3. Video-call students through Google Meet – opportunity for questions from teacher and students, clarify misunderstandings, screen sharing to share work (synchronous). 4. Students return to their work, able to refer to lesson material video (asynchronous). Students can message/ video-call the teacher during the lesson if they require help (synchronous). 5. Quiz to clarify learning (asynchronous). 6. Reflection on lesson via questionnaire.

Table 10 - The three initial teaching models

Now that the initial online teaching models have been introduced, the next section discusses how the models were developed through the process of action research.

3.4 The Research Methodology: Action Research

This section provides an overview of action research through an exploration of seminal texts, justifies the choice of this methodology, and examines how it was used in this research. Action research is based around the concept of developing practice through cycles of inquiry (McNiff, 2013), while seeking to bring about change within your own context (Zuber-Skerritt, 1996). The concept of action research in education was first promoted by Lewin (1946), with Lewin stating research should do more than produce books. A key concept of action research is it is centred around practitioners researching their own practice, as opposed to a researcher looking at the practice of others (McNiff, 2017).

3.4.1 Background and Key Features of Action Research

The work of Lewin (1946) is often deemed to have been critical in the early development of action research (Koshy, 2010). Koshy (2010) points us towards notable names in the field of action research in the United Kingdom, such as Elliott and Adelman (1976), but it was Stenhouse's *An Introduction to Curriculum Research and Development* (1975) that made action research an appealing way to research education (Koshy, 2010). Action research continues to be popular as a research methodology, as practitioners 'see the potential of action research in producing applied knowledge…which can be of practical use' (Koshy, 2010: 4). In line with Koshy, producing findings which can be of practical use is what this research aims to do.

The biggest critique of action research is that it is not research. Hopkins (2014) discusses this, first drawing our attention to Ebbutt's (1985) suggestions that for action research to be 'legitimate' it must be subject to public critique, then highlighting Armstrong's (1982) renaming of classroom research as 'enquiry' and 'self-monitoring' (seemingly demoting it to a position

below ‘real’ research), and finally with Hull et al. (1985) labelling Armstrong’s views as a description of investigating one’s practices in private. These views do nothing but confuse people’s understanding of what research is and undermine the legitimacy of action research. Part of the reason that these terms (teacher research, enquiry, and self-monitoring) are not deemed as being ‘proper’ research is because statistical research is so embedded in people’s psyche as being ‘real’ research, that many people cannot imagine ‘research’ meaning anything else (Hopkins, 2014). However, just like ‘traditional’ research, action research requires a systematic approach to produce rigorous findings (Hopkins, 2014).

There are many different definitions of action research (table 11, adapted from Koshy, 2010: 8):

Author	Definition
Bassey (1998: 93)	*‘Action research is an enquiry which is carried out in order to understand, to evaluate and then to change, in order to improve educational practice’.*
Hopkins (2002: 41)	*‘Action research combines a substantive act with a research procedure; it is action disciplined by enquiry, a personal attempt at understanding while engaged in a process of improvement and reform’.*
Cohen and Manion (1994: 192)	Action research is *‘essentially an on-the-spot procedure designed to deal with a concrete problem located in an immediate situation. This means that ideally, the step-by-step process is constantly monitored over varying periods of time and by a variety of mechanisms (questionnaires, diaries, interviews and case studies, for example), so that the ensuing feedback may be translated into modifications, adjustment, direction changes, redefinitions, as necessary, so as to bring about lasting benefit to the ongoing process itself rather than to some future occasion’.*

Table 11 - Definitions of action research

While these definitions are different, they do draw out some consistent features of action research: improvement, reform, problem-orientated, logical process, and modification (Koshy, 2010). There are however some differences between the definitions, such as Bassey (1998) and

Cohen and Manion (1994) not specifying who should conduct the research, and Hopkins (2002) suggesting that it should be 'personal'. The differences between the definitions are small, with all agreeing that action research involves identifying a problem, trying a solution, evaluating the solution, making changes, and trying it again. Drawing on the conceptualisations of McNiff (2013) and Zuber-Skerritt (1996), for the purposes of this research study action research is conceptualised as:

Action research is a form of research which is based around the concept of practitioners *(myself as a teacher)* developing their practice *(how to teach composing online)* by taking action as part of a reflective *(through a research diary/ observation)* and systematic research enquiry. There is a view to improving practice through cycles of inquiry *(two research cycles*), while seeking to bring about change within the practitioner's own context *(my own school, and the students I teach).*

My definition is very similar to those in table 11, but the italics make it clear how each part relates to this research and context. However, my definition expands on table 11 with the addition of critical reflection. Cohen and Manion (1994) suggest that the process is 'monitored', but to me this is far more passive than engaging with the research process and cycles in a reflective way.

There is not one set way in which to do action research. Most action research approaches contain the same basic elements of 1) plan a change, 2) act and observe that change, 3) reflect on the change, 4) re-plan, 5) act and observe that change, 6) reflect… (Koshy, 2010). However, different proponents of action research propose different structures. For example, the spiral model as suggested by Kemmis and McTaggart (2000) differs from Elliot's model (1991), which again differs from O'Leary's cycles of research (2004: 141). Kemmis and McTaggart (2000) offer a simple model, containing only the elements of plan, act and observe, reflect, and repeat. Elliot's (1991) model additionally adds in a reconnaissance step, which is somewhat like O'Leary's (2004) 'observe' step. Arguably, these recognisance and observation steps are carried out almost intuitively by teachers as they notice problems which need to be solved. However,

formalising this intuition makes sure that the intervention is as appropriate as possible, and ensures the research is rigorous.

While the approaches share some similarities, variation is important in the concept of action research as action research models are intended to be flexible for use in different contexts. Keeping rigidly to a model goes against the emerging nature and flexibility of action research, two of its most important points. However, my research study aligns closely with Kemmis and McTaggart's spiral model (2000), in that first of all a plan was made (for each of the models, what I am trying to achieve, and for the lessons themselves), I acted upon those plans and observed the lessons (in the form of a researcher diary, as well as using questionnaires and semi-structured interviews), reflected on the models, and then created a revised plan and repeated the process. The inclusion of a pilot study in this research reflects Elliot's reconnaissance phase, discussed further in the pilot study section of this chapter.

Action research was deemed to be an appropriate choice for this research as it offered me the opportunity to apply an intervention (the different online teaching models) within my own context, reflect on the implementation, evaluate the models, and then modify them before reapplying a second time. While there are some potential disadvantages with action research, such as where an organisation asks the researcher to investigate something that is not of interest to them (Wisker, 2008), this was not a concern in this case as I had the autonomy to choose the area of enquiry. According to Koshy (2010: 9) action research is a constructive form of research, as the researcher is literally constructing their 'knowledge of specific issues' through a cyclical learning model. Therefore, action research is consistent with a constructivist approach.

One aim of this research was to develop the teaching of online composing lessons, but as there are no existing models for the online teaching of composing lessons the three initial models which I introduce must be developed, making action research an appropriate methodology. Three models were explored, as opposed to just selecting one model, as there is not currently one dominant model for online music composing teaching.

3.4.2 The Research Environment

The school involved uses the G Suite for Education (GSfE), which comprises internet-based applications Google Meet (video-conferencing software) and Google Classroom. A simulated online learning environment was created in a classroom by having one computer and pair of headphones per student, and by participants only communicating through the GSfE.

A simulated online environment, as opposed to a true online environment, was selected for this study for several reasons. First, research suggests that there are inequalities in online learning (Pensiero et al., 2021), such as with equipment and internet speed, and these inequalities are mitigated by conducting research in a simulated, classroom-based online environment. With all students able to access the same equipment, with the same internet speeds, in a safe environment free from the challenges or advantages that their home environment might possess, the research could focus on developing the teaching models instead of solving issues that specific individuals might have. In this way, an environment was created in which the research could take place with fewer distractions. Secondly, it allowed me to see what students were doing in their online lessons, something that would normally be hidden to an online teacher or researcher. The benefit of this was that I could observe when students were on task, and when they were perhaps not on task. For example, during the first cycle of synchronous lessons I asked students to listen to a short section of an audio file independently, and then answer questions about it. However, as this research took place in a simulated online environment, I was able to see that students were listening to much more of the audio clip than directed, and as a result were answering the questions incorrectly. This led to a development of the synchronous model in cycle two, where the teacher controlled the audio file for all students. Without being in a simulated online environment, this small but important development to the model might not have been included. My location within the classroom (at the front, with the students sat on computers against three walls in a horseshoe shape), allowed me to see all their screens and witness such challenges as described. With issues such as these now resolved in a simulated environment, the models can now be developed further in a true online environment. My location within the classroom also influenced the inclusion of a researcher diary as a data collection tool. While a researcher diary was also selected in part due to the opportunities it afforded with reflexivity, using a researcher

diary while being in the classroom with students meant that I was able to make observations of students and the models both on-screen (through my computer monitor) and off-screen (over the shoulders of students). It was easier to make off-screen observations in the asynchronous model than the synchronous and synergistic models (as I was not required to do any live teaching), but it was still practical to make off-screen observations in all models. I believe that this hybrid approach to lesson observations, both on and off screen, was a major advantage when developing the models as it provided a more nuanced insight that online being able to observe through my own screen. BandLab does allow teachers to access their students work, it does not allow us to work on it together simultaneously. Similarly, without specialist software it was not possible to see what each student was doing (on or off BandLab). However, a simulated online environment, combined with a teacher diary, allowed me to observe how students were interacting with the models throughout the lesson. These observations, along with the survey completed by each student, were then useful when interviewing students about their experiences with the models as I could reference how I could see them using the models. Finally, a simulated online environment was selected due to my lack of access to a true online class.

While there are benefits to using a simulated online environment, such as providing an equitable experience for all students in the class and the ability to observe students and their screen in a classroom to develop the models in a way that might have been limited in a true online environment, there are limitations with this approach. First, the models developed in a simulated online environment might not translate to a true online environment, with the teacher being in the same room as students, and students not taking part in the lessons while physically isolated from the rest of the class. While this was the case, every effort was made to ensure that all teacher-student and student-student communication took place through online means only. Secondly, participants may act differently in a true online environment when they know they are not being physically observed. This is challenging to account for, which is why the first recommendation is to further develop the models in a true online environment. Finally, as highlighted throughout section 2.2, there are likely to be technical issues in a true online environment. As such, conducting the research in a simulated online environment did not factor in the teacher's role in troubleshooting any issues. However, this did mean that the focus of the research could remain

on developing the models for the teaching of music composing lessons, as opposed to the development of models to resolve technical issues.

The notion of validity is explored further in section 3.11, but while there are limitations to conducting the research in a simulated online environment there are also significant advantages, and as the research was careful to ensure that all teaching and communication took place online the findings remain valid.

BandLab has been chosen as the online digital audio workstation (DAW) on which students will compose. BandLab is like software-based DAWs such as Logic Pro X, but is available online, is free, and allows teachers to set projects and assign classes. Other online DAWs are available, and this research is equally relevant to these other DAWs as their functionality is largely the same.

3.4.3 Action Research Cycle 1

In week 1 students received training on how to use BandLab. In weeks 2-7, composing module 1 was taught through synchronous, asynchronous, and synergistic models (table 12). Between each lesson I listened to each student's work and provided feedback using the 'notes' section on BandLab. The data collected was analysed upon completion of cycle 1.

Week 1	**Weeks 2+3**		**Weeks 4+5**		**Weeks 6+7**		**Week 8**
Online DAW Introduction	Synchronous	Synchronous Followed by questionnaire (week 3)	Asynchronous	Asynchronous Followed by questionnaire (week 5)	Synergistic	Synergistic Followed by questionnaire (week 7)	Interviews
	Researcher Diary		Researcher Diary		Research Diary		

Table 12 - Rotation of teaching models

3.4.4 Action Research Cycle 2

As per the action research approach, after cycle 1 changes were made to the teaching models based on analysis of the questionnaires, interviews, and researcher diary. There was then a second round of data collection during composing module 2, using the same class but developed versions of the teaching models. The same structure and data collection strategy as module 1 was applied to module 2. Final data analysis took place after cycle 2. The data collection process is outlined in table 13.

Data Collection Cycle 1 **Composing Module 1** **6 Weeks**	Synchronous (2 weeks, questionnaire at the end of week 2)
	Asynchronous (2 weeks, questionnaire at the end of week 2)
	Synergetic (2 weeks, questionnaire at the end of week 2)
	Interviews (post week 7, not in class)
Cycle 1 Analysis	(Approximately 7 weeks)
Data Collection Cycle 2 **Composing Module 2** **6 Weeks**	Synchronous (2 weeks, questionnaire at the end of week 2)
	Asynchronous (2 weeks, questionnaire at the end of week 2)
	Synergetic (2 weeks, questionnaire at the end of week 2)
	Interviews (end of the sixth week, not in class)

Table 13 - Data collection breakdown

Having established how action research was approached in this study, I next turn to the data collection methods.

3.5 Data Collection Methods

This research employed three data collection methods: student questionnaires; individual semi-structured interviews; and observations recorded in a researcher diary. These three data collection methods were considered appropriate because they each allow for the experiences of individuals to be collected, including myself as a teacher-researcher. The questionnaires were useful in gathering large volumes of data quickly and regularly about each teaching model, the semi-structured interviews allowed for more in-depth exploration of student experiences, and the researcher diary provided insights into real-time behaviours and actual practice that participants might not have been consciously aware of. Data was collected in three ways to aid with authentication and to support knowledge claims. Triangulation is the most common way to establish the authenticity of data (McNiff, 2013), requiring the collection of two or more data types (Creswell & Plano Clark, 2007), and can help findings be accepted as convincing (Yin, 2014). Woods (1986: 87) suggests using 'three or more' data collection methods 'greatly increases the chance of accuracy', a process that Denzin (1978) describes as methodological triangulation. In this research methodological rigour is demonstrated by using three data collection methods.

3.5.1 Questionnaires

Every two weeks students completed a short questionnaire about their experiences of one teaching model. These were mainly Likert scale questions, followed by a small number of qualitative questions, hosted via Qualtrics (appendix A). Experiential questions, such as student preference, ease of use, and what they found challenging about learning through the different models, were based on Hallam et al.'s Musical Futures questionnaire (2008) and Lee, Song and Hong's indicators of engagement in e-learning (2019). Likert scale questions can measure the attitudes of respondents (Thomas, 2017), and were answered on a 1-5 scale to provide the opportunity to answer neutrally. Students completed this questionnaire while in the classroom via a link posted on Google Classroom, making the collection of the questionnaires straightforward, improving the chances of completion, and being less intrusive to students' lives.

The advantages of using questionnaires include they are inexpensive, can be completed online, responses to the same question are directly comparable, and they are easy to anonymise (Hoskins, 2020). A disadvantage of questionnaires is questions can be skipped, resulting in incomplete data, but settings with online questionnaires can be enabled to require the completion of all questions (Hoskins, 2020). Many researchers struggle with generating sufficient responses due to questionnaire fatigue (Hoskins, 2020), but by having a captive audience and completing the questionnaires in the classroom this can be mitigated. Torres (1998) argues that questionnaires cannot provide enough insight into complex issues, but completing the questionnaires before the interviews allowed me to follow up on any relevant points. The purpose of questionnaires in my research was not one of statistical importance, but to act as a way for students to record how they felt about the different teaching models and provide a starting point for the interviews. Questionnaires were completed after students had two lessons on one of the teaching models, so that their experiences were captured before moving on to the next model. Questionnaires were the most efficient way of getting responses from students, while still being targeted enough to generate data relevant to the research question and aims.

The same questionnaires were used in cycle 2 of the action research, which allowed for comparisons to be made after changes to the teaching models were implemented.

3.5.2 Semi-Structured Interviews

Semi-structured interviews were chosen to explore students' experiences of each of the teaching models and build upon the questionnaire responses. Interviews have several advantages, including the ability to 'probe an interviewee's thoughts, values, prejudices, perceptions, views, feelings and perspectives' (Wellington, 2015: 137) in a way which cannot be achieved through observation or questionnaires alone. This understanding of experiences aligns with constructivism and is why they were chosen for this research.

At the end of each action research cycle six one-to-one, semi-structured interviews took place. The interview questions (appendix B) were developed from those used for the questionnaire, seeking to expand on the responses of students. However, while each questionnaire dealt with

just one of the three teaching models, there was only one interview per student during each research cycle. As such, the interview questions covered all three teaching models.

There is more than one approach to interviewing participants. Wellington (2015: 141) divides the structure of interviews into three categories:

1) Structured –a face-to-face questionnaire, with little deviation from a set list of questions.
2) Unstructured – the questions vary from one interview to the next, with no set list of questions.
3) Semi-structured – there is a guide or framework of questions, but the interviewer has flexibility about the order and range of these questions.

Semi-structured interviews allow for the interview to develop through a conversation, which can generate rich and detailed data (Wisker, 2008). This is consistent with my theoretical framework and provides the opportunity for students to communicate their thoughts about online learning without influence from others. As Spradley argues, interviews can help researchers to understand the meaning of a participant's experiences (1979), and by conducting individual interviews participants were provided with an opportunity to share their experiences. It could be argued it is preferable to have group interviews with students. However, as the lessons in this study were online and students were not working with each other then it is likely that they had different experiences. To gain a better understanding of individual experiences, individual interviews were judged to be more appropriate. Additionally, whilst group interviews may arguably make participants feel more relaxed, individual interviews were deemed appropriate because I am known to the participants, have an established rapport with them, and the interviews took place in a familiar school setting. Individual interviews also help to overcome some of the disadvantages of group interviews, including individuals who dominate the discussion and a reduction in the amount of time allocated to each participant (Wellington, 2015).

As the interview questions were based around the same questions and themes from the questionnaire, I decided to conduct semi-structured interviews. Semi-structured interviews provide a clear framework for questioning but afford the researcher the flexibility to ask follow-

up questions (Kvale, 1996). These targeted questions prevented interviews from going off topic, while also being insightful and able to provide explanations (Yin, 2014).

There are challenges with semi-structured interviews. Firstly, poorly worded questions can create bias or generate undesired data (Yin, 2014), which was mitigated in the pilot phase of this research and subsequent refining of the questions. Secondly, interviews had their audio recorded for transcription, as inaccuracies with remembering what has been said can be an issue. A third challenge relates to the unequal power relations between the researcher and students (Kvale, 1996), in that the participant may tell the interviewer (teacher) what they believe they want to hear (Yin, 2014). To negate this, I set out my own position in the research, and provided background information and an explanation of the research project (Wisker, 2008) to set the interviewee at ease and promote honest answers. Being reflexive during data collection, the analysis, and the write up of the findings is another way to mitigate unequal power relations (Hoskins, 2020), which was achieved by implementing a researcher diary.

As already mentioned, the interviews were transcribed to aid analysis. Flick (2002) argues the researcher should only transcribe as much as is required by the research questions, and that over-exact transcriptions are time consuming and unnecessary. However, in the pilot study an audio-text transcription software was trialled, which was highly accurate and reduced the amount of time needed to transcribe each interview. As such, all interviews were transcribed verbatim (appendix C). While there may be some material which is not deemed as being 'fruitful' (Bryman, 2008: 445), if something emerges later which requires consideration then the transcriptions will have already been completed. The audio recordings were archived as unintentional mistakes can be made during transcription (Cohen et al., 2011).

Even though interviews were transcribed verbatim, member checking took place to ensure that the meaning of participants' comments were not taken out of context or misinterpreted. Member checking, and its importance, is discussed later in this chapter.

3.5.3 Researcher Diary/ Observations

The final data collection method consisted of a teacher-researcher diary and observation. In this thesis the terms 'researcher diary', 'teacher diary, 'researcher observation', and 'teacher observation' are used interchangeably and used to mean the same thing. Classroom observation has many uses and takes many forms, with a long history in the social sciences (Punch, 2009).

The researcher diary recorded qualitative data and used a semi-structured schedule, and considered how all participants interacted with the models. Qualitative observation is concerned with looking for meanings behind actions and events, and interpreting classroom life beyond the surface level (Wragg, 1999). As such, while the observation schedule contained questions, these were open questions which allowed for observations and reflections on other events (appendix D). Students were also given the opportunity to self-report how many interactions they had with the researcher and their peers, as exact numbers were not necessary in their research. After each lesson anything of note was documented, such as the successes or challenges of each model, and the impact these had on students and their learning. In particular, the types of entries included observations as the lessons were underway, reflections afterwards, feelings, thoughts (Kemmis, 1981), and possible explanations with reference to the TPACK model.

McNiff outlines a simple way of tracking events in a researcher diary using two simple questions: 'what happened?' and 'what did I learn?' (2013). As well as keeping a record of the events that took place, this allowed me to reflect upon those events and consider how they might manifest in terms of TPACK and the other aims of my research. In addition to McNiff, the observation schedule was influenced by Lee, Song and Hong's indicators of engagement in e-learning (2019) and my research aims. The diary also allowed for a comparison of my experiences of the teaching models with the students, aiding triangulation (Elliott, 1991). A 'what I learned' question, combined with the experiences of the students, was crucial in developing the teaching models as part of the action research approach. The observations were similar in format to the interviews in that they were semi-structured (Punch, 2009). This gave the observations some flexibility, which was necessary to observe and reflect upon an area about which there is little research and a large element of unpredictability. I am also taking part in this

observation and diary as a participant, as I was involved in the research and lessons. This put me in the position of a participant observer, which was beneficial as it allowed me to experience the teaching models at the same time as the students and gain a deeper understanding of how the models work and how the students react to them (Whisker, 2008), but also meant I might miss events which happened while I was teaching.

These observations were somewhat different to face-to-face classroom observations. In the case of this research, as the lessons took place online but within a classroom, the observations were a hybrid of face-to-face and digital observations. In practice, this meant I found myself looking around the classroom and over the shoulders of students, while also observing how students interacted online through Google Meet and by accessing students' composing work through BandLab. While there is little research literature about conducting online observations, some practical guides do exist. For example, TeachStone (2020) have published guidance for conducting online observations, but unfortunately this guidance is specific to their own product and therefore was not applicable.

The researcher's diary had the additional purpose of allowing me to be reflexive during the data collection process. Reflexivity is important during action research and is discussed later in this chapter.

While a researcher diary was used as a data collection method for all three teaching models, the role of the teacher and subsequent observations did vary between them due to the nature of synchronous, asynchronous, and synergistic lessons. During synchronous lessons, I was required to always sit at my computer because I needed to teach the lessons live. Similarly, while I did not always teach live during synergistic lessons, in the case of this research I remained at my computer so that I could interact with students whenever required. During the synchronous and synergistic lessons my primary role was to teach live and/ or speak to students, but I was able to observe students during quieter moments and make brief observation notes. In these lessons, I completed the researcher diary after the lesson as soon as possible to try and mitigate forgetting any notable observations (making use of the notes I made throughout the lessons). However, during asynchronous lessons I was not required to remain at my own computer and as such could

move around the physical classroom to observe what students were doing, and could complete the researcher diary during the lesson. Due to the arrangement of the classroom used in this research, with computers in a horse-shoe shape around my desk with computer monitors facing me so that I could view them, I could see what students were doing on their computers during synergistic and synchronous lessons. However, the nature of the models meant that the nature of each observation was different. For the synchronous and synergistic lessons, I was able to make observations of the models both through my computer and to some extent (due to limited mobility from my computer) by viewing each student's computer, while in asynchronous lessons I was only able to observe students through their computer screens (but I was able to leave my desk and get closer to them, and for longer). These differences in the observations were however a benefit of conducting the study in a simulated online environment. Had this study taken place initially in a true online environment then no observations of student computers would have been able to take place at all, with the observations only possible through my computer. As such, it would have been extremely difficult to observe lessons in the asynchronous lessons and more difficult to observe the synchronous and asynchronous lessons. Therefore, the simulated online lessons provided an opportunity for more in-depth observations to take place in all three models, potentially allowing the models to be developed further than if the research had taken place in a true online environment.

There are challenges and safeguarding considerations to draw out within the teacher diary/ observations. As I was able to view the computer screens of students to different extents depending on the model, I could not always monitor what students were looking at on their screens and as such this highlights a potential safeguarding issue with online learning in general. In this school, students are safeguarded from accessing inappropriate websites and social media websites due to internet restrictions, had the lessons been in a true online environment this would have been challenging to mitigate. This is however another benefit of conducting this research in a simulated online environment, as students are safeguarded from inappropriate online activity and the focus can remain on developing the models, not online safeguarding. The differing extent to which I was able to write my observations down during each lesson also highlighted the challenges of being a teacher-researcher. While I endeavoured to fulfil the roles of both a teacher and researcher, I must acknowledge that I was able to act almost entirely as a researcher during

the asynchronous lessons, but acted more as a teacher than a researcher in both the synchronous and asynchronous lessons. The nature of the models means this is a somewhat unavoidable limitation of the research, by this is mitigated by having two other data collection methods. It should be noted that the safeguarding duties required of any classroom teacher were still carried out during all models, and were unaffected by the research. My position as a head of year at this school also required me to be a designated safeguarding lead with level three safeguarding training, and as such I am acutely aware of the importance of safeguarding children.

3.6 Sampling

This research was conducted with one year 9 music class of 19 students, all of whom selected music as an option subject. At this school the year 9 curriculum was narrowed, allowing students to choose from a selection of subjects. The term "option" was used to describe these elective subjects, while "core" referred to the subjects that all students were required to study. However, students continued with a KS3 curriculum and did not begin GCSE music. The sample was a purposive convenience sample, as the class which participated in the research was assigned to me as their teacher. The class was mixed ability, consisted of male and female students, and was broadly representative of the music cohort at this school in terms of ability, gender, and the instruments they play. Convenience sampling involves selecting students because they are easily accessible (Cohen et al., 2011), but in this case the convenience sample was also directly relevant to the research purposes as the students were of the desired age group and studying music. As Punch suggests, it is common for researchers to take *'*advantage of an accessible situation that happens to fit the research context' (2009: 250). In this case, the advantages of using my own class included accessibility and a likelihood of a high response rate. A major challenge is the lack of representativeness that can arise because of convenience sampling. To mitigate this, I selected interviewees who represented a cross section of abilities and backgrounds, which is expanded upon below.

A year 9 class was selected for several reasons. Composing multiple pieces of music forms part of the assessment for GCSE music, and as such I did not believe it was ethical to conduct this research with year 10 or 11 students as the time spent developing models, completing

questionnaires, and taking part in interviews may have detracted from the time available for the completion of their GCSE compositions. In year 7, students come from a variety of primary schools and vary in their composing knowledge and skills, general musical knowledge, and prior musical experience. While there will always be variation in the knowledge and skills of individuals, by undertaking this research with a year 9 class I know every student has received two years of composing lessons with either myself or my colleagues, and as such were a better choice as the participants for this research.

The main sampling decision was in selecting participants to invite to take part in the interviews. While all students took part in the questionnaire, not all students were interviewed due to logistical and time challenges. Instead, a representative sample based on the school's percentage of English as an additional language (EAL) and free school meal (FSM) students was chosen, and a spread of different target grades. In this school 80% of students are registered with EAL and 50% of students receive FSMs, which my sample represents. While it might be argued ethnicity should also be considered, the school had such a diverse range of students from many different backgrounds that it would be impossible to accurately represent everyone. Additionally, while the students in the class play a range of different instruments, as this research is about composing that was not a relevant consideration. All the students taking part have received some piano instruction in years 7 and 8 and have experience of composing using a DAW, so their personal instrument was not relevant.

I interviewed:

- Two students who had target grades towards the top of the class.
- Two students who had target grades towards the middle of the class.
- Two students who had target grades towards the bottom of the class.

As approximately 50% of the pupils at the school received FSMs and 80% were registered with EAL, of the six students invited to take part in interviews three of them were receiving FSMs and 5 of them were registered as EAL. The students selected for interviews were present for all the lessons, completed all the questionnaires, and it was the same students who took part in the first

and second round of interviews after each cycle of action research. While the class taking part in the research was representative of the male and female population in this school, I did not collect gender information because it was not relevant to my research question and aims and as such would have been unethical to collect. Additionally, collecting this information without acknowledging other genders risked marginalising students who identify as something other than male or female.

While selecting students for this research was important, perhaps more important was the role of students. This is discussed in the next section.

3.7 The Role of The Students

Students were not passive participants in this research; they were crucial to the development of the models and in constructing new knowledge. However, the students cannot be described as co-researchers as they were not researching alongside me. Co-researchers are students who take part in research and are involved in the development of the instruments (Fielding, 2004), in this case the teaching models. I collated, analysed, and mobilised the responses of students to develop the models: the students had no say in this part of the process. Students provided their responses as part of the reflection process within the semi-structured interviews and questionnaires, and their feedback was integral to developing the models; I asked the students what they thought of the models, what changes they thought needed to be made, and the impact of these changes. Sitting on a continuum between passive participants and co-researchers, students might be more accurately described as active respondents (Hopkins, 2014). Student views and experiences were collected through questionnaires and semi-structured interviews, which I as the teacher-researcher used as part of the evidence base on which to develop the teaching models.

In this section I considered the role of students and how they impacted the study, and I next consider how reflection and my own position were important to me as the researcher and important to the research.

3.8 Reflexivity and Positionality

Researcher positionality describes one's world view, the position they adopt about a research issue, and their social and political context (Rowe, 2014). A world view describes 'where the researcher is coming from' (Holmes, 2020). Positionality influences how research is undertaken, the outcomes, and results (Rowe, 2014), and influences the choice of the subject of the research (Grix, 2019). As Holmes suggests, researchers must acknowledge that their positionality is unique to them, and that it can 'impact all aspects and stages of the research process' (2020: 3). All researchers adopt a position, whether they realise it or not, so one must acknowledge that not adopting a position is impossible. My position was one of an 'insider', as I was researching my own pedagogic practice within my own classroom. A teacher-researcher is a person who undertakes a piece of research and teaches simultaneously (Menter et al., 2016). Being a teacher-researcher is a choice, but one that places contextualised problem solving at its heart, and allows for a teacher's professional judgement (Hopkins, 2014) to be utilised. There are clear rationales for being a teacher-researcher, such as the positive impact conducting one's own research can have on classroom practice (Hokpins, 2014). Conducting research in your own classroom also has a positive impact on your students (Baumfield & Butterworth, 2005). Pollard and Taan (1993) suggest a reflective cycle for teacher-researchers (figure 3).

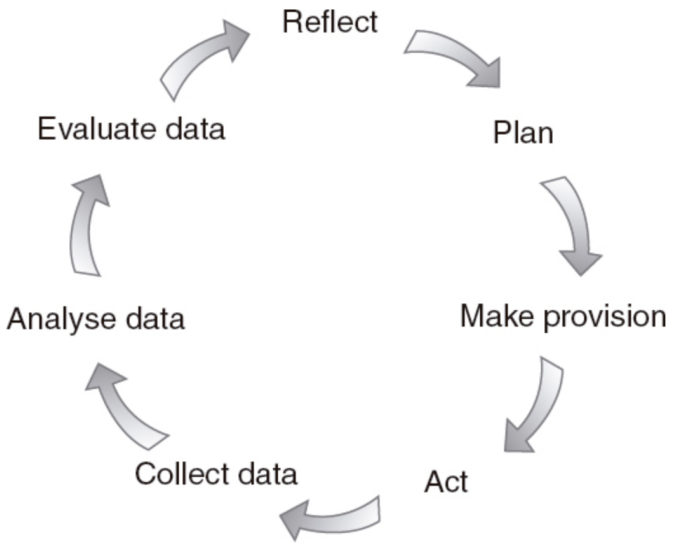


Figure 3 - Reflective cycle for teacher-researchers

This reflective teaching cycle was embedded within the action research approach and researcher diary.

A researcher's positionality is usually expressed through a positionality statement (Holmes, 2020). My position was one of a music teacher and head of year in an inner London school, who studied music to postgraduate level, taught music online during the Covid-19 pandemic, and is an advocate for music education. As part of my role as a head of year, I was a designated safeguarding lead with level three safeguard training. My own experiences as a teacher have led me to believe that meaningful change is best trialled in the classroom by teachers with their students, and that individual student experience is invaluable when analysing new interventions. Some of the ways my position impacted this study are acknowledged in table 14, but as the positionality of a researcher shapes all aspects of a study (Savin-Baden & Howell Major, 2013), it is impossible to address every single way that my position impacted on this research.

Section of Study	**Impact Due to Positionality**	**Considerations in *Simulated Online Music Composing Lessons: developing teaching models through action research***
Research Question	Based on my belief that all students should receive music education, regardless of their location or access to teachers.	This belief led me towards a research project examining online learning, to improve access to music education for as many people as possible.
Research Process	Curriculum – The music department I am part of has two composing modules during year 9. As such, this has determined that the action research should consist of two cycles.	Ethically I must teach the same content as the rest of year 9.

	Individual interviews – as I already had a relationship with the participants, a rapport was already established with individuals.	I had not been a head of year to any of these students but had been a music teacher to many of them in previous years. As such, I knew some students better than others (and some knew me better than others). This is where an interview schedule within the semi-structured interviews became useful, to keep my questioning on track and relevant and prevent the interviews becoming too familiar.
	Prior knowledge of teaching online – I came into this research having experienced teaching music online through the Covid-19 pandemic. I was therefore not starting from 'nothing' with my teaching models.	I used Google Meet and Google Classroom as platforms because I had used them before, and so had the students, and this is as a direct result of my school subscribing to these platforms.
	Action Research – My own experiences in the classroom, and as a head of year, have meant that I have informally engaged in action research many times by identifying issues and experimenting with different initiatives	I have lived experience which suggests that action research works for me, in my context, and has produced meaningful change in the past. However, I needed to broaden my understanding of action research

	to overcome them. As a result, action research felt like a natural research methodology for me to engage with. However, the decision to use action research as an approach was ultimately governed by the research question and nature of the research.	and create a more carefully considered action research plan than I have previously done.

Table 14 - Positionality impact

Reflexivity and positionality are closely linked, in that reflexivity suggests a researcher should acknowledge themselves in their research, and positionality is the actioning of that. Reflexivity is when a researcher has a self-conscious awareness of the effects they have on the research process, and how their values, beliefs, and experiences impact a study (Cohen et al., 2011). Reflexivity is central to action research as the researcher is often a participant and practitioner (Hammersley & Atkinson, 1983). Researchers who conduct action research must be open about their own position and acknowledge how it may influence their research (Denzin & Lincoln, 2003). So that any potential bias could be considered, my position in the school and my relationship with the participants is outlined in the ethics section. However, my role as a music teacher in the school was beneficial as it provided me with both a platform and the credibility required to implement any positive changes that arose from this research.

Reflexivity requires an awareness of oneself, as a researcher-participant, regarding the effect of one's ‘values, attitudes, perceptions, opinions, actions, feelings’ (Cohen et al., 2011: 310). To aid with reflection, various frameworks exist. One such framework is Ghaye’s suggestion that reflection should be descriptive, perceptive, receptive, interactive, and critical (1998). I applied Ghaye’s framework within my research diary, to help ensure the observations made contained a reflexive element. For example, questions within the diary such as ‘how can I change my teaching to improve this model’ provided opportunities for critical reflection, while also linking to further action (interactive) and relating my personal views of how to change my teaching (receptive).

McAteer (2012) promotes the use of a researcher diary to aid with reflexivity, while also serving the additional purposes of data collection, generating theoretical insights, and providing a space for initial thoughts on analysis. The researcher diary utilised in this research aided with the ongoing reflexive nature of action research.

3.9 Data Analysis

Data analysis took place in two stages. The first stage of analysis occurred after action research cycle 1, when all three teaching models had been used for two weeks. This analysis focused on the challenges and advantages of each model and did not concern TPACK, and was used to inform changes for the second cycle of action research. At this stage, an analysis involving TPACK was not necessary to inform change in cycle 2, and there were significant time constraints between cycle 1 and cycle 2 so analysis was kept functional to the development of the teaching models.

The second stage of analysis took place after all data collection was completed. Stage two was more in-depth, examining the challenges and advantages of each model and further developing them based on the data collected, while also using the TPACK model as an analytical framework. The second stage of analysis utilised thematic analysis, identifying emergent themes.

Data were analysed using an abductive approach. Abduction begins with a lack of understanding about something but directs the research to making the ‘indeterminate more determinate in order to facilitate action’ (Brinkman, 2017; 90). In the case of my research, the lack of understanding references the gap in knowledge regarding teaching online music composing lessons, the indeterminate are the merits, challenges, and suggestions for improvement from multiple data sources, and the determinate is the action taken to address the original lack of understanding. Dewey (1991) suggests a 5-step approach to abduction, which is outlined and related to the abductive approach taken to analysing data in this study in table 15.

Dewey's Steps	Relation to *Simulated Online Music Composing Lessons: developing teaching models through action research*
1. An unresolved situational problem.	The situational problem is how to teach music composing online.
2. Collect data about the problem at hand.	Data were collected using questionnaires, interviews, and a researcher diary after cycle 1 of the action research.
3. Researcher creates a hypothesis of how to solve the problem.	Cycle 1 data were analysed in stage one of the analysis process
4. Proposed hypothesis is elaborated on and compared to other solutions.	Changes were made to three teaching models, which were then compared to one another.
5. The hypothesis is put into practice.	Cycle 2 of action research.

Table 15 - Dewey's abduction approach

In addition to abduction, deductive and inductive approaches were utilised at different points of the data analysis. A deductive approach involves using the research as a lens (Braun & Clarke, 2022), in this case the need to identify positives, challenges, and suggestions for improvement in the different models to aid their development. Phase one analysis was deductive, but phase two analysis was both deductive and inductive to improve the models and aid thematic analysis. An inductive approach involves identifying codes outside of the parameters already set by the research (Braun & Clarke, 2022). The dialogue between the different data collection methods, and how they interact to influence change, is outlined in the next section.

3.9.1 Stage One Analysis

1. Each questionnaire was coded using three codes: challenges, positives, suggestions for improvement.
2. These three codes were then applied to the interviews (appendix C) and researcher diary (appendix D).
3. Commonalities within these codes were identified and placed into a master coding document (appendix G).
4. The commonalities were used to inform the teaching models for the second cycle of action research.

The codes were used to triangulate evidence which supported modifying the teaching models in particular ways. In the case of this research, changes were made if they were suggested in the researcher diary, questionnaires, and interviews, or any two of the three data collection methods. These changes were then made to the teaching models, ready for implementation in action research cycle 2.

3.9.2 Stage Two Analysis

Initially, the second stage of analysis followed the same process as stage one and further developed the teaching models based on the data collected. However, stage two additionally used TPACK as an analytical framework, and employed thematic analysis. The thematic analysis and TPACK analysis were independent of one another, and as such their findings are discussed in different sections (5.2 and 5.3 respectively).

The TPACK model was used as an analytical framework in this study. The TPACK coding frame created by Pringle et al. (2015) was used as a way of identifying elements of TPACK within the data, and as a basis for analysis. This allowed for the lesson design principles to be established for the online-composing specific TPACK model.

TPACK is broken down into 6 constructs (Pringle et al., 2015):

- Technological knowledge (TK)
- Pedagogical knowledge (PK)
- Content knowledge (CK)
- Technological pedagogical knowledge (TPK)
- Pedagogical content knowledge (PCK)
- Technological content knowledge (TCK)

For this study, an adapted version Pringle et al.'s (2015) definitions of each TPACK construct was used:

TK

TK was represented by the general software and hardware used in the lesson. General software and hardware are not specific to the subject of music (for example, a computer or pair of headphones).

PK

PK was identified by using Jonassen et al.'s (2003) components of meaningful learning:

a) evidence of students developing knowledge and/ or skills (active)

b) the creation of artefacts (constructive)

c) learning happening in a real-world context (authentic)

d) students working together or with the teacher to build new knowledge (cooperative)

To identify PK not all components needed to be evident. One component was sufficient to identify PK (Morrison et al. 2007).

CK

The objectives of the lesson plan and scheme of work for the module outlined the intended CK.

TPK

Following Pringle et al.'s (2015) definitions of TPACK constructs, TPK was identified using the technology integration matrix (Allsopp et al., 2007) (table 16) built around Jonassen et al.'s (2003) components of meaningful learning. This allowed me to first identify how students used technology in their lessons, before considering how to integrate technology into the classroom based on how students used that technology. This placed my TPK onto the matrix, providing an indication as to how it might be improved (appendix E). There are two sides to this matrix, the *levels of integration into the curriculum*, divided into entry, adoption, adaptation, infusion, and transformation, and the *characteristics of the learning environment*, divided into active, collaborative, constructive, and authentic. The definitions of each are outlined in table 16.

→ Levels of Technology Integration into the Curriculum

Technology Integration Matrix	**Entry** Teacher uses technology to deliver curriculum content to students.	**Adoption** Teacher directs students in the conventional use of tool-based software. If such software is available, this level is recommended.	**Adaptation** Teacher encourages adaptation of tool-based software by allowing students to select and modify a tool to accomplish the task at hand.	**Infusion** Teacher consistently provides the infusion of technology tools with understanding, applying, analyzing, and evaluating learning tasks.	**Transformation** Teacher cultivates a rich learning environment, where blending choice of technology tools with student-initiated investigations, discussions, compositions, or projects, across any content area, is promoted.
↓ Characteristics of the Learning Environment **Active** Students are actively engaged in educational activities where technology is a transparent tool used to generate and accomplish objectives and learning.	**Active: Entry** Students receive content through the use of technology or use technology for drill and practice type activities.	**Active: Adoption** Students occasionally use specified technology tools to plan or create end products.	**Active: Adaptation** Students choose or modify the technology-related tools most appropriate for developing learning tasks.	**Active: Infusion** Students focus on learning tasks, and purposefully combine technology tools to design desired outcomes based on their own ideas.	**Active: Transformation** Students seamlessly organize the learning tasks and formulate products, discussions, or investigations using any appropriate technologies available.
Collaborative Students use technology tools to collaborate with others.	**Collaborative: Entry** Students primarily work alone in highly structured activities, using technology.	**Collaborative: Adoption** Students are allowed the opportunities to utilize collaborative tools in conventional ways.	**Collaborative: Adaptation** Students have opportunities to select and employ technology tools to facilitate and enhance collaborative work.	**Collaborative: Infusion** Students select technology tools to facilitate and enhance collaboration in all aspects of their learning.	**Collaborative: Transformation** Students seamlessly use technology tools to globally collaborate with peers and experts.
Constructive Students use technology to understand content and add meaning to their learning.	**Constructive: Entry** Technology used to deliver information to students.	**Constructive: Adoption** Students begin to use constructive technology tools to build upon prior knowledge and construct meaning.	**Constructive: Adaptation** Students have opportunities to choose and manipulate technology tools to assist them in molding their understanding.	**Constructive: Infusion** Students make connections with technology tools to construct deeper understanding across disciplines.	**Constructive: Transformation** Students use technology to construct, share, and publish new knowledge to an appropriate audience.
Authentic Students use technology tools to solve real-world problems meaningful to them, such as digital citizenship.	**Authentic: Entry** Students use technology to complete assigned activities that are generally unrelated to real-world problems.	**Authentic: Adoption** Students are allowed opportunities to employ technology tools to connect content-specific activities that are based on real-world problems.	**Authentic: Adaptation** Students have opportunities to select and utilize the appropriate technology tools and digital resources to solve problems based on real-world issues.	**Authentic: Infusion** Students select appropriate technology tools to complete authentic tasks across disciplines while modeling digital etiquette and responsible social interactions.	**Authentic: Transformation** Students participate in meaningful projects that require problem-solving strategies, and facilitate global awareness, through the utilization of technology tools.

Table 16 - Technology integration matrix (Allsopp et al., 2007)

PCK

PCK was identified by considering the cognitive demand of the lesson and individual tasks, split into high-demand and low-demand tasks (Silver et al., 2009). Low-demand tasks were those which included recall and applying facts or procedures. High-demand tasks included analysing, creating, and evaluating.

TCK

TCK was identified as subject and content-specific software, and its usage by the students and teacher. In music, this may take the form of software such as DAWs. The definitions of each component, and how they were identified in my study, are summarised in table 17.

	Definition	Identification
CK	Teacher knowledge of the subject.	Evident in the objectives of the lesson plans and scheme of work.
PK	Teacher knowledge of teaching and learning practices.	Evidence of Jonassen et al.'s (2003) components of meaningful learning: active, constructive, authentic, cooperative.
TK	Knowledge of different technologies and how to use them.	The use of any general hardware or software, not specific to music.
PCK	Knowing what teaching approach is appropriate for the subject and context.	Evidence of high-demand and low-demand cognitive tasks (Silver et al., 2009).
TPK	Knowledge of how to teach a subject and how technology can change or adapt the subject.	Evidence of the technology integration matrix (Allsopp et al., 2007), on a scale of entry to transformation.

TCK	Knowledge of technology, and how that technology might change teaching.	The use of any subject and/or content-specific software.

Table 17 – Definitions and identifications of TPACK components

TPACK itself does not need to be evidenced through all the components taking place at one time but can be understood as being evidenced if all components are evident within a task, lesson, or set of lessons. The approach to using TPACK in this study is summarised as the following:

1) Analyse TPACK in the new models. After the second cycle of action research was completed, evidence of TPACK from cycle 1 and cycle 2 of the research was identified by analysing the surveys, interviews, and researcher diary. This supported aim 4 of this research.

2) *Composing-specific TPACK model*. The evidence of TPACK in the modified models was used to create a set of online composing specific TPACK design principles, supporting aim 4 of the research. These lesson design principles for the online teaching of composing at KS3 can be used as a framework for the future design of online composing lessons.

As explained in 3.10, the pilot study highlighted some subjectivity when coding using the TPACK framework. As such, to provide more consistency in coding and reliability in the findings, and to remind myself of why something was coded in a particular way, analytical memos were used (Saldana, 2015).

3.9.3 Coding and Thematic Analysis

This research used thematic analysis. To identify the codes and themes within the data, Braun and Clarke's six phase reflexive thematic analysis approach (2022: 35) was utilised (appendix F). How each phase was implemented is outlined in table 18.

Phase	Approach in *Simulated Online Music Composing Lessons: developing teaching models through action research*
1) Familiarising yourself with the data.	Reading and re-reading the questionnaire data; writing and re-reading the researcher diary; and listening to the interviews, transcribing them, and reading and re-reading the transcripts.
2) Coding.	Both deductive (the research provides a lens) and inductive (coding is driven by the data content) coding took place, as suggested by Braun and Clarke (2022), as this was most appropriate for the research purpose. Phase one analysis was largely deductive, with the constructs of positives, challenges, and suggestions for improvement providing the research lens with the purpose of improving the models for cycle 2. Phase two analysis was both deductive and inductive. It was deductive because it also involved identifying positives, challenges, and suggestions for improvement, as well as the codes described above as relating to TPACK, but was also inductive as other codes emerged within the data set outside of the parameters already described. Phase one analysis could also be described as semantic coding, where meaning is explored at surface level (Braun & Clarke, 2022). While phase two analysis involved some level of semantic coding, there was also evidence of latent coding as I sought to identify understanding at a more implicit level (Braun & Clarke, 2022).
3) Generating initial themes.	The initial themes were constructed based on the codes by identifying patterns across the codes. For example, codes relating to challenges with communication and developing a sense of belonging have a shared pattern within a theme of relationships.

	During this stage, the themes of pedagogy, relationships, classroom management, and the use of time within lessons were identified.
4) Developing and reviewing themes.	The themes were reviewed, and an additional theme which linked the use of time within lessons and connectedness was added.
5) Refining, defining, and naming themes.	The themes were reconsidered, and renamed online music composing pedagogy, online relationships within music composing lessons, efficiency and inefficiency, and efficiency and connectedness.
6) Writing up.	Writing up began during phase two, while improving the teaching models for cycle 2.

Table 18 - Approach to coding and thematic analysis

Having explained the data analysis strategy and approaches, I next discuss the analysis of and reflections on the pilot study.

3.10 Pilot Study

In this section I discuss and reflect on the pilot study, including the stage one and two analysis process.

A pilot study is a small study conducted prior to the main study (Thomas, 2017). It provides an opportunity to test the sampling, data collection, and methodology, and make any necessary changes before conducting the main study (Thomas, 2017).

The pilot study consisted of a one-off synchronous composing lesson with a year 9 class, where students composed a theme for a fictional character of their choice. A total of 19 students took part, but due to gaining ethical approval late in the academic year consent to use the data collected was only obtained for 6 of these students. As such, data from 6 questionnaires and 3

interviews was used in this pilot study, as well as a researcher diary. The pilot study was conducted in the academic year prior to the main study, meaning there were no common students in the two studies.

3.10.1 Stage One Analysis

Data analysis for the pilot study followed a similar process as the main study. The commonalities identified through analysis of the data, coded as challenges, positives, and improvements, were as follows (table 19):

Challenges	Positives	Improvements
Difficult to make learning connections with other students.	Google Meet and Google Classroom are easy to use.	A way for students to talk to each other to discuss their work.
Challenging to ask for help from the teacher: chat comments not always seen, difficulties in speaking privately with the teacher.	Students could communicate with the teacher using the chat function.	A way for the teacher to drop in on students to provide help and feedback.
Students missed a teacher being there to offer suggestions for improvement.	Students liked being able to get on with their work without a teacher always watching over them.	Making it clear that students can use the chat to communicate with each other about their work, not only the teacher.
Students could not listen to each other's work.	Instructions were clear and all students composed a leitmotif, suggesting the way the model	Provide an opportunity for students to share their work.

	dealt with explaining the work was successful.	
Teacher did not check students' work as much as face-to-face lessons.	Like face-to-face teaching in lesson structure, providing some familiarity to students.	Install Google Chrome on all computers to allow for full functionality of BandLab.
Enthusiasm/ lack of motivation to engage with the learning.		

Table 19 – Pilot summary of challenges, positives, and improvements

As a result of this pilot study, several changes were made for the main study synchronous teaching model:

1. The teacher should ‘drop in’ on students to provide personalised feedback throughout the lesson, something that was not evident in the original model.
2. Towards the middle of the lesson, provide an opportunity for students to share their work with the class, which the class and teacher could provide feedback on.
3. Clarify at the start of the lesson that students can talk with each other about their work using the chat function, including sending links to their work for others to listen to and offer feedback on.

While requiring some refinement, the data collection tools and stage one analysis achieved the desired outcome in that they highlighted what worked in the synchronous teaching model and suggested further improvements. The suggestions for improvement could have been implemented for a second cycle, which was how these tools were intended to perform.

However, there were several changes and clarifications to the data collection tools made for the main study:

1) Clarity on how the questionnaire responses were used to inform the interview questions. In the pilot study I first went through my interview schedule with the student, and at the end asked questions based on the questionnaire responses. This largely revolved around asking participants for more information about why they had selected a particular response to a Likert scale question, as well as asking them to explain further suggestions for improvement and why they did/ did not communicate with people during the lesson. It required me as the researcher to view their participant questionnaire responses beforehand and have a copy of them available during the interview.
2) Include a box at the end of the observation template to provide a space for my overall reflections and learning points, as part of my ongoing reflexivity.
3) Include a box in the observation template to reflect on student participation and engagement.

Encouragingly, the use of critical friends in the first instance helped to develop a questionnaire, interview questions, and observation template which contributed towards answering the research question and aims.

3.10.2 Stage Two Analysis

Initially, this stage of analysis followed the same procedure as stage one but then used the TPACK model as an analytical framework. For the pilot study, as there was no second round of data collection, I went directly to using TPACK for analysis.

To begin with, diary/ observations, questionnaire, and interviews were coded using the codes from table 17. There is an example of each code in table 20.

	Researcher Diary/ Observations	Questionnaire	Interviews
CK	Teacher displayed knowledge of Leitmotifs and composing, and this was relayed to students.		Student 2: In terms of music we had, we've done stuff like that before. So, it's a little bit easier.
PK	Students clearly progressed, with all students managing to compose a leitmotif as a result of the teacher's instructions.	Students felt confident in what the teacher was asking them to do (all students agreed or strongly agreed).	Student 2: 'I enjoyed the freedom of being able to like, explore and do things by myself.' ar. So it was easier to do it.'
TK	Macs, headphones, Meet, Classroom. Secure knowledge displayed.	What would have improved your online lesson? 'Being able to talk verbally.' 'Being able to discuss our compositions verbally.'	Researcher: 'How do you feel about using the chat?' Student 2: 'It was a good like, it was a good thing to use, instead of talking about face to face, but face to face is definitely better.'
PCK	Composing is a high-demand task, as it involves creating something from scratch. In this case, students needed to understand what a leitmotif was, and then be able to apply this knowledge to create one of their own.	Students reported making progress with their compositions, while at the same time managing to complete all the work expected of them. This suggests that, through clear explanation, the teacher had good content knowledge and understood how to	Student 5: 'Thinking how to start off doing the leitmotif for the character that you chose. Because like it was starting off is kind of the hardest part.'

		teach students about composing.	
TPK	Falls into the 'Active: Adaptation' category. Students are actively using the technology of a DAW for their composition, but their limited use of the DAW means that they do not always use it purposefully, it can be somewhat experimental.	Some students reported that they didn't know how to click in notes on Logic and had to use a keyboard instead.	Evidence of authentic: adoption category from students: Student 5: 'It was kind of interesting. (Why do you say it was kind of interesting?) Because it's interesting to explore how like, I don't know what they're called, but the people who make music and films, yeah, how they like How they're so good at it you know, because like for stranger things and stuff like the music is never disappointing. It's always really good. So, it's interesting to see like, how I can do it.'
TCK	TCK: Music specific software is used to both model the composing task and as a means for students to compose their own leitmotif.		Interview with student 2: Teacher: 'Did you use the actual keyboard? Or did you click in the notes?' Student 2: 'I used an actual keyboard.'

Table 20 – Example of pilot data TPACK coding

The data from the pilot study suggested that the TPACK knowledge required for a synchronous online composing lesson could be conceptualised as follows (figure 4):

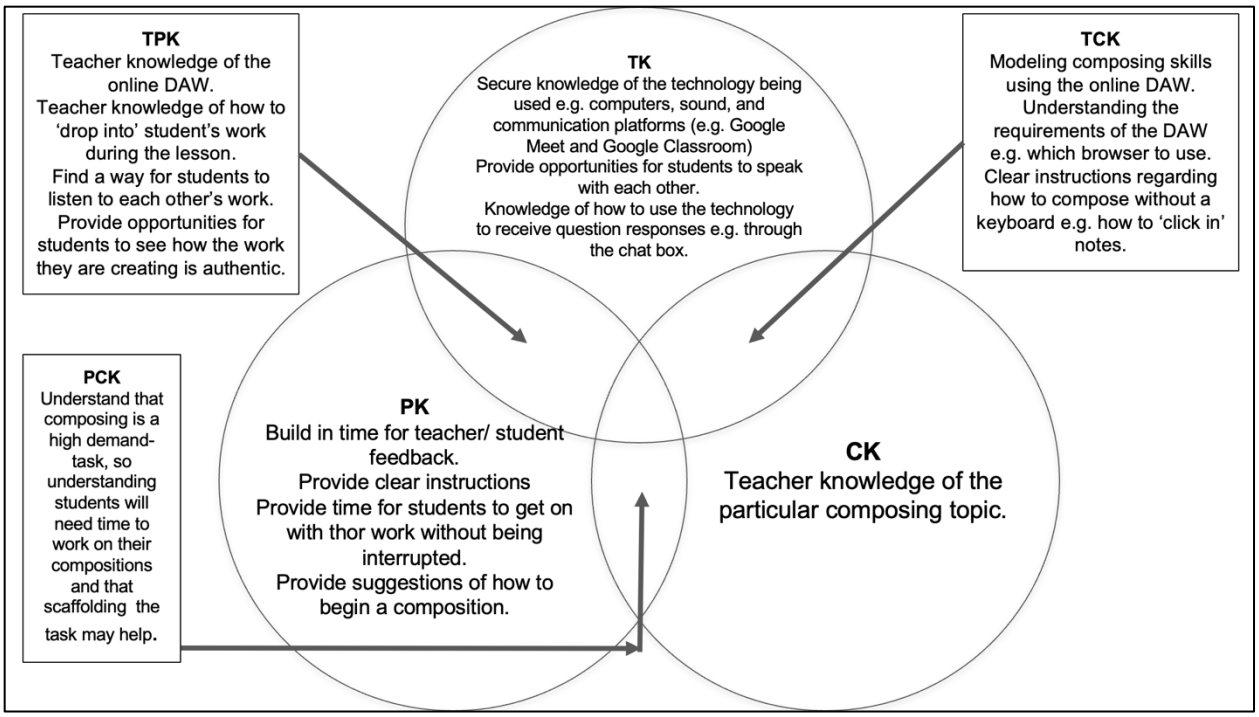


Figure 4 – The TPACK required for online composing lessons (pilot)

Aim 4 of this study is to create an online composing specific TPACK model. To make the model accessible teachers may find the following online composing TPACK checklist a useful aid. This question-based model follows the same structure as the original TPACK model, but is presented as a set of questions (figure 5):

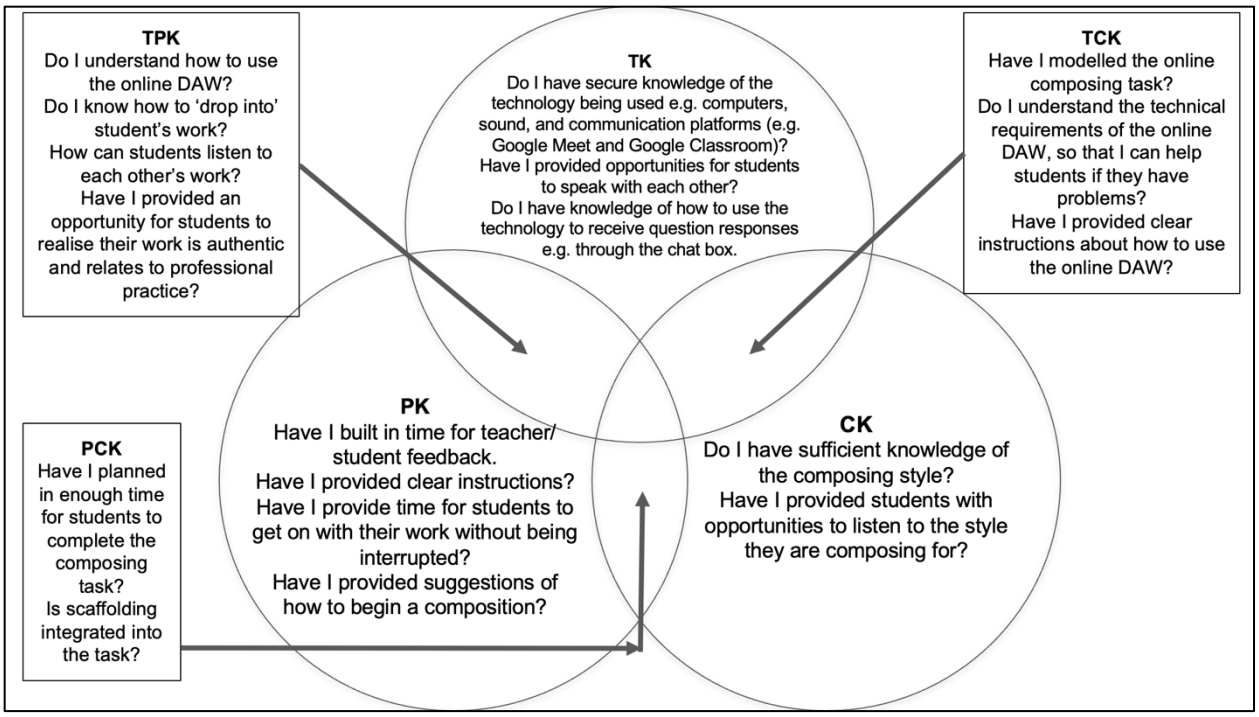


Figure 5 - TPACK checklist for planning online composing lessons (pilot)

As a result of using the TPACK model as a framework, it became apparent that finding evidence of CK within the interviews was challenging because the questions did not provide an opportunity for CK to be discussed. As such, 'can you tell me what you have been learning about in your lessons over the course of this module?' was added to the interview schedule.

It was interesting that all the TPK evidence collected sat within either the entry or adoption categories. While the goal of TPK may be to push students towards the 'transformation' end of the scale, this only seems achievable over a prolonged period. For example, the constructive element may begin with the teacher using technology to give instructions to students, but by the end of the module after students have learned how to use various tools within the DAW it may be appropriate to include tasks which are 'transformative'.

3.10.3 Reflections on the Pilot Study

While only six out of nineteen students gave consent for their data to be used, it was still possible to collect questionnaire data, conduct interviews, and complete the researcher diary. The sample size of the pilot study compares well to the respondent population of the main study and highlighted some areas for improvement.

The pilot study was useful in terms of trialling the practical application of an online teaching model and refining my data collection tools. In the lesson it became evident that BandLab required Google Chrome to function, so after the pilot study the Information Technology (IT) department at my school installed Google Chrome on all the computers in the music department. Had a pilot study not been completed, this might not have become evident until the main study began. This meant that some functionalities of BandLab, such as dropping in on students, could not be tested and so a critical friend was used to explore these features prior to the main study taking place. The pilot study provided an opportunity to test that Google Classroom and Google Meet functioned as expected within a virtual classroom setting, and while they did and students reported that it was easy to access their work, there were issues with peer-to-peer and student-teacher communication. The pilot lesson also provided an opportunity to test out the Qualtrics questionnaire, semi-structured interviews, and research diary. The questionnaire link, placed on Google Classroom, performed as expected and all students were able to access the questionnaire. There were no obvious misconceptions with the questionnaire, and it provided useful data which could be utilised. Finally, the pilot study led to changes in the data collection tools and the synchronous teaching model within the main study.

The pilot study also provided an opportunity to test out the data analysis tools. The stage one analysis process was useful in that it did highlight some issues with the synchronous teaching model. Had this been the main study these things could be changed for action research cycle 2, in line with the action research approach.

Beyond testing the data collection and analysis tools, in some ways this pilot study reflects Elliott's (1991) 'reconnaissance' idea. Elliott suggests that prior to a study taking place a

reconnaissance phase of fact-finding and analysis should occur. The purpose of the fact-finding is to learn as much as possible about the nature of a situation, and when combined with the analysis stage builds one's understanding of a phenomenon before the main research takes place. While this pilot study does not go as far as Elliott's pilot testing in the analysis phase, there certainly are similarities between the two.

The application of the TPACK model worked as desired in the pilot study as an analytical framework, but while the coding criteria were helpful there were times when coding the data became subjective. In the main study, to help reduce the subjectivity and remind myself why I coded something in a particular way, analytical memos were used (Saldana, 2015), as previously mentioned. However, it was possible to take the original TPACK model and use it as a coding framework and repurpose that coded data into a checklist for teachers to use when planning online composing lessons. This will help teachers to make sure that they are exploiting the technology in online composing lessons, while highlighting areas within content, pedagogy, and technology which may require further CPD.

3.11 Ethical Considerations

A researcher has a responsibility to protect their participants, including vulnerable participants, the university they are representing, and themselves (Wisker, 2008). While my research was granted ethical clearance by the University of Wales Trinity Saint David (UWTSD) ethics committee and adhered to the British Educational Research Association's (BERA, 2018) ethical guidelines, there are specific ethical responsibilities to be drawn out. Prior to any data collection taking place, consent forms were obtained from the school (appendix H), the participants (appendix I), and the participants' guardians (appendix J).

All participants were given the option to remove their data from the study, provided they requested this before anonymisation. This research took place during normal timetabled lessons, and as such used very little time outside of students' lessons apart from a small number of interviews. Additionally, the lesson content studied by students taking part in this research

studied was the same as the rest of the year 9 music cohort. The difference in this research is that the students learned through an online medium, whereas the rest of the year 9 cohort did not. To mitigate this, any students who felt disadvantaged by learning online were given the opportunity to complete their work in a traditional setting later. However, even though consent for data collection was not obtained for all students the lessons still took place in a simulated online environment, as the school gave me consent to conduct my lessons online. All students also took part in the questionnaire as a reflective part of the learning process, even if they decided that they did not want their data to be used. Students were asked for their ongoing consent at the beginning of each questionnaire and at the start of the interviews.

There were additional risks to the participants in this research, including risks of coercion to take part, emotional distress caused by worrying about receiving sanctions from the teacher-researcher if they did not answer as they believed the researcher wanted them to, and that the research might have been time consuming. Kemmis et al. (2014) refer to this as a dependant relationship, where it is challenging to be certain that the dependant (in this case, the students) can participate freely in a research project that is being conducted by their teacher. While it was difficult to account for the dependant relationship in this research, to reduce the risks outlined at the beginning of this paragraph student names and identifiers were anonymised, students were reassured that the teacher was acting as a researcher, responses were viewed from a researcher, and not teacher, perspective, and participants were provided with the opportunity to member check their data. Additionally, to further support the student participants and to avoid the research becoming time-consuming, the use of the teaching models and completion of the questionnaires took place during lesson time, and interviews lasted no longer than 30 minutes. While not a dependant relationship, the school itself must also be protected and as such had its name and identifiers anonymised.

Issues of power and authority may have arisen due to my position as a teacher. Although I explained to participants that I was acting as a researcher and not a teacher, I need to acknowledge that my position of authority did not change and may have influenced the data. Specifically, students may have felt they had to take part in the study and might have changed their answers in the questionnaires and interviews because they thought saying the ‘wrong’ thing

would lead to them receiving a sanction. I reiterated to participants that I needed their true views of the teaching models, that no sanctions would be handed out, and that during this process I was acting as a researcher as well as their teacher.

The ethical issues outlined above can be considered in terms of BERA's guidelines (2018) (table 21):

Guideline	**Consideration in *Simulated Online Music Composing Lessons: developing teaching models through action research***
Voluntary Informed Consent.	Consent sought from the school gatekeeper, parents, and students. Students required to provide ongoing consent for questionnaires and interviews.
Openness and Disclosure.	Provide the school, parents, and students with participant information sheets, explaining the research clearly and in full. Students in the class informed about the research and had the process explained to them, prior to the research beginning.
Right to Withdraw.	All participants were informed that they had a right to withdraw at any time, up until data was anonymised.
Children, Vulnerable Young People and Vulnerable Adults.	All participants were able to provide voluntary informed consent, regardless of their needs. Those unable to provide consent did not have their data collected.
Incentives.	No incentives were provided to take part in the research other than intrinsic ones.

Detriment Arising Through Participation in Research.	Students who felt that they have been disadvantaged by learning online had the opportunity to complete their compositions with me in a face-to-face classroom environment.
Privacy.	All participants, and the school, were granted anonymity in the research write up. Data was stored in compliance with the Data Protection Act (2018), in this case on the University's secure online server.
Disclosure.	Any safeguarding concerns which arose during the completion of this research were disclosed to the school's designated safeguarding lead. Participants were made aware that should any safeguarding concerns arise during the research then these would be disclosed to the designated safeguarding lead, in accordance with school policy.

Table 21 - BERA guidelines and considerations

There are specific considerations to explore regarding myself as the researcher. Due to a relatively short 7-week gap between cycle 1 and cycle 2, there was a risk of collecting too much data and being overburdened by the amount of analysis that needed to be done before cycle 2. To mitigate this, I collected interview data from six students, and conducted a relatively simple stage one analysis process to ensure that analysis could be completed with sufficient time left for changes to be made to the teaching models in readiness for the commencement of action research cycle 2. There were additional risks, including that the researcher could be accused of misrepresenting participants' views, which is why member-checking took place, and a risk that not enough data would be collected. However, using the captive audience of my own class, who were required to be in my lesson (although not required to participate in the research), helped to mitigate this risk. Researcher bias was also a risk in this research, as I was the music teacher of the participants and had prior experience of teaching online and as such may have formed some assumptions about online teaching methods. My positionality is set out in chapter one, and a

systematic analysis of the data reduced researcher bias. However, my ontology acknowledges that I shape the study, and therefore will shape the findings, and making my positionality visible accounts for any bias.

3.12 Generalisability, Reliability and Validity

The notions of generalisability, reliability and validity are challenging and much contested within interpretivist research. The purpose of this research is to develop new knowledge, which can be applied to my context and any other context deemed appropriate. This relates to the concept of generalisability, where the outcomes of one piece of research can be applied to another context (Hammond & Wellington, 2013). While generalisability is often associated with positivist research, and has an inherent assumption that findings are applicable between contexts (which some, such as Carspecken (1996), disagree with), Bassey's idea of 'fuzzy predictions' (2001: 9) suggests that recommendations from interpretivist research can be made if there is a strong evidence base, with the understanding for other practitioners that contextual allowances may need to be made when applied to their own context. There is no suggestion that these findings are generalisable to all contexts, only that they are applicable to this research and professional context at the time of data collection and may have application beyond this context.

Validity is a complex term with multiple meanings attributed to it (Punch, 2009), and its relevance to interpretivist research is questioned. However, Hammersley (2005) argues that all research must be judged in terms of its validity, especially if it is seeking to make claims of new knowledge. While there are many types of validity, of greatest concern in this research is internal validity (Campbell & Stanley, 1963), referring to the 'internal logical and consistency of the research' (Punch, 2009: 315). Essentially, internal validity questions if the researcher has conducted a study which logically leads from the research question to the findings. While Campbell and Stanley refer to quantitative designs in their discussions about validity (1963), internal validity in qualitative research can be checked in the following ways (Punch, 2009):

1. Do the components of the research, such as the research question, theoretical positioning, research approach, data collection methods and analysis methods, fit together?
2. Is evidence provided which backs up the findings and claims made by the researcher?
3. Has member checking taken place?

One piece of evidence is not sufficient to support any claims made, and as such the triangulation of evidence through multiple data collection sources becomes important.

To aid with the internal validity of this research, a problem which caused me an authentic challenge was selected. This was supported by a research question and approach which addressed the problem. While social research has limits to its validity due to different people viewing things differently (Wellington, 2015), I am confident that the methodological approach lends itself to ensuring internal validity. Reliability is another term with contrasting meanings in positivist and interpretivist research. The term reliability originates from quantitative research, where it refers to the reliability of any tests being used: different researchers should be able to use the same test within the same context and find the same results (Hammond & Wellington, 2013). However, given that qualitative research is largely concerned with individuals, there is an argument that the same tests will never produce the same results and as such reliability in qualitative research is not relevant (Thomas, 2017).

Instead of the contested terms of validity and reliability, there are other approaches to judging the quality of research and findings in interpretivist research. One approach is the concept of 'trustworthiness' (Lincoln and Guba,1985). This idea considers the credibility of the research and its findings, and if the findings reflect the evidence that has been produced. Bassey (1999) builds on this by producing criteria which can be used to judge a piece of qualitative research:

1. Has the researcher immersed themselves with their sources of evidence?
2. Is there an understanding of the themes, and are they being searched for?
3. Has evidence been checked with the source?
4. Has the evidence been triangulated?
5. Have the themes been tested against the research questions and aims?

Each of these points are considered in this inquiry:

1. Yes, during the data analysis including through transcribing the interviews.
2. The TPACK themes are clearly defined using an existing framework, with other themes being searched for as per the analytical approach.
3. Member checking took place.
4. Triangulation took place by using three data collection methods.
5. The themes are used to answer the research question and aims, outlined in chapter six.

Furthermore, McNiff (2017) outlines several sets of criteria which can be used to understand the quality of a piece of action research, namely those by Heikkinen et al. (2012), Winter (1989), and Herr and Anderson (2005). McNiff (2017: 253) combines criteria from Habermas (1976) and Foucault (2001) to suggest that to present valid knowledge claims, the researcher needs to show seven components. These are outlined below, with their location in this thesis in brackets:

1. Conducted rigorous research (chapter three).
2. Engaged in scholarly enquiry (chapter two).
3. Told the truth – In the context of constructivism and interpretative research, this is understood as the research going through a 'rigorous validation procedure' (McNiff, 2017: 253). This differs from the scientific approach to discovering objective truth and facts, as the truth told here reflects multiple versions of reality as dictated by those who took part in the research (chapter three and chapter four).
4. Developed confidence in personal knowledge (chapter five and chapter six).
5. Displayed courage and tenacity through informed debate (chapter two, chapter five, and chapter six).
6. Evidenced that you believe you are right, while acknowledging that mistakes are possible (chapter five and chapter six).
7. Lived your values in practice (chapter six).

Member checking is another important part of authenticating and validating data. It is the process of checking data with participants to improve the internal validity of a study (Punch, 2009). As noted previously, in this study member checking took place after data collection. Member checking only took place once, to reduce the time burden placed on both the researcher and the participants. However, this still provided the participants with an opportunity to check for accuracy in their responses. This was especially important for the interview questions, as member checking took place after transcription and was important for internal validity.

Determining the quality of a piece of research, and its findings, is of paramount importance in that it may influence future practice and requires a well justified and credible evidence base, but also so that the thesis accurately represents the participants and community within it (Onwuegbuzie & Johnson, 2006).

Generalisability, trustworthiness, and internal validity were considered in this research in the following ways (table 22):

	Considerations in *Simulated Online Music Composing Lessons: developing teaching models through action research*
Generalisability.	It is acknowledged that this research took place in a specific context, limiting generalisability. However, the findings may be relevant to others in similar contexts. To help make the research more generalisable, three different teaching models were explored instead of only one, as to be relevant to more contexts. Additionally, the composing specific TPACK model is presented as a list of questions which can be applied and adapted to the circumstances of a teacher's specific online teaching context.
Trustworthiness.	There was a clear methodological procedure in this research, through the cycles of action research, data collection, and data analysis. Furthermore, data was triangulated through three data

	collection methods. Prior to data collection the themes for analysis were already set out in this chapter, with some dictated by the TPACK model. These themes, along with the data collection and analysis methods, were tested against the research question and aims in the pilot study. Also, some of the evidence was checked with the source, by expanding on questionnaire responses in the semi-structured interviews and member-checking.
Internal Validity and Credibility.	I have demonstrated internal validity and credibility to the claims made in this research through the existence of the underpinning evidence base, i.e. the completed questionnaires, transcriptions of the semi-structured interviews, and the researcher diaries. The research tools were piloted with appropriate changes made, lending them more credibility as reliable data collection and analysis tools. Internal validity and credibility were also aided by triangulation and the inclusion of member-checking for feedback and verification (Savin-Baden & Howell Major, 2013).

Table 22 - Generalisability, trustworthiness, validity and credibility

This discussion regarding generalisability, trustworthiness and validity concludes the methodology chapter, with a summary of the chapter to follow.

3.13 Summary

This chapter began by setting out the theoretical orientation adopted for this research, along with the action research approach, data collection methods, data analysis approach, and the three initial teaching models. It also considered sampling, member checking, ethics, and how this

research can make valid knowledge claims. The methodology for this study provided a secure base from which credible knowledge claims were made, by demonstrating the systematic and rigorous design, planning, and conduct of the inquiry to answer the research question and aims. In reference to McNiff's criteria (2017: 253), this chapter has explained how my research is rigorous and explores how this research tells the truth in relation to constructivism and interpretivism though a validation procedure. In the next chapter the findings from this research are outlined.

Chapter Four - Presentation of Findings

4.1 Introduction

Upon completion of the data collection, the challenge shifted to analysing and relating the data to the research question and aims.

The findings in this chapter are presented chronologically, in the order the models were taught. First, the findings from cycle 1 synchronous, asynchronous, and synergistic models are considered, divided into merits, challenges, and improvements. The findings from the first cycle of the action research were then reviewed, with the identified improvements made to each model. I then present the findings from cycle 2 in the same sequence as cycle 1: synchronous, asynchronous, and synergistic models. Stage two analysis then relates the findings to the TPACK model, and specifically composing music.

In line with the conceptualisation of action research set out in the methodology chapter (section 3.4) and influenced by McNiff (2013), Zuber-Skerritt (1996), and Kemmis and McTaggart (2000), the structure of this chapter demonstrates how action research was utilised to bring about change in my own context. Specifically, this chapter explicitly outlines the findings from two cycles of enquiry, how I have developed my own practice of teaching composing online and have sought to bring about change in my own context, and the reflexive nature of action research. This chapter demonstrates how the identified problem (no research into teaching music composing online) has been approached through two cycles of action research.

The average numeric responses to the questionnaires were downloaded in a question-by-question format, to allow for comparison between the different teaching models and the two cycles (appendix K). Action research forms part of the qualitative tradition, within which researchers usually adopt a qualitative perspective (Savin-Badin & Howell Major, 2013). While statistical

analysis was not a feature of my research, the average numeric analysis did provide some confirmatory evidence.

The open questions from the questionnaires, semi-structured interviews, and observations were coded for organisation and analysis. The initial coding of challenges, merits, and suggestions for improvement for all data collection methods were collated into a spreadsheet. In addition to the three existing codes, the TPACK model was used as an analytical lens, and additional themes beyond TPACK and the three initial codes were identified.

An abductive (Dewey, 1991; Brinkmann, 2017) approach to data analysis was discussed in the methodology chapter (section 3.9). In this chapter, the dialogue between the different data collection methods, the literature, the interpretation of the findings, and how their interactions influence change to the three models in the different cycles of action research, were considered.

The overarching finding is that online composing lessons, where composing skills are taught and new music created by students, are achievable. For example, I noted in the researcher diary for synergistic cycle 2 that *'composing works well and is very efficient, online'* and *'composing works well online, which I think this research has successfully displayed and improved'*. Ultimately, students managed to complete two composing modules over twelve online lessons and composed two original pieces of music each.

To aid with analysis and the presentation of findings, several steps were taken:

1) Each data collection method was analysed using the codes merits, challenges, and suggestions for improvement.
2) The data from these codes was compiled in a master spreadsheet (appendix G), which presented together all the merits, challenges, and suggestions for improvement from across each data collection method, teaching model, and action research cycle.
3) The merits, challenges, and suggestions for improvement for each teaching model/ cycle were then put into an individual document, compiling each data collection method to display the merits, challenges, and suggestions for improvement.

4) These merits, challenges, and suggestions for improvement were used to make alterations to the teaching models.

It may also be useful to outline the content of the two composing modules, both of which ultimately involved students composing entire pieces of music. The first composing module was based around the musical genre club dance, and explored a different composing skill each lesson e.g. how to compose a bass line, how to add in chords, how to compose a melody, how to incorporate drums. The second composing module was to compose a minimalism piece, and students learned specific minimalist techniques each lesson such as metamorphosis, addition, and subtraction. The functionality of BandLab remained the same for both compositions, with no additional specialist uses of the DAW arising because of each genre. Students used the same BandLab techniques, such as automation (programming aspects such as volume changes), panning (moving the sound between headphones or speakers), and quantising (in this case, making the timing of musical notes precise by conforming to a rhythmic grid), in both compositions.

4.2 Enacting Change – Findings from the three online composing teaching models

As per the action research nature of this study, which wass based on cycles of action, critical reflection, and replanning, the three initial online teaching models changed between cycles one and two, with further suggestions for improvement post cycle 2. As explained in the methodology chapter (section 3,9.1), during stage one of the analysis the merits, challenges, and improvements for each model were identified. The findings from analysis stage one are outlined below, and all of the quotations in italics have been transcribed verbatim from the semi-structured interviews unless otherwise stated.

4.2.1 Cycle 1 - Synchronous

The original synchronous model was based on *a model for synchronous learning using the internet* (Chen et al., 2005). To recap, in the synchronous model learning happens at the same time as teaching, but the teacher and student(s) are in different locations.

There were several merits relating to online synchronous lessons that presented themselves in cycle 1. Students suggested they appreciated being able to ask questions live, adding that *'I think it was better than like, actually a question in real life'* (pupil C, interview). This aligns with Maki (2001), Dye (2007), and Lockett (2010), who all say that live questioning is a positive feature of synchronous lessons. Building on the ability to question students live, it was advantageous to be able to play clips of music live and ask relevant questions, model tasks live, and go into student work on BandLab: *'You could like, check my piece and then tell me what to do'* (pupil C). The synchronous lessons appeared to keep students engaged in the lessons and on task, with very little off task communication: *'You don't have to worry about anyone else'* (pupil B), *'I was concentrated on my own work'* (pupil C), and *'I was literally concentrating on my own work'* (pupil D). I suggest this was partially because I was able to communicate via Google Meet to students constantly, another benefit of synchronous lessons and a similarity to face-to-face teaching. Maki (2001) suggests that online lessons can be like face-to-face lessons, and that seemed to be the case here. Additionally, the lesson structure of the online synchronous lessons was like face-to-face lessons. Students being engaged with lessons may have also contributed to the high completion rate of work, with many students self-reporting that they managed to complete their work and improve their composing skills. Synchronous lessons gave students to opportunity to communicate with me and other students: *'I asked her for help'* (pupil F). Dammers (2009) and Riley (2007) suggest that forming relationships in online lessons is challenging, but as students were evidently communicating with me and each other and self-reported that they felt a sense of belonging in synchronous lessons, that was not entirely true here. Finally, there were several technical benefits which first became clear (through the survey and my observations) in these synchronous lessons and which were also apparent in the other two models. Namely, students found the tasks easy to access through Google Classroom and Google Meet, clicking in notes (i.e., place an F note at exactly this point in a bar) instead of

using a musical keyboard was not a problem, and the ability for the teacher to leave written feedback for the students between each lesson was useful.

While the cycle 1 synchronous lessons had merits and showed promise, there were multiple challenges. The most significant issue was an inability to have one-to-one conversations with students without other students also hearing, disturbing the other students. This made one-to-one conversations less attractive, as students may not have wanted to be overheard by the whole class. As students were then somewhat reluctant to have these one-to-one conversations, lessons turned into a one-way conversation at times and, as Riley (2007) noted, reflected university-style lectures as they resulted in the teacher talking with little student interaction. In the survey students reported that most of them did not speak with me, suggesting those who did speak with me dominated the chat, and that quieter students preferred not to communicate with me or anyone else. This was also true of the chat function, with only some students utilising it to communicate with me: '*If I didn't understand I would have to keep on typing. And if I like constantly didn't get, I have to keep on typing, typing.'* (pupil D). This suggests that pupil D was frustrated at having to repeatedly type in the chat when they did not understand an explanation, potentially dissuading them from asking for clarification using the chat function in the future. Students also reported that they did not communicate with each other much, saying that *'I was so independent on my own work and there was no like interaction between other people'* (pupil A). Students working independently did also mean that some completed the tasks quickly and did not know what to do next: *'I think having more extension tasks because to be fair, you have people who will move on to the next class quite quickly. And let's say they don't understand it, there's always the next lesson to be able to help. And also extension tasks, they allow you to build up what skills you have inside you'* (pupil B).

The issue of students reluctance to communicate with me or with each other was particularly troubling, as those who did not understand the work did not seek advice and guidance to remedy this: *'Sometimes I kind of zone out and I don't understand what's really going on'* (pupil A); *'It's just like, it's not my type of teaching because like, even in lesson sometimes I actually get confused'* (pupil B); *'Some things were quite confusing'* (pupil C). Even if students do not understand what to do, a benefit of synchronous learning is that the teacher can check for

understanding and respond in real time to help students (Solomon & Verrilli, 2020). However, that benefit is only true if students communicate with teachers or each other, which for the most part they did not. Demonstrating through musical modelling can be challenging in online music lessons (e.g., Dye, 2007), and while musical modelling was used in these synchronous lessons the fact that students at times struggled to understand what to do suggests that modelling and two-way communication are both required. There were also some difficulties with the technology, such as off-task use of the chat function within Google Meet (which was difficult to moderate while also teaching), and the processing speed of the computers: *'To be fair, Bandlab was easy to use, it's just the computers that were really hard to actually process that information' (pupil B).* Solomon and Verrilli (2020) cite technology issues as a limitation of synchronous lessons, and to some extent that was true of my research due to communication challenges and computer processing speeds.

As a result of the challenges in cycle 1, several changes to the synchronous model were made for cycle 2. These changes are broken down into four categories (table 23):

Category	Changes Made
Explanations.	- 'I-do-we-do' approach, where the teacher models a concept followed by the class doing the concept together, with an option for students to continue independently if they feel confident after the initial explanation. - Drop into more student work early in the lesson to help prevent misconceptions. Target students known to be quieter or of lower attainment to check for understanding and encourage active participation. - Slow down my explanations, and check that students are looking at the correct screen (by asking them to say 'yes' in the comments when looking in the right place).

Google Meet and Teacher-Student Communication.	- Open a second Meet call to speak to students privately. Mute the first Meet call while on the second, private call. - Establish clearer ground rules for the chat.
Completing Work.	- Provide additional extension work, in the form of a task which looks forward to the next lesson. - Leave feedback notes between lessons on BandLab, for students to act on at the beginning of the next lesson. - If students did not manage to complete all the work in the lesson, there should be an expectation that they complete it at home before the next lesson.
Sharing Work and Student-Student Communication.	- Provide more time for students to give feedback on each other's work when it is shared with the class. - Encourage critical thinking and listening skills by using the module marking criteria when listening to each other's work (to be referred to when answering questions).

Table 23 - Synchronous changes cycle 1

Considering the changes outlined above, the initial synchronous model was adapted for cycle 2. The original model (left hand side) and the model after cycle 1 (right hand side) are placed next to each other for comparison (figure 6).

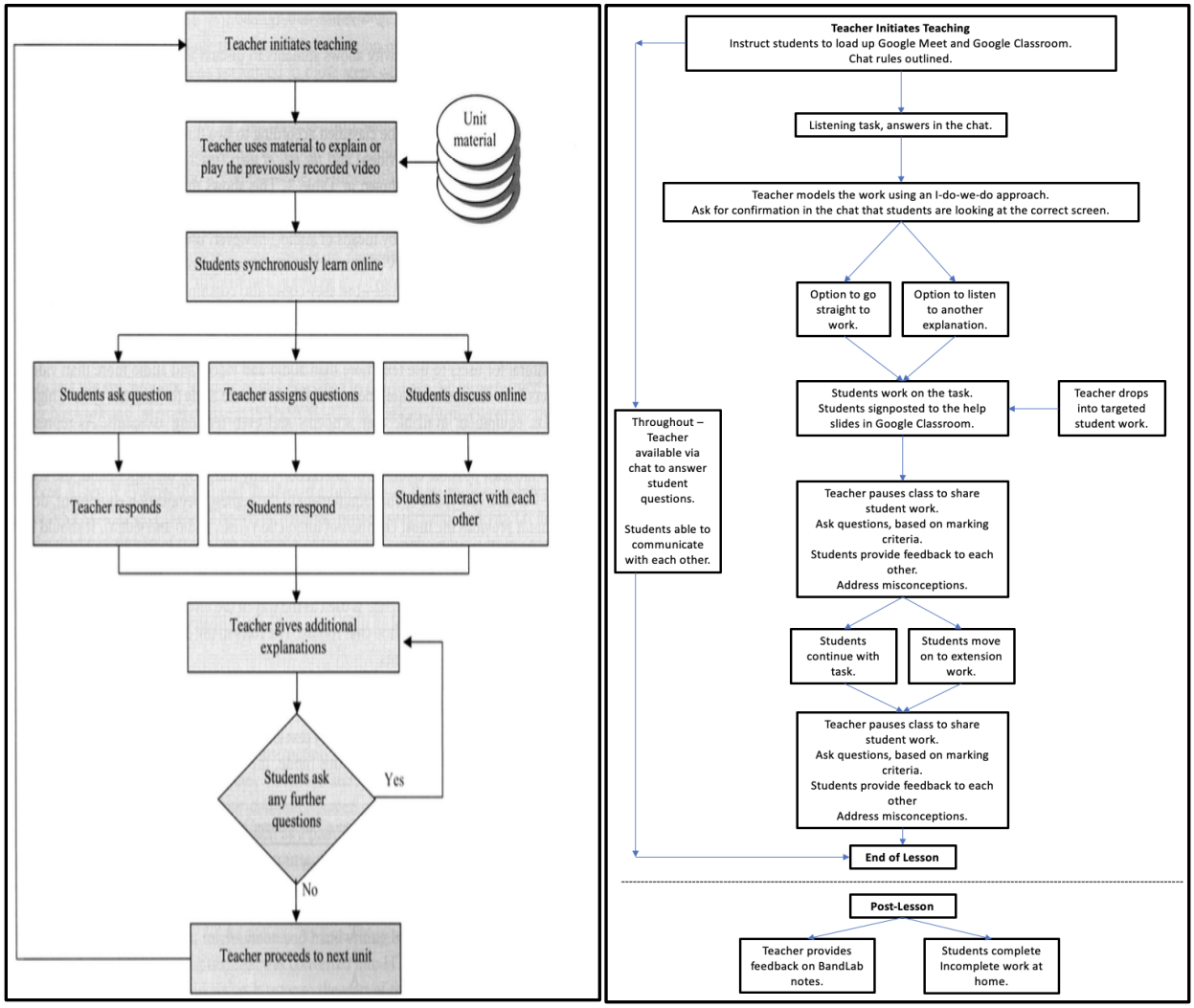


Figure 6 - Original synchronous model and model after cycle 1

4.2.2 Cycle 1 - Asynchronous

The original asynchronous model was based on the *7 Principle Model* (Ou et al., 2019). In asynchronous lessons, learning happens at a different time to teaching, and in different places (a pre-recorded lesson). As with synchronous, after cycle 1 multiple merits, challenges, and suggestions for improvement were identified.

The first positive aspect was a somewhat unexpected consequence of having no 'teacher-talk' or the ability to communicate with anyone. The lack of teacher-student and student-student

communication meant that students had more time to complete tasks than in a typical lesson which helped students to maintain their focus: '*I felt more focused, if I didn't talk to anyone' (pupil F)*. Morgan (2022) suggests that 'dull instruction' because of 'passively listening to videos and presentations' is a problem with asynchronous online learning, with Solomon and Verrilli (2020) adding that there is little 'connectedness' between students in asynchronous lessons. However, while the teaching of the content was passive, the tasks students were completing were active. The passive nature of the lesson (with students and teachers not interacting) gave students more time to complete the active part of the lesson (the composing itself). Active learning, combined with fewer opportunities for communication, complemented one another. Students appeared to enjoy the opportunity to concentrate more, as exemplified in this comment from pupil D who reported that learning was *'fun at the same time because I got to concentrate way more'*.

As this model appeared to give students more time to complete their work, most students completed the main tasks and moved on to extension tasks without having to wait for the rest of the class to catch up: *'If you do one thing and you finish it, you don't have to wait. And you can go straight into the next part'* (pupil B). This has some parallels with Johnson's (2020) student-centred model, with students responsible for the pace of their own learning. Without the ability to communicate with anyone, there was evidence of students solving problems for themselves, and developing their compositions beyond the tasks using their own initiative. For example, one student who wanted to know the notes of the piano independently found a website to answer their question, some students added additional instruments to further develop their composition beyond my explicit instruction, and one student taught themselves how to do automation (automatic volume changes). These behaviours illustrate the development of learner independence in music composing. These lessons began with a self-marking quiz, and beginning the lesson with a starter helped to retain a somewhat familiar lesson structure for students, contributing to their success (Maki, 2001). Another positive aspect of asynchronous lessons was that students rewatched the videos when they needed help: *'When I watched it the second time, like it made more sense to me'* (pupil A); *'I can just replay the video over and over again'* (pupil D). Solomon and Verrilli (2020) suggested that a benefit of asynchronous learning is students can learn where and when they want, which one can assume includes going back to review

videos when required. When asked in the questionnaire, most students said that they preferred asynchronous lessons over synchronous lessons, as they could refer to the videos if they were unsure of anything: '*you can always go back and you can understand it. However, with learning itself with listening to a teacher, you can't, you can't just skip time backwards'* (pupil B). Morgan (2022) suggested that most teachers also prefer asynchronous lessons over synchronous, as they experience fewer issues with technology.

Along with merits, there were also challenges with the asynchronous lessons. While students did highlight some of these challenges themselves, most of these challenges came from the teacher observations and reflection. First, not being able to provide live feedback or answer questions was frustrating, especially as some students were evidently struggling with the work. Some students also found the lack of teacher-student and student-student communication a challenge: *'The biggest challenge is, you know, when we have asynchronous lessons, it's like, not being able to actually, like, gain help from other people'* (pupil B'); *'There was no like, talking. It just made it a bit like kind of boring'* (Pupil D). Dye (2007) found that students communicated with each other in online lessons in a similar way to face-to-face but that was not the case in these asynchronous lessons, and Morgan (2022) highlights isolation caused by a lack of interaction with peers as a major challenge with online learning. Solomon and Verrelli (2020) reported little connectedness between students in asynchronous lessons, something which was also evident in my research. Not being able to communicate meant that mistakes and misconceptions could not be corrected during the lesson. This meant that students needed to wait until the next lesson to respond to feedback and correct their work: *'If I was struggling, then I'd find it hard.'* (pupil F); *'If there was any technical issues, then then there would've be a problem, because, because, because not everyone knows how to use BandLab properly'* (pupil E). This difficulty in checking for student understanding posed by asynchronous learning modes was something to which Solomon and Verrilli's (2020) study also attested. By extension, a teacher cannot correct misconceptions if they do not first check for understanding. I also found it frustrating that I was unable to share student work during the lesson, that not all students completed the quiz at the beginning of the lesson, and that instructions that students found confusing could not be clarified: *'Some bits I understood and some other bits I didn't really understand'* (pupil A). When students fell behind it was difficult for them to catch up without synchronous support, and

students did not complete any missing work at home. While Solomon and Verrilli (2020) suggested that learning via asynchronous means gives students the opportunity to learn where and when they want to, this finding was not borne out in the research as students did not demonstrate the ability to complete unfinished work at home. Finally, creating videos for these lessons was extremely time consuming, and whilst Johnson (2020) suggested that the preparation time for online and face-to-face lessons is similar, this is not in accord with my experience.

As a result of the challenges in cycle 1, several changes to the asynchronous model were made for cycle 2. These changes are broken down into three categories (table 24):

Category	Changes Made
Extension Tasks.	- As the teacher has less control over how quickly students complete a task (and cannot suggest improvements to their work during a lesson), additional extension tasks need to be provided.
Addressing Misconceptions.	- Misconceptions proved to be an issue. Shorter videos, which can be followed step-by-step, may mitigate this issue. - Provide a short introductory video explaining what needs to be done in the lesson, including a clear explanation of what each link does and how long should be spent on the quiz at the beginning of the lesson.
Questions.	- Set up a place on Google Classroom where students can post questions/ communicate with each other (which the teacher can also review between lessons), and provide a feedback video for students and leave personalised feedback in the 'notes' section of BandLab. The video will address common questions and misconceptions, while the individual feedback left in projects will be specific to that student.

Table 24 - Asynchronous changes cycle 1

Considering the changes outlined above, the initial asynchronous model was adapted for cycle 2. The original model (on the left-hand side) and the model after cycle 1 (on the right-hand side) are outlined below (figure 7).

Instructional phase	Component of video lesson	Instructional methods
Activation	Preview of the lesson	Learning through reflection
Demonstration	Presentation and discussion of lesson topics	Learning by example
Application	Exercises Exercise solutions Assignments	Learning by doing Adaptive feedback
Integration	Wrap-up The cognitive connection Reflection	Learning through reflection

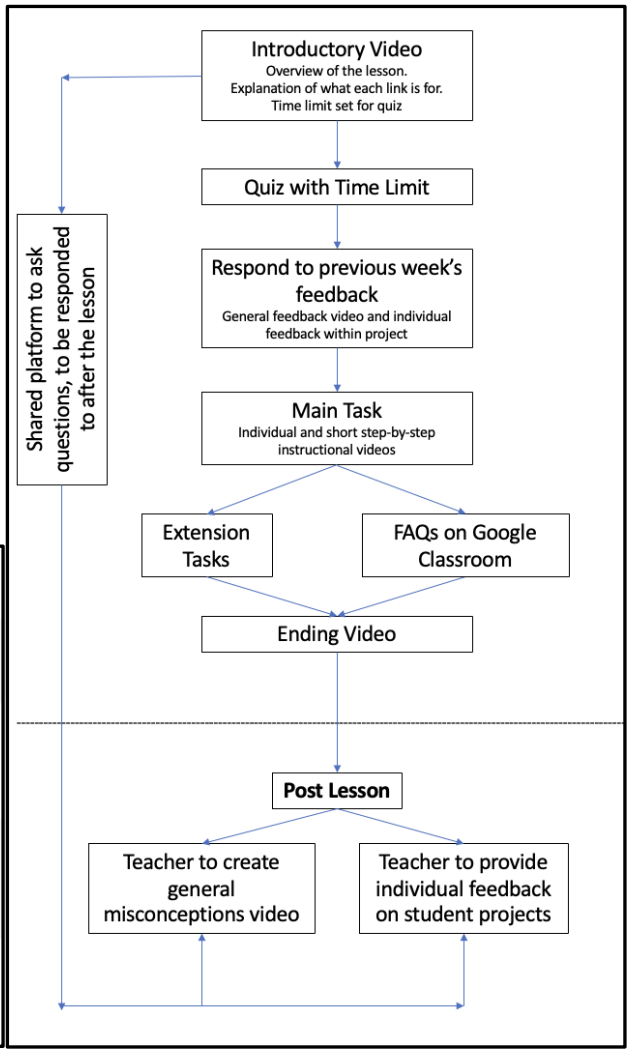


Figure 7 - Original asynchronous model and model after cycle 1

4.2.3 Cycle 1 - Synergistic

The original synergistic model was based on The Flipped Classroom Model (Rehman & Fatima, 2021). Synchronous lessons take place on a continuum between synchronous and asynchronous lessons, with both live and pre-recorded elements. As with synchronous and asynchronous

lessons, after cycle 1 multiple merits, challenges, and suggestions for improvement were identified.

Some merits of the synergistic model were identified in the lesson observations. For example, many students requested that their work be shared with the class, and the ability to both communicate with students and receive these requests, as well as the act of sharing work, was a positive feature of synergistic (and indeed synchronous too). Interestingly, students also reported that they could watch the help videos if they did not understand a concept once I had explained it, or come back to me for help:

'*Sometimes when people explain things like I don't get it the first time and like I don't really ask again, because I feel like it would be like rude or something but, but the video was also like it was just there on Google Meet like I could watch it myself*' (pupil A)

'*The video, that's your main source, in my opinion, that's my main source, but then if I if I really don't get something if I look at the video, I go back and continue just my mind is further like confusion, I can always ask the teacher to help me understand*' (pupil B)

'*I didn't need help…because the video was already there for help'* (pupil D)

'With the videos, you can skip to the point that you want to get, and Google Meet, I will still talk to you and I still get extra help if I need it' (pupil E)

As evidenced, the ability to combine the merits of synchronous (two-way communication and the ability to share work) and the merits of asynchronous (able to rewatch videos) was a strength of the synergistic model: *'I like you and video'* because *' let's say all of us finished the work, sometimes I go on Google Meet to see like how other people are doing. When you present other people's work, I can compare it to mine'* (pupil D). I witnessed students asking questions during the lessons, responding to questions, and offering feedback to each other. Students took part in these communications via the chat feature in Google Meet, consistent with Murphy et al.'s (2011) suggestion that students prefer to use chat functions instead of speaking. Contrary to

much evidence, which suggests that relationships can be difficult to form and maintain in online learning environments (Dammers, 2009; Riley, 2007), the chat function provided an opportunity for relationships to develop. Finally, much like synchronous lessons, in synergistic lessons students could ask questions which were answered live.

There were also challenges with synergistic lessons. The first challenge was at the beginning of the lessons where some students spent far too long on the first quiz, and it was then difficult to get students back together to present the introduction video. Relating to this, the videos which explained the tasks (which were presented to the entire class simultaneously) were too long while at the same time explained concepts too quickly (suggesting too much content, delivered quickly, in a single video). As a result, students frequently asked to slow down the videos or pause them. Another issue with presenting the main task in the form of a video, as suggested by the initial model, was that I could not address misconceptions or answer questions due to the video playing. Dye (2007), Maki (2001), and Locket (2010) all found that more questioning takes place in online lessons, but this synergistic model appeared to be limiting the opportunities for questioning to take place. As with the synchronous model, when a student asked me a question everyone could hear my response. Similarly, everyone could hear when I was listening to another student's work. This created some confusion for students*:*

'You're helping other people on Google Meet and I couldn't really hear my piece, so it made me a bit confused' (pupil A); *'It was a bit confusing because like you took up talking and then the video was talking as well and I just can't hear it'* (pupil C).

While some students communicated with each other during the lesson, many did not. Whilst Dye's (2007) study found that students communicated with each other in online lessons in a similar way to face-to-face, for most students in this study that was not the case in synergistic lessons. Finally, some students reported that there was too much work to complete for one lesson while others wanted more extension tasks because they quickly finished the work. Students who struggled to complete all the work were supported, but planned extension work which students could access independently would have been beneficial.

Taking these challenges into consideration, the changes to this model have been divided into four categories (table 25):

Category	Changes Made
Lesson Control.	- Begin by explaining the task and modelling live. Have short step-by-step videos available to students to refer to. - Teacher to control the quiz process, instead of giving students the opportunity to control the audio/ video for the quiz themselves.
Communicating with students.	- Have a second Google Meet call available for speaking with students individually.
Extension Tasks.	- Have extension tasks available for students who complete the set tasks.
Post-Lesson.	- Set homework for students, which includes completing work that they did not finish during the lesson and checking that the previous week's work is up to date.

Table 25 - Synergistic changes cycle 1

With the changes above made, the synergistic model for cycle 2 is as follows. The original model (on the left-hand side) and the model after cycle 1 (on the right-hand side) are placed next to each other for comparison (figure 8).

1. Begin with a quiz on Google Forms, relating to last week's lesson (asynchronous). Students directed to read their feedback from the previous week's work.
2. Introduce the new lesson material through a video (asynchronous)
3. Video-call students through Google Meet – opportunity for questions from teacher and students, clarify misunderstandings, screen sharing to share work (synchronous)
4. Students return to their work, able to refer to lesson material video (asynchronous). Students can message/ video-call the teacher during the lesson if they require help (synchronous)
5. Quiz to clarify learning (asynchronous)
6. Reflection on lesson via questionnaire.

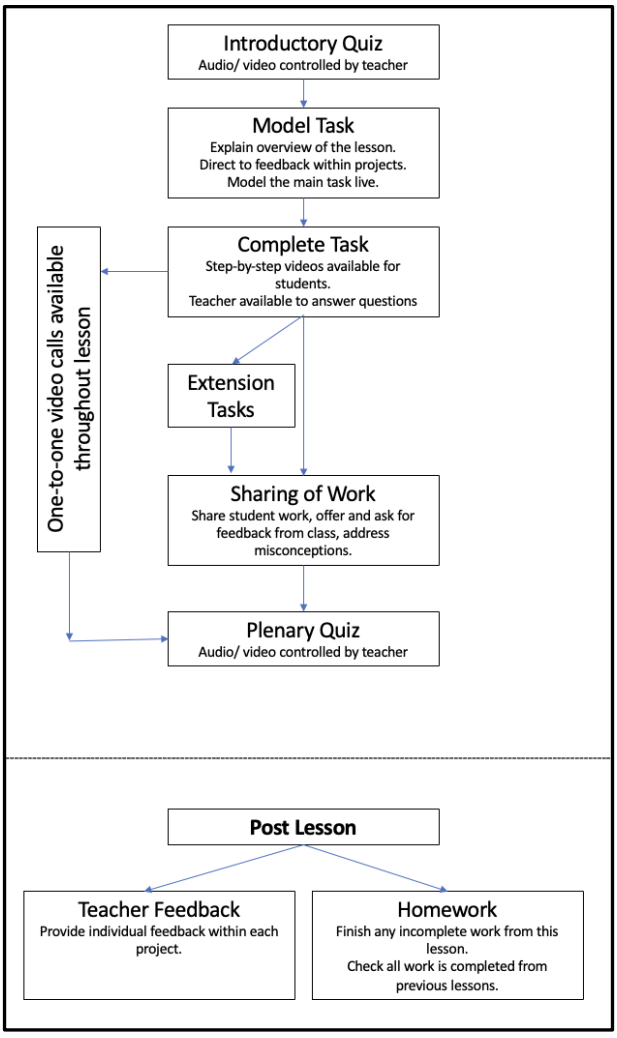


Figure 8 – Original asynchronous model and model after cycle 1

I next consider the teaching models in action research cycle 2, which incorporate changes to the interventions consistent with the action research methodology with its improvement and change orientation. This is followed by further suggestions for improvement post cycle 2.

4.2.4 Cycle 2 – Synchronous

The merits of the cycle 2 synchronous model, as outlined below, are in addition to those highlighted in the cycle 1 findings. The changes made to the original synchronous model, as with all models, appeared to improve it. In particular, the second Google Meet call was well received by students:

'I really like the second Google Meet because like let's say you're stuck, and then if your classmates doesn't know the answer, so you can go on to the other thing to like, actually ask for help' (pupil D);

'Before we do any of this [the changes to cycle 2], *you always used to help students, like, and then you could hear everything. So it was really annoying'* (pupil F).

There also appeared to be more evidence of students helping each other in cycle 2 of synchronous lessons, with pupil D saying that '*you don't always have to use the second one* [Google Meet call] *as you can like ask your classmates if they know the answer'*. Pupil E added that synchronous lessons were better in cycle 2 because there were more ways to communicate with others, and it was noted in the observation that there was more student-student and teacher-student communication in this cycle, in part due to the second Google Meet call. Students also reported that they felt part of the class in these cycle 2 lessons, with pupil E saying that *'there's the chat, which is sometimes active'* and pupil F saying that they felt more a part of a class in these lessons. Much of the above was reflected on in the observations, especially the benefits of the second Google Meet call, the additional extension tasks, providing written feedback in each lesson on BandLab, and the advantages of being able to drop into student work. I noted in the observations that I felt this new version of the synchronous model was an improvement on the first, as it was possible to help students without distracting others, and students could ask for help without fear of being overheard by others. The extra extensions helped to keep everyone engaged and on task, and the I-do-we-do approach reduced the number of misconceptions. Lessons felt less like a lecture than the previous version of the model, and students who were behind could catch up by interacting with the teacher in the separate Meet call.

While the second synchronous model mitigated many of the challenges of the first, there were still challenges with this new model. For example, despite improvements in communication 10 students did not ask a question, and 13 students did not speak to another student. When asked why they did not speak to anyone, pupil A said *'I just work independent(ly)'.* In this model, students did not like waiting for explanations to finish as they wanted to get straight on with their

work: *'I can get on with the work like, very quickly and kind of waiting for you just like finishing off like was a bit like difficult'* (pupil A). While the second Google Meet call had many advantages, having two Google Meet calls operating at once was logistically challenging. With the 'main' call on a computer and 'help' call on an iPad, to share the screen of BandLab the calls have to be changed to the opposite device. However, the computer did not have microphone access, so I could only share the screen and type in the chat to those I was helping instead of talking to them. I also noted that it was challenging to ensure that every student was answering questions and was engaged with the tasks. Similarly, it was difficult to tell if every student was communicating in synchronous lessons. On several occasions students were asked to write 'done' in the chat when they completed small tasks (e.g., log in to BandLab), and while it appeared that everyone wrote in the chat, I could not be certain that everyone communicated with me. There were also barriers to creating an environment where students communicate with each other. For example, when it came to asking for help students had options, such as using the second Meet call or using the written guide on Google Classroom, and therefore may not have felt the need to ask each other. It was challenging to promote student-student communication and simultaneously foster an online environment where students focused on their work, and striking that delicate balance was unsuccessful. In addition, there was some silliness with the chat (overuse of emojis, for example), and even though more extensions were provided one student still required additional tasks.

While several students said that 'nothing' would improve these synchronous lessons (e.g., pupil A and pupil D), there are changes which should be made to the second iteration of the synchronous model. The first is to dictate how the two Google Meet calls are set up, for example in separate tabs on a single microphone and video equipped laptop or computer. Additionally, to ensure that all students are communicating and engaged in the lesson, more focused questioning of quieter students should take place, as should the public sharing of work of quieter students (so that the class can provide feedback). To promote student-student communication, a more private way for students to communicate with each other (while being monitored by the teacher) could be introduced. This might include the use of a different chat application if not achievable within the G Suite for Education. Finally, there should be clear instructions for students to communicate

with the teacher if they complete all the work and all the extension work, so that further extensions can be provided.

A new version of the synchronous model, along with new versions of the asynchronous and synergistic models, are presented in chapter six.

4.2.5 Cycle 2 - Asynchronous

As with synchronous, the merits of asynchronous cycle 2 build on the merits of cycle 1. Once again, the questionnaire suggested that students were positive about asynchronous lessons in the second cycle. It was observed that asynchronous lessons used time very efficiently, with students getting straight on with their work as soon as they entered the classroom and logged on to their computers. Pupil B added that:

> '*It was much easier for me to use asynchronous than synchronous, because like, once you get once you sit down, it to be able to be told, go straight onto it, it makes me feel like I can just immediately do something that I want to do'.*

I observed that many students thrived when given the opportunity to work independently, with some students an entire lesson ahead. In the questionnaire, one student said *'I prefer being taught by video because I [like] to work independently'*. A positive aspect of asynchronous lessons was that they allowed students to work at their own pace, and at one point there were simultaneously students on lesson 1 and lesson 5. Students reported that they still liked being able to replay videos, with one student in the questionnaire saying that I '*can replay the video I am stuck on',* and another adding that '*you can easily look back if you're stuck'.* Students also said that they preferred cycle 2 synchronous lessons because of the additional extension tasks (e.g. pupil A) and the slower videos (pupil C), and I observed that cycle 2 was an improvement over the previous asynchronous model due to the step-by-step videos and the comment section on Google Classroom. Regarding the additional extension tasks, pupil D said:

'I really liked that extension task because you gave it like the next lesson ahead, so if you finish the first lesson, because you know, when I was in for a lesson and then the extension was like, the next lesson, so I got to do that as well in like both two lessons in one lesson. So I got to like finish and accomplish a lot in only one lesson'.

At the end of cycle 2 lessons one and two, as reported in the observations, students verbally confirmed they used the misconceptions videos, found them helpful, and thought that asynchronous lessons improved this cycle. In this cycle students had the option of using short step-by-step videos or using a written guide. Pupil D said they preferred the written guide, as they found it 'easier'. The shorter step-by-step videos themselves were also well received, with pupil E saying that '*The shorter videos like helped since like the longer videos you have to like, go back and find the exact moment of like, where you are right now, which [is a] waste of time'*. As already noted, some students used the comments section on Google Classroom to communicate and help each other. Instances of this peer-supported learning can be seen in the following examples:

Example 1
Pupil A) Sir, my step 2 and 3 videos won't play.
Pupil B) Just rename the track to 'motif 1 metamorphosis' and then move it to below motif 1.

Example 2
Pupil A) You see the subtraction it gets too small what do I do?
Pupil B) On the video it says that if it gets too small you can make it bigger again.

However, both examples are from lesson one of asynchronous cycle 2, as students said the instructions were 'clearer' in lesson two and therefore they did not use the chat.

While cycle 2 of asynchronous was an improvement over cycle 1, there were still challenges with this model. Firstly, some students did not like the shorter videos (even though they were a popular request for improvement after cycle 1): *'I feel like the shorter videos were kind of a bit hard to use, because you just had to keep that going on to every single slide and it was a bit*

hard' (pupil A). As noted above, some students did use the Google Classroom chat. However, most students did not, and students reported that they did not feel part of a class during these lessons: *'It just felt like you're like, looking up like a video and just doing stuff alone. Like there's like no one else'* (pupil E); *'I felt like, let's just say that pretend I was in that alone space working just by myself, something like that'* (pupil F). I also found that students did not always look at all the slides, and as such missed information: *'Actually, I didn't even watch the introduction or any of the videos because I was on the other slide'* (pupil C). Several other challenges were noted in the observations, such as that some students struggled to follow instructions independently without guidance from a teacher, even when broken down into step-by-step videos, that it was not possible to share student work, and that misconceptions could not be corrected live. I noted that asynchronous lessons involved more preparation than synchronous lessons, and that even with written feedback and instructions to complete work at home, some students did not. Finally, it was observed that it was difficult for students who had fallen behind with learning to catch up in asynchronous lessons.

While many students said variations on 'nothing' when asked how asynchronous lessons could be improved, there are improvements to be made in the next iteration of asynchronous lessons. Firstly, students should be given the option of long videos, short videos, and a written guide. If students are working on their own without a teacher to help, having the material available in a way which suits them best will help students to understand the work. Further extensions would also be beneficial to those students who are working very quickly, and students need more encouragement to communicate with each other using the Google Classroom comments. For example, when students complete a particular task they could post a link to their work on Google Classroom and ask for their peers for feedback. Finally, a mechanism should be built into the lessons which prevents students from moving on to the next part of the lesson without first completing each task in order, for example completing a quiz or watching a particular video.

4.2.6 Cycle 2 - Synergistic

Cycle 2 of synergistic built on the merits of cycle 1 and addressed some of the challenges. Much like synchronous, the inclusion of an additional Google Meet call was well received by students, with the extra call described as *'very useful'* (pupil D). A student added that if they were having issues they could *'go to the call and get it fixed'* (pupil E). I observed and noted in the teacher diary that the changes made for cycle 2, especially the second Google Meet call, were effective, and during an informal conversation with students at the end of a lesson students confirmed they liked the additional call. Overall, students said that the synergistic lessons improved in cycle 2, saying the lessons were *'a lot better than last time'* (pupil C), with 8 students confirming this in the questionnaire. While the additional Google Meet call improved both the synchronous and synergistic models, some students preferred synergistic lessons: '[I prefer] *partly live and partly video, because I can still receive extra help'* (questionnaire); *'I prefer a bit of both because the videos are straightforward and if you need help you can also ask the teacher'* (questionnaire). Pupil C and pupil D had similar reasons for preferring the synergistic model over the others, saying that *'if I didn't get the videos, I could come to you'* (pupil C) and *'I really like you and the videos because sometimes when I need it…I can just ask you'* (pupil D). Other improvements included the additional extensions: *'I was able to have more work to finish as well as more extensions'* (questionnaire), and I noted in my diary that *'plenty of extension tasks meant that there was enough work for all students'*.

The synergistic model afforded me sufficient time to help students who needed it, as most students could access the work via pre-recorded video, freeing up my time to aid those who were struggling. Arguably this was an effective use of lesson time for myself and the students, which students confirmed to me during an informal conversation after synergistic lesson 1. There was a significant amount of communication, both student-student and teacher-student, during synergistic cycle 2. The second Google Meet call was often used by students asking me for help, extensions, or feedback, and students would reply to questions using the chat function. Students also communicated with each other, giving relevant and accurate feedback to pieces that where shared with the class and offering technical advice (e.g. to a student whose headphones were not working). I noted within my teacher diary that synergistic cycle 2 lesson 1 was *'the best lesson*

so far' for communication, and that *'communication in this model is the best of the three'*. This contributed to some sense of belonging in the online class (pupil F and questionnaire). Additionally, it was observed that controlling the audio and timer for the quiz myself was successful, explaining the task initially instead of using a video was effective, step-by-step videos worked well, misconceptions were addressed as they arose, questions were asked live and student work shared, and that students who were behind could be focused on and helped to catch up.

Despite numerous merits, there were still challenges with the second cycle of synergistic lessons. For example, while communication improved it was still difficult for some students to make a learning connection, such as pupil F. In the questionnaire, 16 students said they did not speak with another student, and I observed in my teacher diary that *'some students do not speak at all'*. 11 students also did not speak with me (evidenced in the questionnaire), and a challenge with synergistic lessons was the students who wanted help took up a lot of the teacher's time, leaving less time to drop in on quieter students. That made it harder to check that everyone was doing the work and progressing, although this was somewhat mitigated by providing individual written feedback in the notes section between lessons. Most students did not complete the homework, partially because some had completed the tasks but also because they '*couldn't ask for help*' (pupil C). Related to this, pupil F said that there were too many tasks in the synergistic lessons, and they were not able to complete them all. There were a few challenges with technology, such as the internet dropping out and issues with sound on student computers, but these were not specific to the synergistic model.

There are improvements to be made to this model, despite many students saying they would improve 'nothing' in the questionnaires, such as more challenging extensions (from questionnaire) and having a choice of long and short help videos (from questionnaire). The main improvement relates to pedagogy, as quiet students could easily be missed. As such, a way to ensure teacher interaction with all students is required, such as checking student names off a list as they are spoken to. A way to ensure that students are looking at the correct screen when required, such as a button which makes all screens look at what the teacher is sharing, would be

beneficial. However, I observed in the diary that '*the changes made to cycle 2 were effective. I do not think any of the changes made from cycle 1 were inaccurate or need to be reversed'.*

4.2.7 Summary of the teaching models

With the findings from the three teaching models across both cycles presented, it is prudent to consider any common emergent points. While all models displayed unique merits, challenges, and suggestions for improvement, there were some similarities.

The only common merit that all models had, apart from that they allowed for composing to take place, was the similarity to face-to-face lessons. This was intentional, as the initial models selected already somewhat reflected face-to-face lessons, and they were then further developed. Specifically, these students experience music composing in face-to-face lessons by using a DAW on computers, through a process of the teacher explaining the work and modelling, students completing their composition, and then the sharing of compositions with the class. In moving from a familiar environment (a classroom) to an unfamiliar online learning environment, a similar lesson structure was maintained to ease the transition. As students become more familiar with online lessons, there may be opportunities to be more adventurous with lesson structure. Exploration of lesson structure might also happen because of the teacher's familiarity with and understanding of their online composing TPACK improving, equipping teachers with the skills to be take more risks and utilise the technology in ways not possible in the traditional classroom.

While there was only one common merit between the models, there were three common challenges. The first challenge was that most students did not communicate with me or one another, even after the changes made in cycle 2. This might be because students had the resources they required and therefore did not need to speak to the teacher or each other, or because it was possible for students to 'hide' in online lessons and be non-responsive. A third explanation relates directly to the at times solitary nature of music composing, with students wanting to write their own music without interruption. The second challenge was that it was difficult to know that all students were on task, engaged, and answering questions. While the

functionality was available to drop into every student's work, in synchronous and synergistic lessons it was impractical, and it was not possible at all in asynchronous lessons. Instead, student work had to be checked after each lesson. However, it is a benefit of these models and BandLab that there was the functionality to listen to each piece of work after the lesson and leave feedback. Finally, the third common challenge was that students were not composing at home. Very few students used BandLab at home to catch up with the work they had not completed, and this was difficult to account for. Some students said they had finished the work in the lesson, but others clearly had not completed the work in lesson and were behind. A possible explanation is that the students who would speak to the teacher in lesson and/ or felt confident in the work managed to complete it during lesson time, and those who did not complete their work at home equally struggled with the work in lessons but were not forthcoming in asking for help. Therefore, they felt unsure how to proceed with their work at home, so did not attempt to complete it. In the future, it may be best to mitigate this lack of work by using the school's behaviour policy and setting sanctions.

There were two common improvements to be made across the three models. The first improvement was to encourage students to communicate more. The communication happens in different ways depending on the model, and therefore so does the intervention, but all models highlighted a lack of communication and classroom community which needs to be addressed. The second improvement is to include more extensions for each model. Some students were getting to the end of the lessons quickly, and students requested more work to complete.

4.3 Interaction with the development of technological, pedagogical, and content knowledge

Part two of the analysis involves the application of the TPACK model as an analytical lens. The findings in relation to each element of TPACK are outlined below. The significance of TPACK and its benefits for music were explained in chapter two, drawing on Bauer (2013: 62), who suggested that music teachers who have considered how technology interacts with pedagogy and content can improve the learning experience for their students.

As evidenced in the TPACK findings below, I now have a deeper understanding of the technologies being used and their application to the online teaching of music composing. The cycles of action research have informed the development of my practice, causing me to consider how my use of technology can be improved to enhance musical learning.

As outlined below, there was little variation in TK, PK, and CK between the models. However, there was greater variation in TCK, and PCK and, in particular (and perhaps given the technological nature of the study not surprisingly) within TPK.

4.3.1 Technological Knowledge (TK)

There was some technology used in these online lessons which did not change for each model or cycle. These were computers (iMac or MacMini), a pair of headphones, an internet connection, the use of Google Chrome, and the G Suite for Education (Google Classroom, Google Drive, Google Slides). Google Forms were also used in asynchronous and synergistic lessons, to integrate self-marking quizzes. While there are other video-conferencing, virtual learning environments, and quiz websites, the G Suite for Education was chosen as it was already used in this school.

The technology used did not change between models or cycles, apart from the asynchronous model not using Google Meet, and asynchronous and synergistic models adding Google Forms. Despite much of the literature suggesting that technological issues are a barrier to online learning, especially in synchronous lessons (e.g., Solomon & Verrilli, 2020: Riley, 2007; Koutsoupidou, 2014; Dammers, 2009), there were no major issues with technology. Minor issues of not being able to hear through headphones were solved by individuals (e.g., asynchronous cycle 2 lesson 1, where a student could not hear their drums but quickly fixed it), or by students helping each other (e.g., synchronous cycle 2 lesson 2). However, the age and quality of the computers did impact on BandLab, causing it to lag. Having a reliable internet connection was also an issue for me, as my iPad kept on dropping the connection, but this was not an issue with

student devices as they used an ethernet cable. However, this was solved by using the hotspot feature from a phone instead of relying on the school's Wi-Fi network.

The technology required for all models of online composing lessons was simple, and as a minimum requirement only a computer with internet access and headphones or speakers was needed. Not owning a musical keyboard was not a barrier to composing in this study. As such, the technological knowledge required by the teacher for online composing lessons was not extensive. A knowledge of how to use video-conferencing software and a virtual learning environment which allows for the hosting of quizzes, presentations, and communication, was required, along with an understanding of how to resolve audio issues. Being able to plan for secure internet connections (as far as is possible) was advantageous, as was knowledge of how to resolve internet issues quickly, and an understanding how the age or quality of a device might impact on the performance of websites.

4.3.2 Pedagogical Knowledge (PK)

As discussed in the methodology (section 3.9.2), pedagogical knowledge was identified using Jonassen et al.'s (2003) components of meaningful learning. To recap, these components are:

a) evidence of students developing knowledge and/ or skills (active)
b) the creation of artifacts (constructive)
c) learning happening in a real-world context (authentic)
d) students working together or with the teacher to build new knowledge (cooperative)

There was evidence of all components of meaningful learning throughout this research, often in the same lesson, and there was little variation in pedagogical knowledge between the models. For example, it was noted in the researcher diary from the very first lesson in this research that the components of meaningful learning were identified in the following ways:

Active: Students were developing their skills with BandLab.

Constructive: The creation of a bassline.
Authentic: Reflects professional composing practices by composing online and using a DAW.
Cooperative: Teacher worked with the students, but students also attempted to answer each other's questions and commented on each other's work when it was shared.

These components were identified in much the same way throughout this research, with students developing their skills in BandLab or in relation to a compositional technique each lesson (authentic), composing a particular part of a composition (constructive), and composing online using a DAW (authentic). The greatest variation was within the cooperative component, particularly within asynchronous lessons where students were less able to contact me or each other. However, this improved in cycle 2 asynchronous lessons with the introduction of the Google Classroom comments.

For me as a teacher, displaying my own pedagogical knowledge meant that I needed to consider how I would include each of Jonassen et al.'s (2003) components of meaningful learning in every lesson. I needed to be clear on exactly what skills students were learning each lesson (which ranged from how to compose a motif, to specific minimalism techniques, to the finer controls within BandLab). I also needed to have planned what students should have constructed by the end of each lesson, that BandLab was being used to compose a piece of music in a manner that reflected the music industry, and that there were opportunities (both planned and unplanned) for student-teacher and student-student communication.

4.3.3 Content Knowledge (CK)

Perhaps the most challenging aspect of TPACK to evidence was content knowledge, referring to the teacher's knowledge of the content being taught. Content knowledge was difficult to evidence as it is simply the knowledge a teacher has about the content being taught, and I know that my knowledge of music composing is strong. A professional, qualified teacher practicing in their own subject area should have secure subject knowledge, which I am able to demonstrate in

the case of music composing. I have taught both composing modules, albeit not in an online format, for 6 years, so am secure in my knowledge of the content.

The content knowledge required and evidenced in the teacher observations revolved around having a secure knowledge of the styles of music which students were composing, specific features of those styles, knowledge of compositional techniques, and an understanding of how to compose each part of a piece (e.g., how to compose a melody, chord sequence, or drumbeat). All of these were demonstrated in each model and both cycles and go beyond knowing 'face value' features of a style (e.g., a four-to-the-floor drumbeat) and rely on a more fundamental knowledge of music composing (such has how harmony works). However, while I feel secure in my content knowledge for both club dance (cycle 1) and minimalism (cycle 2), had I not then it would have impacted on the other aspects of TPACK. Before teaching an online lesson, as part of considering their TPACK teachers should challenge their content knowledge to make sure that it is sufficient.

4.3.4 Technological Pedagogical Knowledge (TPK)

TPK was identified by using the technology integration matrix (Allsopp et al. 2007). When considering the levels of technology integration into the curriculum, my own level of TPK falls largely into the *adoption* category: *Teacher directs students in the conventional use of tool-based software.*

Adoption was the most appropriate category for most students in these lessons, as students were for the most part learning how to use BandLab, and the tools within it, for the first time. Students did not yet have the knowledge of how to choose or modify the technology related tools (adaptation) but could learn how to use the tools in a conventional way. Similarly, the G Suite for Education was used in a conventional way throughout this research.

More so than pushing to include the higher end of the levels of technology integration into the curriculum, such as *Infusion* or *Transformation*, teachers may find it beneficial to consider if the

level of technology integration is appropriate for the students they are teaching. As such, an understanding of how TPK can be changed to support the students being taught may be more important than pushing for the highest level of integration into the curriculum. For example, in the very first lesson it was observed that students used the tools within BandLab to build on their prior knowledge of music technology, working out how to compose a bassline (active: adoption). However, one student (student B) exploited the tools within BandLab, such as editing note lengths, pitch, and automation (the programming of volume changes) to develop their bassline based on their own ideas and therefore displayed aspects of active: infusion (purposefully combining technology tools to design a desired outcome, based on their own ideas). That student had more prior experience with DAWs, and therefore it was appropriate to push that student by considering TPK.

I noted in the observations that I remained largely in the adoption category (where the teacher directs students in the use of tool-based software) throughout cycle 1, with a small number of students moving into the adaption category. In the adaptation category, students choose or modify the technology related tools. As a teacher, it was important to recognise that as students became familiarised with the software and technology, the technology could be integrated into the curriculum more. In asynchronous lesson 1 cycle 1, students were given the opportunity to manipulate their melody using the technology, beyond a functional approach of just inputting the notes to a melody. In synergistic lesson 1 cycle 1 students manipulated a drumbeat tool to compose their own drumbeats, which is reflective of adaptation. As students developed their skills with BandLab, technology did become more integrated into the process of composing in cycle 2 and moved to being largely in the adaptation category. This was a conscious decision, as students had learned how to use the software beyond the conventional means and therefore were encouraged to modify the tools within BandLab during while composing. For example, in observation 5 cycle 2 students were making decisions about which compositional approach and BandLab tools were most suitable for the next part of their composition, without direct input from me.

As the lessons progressed the importance of the teacher's own prior knowledge of the technology used, and a consideration that different students needed different levels of technology integration based on their level of expertise with the software, became apparent.

4.3.5 Technological Content Knowledge (TCK)

It was clear that the TCK in online composing lessons revolved around the online DAW chosen, in this case BandLab. There was a learning curve with BandLab, and it was observed in lesson 1 of cycle 1 that even at an early stage all participants improved at using the various features. The work was sequenced so that the more advanced features of BandLab, such as automation, were introduced as students became more skilled in using it. Another example was the drumbeat tool, which was introduced in lesson 5 (synergistic) once students had become familiar with the basic features of BandLab. However, the features of BandLab were very similar to another piece of software (not available online) that these students were familiar with, which helped them migrate to the online DAW (as noted in observation 4 cycle 1). The number of tasks that students needed to complete in a lesson also increased as they became more familiar with BandLab, as noted in observation 2 of cycle 1.

It quickly became clear that evidencing TCK was challenging. TCK is identified through subject or content specific software, but in the case of this research the only content specific software was BandLab. Once the features of BandLab had been explored, which they were in cycle 1, there was then no further development of TCK in cycle 2. The technology shaped the content, such as through the introduction of basic features before more complex ones and having fewer tasks to complete in earlier lessons, but beyond this the technology did not change the content. As a teacher, it was therefore important to recognise and plan for students' skill level and adapt the content as technological proficiency improved.

4.3.6 Pedagogical Content Knowledge (PCK)

The lessons were designed with low demand and high demand tasks in mind, and all lessons contained a mixture of both. As this research was based on music composing, the main tasks in each lesson involved creating new music. Pringle et al. (2015) suggest that tasks which involve creating are high demand, so additional low demand tasks were included to complement the main task. Perhaps unsurprisingly, the high demand task of composing took up most of the lesson time.

Lessons began with low demand tasks in all models, with listening to music and answering questions in the chat used in synchronous lessons, and self-marking multiple-choice quizzes in asynchronous and synergistic lessons. Students then moved to the main task of composing, and there were at times other low demand tasks at the end of lessons such as further quizzes in synergistic lessons. As evidenced in cycle 1 observation 3, some quizzes had both low demand (e.g., recall questions such as 'what is a chord?') and high demand (e.g., music analysis) questions. Observation 4 cycle 1 noted that the low demand tasks were important in helping students to remember key features of the style of music they are composing for. This was then useful to students when composing, as they could recognise and include the features of the music in their own compositions. As such, including low-demand tasks which were directly related to composing was effective.

A high demand task used frequently in these online lessons was responding to individual feedback. Between lessons feedback was provided to students in the 'notes/ lyrics' section of BandLab. Figure 9 shows an example of feedback and suggestions to a student, left during cycle 1 of this research.

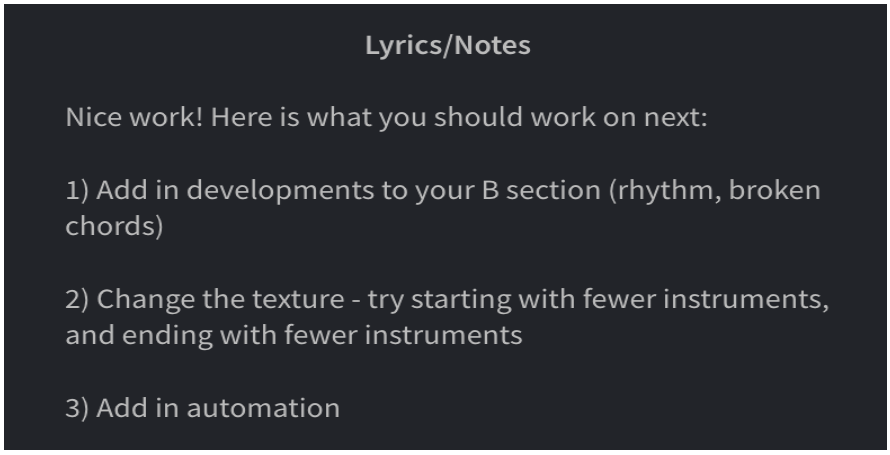


Figure 9 - Example of feedback and suggestions

Students were instructed near the start of the lesson to respond to this feedback, and it was useful in helping students to catch up with any work not completed the week before and address misconceptions. In cycle 2, a new high demand task to synchronous and synergistic lessons was added: commenting on each other's work. While experimented with during cycle 1, further opportunities for students to listen to and comment on each other's work were included in the cycle 2 models. Students were encouraged to comment on each other's work by relating it to the features of the style, and the marking criteria.

Overall, having a mixture of low and high demand tasks, beginning with low demand tasks, was useful in structuring online lessons in a similar way to face-to-face lessons. The opportunity to give critical feedback to others and engage with a marking criterion was missing from cycle 1 and was an improvement in cycle 2.

4.4 Summary

This chapter began by suggesting that composing music through online lessons is achievable, regardless of the teaching model. Figure 10 is a partial screenshot of a composition from cycle 2, which was composed during two synchronous, two asynchronous, and two synergistic lessons (as per the action research approach outlined in section 3.4), as evidence of this claim. While the colours have no significance (they are automatically applied), the markings within each cell

show where notes have been inserted and the descriptions on the left-hand side (e.g. subtraction) detail the specific composing technique used.

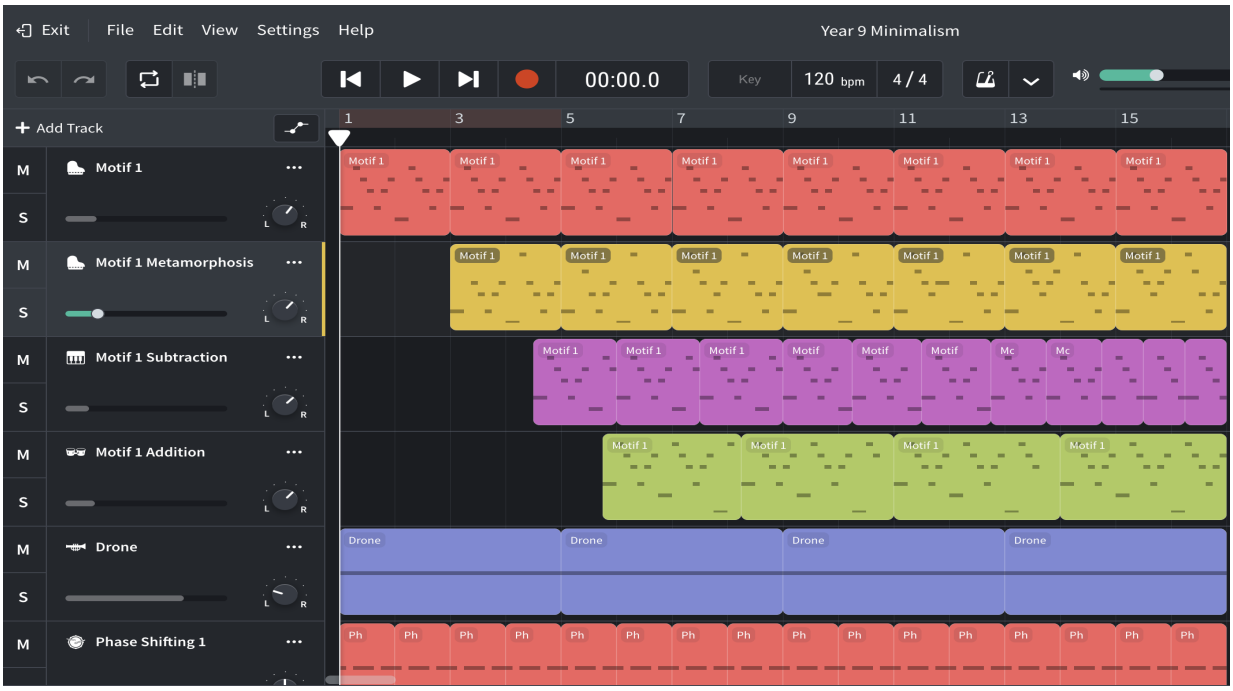


Figure 10 - Minimalism composition A section

While composing online was achievable, there were downsides too. As the findings in this chapter evidenced, at the forefront of these downsides, which included technology issues and the frustration at waiting for other students in some models, was a lack of connectedness between students and students, and students and teachers.

The findings from each cycle and teaching model have been presented in chronological order, outlining the merits, challenges, and suggestions for improvement in each. The changes made for cycle 2 were presented and explained, and the impact of those changes set out. Next, the findings in relation to the TPACK model were presented, using the indicators suggested by Pringle et al. (2015).

In the next chapter the significance of the data from a music education and research perspective is discussed, while engaging with the literature from chapter two.

Chapter Five - Discussion and Analysis of Findings

5.1 Introduction

In this chapter the substantive themes identified in this research are analysed, discussed, and related to the literature outlined in chapter two. By doing this I add my own contributions and voice to the discussion around online music composing lessons, TPACK, and action research. This chapter begins by considering the main themes of this research, before exploring TPACK, technology in online composing, action research, and areas of convergence and divergence amongst participants. The main themes of this research are online music composing pedagogy, online relationships within music composing lessons, communication, efficiency, and efficiency and connectedness. These themes are discussed in relation to the research question and aims.

5.2 Themes

In this section the substantive themes of this research are outlined and discussed, alongside the relevant literature from chapter two. How these themes were identified was explained in chapter three. There are some striking similarities and differences between my research and the literature, which forms part of the discussion below. It must be acknowledged that in making comparisons with relevant literature, such as Riley (2007), one must consider that the technology available at the time of earlier studies was different to the technology available during my study. Regardless of the differences in technology, the comparisons remain relevant and useful to the progress of online music composing lessons.

This thesis explores key themes in online music composing pedagogy, developed through a rigorous qualitative research process. To arrive at these themes, I employed an action research approach, utilising semi-structured interviews (12 in total), one reflective teacher diary per lesson (12 in total), and 19 student questionnaires every two weeks (144 in total). These methods

enabled me to capture diverse perspectives and experiences, which were then analysed using Braun and Clarke's (2022) six-phase thematic analysis framework. All the themes identified, using the six-phase thematic analysis framework, are drawn from the three data collection methods. Through this process, I identified the themes of online music composing pedagogy, online relationships within music composing lessons, efficiency and inefficiency, and the misalignment of efficiency and connectedness. The themes are presented in this order, as they logically build upon one another, reflecting an evolving understanding of the complexities inherent in online music composing lessons.

5.2.1 Online Music Composing Pedagogy

Of critical importance to this study is online music composing pedagogy, and how music composing pedagogy might be impacted by the move to an online environment with the inclusion of additional technologies. Within the concept of online music composing pedagogy, two sub-themes became evident: engagement and active learning in contrast to 'dull instruction' (Morgan, 2022), and demonstrating musical ideas.

Student Engagement and Active Learning in Online Music Composing Lessons

In this research, engagement is defined as being actively involved in one's own learning to understand new information (Pritchard, 2005), and active learning is accepted as completing tasks and learning through experience. While students were not asked directly about their own levels of engagement, analysis of the questionnaire implies that students enjoyed the lessons, found the online lessons interesting, felt motivated, that lessons enhanced their interest in learning, and that students were looking forward to the following lesson. In sum, these suggest that students were engaged with the work, thus determining the theme of engagement through inference. Morgan (2022: 111) asserts that online instruction is 'dull', but the findings of my research do not support this claim and instead students exhibited behaviours which indicated the opposite. Similarly, the lack of behaviour management issues, which were non-existent apart

from two students being off task in the chat during a single cycle 2 lesson, speaks to the engaging nature of these lessons. As such, I next consider how pedagogy facilitated student engagement. Students 'doing something' with their new knowledge is important in a constructivist approach to learning, and 'doing something' with their new knowledge requires students to undertake actions which are directly related to what they have just learned (Pritchard, 2005: 33). Pritchard (2005) refers to this process as engagement.

To facilitate engagement in lessons, several pedagogical decisions were made before this research began. First, in response to Riley (2017) implying that online lessons can feel like university style lectures; lessons were planned to make use of active learning, an important aspect of online learning (Morgan, 2022). In my research, active learning took the form of composing a piece of music. Combining music theory with the practice of music making aligns with Swanwick's (1999) concept of 'teaching music musically', which was influential in the integrated approach to teaching composing techniques within composing tasks in my research. The structure of lessons included the teacher telling students how to complete the next part of their composition or introducing a new composing technique (either live or pre-recorded), followed by students actively learning by using these techniques. The act of learning through doing in music education is well documented (Swanwick, 1999; Spruce, 2016), and learning through doing in online music lessons helped to mitigate the feature of passivity. This pedagogical decision connected engagement with constructivism. Active learning facilitated engagement, with new information being systematically taught to students in a logical way and thus building on their prior skills and knowledge (Pritchard, 2005). By applying the new knowledge to their own compositions, students were provided with the opportunity to construct their own understanding (Pritchard, 2005).

The second pedagogical decision taken to aid with engagement was to structure lessons in a similar way to face-to-face composing lessons, as suggested by Maki (2001), to help online lessons feel more familiar to students. This may have helped students to stay engaged with their online lessons, as it meant that the structure of the lesson was not a barrier to their learning. Had the lesson structure been too unfamiliar to students, for example if a lesson had turned into a lecture instead of composing tasks or allowed total freedom to compose without instructions or

feedback, then students may have become disinterested. Good practice in face-to-face lessons was recreated online, with both lesson structure and the avoidance of didactic lectures. The emphasis remained on students experiencing music making, which was embedded in the pedagogical practice online just as it would be in face-to-face lessons.

A third pedagogical decision to improve engagement relates to the first: plan online music lessons to be practical, and do not focus on theory or listening. Maki (2001) suggests that teachers move towards music theory and history and away from practical music making in online lessons. With significant improvements in technology since 2001, I disagree with the idea that practical music making needs to be replaced by theoretical or historical content. My own experiences (Rogers, 2021) of teaching online music lessons during the Covid-19 pandemic were that music teachers, including myself, did reduce practical music making in favour of other tasks, and indeed that was a catalyst for this research. However, this research has shown that music making can be both online and practical, with the appropriate pedagogical approach and technological knowledge. The lessons in this research did contain some theoretical and historical content, but these were directly related to the lesson and composing task at hand. Theory and history became part of the lesson, balanced with the practical as in my face-to-face music lessons, without becoming the entire lesson. Riley (2007) noted that students are enthusiastic about online music lessons, and in the case of my research that was certainly my impression from students. It appeared that making online music lessons practical and not wholly theoretical was a contributing factor to keep students engaged with the lessons and looking forward to the next one.

While the pedagogical decisions listed are crucial to engagement in online music composing lessons, without sufficient TPACK they may be difficult to implement. Technology can increase student engagement, especially when teachers know how to select and utilise appropriate technology (Leasor, 2023). The importance of TPACK is discussed later in this chapter.

Teacher Demonstration of Musical Ideas in Online Music Composing Pedagogy

Another way that pedagogy was considered in the construction of the online lessons, which also contributed towards engagement, was regarding the demonstration of musical ideas. Teacher-led practical demonstrations of musical ideas to the students, as opposed to describing musical ideas or otherwise, was a consideration from the first lesson. In composing lessons, demonstrating musical ideas (the act of showing students how to do something with their composition) was crucial. Arguably, demonstrating how to click in notes on a DAW or demonstrating which buttons to press does not constitute demonstrating musical ideas. However, I argue that as demonstrating how to click in notes and demonstrating which buttons to press results in composing taking place, they do constitute the demonstration of music ideas within the context of online music composing lessons. Without demonstrations, students would be less clear on what they need to do. Demonstrating musical ideas is documented as being a challenge in online lessons (e.g., Riley, 2007), but is common in the face-to-face music classroom (Swanwick, 1999). However, in my research lessons were designed from the outset to include musical demonstrations, in part to reflect face-to-face lessons. Depending on the teaching model, these demonstrations took place live via the screen-share feature, were pre-recorded, or were available to watch again after a live demonstration. Dye (2007), Maki (2001), Lockett (2010, and Biasutti et al. (2021) all suggest that online music education impacts on pedagogy in terms of requiring less modelling and more questioning. While there was undeniably an impact on pedagogy in online lessons when compared to face-to-face lessons, in the case of this study it did not result in less musical modelling and more questioning. In asynchronous lessons, for example, there was no questioning at all, and students could repeat videos as many times as they like, effectively rewatching the modelling on demand. There may be a relation to a teacher's TPACK here, with teachers who have a less developed TPACK potentially finding musical modelling in online lessons more challenging.

In terms of composing lessons, it is extremely difficult to explain to a student how to do something without showing them. By demonstrating musical ideas, for example how to click in a melody or programme a drum pattern, students could hear the musical outcome and see how it was achieved. Students are then engaged, as they know what to do and how to do it. In terms of

this research, demonstrating musical ideas was straightforward. The ability to screen share in synchronous and synergistic lessons made it very easy for students to watch any modelling (possibly easier than lessons which involved instrumental performance, as they must find accurate camera angles and set up appropriate microphones), and pre-recording videos in advance meant that students could watch and rewatch my demonstrations in synergistic and asynchronous lessons. There was no evidence to suggest that demonstrations were a problem for students, and indeed in the researcher diary demonstrations are only ever highlighted as a strength of the models.

There was no indication from students that the instructions during lessons needed clarification, suggesting that the musical demonstrations were clear. However, challenges with communication and relationships might have resulted in some students being unable or unwilling to express that they did not understand something. It was particularly challenging to check for understanding after the demonstrations. That does not mean that a demonstration was 'bad', just that the logistics of not being able to physically see each student meant checking for understanding became more difficult. While this is highlighted as an area which needs further development in chapter 6, it was possible to check for understanding by using the second Google Meet call and the chat function integrated into Google Meet. In contrast to Riley's (2007) suggestion that demonstrating musical ideas can be a challenge in online environments, demonstrating musical ideas for composing lessons was as easy, if not easier, than face-to-face lessons. This was because rather than displaying my computer screen on a digital whiteboard which students need to look at from their position within a classroom, all students had my exact screen shared to their own computer to view at close proximity. This was particularly important in music composing lessons, as it was often necessary to demonstrate specific buttons to press, which may be hard to see if students are far away. There was also little need for behaviour management when demonstrating online, as there were fewer distractions (or at least students were not distracting each other) in the online environment. Demonstrating musical ideas was perhaps the most important way that pedagogy impacted on engagement: without the teacher demonstrating musical ideas, it appeared highly unlikely that students would have enjoyed the composing lessons, felt motivated, or looked forward to the next lesson, as they simply would not have known what to do.

To summarise, considerations regarding active learning, lesson structure, practical lessons, and demonstrating musical ideas are all key points within the pedagogy of online music composing lessons.

5.2.2 Online Relationships Within Music Composing Lessons

Teaching is a relational process (Ljungblad, 2021), and most often these relationships consist of teacher-student and student-student relationships. However, in my research there was the addition of student-computer relationships. In education, 'relationship' refers to the evolving interactions between students, teachers, and peers (and, in the case of this research, computers), that significantly influence learning, motivation, and overall well-being (Hattie, 2009). These relationships are foundational for creating a positive educational environment that promotes engagement, emotional support, and academic success. Teacher-student relationships are vital for fostering trust, respect, and open communication, which contribute to students' motivation and achievement. How the different relationships manifested in this research is discussed in this section, but the relationships in this study could be described as challenging. Students appeared to remain isolated from me and one another despite opportunities to develop relationships, aligning with the findings of Morgan (2022). It can be challenging to develop and maintain good teacher-student relationships within the classroom (Jensen et al., 2015), and it appeared to be even more challenging in an online space. Relationships should be at the very centre of teaching (Ljungblad, 2022), with Hattie's (2009) study suggesting that the relationship between student and teacher has a greater impact on student achievement than the subject knowledge of the teacher. One caveat to the above is that relationships, including their type and function, are highly contextualised (Ljungblad, 2022). The triad of online relationships (teacher-student, student-student, and student-computer), and their significance in online music composing lessons, are considered next.

Teacher-Student Relationships

The relationship between a student and their teacher is significant to the process of teaching and learning, with Starkey asserting that students are 'more likely to disengage' from learning when they do not 'experience a connection to the teacher' (Starkey, 2012: 30). My research was not able to support Starkey's claims, as there was little evidence to suggest that engagement suffered due to student-teacher relationships not developing. While this section is largely concerned with individual teacher-student relationships, the teacher-cohort relationships is also noteworthy. While less personal than teacher-student relationships, a teacher-cohort relationship suggests that an effective learning environment is established and maintained within a classroom, virtual or otherwise (Starkey, 2012). My research has evidenced that an effective learning environment was established and maintained through the high-quality composition work being produced, suggesting that appropriate teacher-cohort relationship was in effect even if there were challenges with the teacher-student relationships.

Most students in this research self-reported through the questionnaire that they did not speak to me at all, and those that did only spoke to me a few times. There were only a few students who interacted with me regularly, and it was difficult to develop relationships with students when there was little communication taking place. Even though students did not speak to me very often, the lessons did not feel like lectures (Riley, 2007) due to the importance placed on active learning. There were times when students interacted with me as a whole class, such as quizzes at the beginning of synchronous lessons, where all students gave an answer and therefore communicated with me. However, this was not meaningful (in that it did not communicate information which improved their individual compositions) or personal communication with individuals, and was designed to check the understanding of an entire class.

Gauging the development of online relationships between myself and students was challenging. I already knew most of these students, had taught some of them before, and as the lessons were in a simulated online environment, I was interacting with these students face-to-face at the beginning and end of every lesson. As such, it is not possible to draw any conclusions about student-teacher relationships in these online composing lessons. However, it appeared that most

of the direct interactions with me were initiated by the students, often coming to me to ask for help via the second Google Meet call or the chat function. Some students did become more confident in speaking to me in the lessons, and this aided our student-teacher relationship. In contrast, some students never initiated contact with me, and nor I to them, so no student-teacher relationship developed. Instead, the students who did not develop a relationship with me (and perhaps also those who did) possibly developed relationships with a digital, pre-recorded version of me in the asynchronous and synergistic lessons (expanded upon below). The students who had very few interactions with me still completed their work, some more than the rest of the class (for example, pupil A and pupil B), which suggested they at the very least trusted the instructions being presented to them digitally. A student's trust in their teacher involves a readiness to be vulnerable, relying on the assurance that the teacher will act with kindness, honesty, transparency, dependability, and competence (Tschannen-Moran, Bankole, and Mitchell, 2013). Student-teacher relationships did develop to some extent in the synergistic and synchronous lessons when using the second Google Meet call, as some students repeatedly came back for help and, as a result, we spoke for a significant amount of time. This was, however, impossible in asynchronous lessons.

An important question arising from this is why students did not communicate with me often in lessons. Some students reported that they did not communicate with me simply because they did not need to, because they understood how to do the work, and did not have any questions (e.g., pupil A and pupil B). Beyond that, no explanations were given. There was an increase in the amount of student-teacher communication in cycle 2, possibly due to the introduction of the second Google Meet call allowing for private conversations to take place without students fearing that they would be overheard by their peers. From the evidence gathered, quality of instruction (and indeed, students were completing the work very well for the most part) and an inability to have private conversations seems to have negatively impacted on student-teacher relationships. While efforts were made to plan for communication in advance (Beltran et al., 2020) in order to build positive teacher-student relationships, such as using the chat function, speaking to students live, and during cycle 2 the second Google Meet call, they were not entirely successful.

Relationships are of course not limited to speaking to one another, and efforts were made to develop relationships with students in other ways. Lessons did at times feel personal and students regularly received individual attention. This differed from findings in other studies which have reported isolation and challenges experienced by students in building online relationships (Dammers, 2009; Riley, 2007). My research differs because, apart from asynchronous lessons, students were spoken to directly and called by their names. Student work could be shared to help correct it and suggest improvements, every student was provided with individual written feedback every lesson, and in each lesson the main misconceptions were addressed in a video specific to that class. Even in asynchronous lessons, where students could not be spoken to, an effort was made to make the lessons feel personal through the individual written feedback and targeted misconceptions videos. Part of the issue with developing personal relationships may stem from students not having their cameras turned on. While keeping cameras off avoided safeguarding concerns, the inability for students to display non-verbal cues such as facial expressions or make eye contact (Sutton, 2001) may have created a barrier to developing relationships (Sorensen & Baylen, 1999). This lack of a developing teacher-student relationship was problematic, as it made it challenging to learn what individual students knew and understood (Starkey, 2012) about the work. Instead of developing a relationship and talking about the work with students, inferences had to be made about student knowledge and understanding based on their compositions.

Student-Student Relationships

Student-student social groups remain an important part of schooling, with social groups inclined to help each other in the classroom and students more likely to ask a peer for help than their teacher (Starkey, 2012). However, this was not reflected in my research. Most students did not ask their peers for help, and in situations where students are likely to experience sustained periods of time of online learning this could lead to feelings of isolation (Morgan, 2022). The questionnaire responses indicated a lack of a sense of belonging for students in their experience of online lessons, and that their sense of belonging only improved slightly between cycle 1 and 2

of synchronous and asynchronous lessons and did not improve between the cycles of synergistic lessons. If students did not feel a sense of belonging, they may indeed have felt isolated.

Some students reported that they did not speak to anyone, including each other, simply because they did not feel the need to. Student B, for example, said that they knew they had the option to speak to other students or the teacher if they needed it. However, the questionnaire data indicated that most students did not make a learning connection with others, did not speak to the teacher, and did not speak to another student. The simulated online environment may have contributed to the students feeling less isolated (as they were physically in the same room), so how these models impact on feelings of isolation in a true online environment is yet to be explored.

The number of student-student interactions in this research remained low, despite my best efforts to encourage communication. There were however some examples of student-student interactions, which usually involved one student asking a question and another answering. These were typically short, one-off interactions, and there was no evidence that a relationship was developing. While this section discusses student-student relationships, the impact of a teacher on those relationships cannot be discounted. In this research, students did not have a forum where they could speak to each other without the teacher hearing or seeing (such as in the chat function) their conversation, so the teacher may have inadvertently curtailed the development of any relationships simply by being present. Had students had a private online space within which they could converse without the teacher being involved, student relationships may well have developed further. However, there are significant safeguarding issues, such as abusive language or the sharing of inappropriate images, with students sharing an unsupervised online space.

Encouraging more student-student interaction may be possible, depending on the teaching model. For example, it may be possible to encourage students to compose collaboratively, forcing students to work together to create a piece of music. Starkey (2012) suggests that collaborative groups should compete against one another to help motivate students, and therefore work together and develop their relationships, but in music composing this is problematic as composing is not a competition: there is no winner.

Student-Computer Relationships

As already asserted, students spent most of their time on their computers not interacting with me or each other. Therefore, it is reasonable to suggest that most interactions students had were with their computers, and that they may have developed a student-computer relationship. If nothing else it may have been a relationship of preference, in that students preferred to spend time alone with their computer than with me or their classmates: indeed, most students said they preferred asynchronous lessons (and this is perhaps where the student-computer relationships were most intimate). What Cuban (1986) pointed to some time ago in his research supports the idea that students who spend a significant amount of time working on computers without a teacher develop a bond with the machine rather than their teacher or peers, especially during lessons where contact with the teacher is reduced (such as asynchronous lessons):

> *'Students working with computers alone or in pairs for long periods of time lose time for direct and sustained contact with teachers. Bonds develop instead between students and machines. Information comes from the machine; the machine generates praise and nudges the student along.' (Cuban, 1986: 89).*

While Cuban wrote this almost 40 years prior to my research, it stands remarkably true in relation to the study. There was a reduced amount of contact with the teacher when compared with face-to-face lessons, and even where there was contact it could not be described as 'sustained'. The information presented to students exclusively came from the screens (either a live or pre-recorded video, along with other lesson materials), which effectively laid out the steps for students and 'nudged' them along. While Cuban's work was not directed at online instruction, it remains applicable.

The human-touch of teaching that comprises imagination, improvisation, pacing, and rapport, is also potentially endangered when the additional factor of a computer is introduced (Cuban, 1986). However, arguably the flexibility of the models allowed for significant imagination in lesson design and the compositions themselves. In the synergistic and asynchronous models for example, the teacher could improvise as they could speak to the class directly, and students could

proceed with composing at their own pace without having to wait for others. Student-teacher rapport remained a challenge however, as already discussed.

Exactly why students preferred to have a relationship with their computers is unclear. Possibly it was because a lack of interactions with the teacher or their peers meant that students could work at their own pace, uninterrupted, and perhaps it was because all the information they needed could be found on Google Classroom, negating the need for a student-teacher or student-student relationship. Another possible reason is that having conversations with a teacher or their peers was challenging, so students actively avoided interactions so that they did not have to navigate the technical or social aspects of having a conversation. In cycle 1 all conversations were public, and while the addition of a second Google Meet call in cycle 2 helped to increase the number of student-teacher interactions (as noted in my research diary), as there was no place for private student-student conversations very few took place. Why students would prefer private one-to-one conversations was not researched, but exploring this in the future may give a better indication on how to encourage and organise student-student and teacher-student interactions.

In the classroom, student-teacher relationships built on trust have been shown to be beneficial to all students (Hughes, 2012). In the online environment, my research shows that a relationship where the student trusts the computer, the teacher teaching through it, the resources, and the technology, can be just as important. In some ways this has been evidenced, such as through the lack of students using other websites to find information about composing (which suggested they had trust in the resources provided to them) and the considerable length and number of instruments in each composition (indicating trust in the technology). It might even be argued that a positive student-computer relationship is almost the same as a positive student-teacher relationship, as it is the teacher who supplied those resources, taught through the computer, and chose the technology which was used. The student may not realise it, but by having a trusting relationship with their computer they were in effect having a trusting relationship with their teacher. However, a relationship with a digital version of a teacher does not meet Hattie's (2009) understanding of what a student-teacher relationship is, as there are no evolving interactions between the parties, and these relationships do not foster an environment that promotes emotional support. There is also no open communication, but in the case of my research this does

not seem to have reduced student motivation or prevented students from composing two pieces of music.

While there is little research regarding student-computer relationships in online learning, some parallels can be drawn from other areas of study. For example, Su and Wood (2022) consider student-teacher relationships in higher education, suggesting that building student-teacher relationships is an intentional process designed to build connections and develop positive relationships to improve learning. However, the computer-student relationship does not and cannot develop intentionally, because the content on the computer is pre-recorded and therefore the relationship cannot be considered intentional or specific to individual students. Instead, perhaps the student-computer relationship is more akin to what Su and Wood (2022) refer to as a traditional student-teacher relationship, where the teacher is the expert, and the students listen and enact what they say without comment or question. In the student-computer relationships in my research, especially in the asynchronous lessons, students have little choice but to follow the instructions provided to them by a digital version of their teacher without question. Following the instructions of a pre-recorded teacher suggests that the students trust the teacher, at least to some extent.

One must then consider why the student trusts the teacher, if they know it is not a live, 'real' version of them. In the case of this research students may have trusted the digital version of me simply because they know, have a relationship with, and trust the real version of me. This is a possible limitation of this research, as it does not consider if or why a student might trust a digital version of a teacher that they do not have a pre-existing relationship with. Payne, Stone, and Bennett (2022) suggest that students seek trust in the form of two categories from their online teachers: trust in their teacher's capabilities and, trust in their teacher's care and concern. Therefore, perhaps it is possible for students to develop trust, and therefore a relationship, with a digital version of a teacher if they perceive the digital version of the teacher to be capable and offering instruction which they find engaging and useful. However, it is equally possible that the relationship with an online teacher might be damaged if the student does not perceive the digital teacher to be competent, leading the student to question the instructions and information provided to them potentially without a way to gain clarification or ask questions to the teacher.

Similarly, it is impossible for a digital version of a teacher to offer individual pastoral care and concern, so the student-computer relationship will not develop in that respect. While it has not been researched, I suggest that students enter into asynchronous lessons understanding that the digital version of a teacher cannot show personalised care and concern towards each student, and therefore perhaps this aspect of trust and relationships is not relevant to asynchronous lessons.

An aspect of trust and relationships which may be relevant to online lessons, in relation to constructivism, is scaffolding. It is suggested by Bruner that teachers scaffold to support the students to construct their own understanding of a concept, with Vygotsky saying that learning is a social activity where learning progresses through interaction with children and teachers (Aubrey & Riley, 2022). This creates two interesting issues in relation to student-computer relationships: 1) students can ignore the scaffolding put in place by a digital version of the teacher, and their understanding cannot be checked, and 2) learning is no longer a social activity within asynchronous online lessons. Students may, or may not, trust the scaffolding put in place for them by their teacher, and my research has shown that students do not engage in learning as a social activity during asynchronous lessons. Therefore, these are either barriers which need to be addressed in the design and implementation of online music composing lessons, or the notions of trust and relationships within online music composing lessons may need to be reviewed.

With the advent of online teaching, and in particular asynchronous teaching, the concept and purpose of student-teacher, student-computer, and student-digital teacher relationships may need to be reconsidered. As such, teachers should consider how teacher-student, student-student, and student-computer relationships might impact their lesson planning and teaching. Teachers should therefore consider relationships within their TPACK, and the notion of relationships has been included within the final composing TPACK model as part of TPK (figure 19). Relationships have been added to TPK because of the crossover between relational pedagogy and relationships within technology.

Relationship Summary

To summarise the relational pedagogy in these online music composing lessons, it was challenging to gauge developing teacher-student and student-student relationships in this research because relationships already existed. Relationships develop through communication, and communication in this research has so far been assumed to be verbal or written (typed in a chat box). McBrien et al. (2009) noted that non-verbal communication, such as smiling or hand gestures, was a limitation of online learning, and certainly in my research, where students did not have their cameras on, non-verbal communication was limited to being from the teacher to the student. The relationships usually developed between teachers and students in music lessons is challenging to replicate online (Panisoara et al., 2021), as my research exemplified. However, while there was little evidence of developing teacher-student relationships, the use of Google Meet and individual written feedback helped to make the lessons feel personal. It was interesting to find that many students did not speak to me or each other simply because they did not feel the need to, as they understood what they needed to do. Finally, the student-computer relationship appeared to be the most comfortable to students, perhaps because it was the only relationship that students effectively had no choice but to engage with, but also maybe because it allowed students to work at their own pace without interruption and with all the instructions readily available. Regardless, if we accept Hattie's (2009) findings that relationships have a significant impact on achievement, then further development of the models to foster better relationships is required. It is challenging to argue that one of these relationships was more important than another, but seemingly the student-student relationship was the least significant in my research as there was less contact from student-student than student-teacher or student-computer. Both the student-teacher and student-computer relationships seem to be important, and a failure in one (such as the teacher not helping a student or a computer not functioning as designed) could have a negative impact on the student.

5.2.3 Efficiency and Inefficiency

The concept of efficiency initially arose from students suggesting that they preferred the asynchronous model, as they were able to complete work at their own pace, did not have to wait for explanations from the teacher, and did not have to wait for their peers before moving on with their work. Equally, the three different models were not equally efficient regarding the use of teacher time. In this research, efficiency referred to the amount of content covered during a lesson. Whether or not online lessons are more or less efficient than face-to-face lessons is difficult to surmise: every lesson, whether face-to-face or online, has the potential to be efficient or inefficient. However, what was evident in this research was that online lessons had the potential to be both efficient and inefficient, at times within the same lesson, depending on the model and the individual student.

Efficiency in relation to the introduction of new technologies is not a new concept (1986). Cuban suggested that in the 'early decades' of this century, teachers and those working in education 'sought efficiency through film, radio, and television' (Cuban, 1986: 3). Cuban (1986) talks about 'efficiency' in several ways, relating efficiency to the efficient use of teacher time, the efficient introduction of technology into the classroom, improving classroom efficiency through technological innovations, and the efficiency of the aids provided. However, Cuban links efficiency to teaching as a technical rational process, which he argues misses the 'crucial non rational elements of teaching' and disrupts the 'emotional bonds that nourish learning' (1986: 88). Perhaps that was also the case in my research: the asynchronous model did little to develop any student or teacher relationships, but was the most efficient model in terms of the amount of work completed.

In the case of this research, efficiency was not 'sought' by me as the teacher, it was noticed afterwards as an unintended consequence. Students suggested that efficiency was in relation to the amount of work they were able to complete, due to an efficient use of time in the online classroom. This was particularly evident in asynchronous lessons, where students described how they could watch videos at their own pace, without having to wait for me to address the class and check for understanding. The amount of work students managed to complete in asynchronous

lessons, and the need for further extensions in cycle 2, exemplified this efficiency. Perhaps, as Cuban (1986) indicated, it was the efficiency of the aids in asynchronous lessons (short and long videos, and a visual guide) which helped to make these lessons more efficient.

The notion of efficiency in online lessons reduces learning to completing as much work as possible in as short a time frame as possible, and loses sight of the aforementioned 'crucial non rational elements of teaching' such as emotional bonds with students (Cuban, 1986: 88). As a result, a more efficient lesson might not mean a 'better' lesson in terms of student learning. While some students were able to complete more work in asynchronous lessons, students who had a weaker understanding of concepts, a less secure musical knowledge, and had difficulty using BandLab, struggled in these lessons as they could not ask questions or be helped. In that sense, it could be argued that the asynchronous lessons were less efficient for some, as some students did not understand the work and therefore did not progress with their composing: they stalled as they lacked understanding, and no one could help. Efficiency for some, which in this case could quite easily be thought of as 'individual learning' (students completing a task with minimal teacher input), occurred at the same time as inefficiency for others. It appeared that synchronous and synergistic lessons resulted in a more equitable experience for students, as they allowed support to be provided to ensure that everyone progressed with their compositions.

My experience of teaching these composing modules both online and face-to-face suggests that students cover more content in online lessons, in contrast to findings from Riley's (2007) study which found that students cover less work in online lessons. Unlike Riley's (2007) study, the findings from my research evidenced that, in terms of the content covered and use of time, online composing lessons were more efficient than face-to-face lessons. However, there were exceptions, such as the students who effectively stalled in their progress in asynchronous lessons due to lack of teacher and peer interactions.

A final use of the word efficiency is in relation to teacher time. At one point in time, it was said that 'teaching the entire class at one time is simply an efficient and convenient use of teacher time' (Cuban, 1986: 57). Synchronous lessons offered some efficiency for the teacher as it was possible to teach the class all at once, but were inefficient in that answering simple questions

from students throughout the lesson detracted from helping the students who needed support the most. Asynchronous lessons provided extreme efficiency for the teacher as it was not necessary to be present in the lessons. However, they may become inefficient when one considers that time may need to be taken out of the next lesson to correct errors made in the asynchronous lesson, and because the teacher will have spent a long time preparing the resources for the asynchronous lesson (possibly longer than the lesson itself). Asynchronous lessons may then become efficient again, as once the lessons have been prepared once they can be reused, and because the number of students who can be taught through an asynchronous lesson is theoretically unlimited. The asynchronous lessons could be used again and again, by a huge number of students, potentially making them extremely efficient in terms of teacher time and could perhaps be purchased by schools to use in place of specialist teachers. Synergistic lessons arguably provided a more efficient use of teacher time, as the pre-recorded resources freed up teacher time and provided the opportunity to support those who needed it most.

5.2.4 The Misalignment of Efficiency and Connectedness

It might be argued that efficiency in these online lessons came at the expense of connectedness. Connectedness refers to a students' 'perception of a supportive and cooperative communication environment' (Macleod et al., 2019: 427), and it is important because connectedness increases student participation (Macleod et al., 2019). The composing teaching models may have been so efficient, in terms of teaching students how to compose and filling as much of the lesson time as possible with composing tasks and supporting resources, that little time was left for student-student or teacher-student communication. Where communication was built into the lessons, for example when sharing student work and asking for feedback, there was limited engagement, and students instead described much of the communication as a 'distraction'. In that sense, perhaps the lessons were inefficient, or ineffective, regarding communication, but had there been a greater emphasis on communication they may have become inefficient in terms of the amount of content covered. This brings into consideration the notion of *dis*connectivity, which highlights the 'exclusionary potential' of online teaching and a potential lack of ability that students may have to self-include themselves in any communication (Selwyn, 2009: 94). As Selwyn (2009)

suggests, some students do not have the skills to communicate in an online learning environment, and this skill, much like any social skill, may develop with practice over time. Certainly, in my research, the opportunities for students to 'hide' within the teaching models and not communicate with the teacher or their peers, especially within models deemed as being more efficient, created an opportunity for disconnection for some students.

This efficiency-connectedness tension may be a dilemma which individual teachers need to resolve, based on their own beliefs, worldview, and their students' needs. As such, the composing teaching models might be adapted to suit the teacher and class. This research is not the first to note this tension, with Bolstad and Lin (2009) finding that 61% of their online cohort thought they learned more in online lessons, but that student-student contact was minimal and most teacher-student contact was initiated by the teacher. While efficiency may come at the expense of connectedness, in asynchronous lessons (where students are arguably at their most disconnected from the teacher and their peers, but that students reported as the most efficient lessons), there was no way to check the efficiency of lessons as the teacher was not present (Lemov, 2020). As such, a teacher might choose asynchronous lessons to improve efficiency (less teacher talk = more time to complete work), only to find that students did not complete the work. Therefore, these lessons would become both inefficient and lack connectedness, while also being in tension with the earlier idea of engagement in online lessons. If online lessons have the potential to be both inefficient and lack connectedness, students may find it challenging to remain engaged. This supports the argument that the synergistic model is preferred over the synchronous and asynchronous models, as it allows for increased communication with the students who require it most, allows for student-student communication, while being able to check that students are completing their work. To support this argument, Lemov (2020) promotes developing synergistic models to exploit the benefits of asynchronous and synchronous models, including the superior connectedness of synchronous lessons and the self-paced learning of asynchronous lessons. While not observed explicitly in my research, Macleod et al. (2019) suggest that an impact of increased student-student connectedness is improved academic success. As such, perhaps connectedness improves efficiency (when efficiency is aligned with academic success: this lesson was efficient, as students displayed academic success) and they do not need to be diametric opposites or included at the expense of one another. However, in this research

they did present as opposites, perhaps suggesting that the models need to be developed further to better align connectedness and efficiency.

As mentioned in the chapter 4, the different models appear to allow for a greater or lesser amount of efficiency (in relation to the amount of work covered) and connectedness (figure 11):

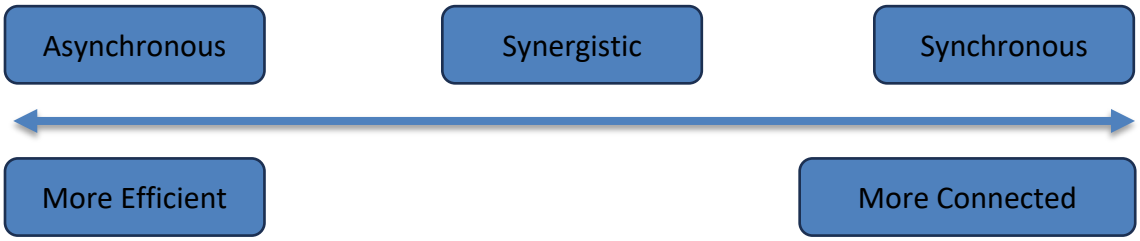


Figure 11– Teaching model and efficiency

This could help a teacher decide on which model they want to use, depending on their priorities for their class. In this research students completed more work in the asynchronous lesson. However, my own misgivings, including not being able to model, answer questions, speak to students, or correct misconceptions, might not align with those of other teachers who may be willing to sacrifice some efficiency for connectedness and strike a balance between the two. Ultimately, the tension between efficiency and connectedness will have to be resolved by the teacher, and that may include experimenting with the different models to see how they impact efficiency and connectedness with their specific class in their own context, or adapting the asynchronous model to improve connectedness or the synchronous model to improve efficiency. The choice of model, and how it impacts on efficiency and connectedness, might also change depending on the subject being taught.

I will add that I can think of no professional musical composition that has ever been described as ‘efficiently composed’, but I can think of many musical compositions which were composed or contributed to by multiple people, so perhaps connectedness is of greater significance when composing music.

5.3 The TPACK Model

How the TPACK model was used in this research is explored in this section. TPACK played a significant part in this study from the very beginning, leading me to question how technology might be used to improve the teaching of online music composing. This question led to problem solving such issues as one-to-one support (the second Google Meet call), allowing students to progress at their own pace (additional extension tasks), and teaching practical online composing lessons (through using BandLab). Instead of teaching *through* technology (not changing how one teaches, simply using technology as the teaching medium) TPACK encouraged teaching *with* technology (exploiting the technology beyond a teaching medium), as an integral part of the lesson in conjunction with pedagogy and content. Teaching *with* technology also has implications for efficiency and connectedness. With an improved TPACK comes the potential ability to make lessons more efficient, suggesting that technology itself may be utilised more efficiently, equipping a teacher with the skills to provide a more connected online learning environment. For example, if a teacher knows how to use technology better, can integrate their technical knowledge with their pedagogical decisions, and has a desire to improve connections through learning relationships within the classroom, more work may be completed by students and students may communicate with others more often.

Many of the themes already discussed in this chapter, some of which diverge from the existing literature, may be explained to some extent through the TPACK model. Those divergences are dull instruction (Morgan, 2022), challenges with demonstrating musical ideas (Riley, 2007), teachers moving away from practical music making in online lesson (Maki 2001), behaviour management (Riley, 2007), and not covering enough content (Riley, 2007). The concept of covering enough content as a primary concern of learning reflects a reductionist approach to education, which does align with the efficient approach to online lessons, but does not consider other aspects to online learning (and indeed, face-to-face learning) such as engagement and connectedness.

From the start of this research, the original TPACK model made me consider how to use the technology available in these lessons, and how technology might be implemented to mitigate

each of the aforementioned issues. For example, Maki's (2001) assertion that teachers move away from practical music-making in online lessons led me to question why that was the case, and if the issue was being caused by a lack of teacher knowledge regarding how to change the content of their lessons, how to adapt their pedagogical approach, and how to best integrate technology. The struggle Maki described indicates an approach where the teacher has tried to teach as they might usually do through technology, which consequently did not work and resulted in the teacher removing the practical music part of their lessons. That was not the case in my research as BandLab was used, a separate platform to the video call software Google Meet, as an interface through which practical music making could take place. A choice could have been made not to use BandLab, and instead students could have explored practical music making by using everyday items as musical instruments through their video cameras (remembering that this research is designed to reflect an online environment where students are at home, and the demographic of these students means that most have no access to instruments at home), but the technology of BandLab allowed practical music making to happen in a way which better reflected professional practices. The composing content was designed to be achievable through BandLab (i.e., the software allowed students to compose a piece of sufficient complexity, with a range of instruments to choose from), and the models allowed me to teach students how to use BandLab and produce a piece of music.

The same might be said for demonstrating musical ideas. A live video of the teacher composing music on real instruments would not have been appropriate for the context of the computer-based composing task set for students, so demonstrating musical ideas by sharing the computer screen, through pre-recorded videos, or through screen shot guides and text-based guides placed on Google Classroom better aligned with the context of the lesson. A live video of me composing using real instruments would simply be using technology as a conduit to replicate face-to-face lessons; using the technology and rethinking how a musical idea might be demonstrated more effectively is an example of using TPACK to teach *with* technology. If a teacher considers the TPACK model then they may come to the conclusion that any number of technologically appropriate methods might well result in musical ideas being demonstrated more successfully than simply using a video camera to film themselves teaching in their 'normal' way: the technology has to be exploited creatively to use it to its potential and help students learn in the

online environment. In this research, students commented on how pre-recorded videos allowed them to review what had been demonstrated to them as many times as they liked, something that is challenging to implement in a physical classroom but in the online environment makes good use of the available technology.

The application of the TPACK model enabled the teaching of music composing online to integrate pedagogic, content, and technical knowledge purposefully, with benefits for student learning. This research demonstrated that through the application of the TPACK framework principles to combine technology with active pedagogy, including online discussions, auto-marking quizzes, chat box-based questioning, the sharing of student work, demonstrating musical ideas, the use of pre-recorded videos which can be watched on demand, individual tasks, and other musical activities, students found the online composing lessons interesting and engaging. This contrasts with Riley's (2007) findings that online lessons can feel like university-style lectures, with students in my research reporting that they found the lessons interesting.

One of the major concerns the original TPACK model aims to resolve is teachers using technology as a 'bolt-on', and not exploiting technology during their lessons (Bauer, 2013). It is argued that using the TPACK model helps teachers to integrate technology better into their lessons (Mishra & Koehler, 2006; Bauer, 2013), and my research supports this claim. Consideration was given to how technology could be better integrated into online music composing lessons during this research, and several ways to integrate technology purposefully were found. Most notably was the addition of a second Google Meet call, which served the dual purpose of allowing students to contact me privately to speak about composing while preventing other students being distracted while others asked for assistance. Students overwhelmingly agreed that the second Google Meet call was a useful addition, and the benefits of this second call were noted in the teacher observations. Technology here was not being used thoughtlessly: it served a purpose and was used deliberately to improve student compositions.

A second example of using technology purposely and integrating it with content and pedagogy was by using screen sharing abilities: sharing my screen, and the work of other students, to demonstrate musical concepts, address misconceptions, and share good practice. Occasionally

students requested their work be shared with the class, which may have also encouraged and motivated some students. My screen, in this instance, was not being shared just because Google Meet gave me the ability to do so, but because sharing my screen allowed me to present the content of the lesson and use my work and student examples as teaching points. A teacher not considering how the technology available integrates with pedagogy and content may not have used screen sharing for this purpose, if at all. TPACK helped me to consider the use of available technology, and now that I have identified ways of using technology in online composing lessons it is appropriate to outline them in a composing specific TPACK model, which is presented in the next chapter. This will go some way to resolving what Stracke et al. (2022) suggest, namely that some teachers are far more prepared for online teaching than others, by providing all teachers with a model from which to begin their planning and teaching. Fullan and Langworthy (2013) also maintain that new technologies have the potential to create differences in the quality of instruction, as teachers are familiar with new technologies to different extents. The original TPACK model may improve a teacher's implementation of technology, potentially raising the quality of instruction for those less familiar with technology, and the same is true for the online composing specific TPACK model.

Use of the TPACK model and the three suggested teaching models, presented in the next chapter, may contribute towards a solution to two issues highlighted by Daubney and the Cultural Learning Alliance. Firstly, Daubney (2019) and the Cultural Learning Alliance (2024) explained the negative impact that the EBacc has had on music education in England, with some schools removing music from the curriculum. These three teaching models and an improvement in teacher TPACK through an online composing specific TPACK model may help safeguard the place of music in the curriculum, by making it possible for schools to hire online music teachers to teach music lessons. While far from ideal, this may provide a solution which allows students to receive music lessons in school (with an online specialist teacher), which is preferable to music being removed from the curriculum entirely, while also saving schools money. My research has demonstrated that it is entirely possible to teach composing lessons online. The second issue Daubney et al. (2019) and the Cultural Learning Alliance (2024) highlighted was the declining number of music teachers and music students at GCSE and A level. If schools cannot employ a permanent music teacher due to lack of availability, employing online music

teachers using the models suggested here might provide a solution. A group of schools, such as a multi-academy trust, could jointly employ an online music teacher to teach their students all at once, making even greater savings while meeting the needs of their students. There is also potential for the online lessons to increase the number of students taking music, with students reporting in the questionnaires that they look forward to the next online music lesson, found the online music lessons enjoyable, and found the online music lessons engaging. While having a well-developed TPACK is not essential or required to teach online lessons in the same way that qualified teacher status is required for many face-to-face teaching positions, this research has demonstrated the benefits of educators developing their TPACK for teaching online composing lessons.

The issues identified throughout section 2.2 were mitigated through the development of my use of the TPACK model, and the development of an online music composing specific TPACK model. One reason that online music composing lessons have been largely unsuccessful and under-researched could be due to the lack of a key element: the TPACK model. It has been suggested that as the use of technology becomes normalised in learning that the TPACK model will become redundant and replaced with a pedagogical content knowledge model (Starkey, 2012). However, my research has demonstrated that even relatively simple and commonplace technologies can be used in a variety of ways to aid the teaching of composing online, indicating that the TPACK model has the potential to relevant for as long as new technologies are being developed.

Having explored the application of TPACK in this research, I next move onto how technology was used specifically for composing in music.

5.4 The use of Technology for Music Composing

The technology used in this research was very simple, consisting of a computer and headphones per participant and an internet connection. While I would not call for such a change, as students were able to compose two original pieces of music using the most simple, generic, and widely

available pieces of technology, perhaps real instruments are no longer essential to the process of music composing in schools. Certainly, in this research the technology worked as desired as a tool for composing.

Tobias (2013) stated that the lines between composing and technology are blurring, and that certainly seemed to be the case in my research. The composing involved in my research did not involve performing on any instruments, with composing based on clicking in notes. This blurred the lines between composing and technology, as the traditional requirements of being able to play an instrument to compose a piece of music were removed by the online DAW. While composing using a DAW is not unique to online composing lessons, that BandLab could be used (and in the study, very occasionally was) at home meant that students could compose when and where they felt comfortable. Students reported that accessing their work (through Google Meet and Google Classroom) was not a problem, and with students saying that using BandLab was straightforward and easy to access through Google Classroom composing is once again blurred with technology. The ability to access work through the website-based DAW, just like any other website, may also have made the work feel accessible and non-elitist.

Finally, while the technology used was available online, able to be accessed from home, and students received much encouragement to do so, very few students used BandLab at home. Given the amount students said they were enjoying online lessons, both in interviews and in the questionnaires, it was surprising that more of them did not complete unfinished work at home. However, I wonder if technical difficulties deterred them. Several students reported that their computers began to 'lag' as the composing progressed, such as student B. Cuban (1986: 75) indicated that 'inadequate software, especially in…music continues to weaken efforts to increase student use', although Cuban was writing almost 40 years ago and thus his writing pre-dates BandLab and modern computers. It was a combination of slow software and inadequate hardware which slowed BandLab down, with the hardware contributing most to the slow speed. I know this because I have used BandLab at home on a faster computer, as did pupil B, and we both experienced far fewer reductions in speed. Sadly, in the case of this research I wonder if the slow speed of the school computers frustrated students to such an extent that they did not wish to use BandLab at home, and, as Cuban puts it, weakened 'efforts to increase student use' (Cuban,

1986: 75). Additionally, while online technology can be used for composing, as shown in my research, the quality of that technology can impact on the quality of a composition. For example, if the technology slows down as more parts are added to the composition to the extent that the student cannot add the next part they desire, then this may be detrimental to the quality of the composition.

5.5 Action Research

In chapter three the action research approach was outlined, along with a brief history of action research. This section revisits some of the literature from chapter three, and considers how action research was utilised to develop the teaching models.

Action research is viewed by practitioners as having the potential for producing knowledge with practical classroom applications (Koshy, 2010). Due to the online nature of this research the 'classroom' is somewhat metaphorical, but using an action research approach for this research created new knowledge of value to online music educators. While new knowledge of online teaching models and a composing specific TPACK model are the primary examples of the new knowledge, adaptations to the action research approach itself were made as the research progressed.

While the action research approach in this research was systematic, following Kemmis and McTaggart's spiral model (2000), there were differences and arguably some evolutions to the approach in this research. The evolutions were not intentional or predetermined: as the word suggests, they evolved. The biggest difference between the approach taken in this research and Kemmis and McTaggart's model was that instead of a going through the cycles of action research to improve a single teaching model, I was simultaneously attempting to improve three teaching models during each cycle. As a result, the plan, act, reflect, revise, repeat approach was not linear. The initial plan was to complete a full cycle of research and then change all three models simultaneously, but instead the models within a cycle influenced one another. I found that the cycle 1 asynchronous model changed how I thought about cycle 1 synchronous and

synergistic models, and the cycle 1 synchronous model gave me ideas on improving the asynchronous model and synergistic model, and so on. In this research, reflection took place on not only the model being used at that time, but on the other models too, as different interventions which could improve each of them were considered. While developing three models at once instead of one may have the potential to cause confusion, it was found to be highly useful.

Two cycles of action research was a relatively short amount of time to identify issues, create interventions, and reflect upon them, and students only had a very limited time to experience and provide feedback on each model. As a result, relating the models to each other within each cycle almost equated to 'mini' cycles of action research, enabling me to consider if alterations made to one model might improve another even if it was not suggested by the students. For example, after the synchronous model it quickly became clear that a second Google Meet call was necessary to avoid disturbing students who were working. This was not explicitly suggested by students after cycle 1 of the synergistic model, but I considered that it would be useful for the synergistic model too. It was the researcher diary which enabled these reflections, as once they were written (either during or on the same day of the lesson), they were revisited each week and the suggestions for one model were considered for the other two models. Kemmis and McTaggart's original model is show in figure 12, and my adaptation to the Kemmis and McTaggart's model is shown in figure 13.

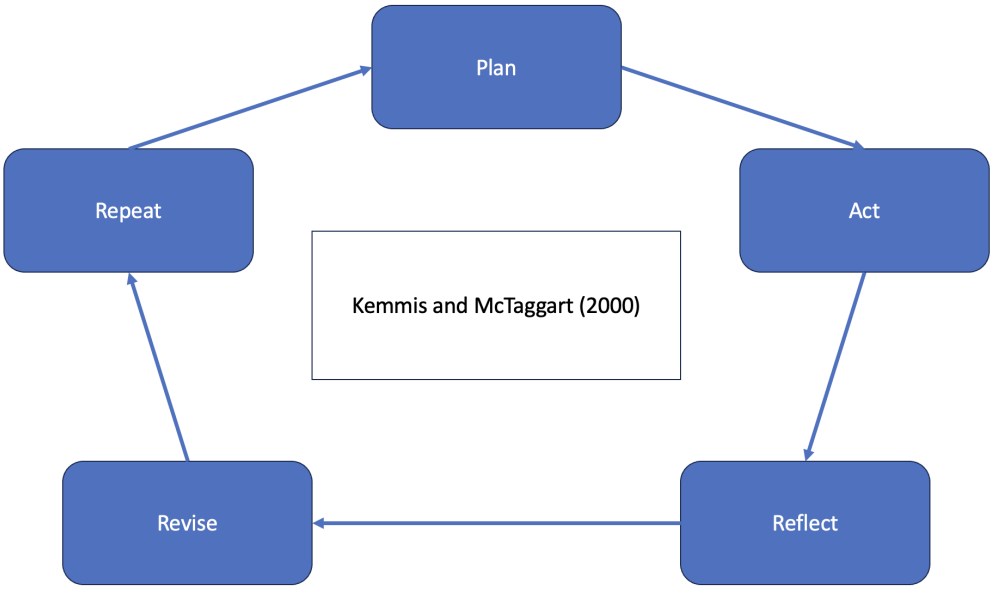


Figure 12 – Kemmis and McTaggart (2000) action research model

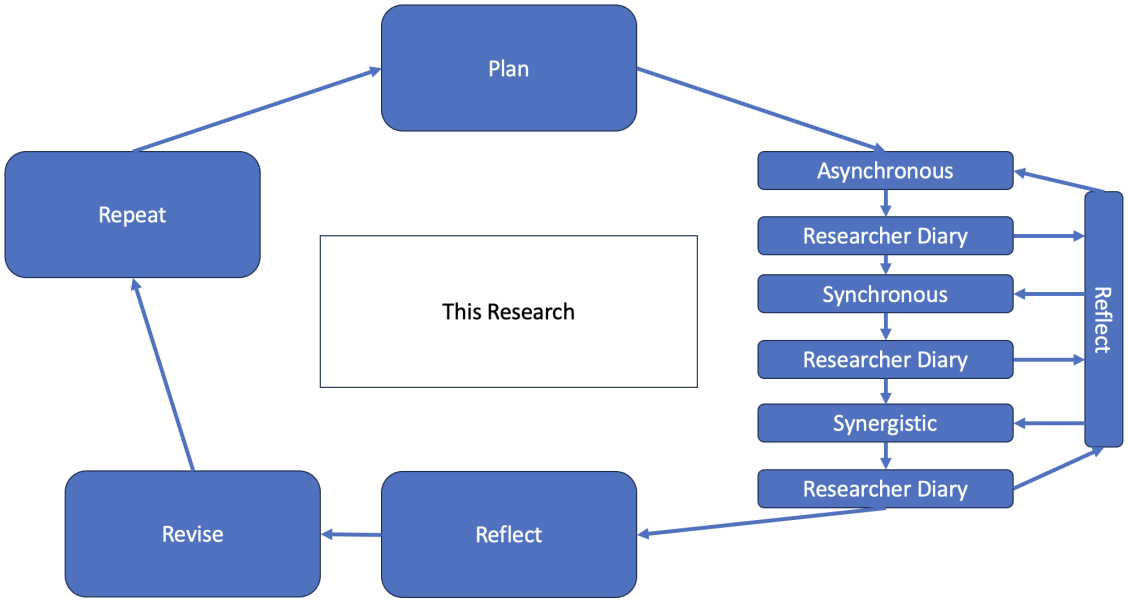


Figure 13 – Action research model in this research

The second way that the approach taken in this research evolved was regarding interactions with students. Specifically, in cycle 2 students were often spoken to informally after the questionnaires had been completed, and students appeared to be able to speak candidly about

their opinions. This became an additional data collection method in the form of an informal group conversation, and was recorded as part of the researcher diary. This possibly added a discussion element to the action research approach and helped to formalise and integrate the influence of participants' perspectives in action research. As a result, the action research model which evolved during this research is depicted in figure 14.

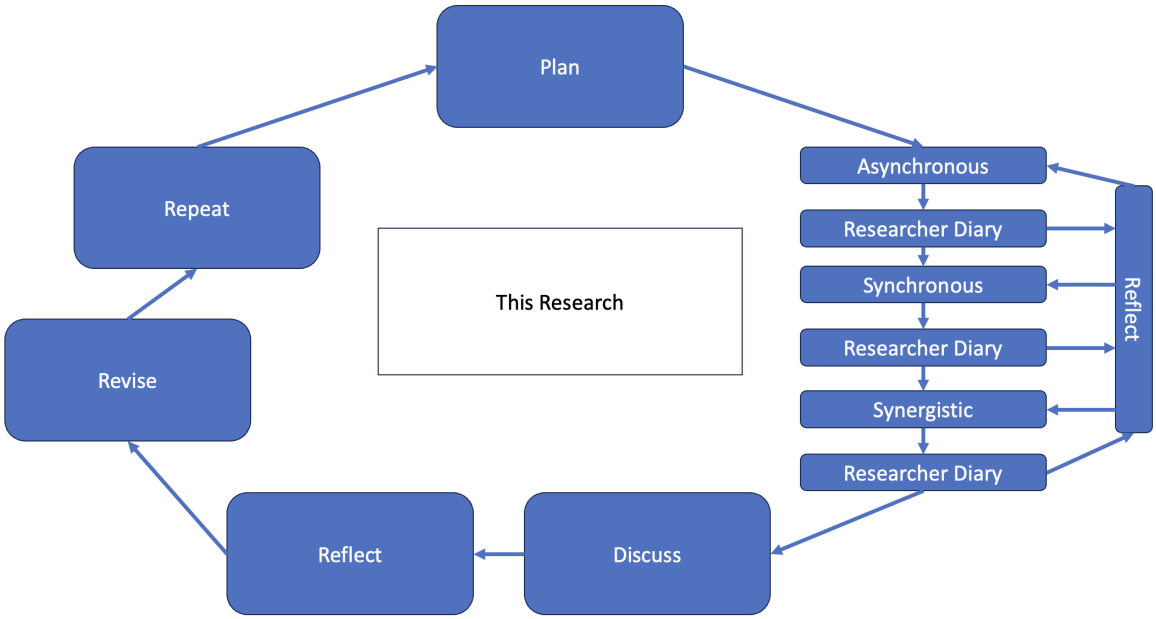


Figure 14 - Action research model in this research with the addition of a discussion

In short, the purpose and nature of this study meant that adaptations to the action research model were necessary so that the ideas presented in one teaching model could be applied to the other teaching models within the same cycle, along with an informal discursive stage which informed my reflection.

5.5.1 An evolving definition of action research

It is argued in chapter three that the variations in action research which are evident in the literature are important to the very concept of action research, and that action research approaches are interpreted and enacted in different ways. While my research aligns with Kemmis and McTaggart's (2000) spiral model of action research it did not follow their model precisely,

as presented in 5.5. Based on the above, an updated definition of action research as originally presented in chapter three can now be expanded:

Action research is a form of research which is based around the concept of practitioners (myself as a teacher) developing their practice (how to teach composing online) by taking action as part of a reflective (through a research diary/ observation) and systematic research enquiry. The aim is to improve practice through cycles of inquiry (two or more research cycles), while seeking to bring about change within the practitioner's own context (my own school, and the students I teach), *in conjunction with the opinions of the participants through a discussion element.*

This discussion element is also consistent with constructivism, utilising participants' informal opinions to make changes and construct new knowledge.

5.6 Areas of Convergence and Divergence Amongst Participants

Students had different experiences of the online lessons in this research, and there were areas in which some students agreed or disagreed with each other. That was unsurprising, as very few teachers would expect to find that all their students agree completely about all aspects of their lessons. Exploring differences of opinion and experiences is a tenet of interpretivism, which is concerned with individual experience. Through analysis of the data, areas of convergence and divergence of student perspectives were identified.

5.6.1 Areas of Convergence

The following aspects emerged from the data analysis as areas of broad agreement: learning to compose online was an enjoyable experience; there was an ease of use through familiarity with the technology; that the addition of a second Google Meet call improved the lessons; there was a reluctance to use BandLab at home; and the synchronous model was the least favoured. In this

section the significance of each is explored. Convergence in these areas suggests some favourable aspects to the online teaching models.

Students self-reported on the questionnaire that they enjoyed the online lessons, with the average score (out of five) for finding the lessons enjoyable being four. During the interviews some students highlighted specific things that they enjoyed, such as pupil A saying that they enjoyed the quizzes, while other students, such as student D, saying more generally that they were *'enjoying [themselves] in these lessons'*. Exactly why students enjoyed the online composing lessons is less clear, but the novelty of learning online may have contributed, as might have the freedom associated with composing their own music. Why lessons were found to be enjoyable was not covered in the questionnaire or interviews, but even in the absence of a reason, most students enjoyed the learning.

Another area in which views converged was in the use of technology. More precisely, students unanimously said that they found Google Classroom and Google Meet easy to use, including locating resources and logging on to the Google Meet call. Google Classroom and Google Meet appeared easy for students to use, aided perhaps by their significant prior experience (and this is precisely why these websites were used). These students already used Google Classroom daily in school, as a platform for lesson resources and homework. Students were also skilled at using Google Meet, having used it extensively during the Covid-19 pandemic. The result of students being able to access work easily through software they were familiar with was that learning how to access the work did not create an additional barrier to learning. This may have implications for educators seeking to implement the teaching models suggested in this research, highlighting the benefits of online tools which are already familiar to their students. Similarly, students reported that BandLab was easy to use. It appears that these students found BandLab easy to use for two reasons: 1) it is like Logic Pro X, a DAW that all students used in year 7 and year 8, and 2) because of clear instruction on the provided lesson slides, and use of musical modelling (both live and pre-recorded). Again, familiarity with music software should be a consideration for educators looking to implement these teaching models. Students also largely agreed that the second Google Meet call was an improvement to the synchronous and synergistic models, from a

privacy (able to have private conversations with the teacher) and disruption (one student and the teacher being heard by all students, stopping them from doing work) point of view.

While students held largely positive opinions about the technology used, students' views converged on one use of technology in a negative way: no students continued their work on BandLab at home. A contributing factor to this may be because students completed so much work in the lessons, with most students moving on to extension tasks within lesson time. In effect, some students did not complete work on BandLab at home because there was no work to be done, they had already completed what was required (and more) during the lessons. However, some students were behind on their work and still did not complete work at home, and that was somewhat more concerning. Pupil C said that they did try to use BandLab at home but thought that it *'sounded wrong so I just said no, I can't do this'.* Perhaps greater emphasis needed to be placed on completing unfished work at home, but while detentions could have been set within my school for incomplete work, that would not have reflected the simulated online environment. How to sanction students for not completing their work in an online environment poses a different, and difficult, question, especially when there is not a physical space within which to supervise a student in detention. Considering that online learning typically takes place at home, the lack of engagement by students at home is concerning. This may suggest that the models, while effective in a simulated online environment set within a classroom, are less effective in a true online environment. This is explored further in the recommendations.

Finally, students converged in opinion that the synchronous model was their least favourite. Not every student selected the synchronous model as their least favourite, such as student C, but a majority did. Student A and F, for example, both said that the synchronous model was their least favourite because they had to wait for the teacher to finish speaking before they could continue with their work. It would seem that the synchronous model was the least favourite due to students having to wait before they could begin composing, which displayed an eagerness to engage with the content or eagerness for freedom within the lesson. Perhaps the teacher instructions limited opportunities for independent learning, and may have inadvertently created a dependence on the teacher instead. It is possible that students also said they liked the synchronous model the least because it most closely resembled face-to-face teaching, something

that students may have been keen to avoid in the online environment. However, while students largely said that synchronous lessons were their least favourite, the positive response to this model in the questionnaires suggested that they did not actually dislike the model. Had the synchronous model been the only model, with no possibility of drawing comparisons between the models, the response to it may have been more positive. Interestingly, in terms of the merits and challenges of each model from the point of view of the teacher-researcher, the synchronous model was not my least favourite of the three models: asynchronous was my least favourite. In contrast to the students, the synchronous model was preferred because it was similar to face-to-face teaching, while the asynchronous model reduced the amount of teacher control. It is possible that my unconscious bias may have influenced student opinion, but this was at least partially mitigated through a set questionnaire which showed limited bias and a semi-structured interview with some pre-arranged questions. However, the discussion which evolved to take place at the end of each lesson in cycle 2 did not feature any mitigations, so my own unconscious bias, such as speaking more enthusiastically about one model than another, may have been evident. That students did not converge with my preferred teaching model suggests that unconscious bias did not play a significant part in this research.

5.6.2 Areas of Divergence

There were five primary areas of divergence amongst participants: different students preferred different models; engagement with the teacher; engagement with other students; the length of pre-recorded videos; and the desire to use a musical keyboard.

The first of these areas was that different students preferred different models, even if a majority preferred the asynchronous model. Those who preferred the asynchronous model cited being able to get on with their work without interruption as the main reason for preferring it, and while this may be the reason for some students preferring it, other students may have selected asynchronous as their preferred model as it meant they could ‘get away’ with doing less work in these lessons. Other students said that the synergistic model was their preferred model, due to the balance between being able to get on with their own work while at the same time having a

teacher available to ask for help when needed. This may have wider implications for the design of online learning courses, with the possibility of offering the same content through different models and therefore allowing for student choice.

Another area of divergence was engagement with the teacher and engagement with other students. While a small number of students regularly engaged in student-teacher conversation during lessons, in particular during the synergistic and synchronous lessons using the second Google Meet call, a slightly larger number of students engaged on a limited number of occasions and the majority did not engage in conversation at all. The number of resources available (such as the pre-recorded videos and text-based guides) may have contributed to this lack of student-teacher contact, and it is possible that it was easy for students to 'hide' during online lessons, remaining unseen by the teacher and not being forthcoming with interactions. Even fewer students engaged with another student, with a small number of one or two sentence interactions when questions were asked. Perhaps students did not want their interactions with each other to be public for all to see and hear, with the use of breakout rooms for private conversations a suggestion for improvement from one student. However, breakout rooms were disabled by the IT team at this school, and bring into question the potential safeguarding issues with giving students an unsupervised online space. Students who are engaged during online learning display sustained involvement in learning activities, including communicating with others (Kumar & Sundar, 2018). This definition of engagement does not align with engagement in my research: students were engaged with the lessons, as evidenced by their completed work, requests for extension work, and ability to remain on task, but they did not engage regularly with the teacher or one another.

The fourth area of divergence was that some students preferred shorter pre-recorded videos, and others longer. This is somewhat contradictory, as the pre-recorded videos in cycle 1 were long, continuous videos, after which students requested as an improvement that these be split into multiple shorter videos to make them easier to navigate. Then, after cycle 2, some students said that they preferred the longer videos to the shorter ones and liked being able to navigate through them as they desired. A decision was made to provide students with both long and short videos for the later lessons of the research. While this provided students with a choice of videos and

catered for both preferences, additional work had to be carried out to produce these videos and therefore may not have been sustainable. Alternatively, it may be practical for a teacher to select either long or short videos instead of offering students a choice. Here the teacher must balance their individual preference with a pragmatic approach to what is manageable.

The final area of divergence was that some students desired to play in the notes of their composition on a musical keyboard, while others were satisfied with clicking in the notes one by one. BandLab has the capacity for both, but clicking in notes was selected as the method for inputting notes in this research for the same reason that the free BandLab software was chosen: to make music composing accessible to as many students as possible in their home environment (most students in this class do not own a MIDI keyboard, so could not play in their notes at home). The students who wanted to play compose on a keyboard were those with greater keyboard proficiency, and for that reason it may be appropriate for an educator to tailor their online teaching to using MIDI keyboards should that suit their class. In this research, those with less proficiency on the keyboard said that clicking in the notes directly to BandLab was not a problem, and to some extent this made the experience of learning online and composing online more equitable as it allowed students who were not proficient on the piano to succeed. This perhaps speaks to student access to keyboard instruments, with those who own or who have access to a keyboard instrument outside of school more likely to want to use one with BandLab. However, as these models are intended to be accessible by using as little specialist technology as possible (such as keyboards), clicking in notes made demonstrating success within musical compositions attainable for all students (Airy & Parr, 2001).

In sum, the areas of divergence are largely based on the opinions and preferences of individual students. In practice, balancing the preferences of every individual will be challenging, and it may be up to the educator to make the most appropriate choices based on these divergences for their context.

5.6.3 Summary of areas of convergence and divergence

A graphical summary of the areas of convergence and divergence across the three teaching models is outlined in figure 15.

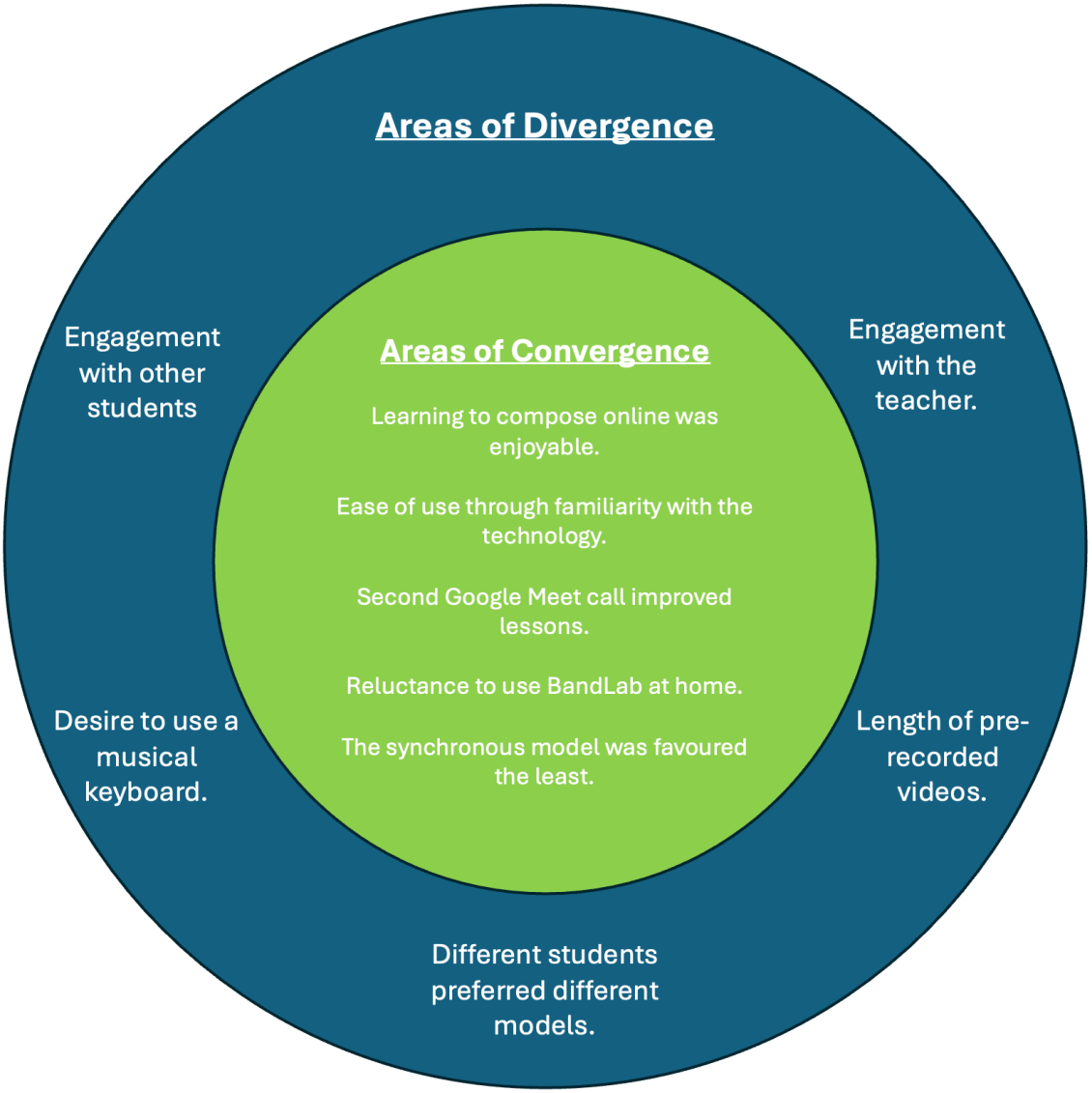


Figure 15 - Areas of convergence and divergence across the three teaching models.

Identifying areas of convergence and divergence has a wider significance for this research, as it indicates what worked well in the online composing lessons and where the lessons might be developed in the future. For example, that students enjoyed the online lessons suggests that the

lesson content and structure were appropriate and engaging, and finding that BandLab, Google Classroom and Google Meet were all easy to use signifies that the technology worked as designed and that selecting technology that students are familiar with is appropriate. Similarly, the differences in engagement, preferences with video length, and that students did not complete their work at home, denote potential future developments.

The areas of convergence and divergence can also be viewed from the perspective of aim 3, 'to explore the merits and challenges of each model from the points of view of the students and teacher-researcher'. While convergence does not equate to merits, and divergence does not equal challenge, the same areas of convergence and divergence as in table 5.1 can be reordered into merits and challenges (table 26).

Merits	Challenges
Enjoyed online lessons.	Students did not do any work at home.
BandLab and Google Classroom/ Meet were easy to use.	Students selected the synchronous model as their least favourite.
Students found the second Google Meet call a useful addition.	Students preferred different models.
	Different amounts of engagement with the teacher.
	Different amounts of engagement with other students.
	Some students preferred shorted videos, other longer videos.
	Musical keyboard vs clicking in notes.

Table 26 – Merits and challenges within areas of convergence and divergence.

Viewed this way, while there are merits to the three models there is more development to be done to reach a consensus about designing online composing lessons. However, perhaps reaching a consensus is simply unrealistic, and when viewed within an interpretivist paradigm it is

understood that experiences and opinions of individuals will never entirely converge. Aim 3 is discussed further in the conclusions chapter.

5.7 Summary

The emergent themes of this research, TPACK, technology in online composing, and areas of convergence and divergence amongst participants have been discussed in this chapter. This includes how action research can be developed to suit the needs of the researcher, and the issues with communication, efficiency, and relationships. In particular, the tensions between efficiency and connectedness were drawn out, and while online lessons can be more efficient in terms of the amount of work completed in a lesson, this suggests a way of thinking about education in economic terms. This contrasts with the non-rational aspects that nourish learning, and throughout this research more subtle thinking developed which suggested that efficiency and connectedness do not need to be binary opposites. I suggest that with the affordances of technology (Google Meet, Google Classroom, and BandLab), online learning in music composing can promote efficient learning (i.e. students can complete a lot of work in lessons), while also striking a balance with connectedness (depending on the choice of model). However, as discussed efficiency is not always the most important consideration for music composing, which is not typically concerned with how efficiently a piece of music has been composed.

Similarly, online music composing teaching when analysed through the TPACK lens highlighted the value of planning and teaching *with* technology instead of *through* technology, with further implications for connectedness and efficiency. This research argues that a teacher with a sufficiently developed TPACK is able teach with technology, exploiting its potential to make lessons more efficient (able to teach more) and improve connectedness by providing avenues for communication beyond speaking. While the importance of efficiency in music composing lessons may be contested, a better understanding of how to teach with technology, including creating a sense of connectedness, may result in more engaged students. As such, the TPACK model is central to the realignment of efficiency and connectedness in online music composing lessons.

This research has demonstrated that online music composing pedagogy is not ‘second-class’ when compared with in person composing teaching. All elements of composing tuition translated into the online models well, and students produced coherent musical compositions during both cycles while being engaged and enjoying their lessons. During the Covid-19 school closures education continued to happen, even under challenging circumstances, and those difficult conditions have very much opened the door to new possibilities and uses for online tuition. The models for music composing developed in this study provide a cost-effective way to teach music composing online, using widely obtainable equipment, with the possibility of multiple schools being taught by one teacher and efficient lesson content coverage. The research findings paint a nuanced picture of knowledge content and interconnectedness through TPACK with active and engaging music composing pedagogy. It is not necessary for music education to be side-lined when this research demonstrates how accessible it can be. Online teaching, and the relationships which can be developed through it, should not be devalued.

In the next chapter, this research is concluded by addressing the research question and aims, exploring how applying the TPACK model to my practice in teaching online music composing has developed, suggesting final models for synchronous, asynchronous, and synergistic lessons, and reflecting on the research process. The contributions to the field of online music composing lessons and the TPACK model are also outlined, along with recommendations for future research.

Chapter Six - Conclusion

6.1 Introduction

This study explored how music composing could be taught online, a particularly challenging aspect of music education to translate into the online environment due to its practical nature and historic need for physical instruments and paid for specialist software. This chapter reflects on the findings and analysis presented in the foregoing chapters, with reference to the research question and aims. The importance and contribution of this work for the development of teaching music composing online using three different teaching models is also summarised, and a much-developed TPACK model is presented.

This chapter begins by returning to and addressing the research question and aims. A summary of contributions made by this study to the fields of online music education and TPACK is offered, along with the significance of each. Next, the limitations of this study are presented, and I reflect on my own research experiences. Finally, recommendations and suggestions for future research are presented.

6.2 Research Question

The guiding question for this research was as follows:

How can teaching models be developed for the online teaching of Key Stage 3 (KS3) music composing lessons in England?

As explained in chapter three, the answer to this question can be found in the opinions and experiences of those who interacted with the models. The teaching models were developed based

on the experiences and opinions of the participants, including myself, with each positive, challenge, and suggestion for improvement shaping the changes in each model. In answer to the 'how' of this question, this research demonstrated how teaching models can be developed by utilising action research and drawing on the experiences and opinions of the participants.

This research demonstrated how generic online teaching models could be developed through systematic cycles of action research, to create KS3-specific online teaching models which may be generalisable to a variety of situations. The research has shown that the TPACK model can be made specific to pedagogy within a subject discipline, so that it is no longer too broad to be of use to teachers. Any educator could potentially follow the same process as in this research to create their own online teaching model, for any subject, while being mindful of what would be appropriate in relation to their subject discipline and other factors relating to their context.

The four research aims each contribute to answering this overarching research question. Through systematic inquiry this research question has been answered, developing three models for teaching music composing at KS3 online and a composing specific TPACK model. The research approach taken, including the cycles of action research, the analysis, and the changes made to each teaching model, demonstrate how online composing teaching models can be developed.

In the next section, how the aims of this research have been met is explored.

6.3 Addressing the research question and aims

6.3.1 Aim 1 – To develop three models for teaching online music composing lessons to KS3 students.

This research drew on three generic models of online teaching and researched their application to pedagogic practice in the subject area of music, and specifically music composing, through two cycles of action research. Over the course of these cycles, the models were refined so that they were specific to online music composing teaching at KS3. While this research was conducted

with KS3 students, the models may be applied to KS2, KS4, or even KS5 students, if the teacher has developed a sufficient TPACK.

Whilst the three models have several similarities with the original models on which they were based, they have changed significantly and have some marked differences which are discussed later in the chapter. The final teaching models, as they appeared post cycle 2, are presented and discussed next.

As previously stated, it is important to offer multiple models for the teaching of online composing lessons. There are many reasons why a teacher might be required to teach synchronous, asynchronous, or synergistic online lessons when they may prefer to use a different model, such as a directive by a school. The asynchronous model also benefits from the teacher not having to be in the lesson, so lessons could be taught to a much larger number of students using this model. As such, three models are suggested below for use by teachers. All models could be adapted to suit different situations: these are simply the models which have been developed as a result of this specific context.

The Synchronous Model

After completing cycle 2, additional adjustments were made to the models based on the challenges and suggestions for improvement. The changes after cycle 1 have already been outlined in the findings (section 4.2), and the changes after cycle 2 are presented and discussed here. In the synchronous model, as with all the models, there were far fewer changes after cycle 2 than cycle 1. This was expected, as the original model was not specific to music composing, so the changes made post cycle 1 were significant to make the models more suitable for the intended purpose. The cycle 2 changes are therefore perhaps better thought of as minor adjustments: there are no major changes, just alterations to the major changes made after cycle 1.

The suggested changes to the synchronous model were detailed in chapter four, summarised here as:

- Set up the second Google Meet call in the same browser as the first.
- Address misconceptions from the previous lesson.
- Regularly remind students to speak to the teacher if they need help or an extension.
- Teacher to target and drop in on students who are known to be quieter or of a lower attainment.
- Allow the use of breakout rooms (not withstanding potential safeguarding issues), to improve a sense of belonging and student-student communication.

The suggested model for synchronous online music composing lessons for KS3 students is shown in figure 16, with the changes to the synchronous model post-cycle 2 highlighted in red.

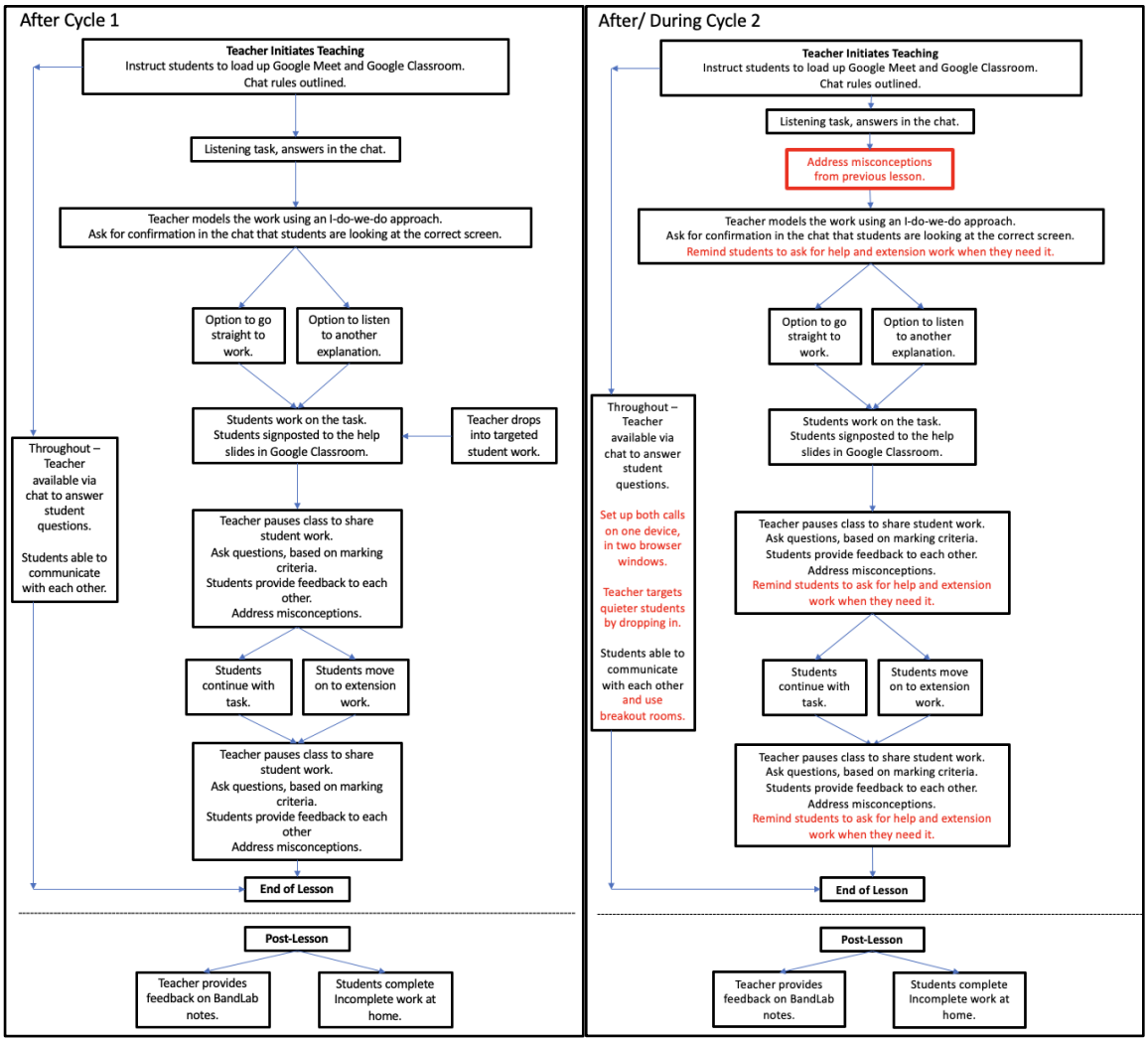


Figure 16 – Synchronous after cycle 1 and synchronous after cycle 2

The Asynchronous Model

The asynchronous model was the preferred model of most students. Students appeared to like that they could get on with their work, at their own pace, and most moved very quickly through the tasks with the clear videos and instructions. Students also seemed to like not speaking to anyone, even each other. However, as students had total autonomy in these lessons some slides and videos were skipped, and students missed key information. While key information was missed, students did progress very quickly and almost all students completed the main task and extension tasks, with good quality work. The composing work was generally of a high quality,

but there were concerns that some of the underlying understanding was missed due to skipping slides and videos.

Following cycle 2, four further changes were made to the asynchronous model and were detailed in chapters four and five. The changes are summarised as:

- Make progression to the next slide available only when students have completed the current slide, so that no information has been missed.
- Require students to interact with one another during lessons through tasks which require group participation.
- The option of one longer or multiple shorter instructional videos, with a text or screenshot-based guide.
- Ensure that there are enough extension tasks available to account for the efficient use of time.

The suggested model for asynchronous online music composing lessons for KS3 students is shown in figure 17, with the changes to the asynchronous model post-cycle 2 highlighted in red.

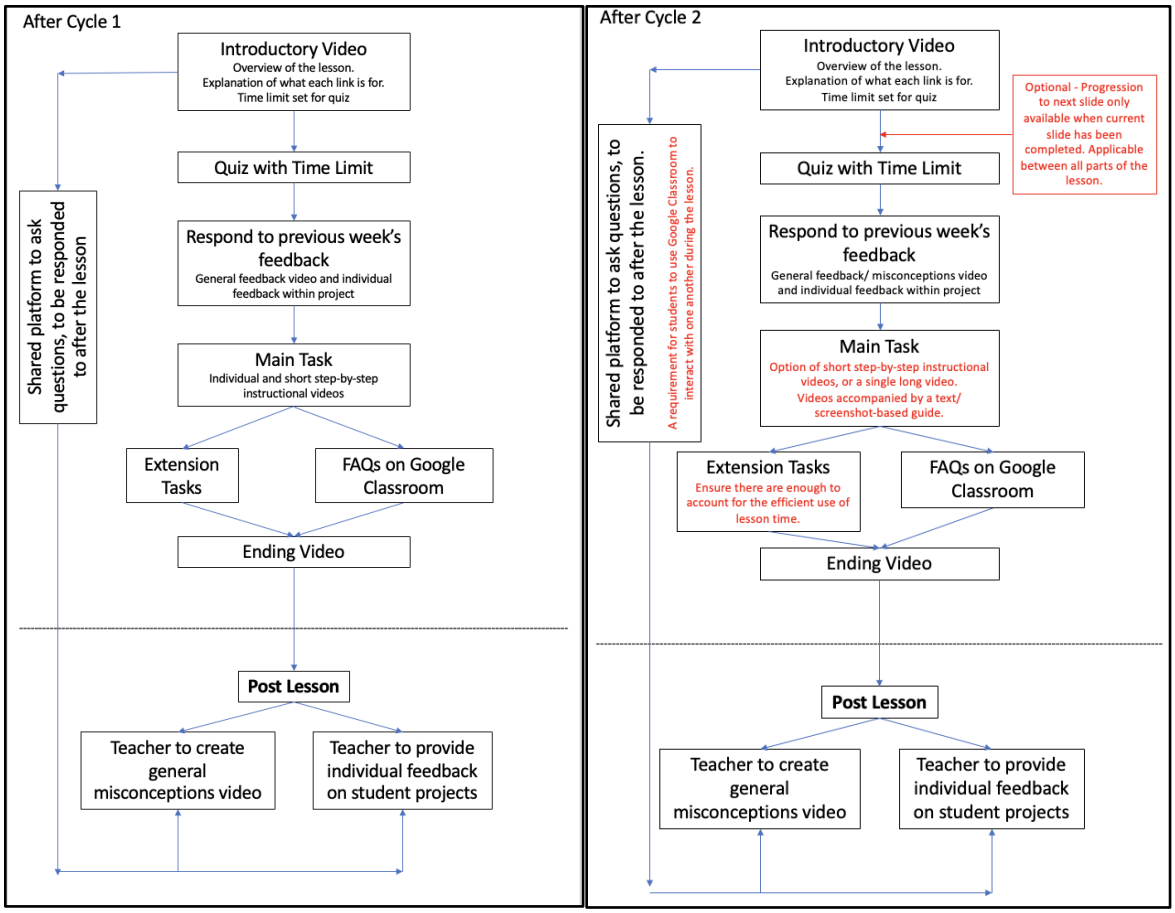


Figure 17 – Asynchronous after cycle 1 and asynchronous after cycle 2

The Synergistic Model

The final model, synergistic, had the advantages of being able to teach students the content all together and address misconceptions, but the teacher could spend most of their time with students who needed help while more confident students could progress at their own pace. In many ways, this combined the best elements of the synchronous and asynchronous models.

Upon completion of cycle 2, further changes to the synergistic model are suggested. These suggestions have already been suggested for either the synchronous or asynchronous models, or are very similar to the suggestions already made, and were detailed in chapter four and chapter five:

- A way to direct students' attention to the teacher's presentation, preventing students from doing work.
- An option for one longer or multiple shorter instruction videos.
- Extension tasks at varying degrees of difficulty.
- Teacher to target and drop in on students who are known to be quieter or of a lower attainment.

The suggested model for synergistic online music composing lessons for Key Stage 3 students is shown in figure 18, with the changes to the synergistic model post-cycle 2 highlighted in red.

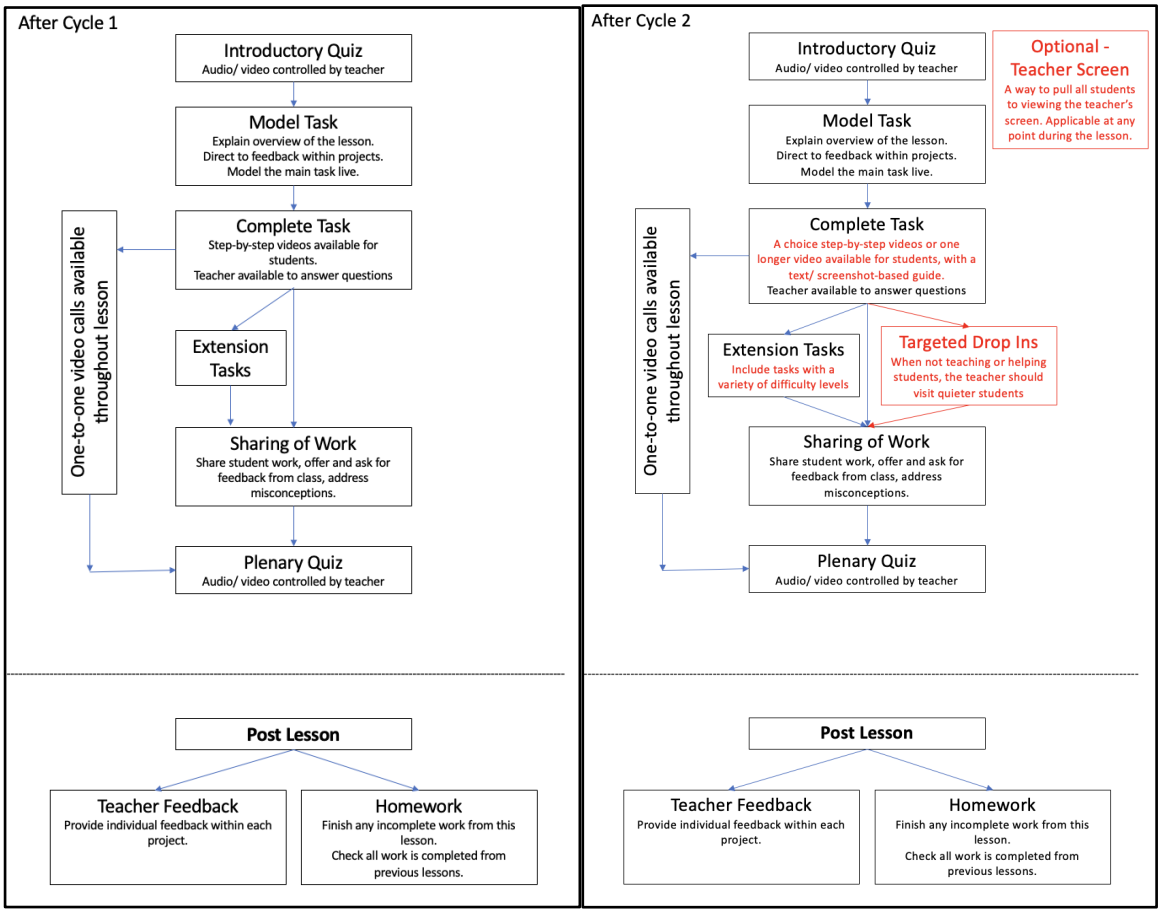


Figure 18 - Synergistic after cycle 1 and synergistic after cycle 2

Aim 1 – Outcome

The aim to develop three models for teaching online music composing lessons was met. Whilst they have been developed, they will continue to develop and evolve should they be used and adapted for other contexts, subjects, and when implemented in true online environments. These models provide an opportunity for educators to *teach music musically* (Swanwich, 1999) in the online environment, as opposed to moving to non-practical music lessons (e.g.Hash, 2021). The idea of making music, and not just learning about music, is central to these models, and these models demonstrate that students do not need to miss out on practical music making due to learning online. Students were immersed in musical activity within each model (Spruce, 2016), and all the models involve active learning (Morgan, 2022) to aid engagement.

6.3.2 Aim 2 - To compare three different models of teaching online music composing lessons.

Now that three different models of teaching online music composing lessons to KS3 students have been developed, this section summarises the similarities and differences between the three models.

Similarities

There are several similarities between the models. The first similarity was that all lessons required the same technology: a computer, internet connection, and a pair of headphones. Access to an online DAW and a virtual learning environment with video conferencing capabilities, such as BandLab and the G suite for Education, was also required, and these were free at the point of writing.

Another similarity was the structure of lessons. The lessons all began with an introduction, looked at misconceptions from the previous week, followed by teacher led questioning or a self-

marking quiz. The main task was then introduced, followed by students completing that task. Finally, the lessons ended with a plenary led by the teacher, a video, or a self-marking quiz.

Two aspects of pedagogy were also consistent across the models: the text-based guide and weekly written feedback. Providing those text-based guides on Google Classroom as supplementary resources in all teaching models was something these students were accustomed to, as they are often used in face-to-face music lessons in this school. The weekly written feedback was also the same for all models, as it took place out of lesson time and therefore the type of model did not impact on it.

A fourth similarity was that students were motivated and engaged in lessons, regardless of the model. Every single observation suggested that students were engaged and on task, which was supported by the questionnaire responses and interviews. There were very few instances of students off-task, on websites that they should not have been on (despite them having access to the internet), or using the chat function inappropriately.

Finally, a fifth similarity was that students progressed with their composing, regardless of the teaching model. The students and I had our preferences, but in all models students were able to make progress and develop their work. This suggests that all three teaching models may represent viable options for the teaching of online music composing.

Differences

While there were some similarities between the three models, there were many differences. Several themes emerged as I became familiar with the data, and the differences between the models will be explored through these themes.

The first theme identified was communication, belonging, and social interaction. Morgan (2022) highlights issues with isolation in online learning, and that was indeed true to some extent in my research. While it was challenging to get students to speak with each other even when they had the opportunity, communication was considerably better in the synchronous and synergistic

models than in the asynchronous model. The addition of a second Google Meet call in the synergistic and synchronous lessons helped improve communication further, as it meant that student-teacher interactions could occur without disturbing others. It appeared that as the lessons progressed student-student interaction also improved, but there is certainly room for further improvement. However, in the asynchronous lessons there was very little student-student communication, and no teacher-student communication. While this is inherent with the model, even with the addition of a comment section on Google Classroom to encourage student-student contact there was very little interaction. It is possible that the quality of resources meant that students did not wish to interact with one another, with pupil F saying in interview 2 that even in synchronous lessons they did not want to speak with other students because they did not want to or need to, and because they preferred to work alone. Pupil B did however say that while they did not speak to students often, that *'if I ever needed to go to someone, like not just the teacher, but also the students around me, if I ever wanted to ask them or some feedback or stuff like that, then…I personally [would] be able to'*.

The next theme is efficient use of lesson time. Students reported that the asynchronous lessons were much more efficient with their use of time than the synergistic lessons and synchronous lessons. Pupil B stated that the synchronous lessons were their least favourite because they felt that they had enough ability to *'get on with the work',* but they had to wait for me to introduce tasks and explain misconceptions. Pupil B said, *'waiting for you like finishing off was a bit difficult'*. This student was one of the highest ability students, and they were clearly becoming frustrated at having to wait for me to explain things to the entire class before they could begin their work. However, student B said that asynchronous was their favourite model because '*I just love being able to just be there and do whatever I wanted'*. It appears that some students found the slower pace of synchronous and synergistic lessons challenging, in particular the parts being led by the teacher, and they indicated that they could have done more work if they had just been allowed to get on with it. In contrast, the asynchronous lessons appeared to make extremely efficient use of the lesson time as students could log in straight away (no waiting for other students to arrive at the class, which could be as much as 5 minutes) and then work through the tasks at their own speed right up to the end of the lesson. It was noted in the observations for asynchronous cycle 2 that students were managing to complete a lot of work in asynchronous

lessons, and that additional extensions would need to be provided in future versions of the model. It was also observed that some students were effectively an entire lesson ahead of others, as they made very efficient use of the maximum lesson time. While the lack of teacher input to asynchronous lessons may have led to more misconceptions, and the reduced amount of guidance was a challenge for some students, many students benefited from the additional time gained in asynchronous lessons due to the lack of teacher instruction.

The next theme, somewhat related to efficiency of lesson time, is independence and autonomy. Regarding online learning in general, in interview 2 pupil F said that online teaching is better than face-to-face teaching because *'it's just easier'*, you can '*just continue on with your work'*, and *'use whatever you have on the slide'* instead of listening to the teacher. In their second interview, pupil F added that asynchronous lessons were their favourite, as they did not need to ask for help because *'the video was there so I'm fine'*. Independence was important for this student, and nowhere was there more independence than the asynchronous model. Pupil A added that they did not speak to anyone during the synchronous lessons because *'I just work independently*', and that they *'didn't really interact with anyone since I've just got on with me work'.* Pupil B agreed, saying that they did not use the second Google Meet call in synchronous or synergistic lessons because *'I've been trying to figure out [things] myself'* (cycle 2 interview). There were greater opportunities for independent work in asynchronous lessons than any other model, as interaction with the teacher was not possible and there was very limited student-teacher interaction, but to some extent all models involve independent work.

There were many other differences between the models, which became evident when examining the three different models post cycle 2. However, these differences were inherent to the different models, such as the inability to speak with a teacher during asynchronous lessons, and the ability for the teacher to share student work in synergistic and synchronous lessons. Overall, the asynchronous model has a larger number of differences when compared to the synergistic and synchronous models. The synergistic and synchronous models are strikingly similar, but the addition of videos in synergistic lessons provide the teacher with more time to answer questions in the second Google Meet call and allow more time to check in on quieter students. The addition of videos in synergistic lessons was an important one, as it allowed the students who needed help

the most additional time with the teacher, while still providing other students with the guidance they required (as they could rewatch the videos as many times as they liked).

Questionnaire Comparison

Whilst this was designed as a qualitative study, a basic analysis of mean values from the questionnaire has value and is worthy of consideration.

Students reported that every cycle 2 model was better than the cycle 1 models. This is positive, as it suggests that the changes made to cycle 1 were appropriate. Overall, students gave the synchronous model the highest mean score, which is interesting because many students reported that the synchronous model was their least favourite. Synergistic, however, was given the lowest mean score by students. The deviation between the mean values is very small, less than 0.2 (on a scale of 1-5) between the highest and lowest overall value. What is interesting is that of the 25 questions asked about all models, in synchronous lessons students gave higher values to 23 of them in cycle 2, in asynchronous lessons 24, and in synergistic lessons only 19. This suggests that synergistic lessons are students least favourite (contrary to what they reported), but this may be a result of lesson and questionnaire fatigue (synergistic lessons were always at the end of the cycle) or because the tasks in synergistic lessons were generally the most challenging, as students improved their composing skills.

While no conclusions are drawn from a numeric analysis of the questionnaire, it is interesting that the questionnaire confirms that cycle 2 is an improvement on cycle 1. This is consistent with other data e.g. observation 4 of cycle 2 where I noted that this model was a *'a definite improvement on asynchronous cycle 1'*, student C in their second interview saying that synergistic lessons were *'a lot better than last time'*, and student E adding that the changes to the synergistic model were *'great'*.

6.3.3 Aim 3 - To explore the merits and challenges of each model from the points of view of the students and teacher-researcher.

Perhaps unsurprisingly, the challenges of online teaching faced by the teacher were largely different from the challenges faced by students. While there were indeed challenges, the merits of online teaching and learning arguably outweigh them. In this section the merits and challenges as they relate to each individual teaching model are explored, along with those which are applicable to all models.

All Models

There were only a few challenges and merits which were consistent between the three models. The first shared merit is that the models all enable progress in music composing. Two entire composing models were taught, using a piece of software unfamiliar to students, with all students producing two pieces of original music. It was far from certain that students would be able to produce original compositions through interaction with each individual model, and conceivably one or more of the models may have resulted in no music being composed. However, it is a merit of the models that in each there was evidence of improvement in students' composing skills. Another merit of all the models was the ability to leave personalised written feedback for each student between lessons (although this is arguably achievable in face-to-face lessons), and that students did not need to own specialist software to compose at home.

The biggest challenge common to the three models was the speed of the internet and computers at the school. As a result, students found BandLab very slow to use, especially as their compositions developed, became more complex, and required more processing power. This however was not an issue with my home computer, and students reported the same. A different teacher utilising these models could not be certain that students' home computers will have sufficient processing power, so a continued challenge for all models, and indeed all of online teaching regardless of the content, subject, or stage of education, will always be the quality of the device and speed of the internet connection.

The Synchronous Model

There were many merits to the synchronous model. It was possible to speak to students, share work, ask questions, receive answers, and model tasks. As such, synchronous online composing lessons share many similarities with face-to-face lessons. The lesson structure and the role of the teacher being largely like face-to-face lessons was an advantage because it provided some familiarity to both teacher and students. One merit for students was that they could ask questions to the teacher and other students. There was some reluctance to do this from some students, but this improved in cycle 2.

The main challenge as a teacher was being unable to check in on every student, and it was possible for quieter students to go the entire lesson without speaking to anyone. While improvements to cycle 2 were designed to address this, it still did not solve the issue. Students however, had other challenges. Students reported that they felt frustrated at the pace of the lessons, and unhappy that they had to wait for explanations to finish and less able members of the class to catch up before they could get on with their work. The other major challenge faced by several students was that when individuals were addressed by the teacher in cycle 1, everyone could hear the conversation. This proved to be very distracting for students, but the move to a two Google Meet approach in cycle 2 provided a successful fix for this issue.

The Asynchronous Model

In asynchronous lessons, students appeared to face far fewer challenges than the teacher. The merits of this model, from the point of view of the students, was that they could move through tasks at their own pace, were very focused due to no distractions, and that there was no waiting for other students or teacher explanations to conclude. Students reported very few challenges, only that they could not ask me for help when needed. A merit of this model was the ability to rewatch videos as many times as needed, but as the videos were the only way for me to communicate lesson information the quality of them was extremely important. Poor quality videos could quite easily make asynchronous lessons very challenging for students.

Many of the merits, from the point of view of the students, were challenges for me. I found it frustrating that I could not interact with students, especially when I could see mistakes being made and slides being skipped. Giving students autonomy was largely positive and allowed for a significant amount of work to be completed, but not all students could work independently, and I was not able to provide those students with help. It was also not possible to share student work with other students, so good examples of work could not be shared, and misconceptions could not be addressed as they arose. The videos, designed to provide instructions and address potential misconceptions, could not predict every possible misconception. Misconceptions were corrected via a misconceptions video at the beginning of the next lesson, and through individual notes on student works, but there was no guarantee that these would be actioned by students. The efficient use of lesson time did emerge as an advantage of asynchronous lessons, and students did complete more work in asynchronous lessons than the other models, but this was to the detriment of communication, sharing work, correcting misconceptions, and having any sense of belonging.

The Synergistic Model

The synergistic model was somewhat of a 'best of both worlds', combining the merits of asynchronous and synchronous models while removing some of the challenges.

Having the ability to speak to students live, share work, ask questions, and receive answers, and help individuals, all while providing students access to help videos, were advantages of the synergistic model. More advanced students could progress at their own pace by using the help videos, after the task was explained and misconceptions addressed, while the second Google Meet call was used to focus on students who required additional support. Unlike synchronous lessons, the most able were not reliant on the teacher to progress, and as a result more time was available for students who needed extra help. This was a significant advantage of the synergistic model. There were no apparent challenges specific to this model, beyond those already mentioned that are applicable to all models.

While students did report that the second Google Meet call was an advantage of this model, and that the videos were helpful in making the pace of lessons quicker, students still said that they

did not want to wait for the live explanations. I explain and model tasks in face-to-face lessons, which appear to be accepted by these students, but this same set of students were frustrated by explanations when learning in an online medium. As such, I must consider if the immediacy of technology in the modern world, especially student familiarity with social media, played a part in this frustration. However, my research suggests that explaining and modelling in the synergistic model, followed by pre-recorded help videos, was an advantage, and evidenced by fewer compositional mistakes and misconceptions in this model than any other.

6.3.4 Aim 4 - To develop the academic field in relation to the teaching of music composing lessons and the technology, pedagogy, and content knowledge (TPACK) model.

While a major part of this research was to develop teaching models for the online teaching of music composing lessons, in the literature review (section 2.2.12) I argued that being given a model to implement, such as the three developed in this research, is not enough to utilise them comprehensively. To fully understand a model and implement it, the TPACK model can be used as a helpful gauge of a teacher's knowledge. The problem outlined in section 2.2.12 with the TPACK model was that it is far too generic to be useful to teachers (Macrides & Angeli, 2018). Therefore, one of the aims of this research was to develop a composing specific TPACK model, which can be used by teachers regardless of the teaching model. This new TPACK model therefore fulfils this aim, as it develops the academic field in relation to the TPACK model.

The composing specific TPACK model is presented in a similar way to the original, as a Venn diagram, as it is helpful in visualising where and how the independent elements of TPACK interact. Similar to the pilot study, the composing specific TPACK model is presented as a series of questions. Teachers can use these questions to test their knowledge and identify any gaps in their own TPACK, using the TPACK model as a catalyst to improve their knowledge. Presenting the model as a set of questions, rather than a set of statements or otherwise, makes the model immediately useful. Teachers simply need to answer the questions to work out what they need to do to improve their practice.

Teachers then have a choice, with the option of planning lessons first using the teaching models and then reflecting upon, and potentially changing, them by using the TPACK model, or improving their TPACK first and planning lessons once they feel secure in their TPACK. While this has not been researched, I suggest that there will be an element of moving back and forth between lesson planning using the new teaching models and the new TPACK model, adjusting the lessons as one's TPACK improves in a cycle not dissimilar to action research.

Ultimately, the teaching models alone are not enough to plan effective online composing lessons if the teacher does not possess a sufficient understanding of how to integrate TPACK. Vice versa, an excellent online composing TPACK is not especially useful without the teaching models. Each lesson effectively requires two models: one of the three teaching models, plus the online composing specific TPACK model.

This integrated model was developed through researching my own practice. I identified areas of strength and weakness in my own TPACK, and considered where improvements had been made, and from this analysis produced a list of review questions for the model. I discuss my own TPACK and how it developed later in this chapter. The online composing specific TPACK model is presented in figure 19. The centre of figure 19, where TPACK should be situated, remains empty. This is because there is no single action to be taken in order to display TPACK, and instead a sufficient TPACK is shown through the inclusion of the other components within a task, lesson, or set of lessons (as discussed in 3.9.2).

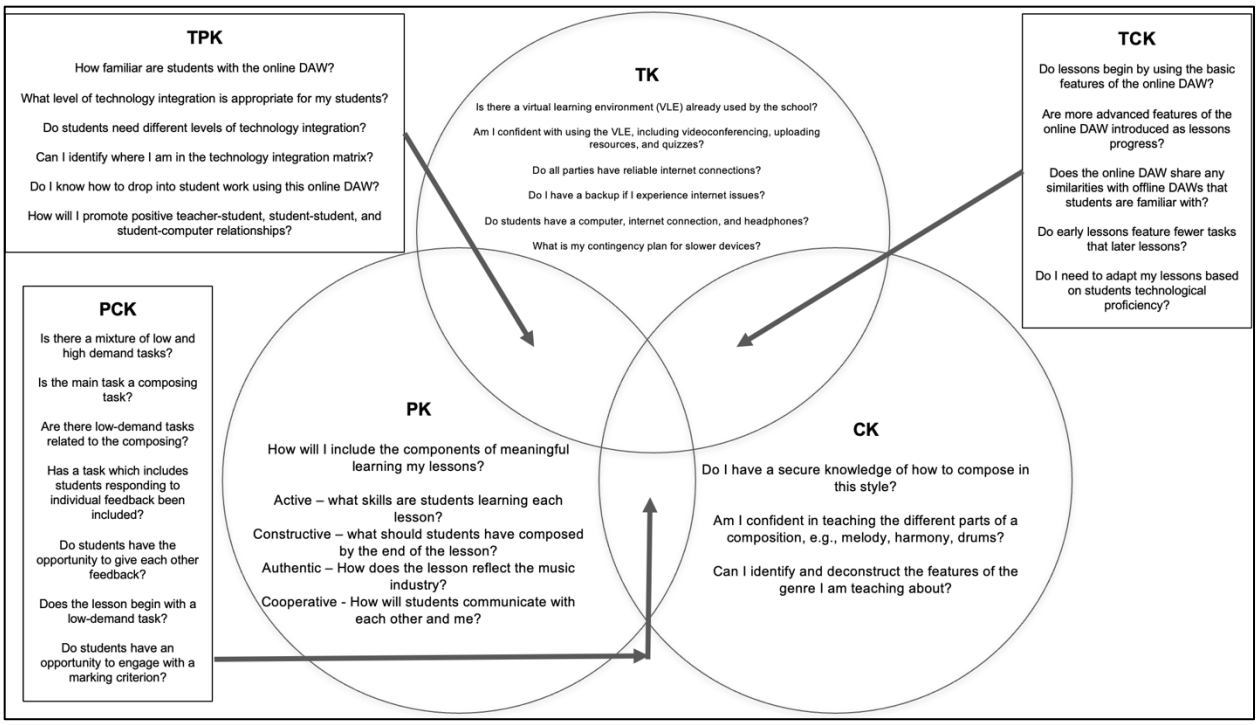


Figure 19 – Online composing TPACK model.

6.4 Summary of Contributions and Wider Significance

This study has contributed original knowledge and understanding to the literature and academic fields of teaching online music composing and the TPACK model. These contributions reside in the development of three models for teaching KS3 music composing online, the development of a composing specific TPACK model, and evaluation of the models. As explored below, these contributions are linked together and contribute to the development of new pedagogic practice for teaching online music composing to entire classes. The significance of this, beyond improving my own practice, is that teachers now have evidence upon which they can plan and teach their own online composing lessons. This is significant, because evidence of how to teach online music composing lessons to KS3 students was not available before my research. Given the small scale of this research, and that it is specific to one context and year group, the models could act as a source for music educators to draw on and adapt for their own settings. This is also significant for ITT providers, who can use the models to educate student teachers on how to teach online, and can be used for subject specific CPD within schools. Exactly how music

educators can teach online composing lessons by using three different models while integrating their chosen technology has been presented, a contribution which extends beyond my own practice. However, these models are not intended to be prescriptive and need to be interpreted in the context of each educator and evaluated in their adopted context.

In the literature review (section 2.4), four gaps which are relevant to the teaching of online music composing lessons were identified. The extent to which those four gaps have been addressed are explored next.

First, there was no research into online music composing lessons at KS3. Riley (2013) explored American teachers composing online with Japanese students, (Biasutti et al., 2021) found that conservatory teachers did not continue with composing during the Covid-19 pandemic, and Crawford (2017) researched composing taught using a blended learning approach, but none of these looked exclusively at online teaching at KS3 level. My research contributes to this gap because it does explore online music composing lessons at KS3, and it provides educators with a starting point for teaching their own online composing lessons.

Second, there was no research which suggested how best to teach online composing lessons. Even though there are examples of research which involve online composing (e.g., Riley, 2013; Crawford, 2017), these do not explicitly detail how to approach online composing lessons. My research presents three different models for teaching online music composing lessons, clearly suggesting how composing might be taught online. While ‘best’ is somewhat contentious, ‘best’ will be different depending on each educator and student’s context and the three models in this research allow for choice and adaptation. Prior to this research no models had been suggested, thus addressing a gap in the literature. While the presented models are specific to my context of an inner London school, a year 9 class, a simulated online environment, and my own prior experience of teaching music composing and teaching music online, these models are accessible and of value beyond my specific context.

Third, a frequent criticism of the TPACK model is that it is too generic to be useful to educators (Macrides & Angeli, 2018). My research set out to develop an online composing specific

TPACK model which could be used by educators when planning their online lessons, subsequently making the TPACK model useful. Whether or not the TPACK model created as a result of this research is useful requires further study, but now that it exists it can be utilised and further developed. This composing specific TPACK model is presented as questions within a Venn diagram, with the intention of the questions being easy to read while visually showing how the different components of a music composing TPACK interlink. The adaptation of the TPACK model provides an integrated planning tool to combine technology with pedagogy and content. This has wider significance and importance for research-informed practice in music education, specifically in online music composing teaching. The TPACK model has the potential to enable other music educators to analyse and develop their own approaches to teaching music composing online with benefits for student learning. In addition, this research has demonstrated how the TPACK model can be used as an analytical lens in online music composing lessons, to review an individual's TPACK and develop a subject specific TPACK model. Teachers could use this methodological and analytic approach to analyse their own TPACK and create their own TPACK models, which they may wish to do so for a different subject. This further contributes to the academic field in relation to TPACK and online music composing lessons.

Finally, this research contributes to filling a wider gap regarding the lack of research into online lessons of any subject in English secondary schools (EEF, 2020). This gap was identified by Ofsted (2021b) in the early part of the Covid-19 pandemic, with this research contributing to an aspect of this by addressing online learning in music.

Considering the contributions, this research runs counter to the narrative that online learning is a second-rate pedagogy. Students were able to compose music through these online lessons, using the models developed during this research. While music centric, these models could potentially be used by other subjects to improve online learning more broadly, using the action research and TPACK approach as presented in this research.

Additionally, there are wider significances related to this research. Firstly, and perhaps most importantly, there are potential benefits to music education. As outlined in the literature review (section 2.2.2), music education currently finds itself in a difficult position (e.g. Daubney et al.,

2019). However, my research has shown that teaching music online is a viable alternative to those schools and pupils who do not have access to a specialist music teacher. The lessons in this research used no specialist equipment beyond a free website, and instead relied on the TPACK of a specialist music teacher. With appropriate training and the development of teaching models using a similar action research approach, a wider music curriculum could conceivably be taught online. The benefits of this are numerous and might go some way to safeguard the place of music in England's schools, including that online music lessons are cost effective for schools and therefore a possible solution to funding cuts (Daubney et al., 2019). Additionally, schools would not be restricted by the size of the class and students in hard-to-reach areas or with no specialist teacher could still receive a music education. As online lessons are theoretically not restricted by class size, the burden of employing a declining number of specialist music teachers (National College for Teaching and Learning and the Department for Education, 2020) is also eased. This might be enough to keep music within the curriculum, or equally it might be used as an opportunity to remove music from classroom lessons. I would advocate for online music education to be utilised in situations where traditional in-person teaching is not possible, but not as a replacement where the option for in-person teaching is reasonable.

Secondly, other teachers in other contexts and subjects may benefit from this study. While this study is based around music composing, on a macro level the action research approach to developing models and using the TPACK model could be replicated for any subject. If an educator did not want to develop their own models through action research, this study may still inform them enough to help them decide on a synchronous, asynchronous, or synergistic approach, and regardless of the subject there is scope for educators to take the final models (including the TPACK model) and adapt them to their own subject and context. Practically, there are very few examples of online teaching models available. Now that these three models have been developed, some educators may find it easier to adapt these models rather than go through the process of creating their own.

Thirdly, there are insights into relationships in online learning. Relationships were the most challenging part of this research, and arguably developed least through the changes to the models. There are implications for online learning here, such as steps that can be taken to

develop online learning relationships (e.g. a more private place to have a conversation), suggestions for how to make sure the teacher makes contact with everyone (e.g. providing written feedback every lesson, and intentionally checking in on quieter students), and understanding the dominant nature of some students online.

Finally, this research demonstrated that there is value to integrating technology with pedagogy and content in online music composing teaching. It is reasonable to assume that Mishra and Koehler (2006) did not imagine their TPACK model being adapted for online music composing, and indeed without making the model more specific to music composing teaching it may well have been too generic to be of use (Macrides & Angeli, 2018). The literature highlighted the need for a music specific TPACK model, simply due to the number of technology issues within online music education (e.g. Riley (2007), Dammers (2009), Lockett (2010), and Hash (2021)). Specifically for music teachers, Bauer (2013) demonstrated that technology is the weakest area of TPACK for music teaching. The value of integrating technology with pedagogy and content in online music composing teaching is that it encourages the exploitation of the technology to teach the concept at hand, and the value of creating a specific TPACK model is that it allows any teacher to do this, even those without expertise in online learning or with technology. A teacher *could* teach an online music lesson in exactly the way they would in a traditional classroom, using technology as a conduit, or a teacher *could* exploit the technology and think differently about their pedagogical approach to teaching the content. A composing specific TPACK model certainly supports the latter, and is adaptable to other areas of the music curriculum as well as other subject specialisms.

Several wider themes also emerged in this research: online learning relationships, efficiency, and teaching 'through' or 'with' technology when integrating TPACK. These themes can be drawn together, and their significance related to how they interact with one another.

Online learning relationships have been evidenced to be challenging in this research, with difficulties in developing student-teacher and student-student relationships. However, the challenges with these relationships may have inadvertently resulted in students becoming less distracted in lessons, improving efficiency to the detriment of connectedness. Efficiency, which

emerged as improved during online learning, suggests that the lessons made good use of time, but this should be balanced with educators considering the potential impact on relationships.

The impact of technology, and therefore a teachers' TPACK, also impacts on both efficiency and relationships. The idea of teaching 'through' or 'with' technology will change how a teacher approaches developing relationships, with those teaching 'with' technology integrating the capabilities of any software and/ or hardware into student-teacher and student-student communication. For example, in this research the notes section of BandLab allowed for teacher communication with students, exploiting the software to provide advice and therefore develop a (somewhat one way) relationship with students. Another example was the use of the chat function in Google Meet, which allowed students to answer questions in an online equivalent to 'hands up'. Had I taught 'through' the technology, simply using Google Meet and BandLab as a conduit for teaching, developing relationships may have been even more difficult.

Teaching 'with' technology also made the online lessons more efficient. Using the technology to its full potential (or at least, as far as my TPACK allowed), presented opportunities to improve efficiency e.g. self-marking online quizzes as opposed to me asking the whole class a quiz at the same time and therefore allowing students to move through the quizzes at their own pace. Teaching 'through' the technology, and not adapting ones teaching practice to utilise the change in medium, might conceivably have meant lessons did not become more efficient or even became less efficient when compared to face-to-face in person lessons.

As demonstrated, relationships, efficiency, and technology are intertwined in this research, and significantly impact on one another. An improved TPACK can improve efficiency and positively impact online relationships, efficiency itself can negatively impact online relationships, and how a teacher wishes to explore online relationships might change how they use technology and approach the use of lesson time (for maximum efficiency, or otherwise). As such, the impact of each should be considered by educators when using these models or when more generally teaching online.

6.5 Limitations of this Research

A robust piece of research has been presented, with a strong case for the findings and recommendations. However, as with all research there are limitations to consider.

Firstly, this research took place in a simulated online environment as opposed to a true online environment. Every effort was made to make the simulated online environment as realistic as possible, but it is not possible to claim that the teaching models or development of the TPACK model would have been identical in a true online environment. While a strong argument has been presented for conducting this study in a simulated online environment instead of a true online environment in section 3.4.2, a true online environment may elicit different findings. However, this does not mean the findings are not valid. The findings remain valid within the context of a simulated online environment, and the models can now be further refined in a true online environment as suggested by recommendations 1 and 2.

Secondly, this study enacted two cycles of action research. Time restrictions and the structure of the music curriculum at this school meant that two cycles was the maximum number possible, but further cycles may have developed the models more. Additionally, it might be argued that the 7-week analysis period between cycles 1 and 2 was not sufficient to analyse the data thoroughly. However, this 7-week period was known before the beginning of the research, and as such the data analysis, and subsequent model development and lesson planning for cycle two, was planned to be achievable during this timeframe and as such the data was analysed thoroughly. Post cycle two, there were no time restrictions for data analysis.

Thirdly, this study has a limited sample size of 19 students, and the students themselves had selected music as a subject at year 9. As such, selecting a small number of students who wanted to study music may have provided me with more positive results than, for example, a selection of year 9 students who did not select music as an option subject but were required to study it anyway. At this point in time I did not have access to a year 9 class who had not selected music as an option subject, and time-pressures limited me to selecting just one class as opposed to increasing my sample size with a second class, which again strengthens the need for

recommendations 1 and 2 (and subsequently developing the models further with a larger sample size).

Fourthly, the extent to which I acted as a teacher or a researcher varied depending on the model, which may have impacted on the data collected. In the synchronous and asynchronous lessons I acted mainly as a teacher, while in the asynchronous lessons I was able to act entirely as a researcher (bar taking the register, dismissing the class, and my required safeguarding duties). Arguably this means that more in-depth data was collected during the asynchronous lesson observations, but this was mitigated by taking notes during the synchronous and synergistic lessons and writing up my observations as soon as possible after the lesson, and by collecting data using three methods.

Finally, this research is highly context specific. The conclusions and findings are true to this context, but had the research taken place in a different context then there may have been different outcomes. This does not delegitimise the findings, but perhaps makes them less generalisable. However, I suggest that the models are relatable to most music educators working with KS3 students in England, and perhaps music educators working with similar age students around the world, and that small changes might be required to the models to make them more appropriate to their context. Borrowing from Trowler (2016: 275), the models may

> *'empower professionals on the ground to make good choices and to themselves decide where situations described in the research are, and are not, analogous to their own situation*'.

6.6 Reflections on the Research Process and Contribution to Professional Learning for Music Educators

Now that the aims have been addressed, and contributions stated, in this section I reflect on the research process, action research, differences in my opinions and students' opinions, the role of the teacher in online learning, and TPACK.

6.6.1 The Action Research Process

This piece of research was the first time I have engaged in action research, and it was both rewarding and challenging. The model of action research was straightforward to implement, and the process of 'try an intervention, analyse it, change it, and then try it again', was intuitive. In many ways, the process of action research is very similar to the way that I teach. I regularly try something new in class, consider the impact it had, and then modify it and try it again. Usually the process is relatively informal, but the process of plan – act – reflect – change – repeat does have many similarities.

This research developed my previously intuitive approach to trying interventions and improving them, by formalising the action research process. I now have a better understanding of how to improve new interventions, including how to collect and analyse data.

Both myself and the students unanimously agreed that the models in cycle 2 were improved from the models in cycle 1. Perhaps this is unsurprising as it demonstrates that the students and I brought into the research process: we wanted cycle 2 to be better than cycle 1. The students engaged with the research, I listened carefully to their opinions and suggestions for improvement, made many of their suggested changes, and students indicated they had been listened to. As a result, it is no surprise that students felt that the cycle 2 models were an improvement on cycle 1. This also points to a wider message regarding the value of engaging student voice and perspectives in curriculum design, and the positive impact it can have on the lessons and student engagement: if students feel they have contributed to the design of a lesson, they may be more engaged in that lesson.

I would have liked to complete more cycles of action research for this project, as the models I developed could be further refined. However, I was surprised by just how much the original models changed after cycle 1. It was at this point, after the analysis of cycle 1 and I had made changes to all three models, that I realised how unsuitable it was to apply existing generic models for the teaching of online composing as a practitioner and expect them to be suitable. This research is required to fill this gap and help practitioners teach online composing lessons

with improved teaching models, instead of directly applying unsuitable generic ones. I would also like to have completed more cycles of action research to continue developing the communication aspect of the models, something all models struggled with. However, communication did improve in cycle 2, and may have further improved with more cycles of action research and the proposed addition of breakout rooms.

The data collection process within action research was also highly interesting. I often use surveys in my additional position as head of year to do things such as measure student opinion and collect feedback, so asking students to complete a questionnaire at the end of every other lesson did not feel unusual to me. However, while I occasionally observe and give written feedback for other teacher's lessons, I never do this for myself. I found the process enlightening, and the question prompts I had prepared focused my thoughts on what I wanted to find out. The observations have benefited me by making my actions more deliberate: they made me actively look for the positives and challenges in lessons. However, they took me away from students during lessons. I also do not regularly formally interview students, but I do often ask students how they think a lesson went or what they thought about a specific intervention, and in that sense the interview process was somewhat familiar to me (if more formalised).

Reflecting on my use of the action research model, my research adapted the action research model as presented by Kemmis and McTaggart (2000) to include additional reflection stages within the 'act' section of their approach and a discussion section before the main 'reflection' section. While the inclusion of these was unplanned, these additional data collection points suited my research and context, and while they diverged from the exact model Kemmis and McTaggart presented they still fit within my definition of action research.

My research demonstrated that classroom research, even when moved to an online environment, has value in terms of systematic reflection on practice with the aim to improve it (Hopkins, 2014). There is no doubt that the approach taken in my research has led to more refined teaching models than a haphazard approach to development. Through the development of the three teaching models and the TPACK model, this research has demonstrated that practitioner research is important for professional learning and the development of professional practice.

6.6.2 Composing Online

This research suggests that online composing lessons at KS3 work well online. The lessons were also relatively easy to teach, even if there was a considerable amount of preparation that needed to be done ahead of time. In the case of both modules, the first being a club dance composition and the second a minimalism composition, all students managed to compose original music. I have taught both modules face-to-face six times and feel that I have improved my teaching of them year on year. There was no evidence of detriment to student learning when lessons moved online, and I think that this constitutes an important positive aspect for the teaching of online composing.

I was however disappointed that more students did not use the online DAW at home. I thought that a major advantage of online composing would be the flexibility to compose at home, but students did not make use of this opportunity. It is possible that this was because students were already used to a different DAW, Logic Pro X, that they do not have access to at home, and were therefore not in the habit of composing at home. Further cycles of research might have seen students grow in confidence with the software, and as a result use it more at home.

While this research was KS3 focused, I see no reason why online composing could not be used at KS2 or KS4. I am aware that at KS4 the composing element of GCSE music must be done under controlled conditions (that is, with a teacher present) and therefore students could not work on their final compositions at home, but they could be set composing homework tasks that they would not otherwise have been able to complete. While taking into account access to technology, internet speed, and processing power, the possibilities for composing online at home do not end there. I am sure there are many uses for being able to compose at home, and seamlessly move between composing at school, online, and at home, that may emerge.

The availability, and similarity to other DAWs, means that I would also consider using an online based DAW in face-to-face lessons instead of software installed only on school computers. I

think that it is a significant advantage that the online DAW used was free, and if used by students from the beginning of KS3, or even KS2, may result in more students using it from home.

6.6.3 The Role of the Teacher in Online Learning

The role of the teacher in online learning is an interesting one, and it varied dramatically depending on the teaching model. My overarching question, to which I have no definitive answer, is 'do you become a better teacher because of the technology or does the technology highlight who is already a good teacher?'. Based on my own experiences in this research, I think that perhaps the technology enhances good practice, but that poor practice would be evident quickly with online learning, largely due to the number of resources which must be prepared for all the teaching models.

In asynchronous lessons, there was no role for the teacher at all during the lesson. All the work required of the teacher was done in advance, with the preparation of resources and filming of videos, and after the lesson, with the giving of feedback to students. During the lesson itself, I could act very much as a researcher as I had no role as a teacher (other than the role of safeguarding, as is expected of me with children in my care inside a school). I was however able to complete the observation forms during the lessons, which had the advantages of me being able to record with greater accuracy what was happening (e.g., I did not forget any key observations between the lesson ending and me filling in the form) and saved me time after the lessons. While I did not especially enjoy the asynchronous lessons, I am aware that if this was a true online asynchronous lesson that the teacher need not be engaged in this as learning is not happening concurrently.

In synchronous lessons, my role as a teacher was very similar to that of face-to-face lessons. I asked questions, introduced tasks, modelled tasks, helped students with their work, and shared student work. As a result, I felt very much a teacher and not a researcher in these lessons. This might have felt so familiar for me due to my experiences with teaching music online during the

Covid-19 school closures. I enjoyed teaching in this manner and was busy enough that my observation forms had to be completed after each lesson.

Finally, the synergistic lessons. Unsurprisingly, the role of the teacher in these lessons falls somewhere between that of synchronous and asynchronous. As the provided guides and videos were available to students, the most able students got on with their work and I had little contact with them. This freed up additional time for the teacher to spend supporting the least able students, and therefore the role of the teacher in these lessons largely revolved around helping the students who were struggling most. This felt like the most effective use of my time, when compared to the other models, as I was neither frozen out from speaking to any students (asynchronous) nor was I being asked simple questions which could easily have been explained in a video (synchronous). I also found that I had some quiet moments in these lessons, where I could either complete parts of the observation form or drop in on quieter students. While students felt that the asynchronous model was the most efficient use of their time, it is for the reasons stated that I think the synergistic lessons were the most efficient use of my time.

6.6.4 The Development of my TPACK

While analysing my TPACK within this research, and developing the online composing specific TPACK model, I concluded that my TPACK has significantly improved. In the simplest of terms, I now know more about how to teach online music composing lessons and how to use technology to improve my lessons than I did at the beginning of this research.

Every change made to the models either improved my TPACK or displayed that my TPACK was developing. Each change represents a deeper understanding of how the technology, content, and pedagogy interact in online music composing lessons, and the success of the changes, judged to be successful as students agreed that they liked the changes, shows that I am improving in that understanding.

An example of how my TPACK improved was demonstrated through the quizzes. Initially, I set the quizzes up so that students controlled the audio themselves, and then opened the quiz to input their answer. This resulted in some students ignoring how long the extract they needed to listen to was meant to be, and instead of listening for a minute would listen to the whole piece and miss the point of the questions completely or would guess an answer to the questions without listening to the piece at all. I recognised that this was a problem, and I identified a solution for cycle 2 where I instructed all students to open the quiz, asked them to confirm that they had the quiz open by typing in the Google Meet, after which I controlled the audio. My experience in cycle 1 gave me a better understanding of how technology and pedagogy interact, and I was able to improve how they were used. The technology itself did not change, I changed how I used it.

While my TPACK has improved, there are certainly areas which need developing further, such as my technological pedagogical knowledge. As I have previously discussed, the use of technology can provide a place for quiet students to 'hide'. Unlike a face-to-face teacher, who can walk around a classroom and observe who is doing the work, engaging, and ensuring everyone is asked questions, in online lessons it is very easy to miss students. For example, when asking the whole class a question and requesting they answer in the chat (usually after a countdown), I found that it was very difficult to check that everyone had responded as there were 20+ simultaneous responses. There are certainly aspects of my own TPACK, such as how to use my classroom pedagogy (e.g., questioning all students and checking that all students are on task) and integrating it with technology such as Google Meet, which require further development.

There are also several suggested improvements to the final models which I do not have sufficient technical knowledge to implement. For example, having the ability to draw all students back to the teacher's screen or a way to prevent students from skipping slides is technologically beyond me, but I recognise the pedagogical benefit of including these features in the models.

Prior to this research, I had not considered the TPACK model. I had always used a piece of technology just because I wanted to, or because the school had mandated it, but had never considered how to use technology effectively with the content I was teaching or my pedagogical approach. This research has made me reconsider how I use much of the technology in my

classroom, and that is largely due to me becoming more familiar with the TPACK model. In my context this includes interactive whiteboards, iPads, and DAWs. I find myself thinking about various modules, not only composing, that I have been teaching for years using these technologies, and reconsidering how I can better integrate those technologies with the content and pedagogy. While the TPACK model I have developed is highly specific, my own development regarding understanding TPACK is far more generalisable.

6.6.5 Relationships

I have found it challenging to gauge online relationships in the same way that some prior research has (e.g., Riley 2007; Dammers 2009), as I already had a relationship with the students in this class. I also saw them for a second, 'instrumental' lesson each week, which was face-to-face, so separating how our relationships developed online and face-to-face was impossible. The students had also been in the same year group for several years, so they all had existing relationships with each other too. However, I found that further developing my relationships with students in these online lessons was difficult. Some students did not contribute at all, making it challenging to develop a relationship with them, while others contributed more which made it slightly easier to develop a relationship.

It may be that the online relationship part of online learning comes with time. Short 6-week blocks of online learning, repeated only twice, were not sufficient for teacher-student or student-student relationships to develop, and perhaps more time completing collaborative work may have helped those relationships develop. There is certainly more work to be done around developing relationships in online learning, an ongoing challenge in online music education since at least Riley (2007) and Dammers (2009). On reflection, there is little evidence to suggest that online student-teacher relationships have significantly improved in the 17 years since Riley's research. Perhaps the computer is a significant barrier to developing relationships, and more focused research is required to explore this.

6.7 Recommendations

Based on the findings and discussion, four recommendations for future research and a recommendation for practice are suggested.

The first recommendation is to test the three models in a true online environment. The three teaching models were developed in a simulated online environment. As the simulated online environment was strict and simulated a true online environment as closely as possible, I suggest that models will translate to a true online environment. However, as they have not been tested in a true online environment this is a sensible first recommendation. I am also the only person to have implemented these models, so the models should be trialled by education practitioners who were not involved in this research. The models may require further development once they have been tried in a true online environment by educators other than myself.

The second recommendation is to further develop this composing specific TPACK model. Much like further researching the teaching models, the composing specific TPACK model should be trialled by music education practitioners. The model I have suggested is built around my own experiences and TPACK, so to refine the composing specific TPACK model further research with additional practitioners should be completed.

The third recommendation is to conduct research into how the composing TPACK model and the teaching models interact. While the TPACK model and composing teaching models were developed concurrently, the composing specific TPACK model was not used to design lessons in this research (as it was still in development). Therefore, there needs to be research into how the composing TPACK model interacts with the different teaching models to see if it is indeed useful to practitioners, and if it aids with the development of schemes of work, online lessons, and improves how teachers integrate technology into those lessons. This is relevant to the recommendation for practice below.

The fourth recommendation is that research should take place which explores developing relationships in online learning. As evidenced in this research, developing relationships in online

learning was challenging. Further research should be undertaken to generate an understanding of how to cultivate student-teacher and teacher-teacher relationships in online music education, as well as considering how to make online lessons feel more personal.

Steps for implementing the composing specific TPACK model constitute a recommendation for practice. Based on the findings of this study, the TPACK model and the three teaching models should be used in conjunction with one another to plan and teach online composing lessons to KS3 students, thus developing a new pedagogic approach to teaching music composing online. It is recommended that teachers follow these steps to implement the composing specific TPACK model.

1. Read the composing specific TPACK model.
    a. Teachers should familiarise themselves with the TPACK model and answer any questions that may impact on their planning e.g., is there a virtual learning environment already used by the school? Exactly which questions will impact on planning will to some extent depend on that teacher's context.
    b. At this stage, the TPACK model may highlight areas where the teacher is lacking in knowledge. For example, the teacher may find they do not have much knowledge about online DAWs and should then proceed to improve their knowledge.
2. Select a teaching model and plan lessons.
    a. Teachers should, depending on their context and the needs of their students, select one or more of the synchronous, asynchronous, or synergistic models. Using the composing specific models, teachers can then plan their lessons accordingly.
3. Review TPACK model.
    a. Once the lesson(s) are planned, the teacher should review the TPACK model questions to help ensure the integration of technology. If the teacher is still unclear on any questions, they should revisit their planning.
4. Repeat.
    a. Repeat steps 2 and 3, until the teacher deems all questions answered.
5. Teach lesson(s).

a. Teachers should teach their new lessons, while reviewing the TPACK model and making adjustments to their lessons as they deem necessary.

6.8 Summary

The experiences and opinions of all participants in this research have guided the development of three models for the online teaching of music composing lessons and a composing specific TPACK model. While further developments to these models is appropriate, as highlighted in the recommendations, this chapter has demonstrated the opportunities and wider significance that these models afford to music education. Although there are aspects of this research that are nuanced and require further exploration, such as resolving the tension between efficiency and connectedness, arguably of greater significance is the potential for these models to provide music education to students who are devoid of specialist teachers due to location, finances, or otherwise.

Central to the development of these models was student honesty. As the research progressed, I found that students became more honest with me about their opinions regarding the teaching models. I think this is testament to the relationship I cultivated with that class, and how they have bought into the research. In cycle 2, I began to ask students their opinions in an informal manner at the end of each lesson and included these opinions on the observations. Students were forthcoming with their opinions and appeared willing to provide honest feedback with little encouragement and without fear of sanction. At this point, the role of the teacher had very much given way one of a researcher, and a lack of fear regarding sanctions suggests that students intuitively understood that this was the case. That students felt they could be honest is of great benefit to this research. It allowed for students to share their opinions freely, which only served to improve the models further.

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&capability=Intercultural+Understanding&priority=ignore&priority=Aboriginal+and+Torres+Strait+Islander+Histories+and+Cultures&priority=Asia+and+Australia's+Engagement+with+Asia&priority=Sustainability&elaborations=true&elaborations=false&scotterms=false&isFirstPageLoad=false (Accessed 29th September 2024).

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Appendices

Appendix A - Online Questionnaire

This questionnaire forms part of the data collection for my Doctorate in Education at The University of Wales Trinity Saint David.

Ethical approval was granted for this study on 7th July 2022.

This study aims to develop three models of teaching online music composing lessons to Key Stage 3 students. The study will compare the three models, exploring the merits and challenges of each, so that teachers can be better informed on how to deliver online music lessons should there be another extended period of school closures. This will also benefit communities who do not have access to specialist music teachers.

This questionnaire will help me to understand the challenges and benefits of the delivery models, by giving you the opportunity to tell me what you think about the lessons. This questionnaire will also help you to think about your learning in the lessons.

Please remember that the questionnaire you are completing today relates to today's and last week's lesson.

End of Block: Introduction

Start of Block: Participant Consent

Q1 I consent for my questionnaire responses to be used as part of this research.

- O Yes (1)
- O No (2)

Page Break

Q2 The teacher has also been observing the class during your online lessons.

I consent for the data collected specifically about me by the researcher through observations during this lesson to be used as part of this research.

O Yes (1)

O No (2)

End of Block: Participant Consent

Start of Block: Participant Information

Your Name

_____

End of Block: Participant Information

Start of Block:

Q1 The questions in this section relate to your experiences of online learning during today and last week's lessons.

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)

The online lessons led by the teacher were enjoyable. (1)	O	O	O	O	O
I felt confident in what the teacher was asking me to do. (2)	O	O	O	O	O
I was able to concentrate and stay on task. (3)	O	O	O	O	O
I was able to follow the instructions easily. (4)	O	O	O	O	O
I found the teacher's instructions clear. (5)	O	O	O	O	O
I understood what I needed to do in the lesson. (6)	O	O	O	O	O
I managed to complete all the work expected of me. (7)	O	O	O	O	O
This online lesson was easy to access through Google Classroom. (8)	O	O	O	O	O

It was easy to communicate with my teacher during the lesson through Google Meet. (9)	O	O	O	O	O
I have made progress with my composition today. (10)	O	O	O	O	O
I have improved my composing skills today. (11)	O	O	O	O	O
Clicking in notes instead of using a musical keyboard was not a problem. (12)	O	O	O	O	O
The explanation of how to use BandLab was easy to follow. (13)	O	O	O	O	O
I found BandLab straightforward to use. (14)	O	O	O	O	O

I had enough time during the lesson to complete today's task. (15)	O	O	O	O	O

Page Break

Q2 These next questions relate to your engagement with e-learning this week and last week.

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
The online lessons enhanced my interest in learning. (1)	O	O	O	O	O
I felt motivated in the online lessons. (2)	O	O	O	O	O
I found the online lessons useful. (3)	O	O	O	O	O
I found the online lessons interesting. (4)	O	O	O	O	O

After taking online lessons, I look forward to the next one. (5)	O	O	O	O	O
I communicate with my teacher for extra help. (6)	O	O	O	O	O
I made a learning connection with at least one other student in my class, e.g. by sharing ideas, discussing the task, and listening to each other's compositions (7)	O	O	O	O	O
I feel a sense of belonging in my online class. (8)	O	O	O	O	O

Q3 How many times did you ask the teacher a question today?

O 0 times (1)

O 1 to 3 times (2)

O 4 to 6 times (3)

O 7 times or more (4)

Q4 How many times did you speak online with other students in the class today?

O 0 times (1)

O 1 to 3 times (2)

O 4 to 6 times (3)

O 7 times or more (4)

Page Break

Q5 What would have improved your online lesson today and last week?

_____

Page Break

Q6 Is there anything else you would like to add about composing online, or being taught online?

_____

Appendix B - Interview Questions

Question	Follow Up
Can you tell me what you have been learning about in this module? (added after pilot study)	Did you understand the features of the music that you were composing for? Would you be able to tell me any of those features? (added after pilot study)
How have you found the online composing lessons over the last 6 weeks?	What have you noticed has changed for you overall? How do you think it compares to the last module/ cycle/ time we did online learning?
Some changes were made to online teaching since last time. In synchronous the things that were changed were using an 'I do-we do' approach, dropping into more student work, slowing down my explanations, using a second Meet to speak privately with students, and providing additional extension tasks. What did you think of these? In asynchronous the things that were changed were include more extension tasks, using shorter step-by-step videos, adding an introductory video, video feedback and a place to interact with other students on Google Classroom. What did you think of these?	What else would improve these models? Did any of these things work well? Why? Did any of these things not work? Why?

In synergistic the things that were changed were having shorter step-by-step videos, opening a second Google Meet call, include more extension tasks, set homework for students to complete work on BandLab at home.	
What do you think would improve online composing lessons?	Are you speaking generally, or about one specific teaching model?
What was the biggest challenge with online composing lessons?	Are you speaking generally, or about one specific teaching model?
What were the best things about the online composing lessons?	Are you speaking generally, or about one specific teaching model?
In the questionnaire you said…can you explain that further to me?	
How did you find responding to my feedback and improving your composition?	Are you speaking generally, or about one specific teaching model?

You have learned for two weeks with me leading the lessons, two weeks with videos explaining what to do, and two weeks as a mixture. Tell me about your favourite of the three teaching models.	Why was it your favourite model? Do you think you learned the most through this model?
Tell me about your least favourite of the three teaching models.	Why was it your least favourite? What could have made it better? Do you think you learned the least through this model?
Do you think that the order in which the models were used impacted on your opinions of them?	
We used BandLab, Google Classroom, and Google Meet for these lessons. How did you find using these technologies?	Were there any particular challenges or things your felt worked really well?
How did you find accessing the work through Google Classroom and Google Meet?	Could anything have been done to make accessing the work easier?
Is there anything else you would like to add about the online lessons over the last 6 weeks?	

Appendix C - Interview Transcription and Coding Example

Coding – Red = Challenges, Green = Advantages, Yellow = Suggestions for Improvement

Pupil E – 2nd March 2023

Pupil E 4:51

I think so far is great since it's so helpful. So people can learn then they can still do work, and then and then some more stuff. And then some people could get inspired to make their own music. And, and, and, and enjoy like musical role.

Mr Rogers 5:17

That's great. So there's nothing you can think of at the moment that would make even better?

Pupil E 5:21

Er no.

Mr Rogers 5:21

Great. What do you think the hardest part about online composing is? What's the biggest challenge?

Pupil E 5:30

When they get like lots of tracks in the, in your thing and then it starts to get slow and then the data gets hard because if you make the mistake is gonna take a few...

Appendix D - Researcher Diary/ Observation Coding Example

Date:14/10/22 Lesson Topic: Club Dance: Drums Teaching Model: Synergistic

Coding – Red = Challenges, Green = Advantages, Yellow = Suggestions for Improvement

Question	Response
What impact did I have on this teaching model?	It felt very unusual to deliver some parts of the lesson by video, it almost felt like 'cheating' e.g. Good morning, watch this video to tell you what to do… Possibly change the order of teaching to make it feel less artificial, such as modelling the task live and then having the video for students to recap from. I model first, possibly no need to show the video at all. The rest of the model worked well, it was useful to have a quiz at the start and end of the lesson, and to have the opportunity to share student work with the class.
What were the merits of this model?	I had control over the video, rather than the students, so I could make sure they all watched it (or at least that it was playing on all their computers). It also appeared very useful to the students to have a video to refer to, along with being able to ask me questions. Questioning throughout the lesson is great through the chat box. Sharing work and feeding back through the chat box for each other worked really well.
What were the challenges with this model?	The quiz process needs work. Some students watched too much of the song video, so it would be better for me to share the video of the song with students, then tell them to do the quiz, rather than let students have control of the video themselves.

	The video I used went through the steps too fast, and students were asking for me to pause it: 'sir, slow down the video or pause it, it's too fast'. Everyone can hear what I am saying while on Meet and trying to speak with one student.
How could I change my teaching to improve this model?	Model live first, then provide students with a recap video which they can pause as they desire.
How could technology be used differently to address any challenges?	Just use the video for a recap, teach the new content live first using an I-do-we-do approach. I need a better way to talk with individuals. I was asked to mute myself twice while trying to speak to individuals. Set up a separate Meet for students to use when they want to talk to me one-to-one, and mute the original Meet?
Any specific examples of student success with this teaching model?	Most students were able to complete their drums, after first reacting to their feedback.
Any specific examples of student challenges with this teaching model?	'Sir, can you mute yourself' – some students finding the model challenging as they hear me all the time, even when I am note speaking with them. 'Slow down the video, I can't keep up'.
Did students appear interested and engaged in the lessons?	Very much so, all students appear on task, engaged, and doing the catch-up work and this week's work. Students are not speaking to the people next to them, they are all in silence working. At the end of the lesson, when I am sharing work, lots of students are asking me for their work to be played to the class. Students really want to share the work they have composed with the piece, suggesting that they are really interested in the lessons.
Do students appear to be on task?	Yes, very engaged in the video. All on task, doing their work and responding to their feedback.

Appendix E - Example of how Technological Pedagogical Knowledge (TPK) was identified.

This example uses data from the first synchronous model lesson, in cycle 1.

Step 1

Observe how students use technology during the teacher diary/ observation.

Students use their prior knowledge of music technology and digital audio workstations (DAWs) to work out how to compose a bassline. One student takes this further, by developing their bassline based on their own ideas and technological ability.

Step 2

Place this observation onto the technology integration matrix (Allsopp et al. 2007).

- Using technology to understand basslines and add meaning to their learning by composing a bassline is indicative of 'constructive', while the teacher instructed students on how to use the DAW available to do so. As such, this falls into the constructive: adoption category, where students use technology to build upon prior knowledge to construct meaning.
- The one student who developed their bassline displayed active: infusion, as that student used BandLab as a tool to express their musical ideas and worked towards an outcome based on their own ideas.

Step 3

Use this information as an indication of my own TPK:

- Based on the above, I am largely relying on the prior knowledge of students, and have taught students how to use the DAW in a functional manner in order to complete a task.

Step 4

Consider how my TPACK might be improved:

- At this stage of the module, as students need to build functional and basic knowledge of how to use BandLab, this level of TPK is appropriate.
- Moving forward, it might be necessary to consider if BandLab needs to be integrated further by allowing students greater autonomy in how they use it, such as the one student who is already displaying active: infusion. I then need to decide how to provide students with greater autonomy, utilising the tools available within BandLab to achieve this.

Appendix F - Thematic Analysis Example

Phase	Approach	Example
Familiarising yourself with the data.	Listening to, transcribing, reading and re-reading the transcript.	Pupil B cycle 2 interview.
Coding.	Deductive coding based on positives, challenges, and suggestions for improvement. Inductive approach for cycle 2 data collection. Initial codes placed in brackets.	'I've been figuring it out myself like that independent form of study'. (Independence/ no contact with others/ problem solving/ use of time) 'I like having access to other lessons, lessons further…this allows me to work on my time management'. (Independence/ use of time). 'It was much easier for me to use asynchronous…it makes me feel like I can just immediately do something.' (Use of time) 'To be able to sit in the classroom, not talk to anyone, and just go straight onto the task, listening to my own headphones instead of other people speak and just get me distracted.' (Use of time, no contact with others)
Generating Initial Themes.	Initial themes generated based on patterns across codes.	Two themes taken forward from the coding phase: 1) The use of time within lessons 2) No contact with others
Developing and Reviewing Themes.	Review themes.	'Time within lessons' reviewed and changed to 'efficiency'. 'No contact with others' reviewed and changed to 'relationships'.
Refining, Defining, and Naming Themes.	Reconsidering and renaming themes.	Additional theme added to link efficiency and relationships/ communication: 'the misalignment of efficiency and connectedness'.
Writing up.	Explanation and discussion of the themes.	Included sections in the research entitled 'relationships', 'efficiency', and 'the misalignment of efficiency and connectedness'

Appendix G - Master Coding Example

Data Collection	Challenges	Advantages	Suggestions
Pupils Overall	One student did not feel conifdent in what the teacher was asking them to do. One student was not able to follow instructions easily. 4 students neither agreed no disagreed that the teacher's instructions were clear. Some students did not percieve that they managed to complete all the work expected of them (1 disagree, 4 neither agree nor disagree) Some students felt like they did not make improvements with their composition (3 neither agree no disagree). 5 students neither agreeed nor disgareed that they had imporved their compoinsg skills. 1 student did not find the explanation of how to use BandLab easy to follow. 1 student found BandLab very challenging to use. 1 student did not feel motivated in online lessons. 1 student did not find the online lessons useful. 2 students diagreed that they communicated with the teacher for extra help. 4 students did not make a leanring connection with other people in the class, and 2 more neither agreed nor disagreed. 1 student did not feel a sense of belonging in the online class. 5 students did not ask the teacher a question today. 10 students did not speak online with another student during the lesson today (only 3 students did).	Online lessons led by the teacher were enjoyable (9 agree, 3 strongly agree, only one neither agree nor disagree). Students felt confident in what the teacher was asking them to do (8 agree, 3 strongly agree, one neither agree no disagree). Students were able to concentrate and stay on task (8 agree, 5 strongly agree). Students were able to follow instructons easily (5 agree, 5 strongly agree, 2 neither agree no disagree). Students found the teacher's instructions clear (2 agree, 7 strongly agree) Students understood what needed to be done in the lesson (5 agree, 6 strongly agree, 2 neither agree no disagree). Most students percieved that they managed to complete the work expected them (4 agree, 4 strongly agree) The online lesson was easy to access through Google classroom (4 agree, 9 strongly agree). Students found it easy to communciate with the teacher through Google Meet (11 agree, 1 strongly agrees, 1 neither agrees no disagrees) Students felt like they made progress with their composition (4 agree, 6 strongly agree). Students felt like they had imporved their composing skills (6 agree, 2 strongly agree). Clicking in notes instead of using a musical keybaord was not a problem (6 students agree, 4 students strongly agree, 3 students neither agree no disagree). The explanation of how to use BandLab was easy to follow (6 agree, 5 strongly agree, one neither agrees no disagrees). Most students found BandLab easy to use (6 agree, 4 strongly agree). Students had enough time in the lesson to complete the task (7 agree, 3 strongly agree, 3 neither agree no disagree). The online lesson enhanced student interest in learning (6 agree, 2 strgnly agree, 4 neither agree nor disagree). Some students felt motivated in the online lesson (4 agree, 3 strongly agree, 4 neitheer agree no disagree). Most students found the online lessons useful (7 agree, 3 strongly agree). Most students are looking forward to the next online lesson (4 agree, 3 strongly agree, 5 neither agree no disagree). Some students communicated with the teacher for extra help during the lesson (5 agree, 2 strongly agree). 5 students did make a learning connection with other students in the class. Most students felt a sense of belonging in the online class (5 agree, 2 strongly agree, 4 neither agree no disagree). 8 stiudents asked the teacher between 1 and 3 questions today.	The opportunity to develop my piece more. Learning how to use BandLab. Knowing the task. The ability to be able to move onto the next task if finished with one, after developments of course, however being allowed to progress further, in this case Lesson 3. More music video examples. How to play music that people listen to nowadays.
Interview 1 - Pupil A	This pupil found it confusing at times: 'Like focusing on the Bandlab, and like listening to you talk kind of like made me confused because I was like, which one should I focus on?' The instructions were not always clear straight away: 'Though there was some bits that I understood and some other bits which I understood, I misunderstood, but I ended up getting through that at somepoint.' This student felt like there was not much interaction between students: 'I mean, it was just the fact that like, I was so independent on my own work and there was no like interaction between other people.' This model was the student's least favourite: 'I would say just Google Meet was my least favourite part.' Followed up with 'Like, of course, I'm the type of person to, like not ask for help, like, I want to do things by myself and without needing help, like, I need to understand myself instead of asking other people.' 'I will say that like Google Meet is just a bit, not for me because, hearing like, sometimes when people explain things to me, like, I have to listen to it. Sometimes I kind of zone out and I don't understand what's really going on.' 'Mainly, probably the fact that if you have a video available, even if you're on synchronous or asynchronous, the synchronous lessons, I feel like they're a bit more like, time preventing, I guess, because everything has to be good. Everything has to be ready first, before you can start the actual lesson itself. Everyone has to be ready. Everything has to be done.'	Didn't feel the need to communicate during the lesson, because they said they 'didn't need it'. The student liked the independence this model gave them, and they did not miss the interaction between students: 'I mean from my point of view, I like being independant more than interacting with other people'.	
Interview 2 - Pupil B	Difficulties with the technology: 'To be fair, Bandlab was easy to use, it's just the computers that were really hard to actually process that information. ' 'Pupil B Like sometimes I was trying to scroll back, was going forward, and what happened was it kept like moving crag, very choppy. Mr Rogers So actually, a faster computer would have solved that. Pupil B Yes, definitely.' Pupil B said that synchronous was their least favourite model: What was your least favourite?, 'Probably synchronous.' The student followed up with 'It's just like, it's not my type of teaching because like, even in lesson sometimes I actually get confused. In lessons outside of music I get confused from rather listening to the teacher and I look at the board more often. So it's more so I am not in the right mind to be able to like, stay in that synchronous position with teachers only small our, I'd rather be independent.'	Did you think you improve your composing skills? Pupil B Definitely.' The student felt that synchronous lessons helped their focus: Mr Rogers Do you think this is because it, do you think it helps your focus then in some ways? Pupil B Definitely, because you have those headphones on, it feels like you're there yourself inside your room instead of like a classroom, feels like you're just there yourself and you don't have to worry about anyone else around you.	I think having more extension tasks will because to be fair, you have people who will move on to the next class quite quickly. And let's say they don't understand it, there's always the next lesson to be able to help. And also extension tasks, they allow you to build up what skills you have inside you, and rather developments. It's more so how far you can progress'
Interview 3 - Pupil C	This student was sometimes confused and did not feel confident in what the teacher was asking them to do: 'Yeah, because like some things were quite confusing like it's like if you're telling me what to do, I won't get it but if you put on like in front of me, and I can see visually then I'll understand so it's easier.'	Synchronous was this pupil's preferred model, because the teacher could check their work: 'Because like you could like, just check my piece and then tell me what to do.' 'Because it's like, it's better than your option because, because Google Meet and the video just confusing and the video, just convenient, confusing as well. So live Google Meet is just better.' This pupil did not speak to others, but said 'because I was concentrated on my own work.' This pupil spoke to me over Google Meet to ask a question and said 'I think it was better than like, actually asking a question in real life.', due to typing the question instead of having to speak to a teacher.	Pupil C felt that if you could press a keyboard, it would improve online composing: If you could, like, press the keys, like, like you show a keyboard and you just press the keys'

Appendix H - School consent form

School Participation Information Sheet and Consent Form

Online music composing lessons at Key Stage 3 in a simulated online environment: An action research study to develop synchronous, asynchronous, and synergistic teaching models

Dear [headteacher],

I am currently studying for a Doctorate in Education at the University of Wales Trinity Saint David (UWTSD). For my thesis, I am exploring different models of teaching Key Stage 3 music composing lessons in a simulated online environment.

I would like to invite the school to take part in my study. In this letter I outline why the research is being done and how it will involve the school. Before you decide if you would like [name of school] to take part, please take time to read the following information. If anything is unclear or you wish for more information, please contact me with the details given at end of this document.

Aims of the research

This study aims to develop three models of teaching online music composing lessons to Key Stage 3 students. The study will compare the three models, exploring the merits and challenges of each, so that teachers can be better informed on how to deliver online music lessons should there be another extended period of school closures. This will also benefit communities who do not have access to specialist music teachers.

Who and what does the study involve?

I am requesting consent for two studies, a pilot study and a main study. The pilot study will involve one year 9 class taking part in a single simulated online lesson, followed by a questionnaire completed in the lesson and a one-to-one interview with three students. This will help me to refine my data collection methods, and I anticipate that this pilot study will take place in July 2022.

The main study will involve one year 9 class, with data collection taking place in their regular timetabled music lessons. There will also be two interviews with six students outside of their timetabled lessons. Lessons will be delivered online but still in the classroom, and students will study the same content as the rest of the year 9 music cohort.

A simulated online environment will be created by students sitting at a computer each, with a pair of headphones on, and lessons being delivered via Google Meet and Google Classroom.

I am seeking permission from the school to conduct this research in my normal timetabled lessons, with my normal timetabled classes.

All that is required of students is to:

1) Take part in their normal classroom music lessons

2) Complete a short questionnaire at the end of the lesson every two weeks, for a total of six questionnaires over the research period

3) Possibly take part in two interviews of no more than 30 minutes each (6 students), where the audio will be recorded

In addition, I will collect data through researcher observations recorded in a diary.

I will need to collect data twice for the main study. The first time will be from September 2022 and will last around 7 weeks, and the second time will be in January 2023 and will again last about 7 weeks.

What is this research being used for?

Primarily, the data will be used for my thesis for my Doctorate in Education at The University of Wales Trinity Saint David. This research may also be used for a journal article or other publication.

How will the school and students benefit from this research?

I am hopeful that by experiencing composing online more students will be encouraged to compose music outside of school, building school/ home music links. This will help to build independence and creativity in our students, and the online nature also reflects real-world professional composing activities.

For the school, by conducting research into online teaching models will mean that I can provide staff training on online teaching in the future and develop expertise in the online teaching of music composing lessons.

How will the school and participants be protected?

All data collected will be anonymised by using pseudonyms and removing personal identifiers, so that the school and participants are not identifiable. Only the researcher will have access to the raw data. Additionally, all participants will be required to give consent. The school can withdraw from the study up until data in anonymised if you wish to do so.

What will happen to the data?

The data will be stored securely on the UWTSD OneDrive and backed up on a password protected laptop.

The Data Protection Act and UWTSD confidentiality policy will be followed, and this research has been approved by the UWTSD ethics committee.

What if you don't like what has been written in the findings?

I will remain as truthful and accurate to the data provided as possible. However, to ensure that the data is not taken out of context there will be an opportunity for you to review it if you wish.

What if you don't want to take part?

It is up to you to decide whether you would like the school to participate in the study.

Safeguarding

Any disclosures made during the study will be referred as appropriate to the school's designated safeguarding lead and/ or the police.

Who do I contact about the study?

If you have any questions about the study then please contact:

Name: Nick Rogers

Email: [redacted]

Phone: [redacted]

If you are happy for the school to be involved in this research, please complete the below consent form, and return it to me at [redacted] or in person.

Thank you very much for taking the time to help me with this research project.

Yours Faithfully,

Nick Rogers

Research Approved by University of Wales Trinity St David ethics committee.

School Participant Consent Form

Title of Project:

Online music composing lessons at Key Stage 3 in a simulated online environment: An action research study to develop synchronous, asynchronous, and synergistic teaching models

Name and Contact Details of Researcher:
Nick Rogers, [redacted]

By signing below, I acknowledge and agree to the following:

1	I have been given a copy of this form and the Participant Information Sheet.
2	I confirm that I have read and understood the Participant Information Sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
3	I understand that the school's participation is voluntary and that the school is free to withdraw any time until the data is anonymized.
4	I understand that the information and data collected about and from the school *may* be used to support other research in the future and may be shared anonymously with other researchers.
5	I agree that data can be collected in the ways outlined in the Participant Information Sheet.
6	I agree that the school can take part in the pilot study and the main study.

Name of Signatory: Date:

Signature:

Appendix I - Participant consent form

Learner Participant Information Sheet and Consent Form

Online music composing lessons at Key Stage 3 in a simulated online environment: An action research study to develop synchronous, asynchronous, and synergistic teaching models

Dear Students,

As well as being your music teacher, I am also studying for a Doctorate in Education at the University of Wales Trinity Saint David (UWTSD). For my research, I am exploring different models of teaching Key Stage 3 music composing lessons in a simulated online environment.

I would be extremely grateful if you would agree to take part in my research. Please take time to read the following information carefully. If anything is unclear or you wish for more information, please contact me with the details given at end of this document or ask me during school.

Why have I been asked to take part?

You have been asked to take part because you are in my year 9 music class.

What will I have to do?

All you have to do is take part in your normal music lesson, which will be taught over Google Meet and Google Classroom. You will come to your normal music lesson, sit at a computer with a pair of headphones on, and complete the work that is given to you.

At the end of the lesson, you will be asked to complete a short questionnaire, and you may also be asked to take part in an interview sometime after the lesson. I will also be keeping a diary about how the lesson is going. After the interview has happened, you will be able to check the transcript if you wish to do so.

Why is the study useful to you?

I am hopeful that by experiencing composing online more students will be encouraged to compose music outside of school. This will help to build your independence and creativity, and the online nature also reflects real-world professional composing activities.

The questionnaire at the end of the lesson is also very valuable, as it will encourage you to think about and reflect on your learning. Reflecting is an important part of the learning process, and this questionnaire provides an opportunity for that reflection to take place.

Do I have to do it?

You do have to take part in the lesson and questionnaire as it is a normal timetabled music lesson and we will be completing the same work as everyone else in year 9, but you can decide not to share your data from the questionnaire with me or take part in an interview. If you choose not to take part, you will not be in trouble with anyone.

What will happen to my questionnaire and interview data?

This data will be stored safely on a secure university website and backed up on a password projected laptop. We will keep you anonymous by changing your name and removing anything that could identify you.

Can I change my mind?

You can change your mind about taking part right up until your data has been anonymised. You will be asked again if you want to take part at the beginning of the questionnaire.

What if I don't want to take part?

It is up to you to decide if you want to take part. Deciding not to take part will not cause any problems with your relationships with teachers at school, and you will not be in trouble.

Safeguarding

Any disclosures made during the study will be referred as appropriate to the school's designated safeguarding lead and/ or the police.

Who do I contact about the study?

If you have any questions about the study, please contact:

Name: Mr Rogers

Email: [redacted]

Learner Participant Consent Form

Title of Project:
Online music composing lessons at Key Stage 3 in a simulated online environment: An action research study to develop synchronous, asynchronous, and synergistic teaching models

Name and Contact Details of Researcher:
Mr Rogers, [redacted]

Students: by signing below, you are acknowledging and agreeing to the following terms:

1	I have been given a copy of this form and the Learner Participant Information Sheet.
2	I confirm that I have read and understood the Learner Participant Information Sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
3	I understand that participation is voluntary and that I am free to withdraw at any time until my data is anonymized.
4	I understand that the information collected about me may be used to support other research in the future and may be shared anonymously with other researchers.
5	I agree that my participation in questionnaires will be recorded and used as data. This data will be stored for the duration of the study only and will not be used for purposes other than as part of the study.
6	I agree that my contributions in interviews will be recorded, and the recordings will be transcribed and used as data.
7	I agree that observations made by the teacher will be recorded and used as data.
8	I agree to take part in the study.

Name of Student: Date:

Signature of Student:

Appendix J - Parent and carer consent form

Parent and Carer Participant Information Sheet and Consent Form

Online music composing lessons at Key Stage 3 in a simulated online environment: An action research study to develop synchronous, asynchronous, and synergistic teaching models

Dear Parents, and Carers,

My name is Mr Rogers, and I am your child's music teacher at [school name].

As well as being a teacher, I am currently studying for a Doctorate in Education at the University of Wales Trinity Saint David (UWTSD). For my thesis, I am exploring different models of teaching Key Stage 3 music composing lessons in a simulated online environment.

I would be extremely grateful if you and your child agreed for them to take part in my study. Before you decide if you would like them to take part, you need to understand why the research is being done and how it will involve them. Please take time to read the following information carefully. If anything is unclear or you wish for more information, please contact me with the details given at end of this document.

Aims of the research

This study aims to develop three models of teaching online music composing lessons to Key Stage 3 students. The study will compare the three models, exploring the merits and challenges of each, so that teachers can be better informed on how to deliver online music lessons should there be another extended period of school closures. This will also benefit communities who do not have access to specialist music teachers.

Who and what does the study involve?

My study will mostly take place in the classroom during your child's normal music lessons, where your child will learn the same content as other year 9 students. This study will not disrupt the teaching of your child as it will be part of their normal teaching by myself as their normal music teacher.

These lessons will differ from regular music lesson because they will take place using the computers in our music classroom, as if they were online lessons. Students will sit at a computer each, with a pair of headphones on, with the lessons taught via Google Meet and Google Classroom.

Beyond taking part in their normal music lessons and completing a short questionnaire at the end of each lesson, six students will be invited to participate in two interviews of no more than 30 minutes each.

In addition, I will also collect data by recording any observations that I make during the lessons in a researcher diary.

I will need to collect data twice for my study. The first time will be from September 2022 and will last around 7 weeks, and the second time will be in January 2023 and will again last about 7 weeks.

What is this research being used for?

Primarily, the data will be used for my thesis for my Doctorate in Education at The University of Wales Trinity Saint David. This research may also be used for a journal article or other publication.

How will students benefit from this research?

I am hopeful that by experiencing composing online more students will be encouraged to compose music outside of school, building school/ home music links. This will help to build independence and creativity in our students, but the online nature also reflects real-world professional composing activities.

The questionnaire at the end of the lesson is also very valuable for students, as it encourages them to think about and reflect on their learning. Reflecting is an important part of the learning process, and this questionnaire provides an opportunity for that reflection to take place.

How will student's data be protected?

All data collected will be treated confidentially. Data will be anonymised by using pseudonyms and removing personal identifiers, so that students are not identifiable. Only the researcher will

have access to the raw data. You can withdraw your child from the study up until data is anonymised if you wish to do so.

What will happen to the data?

This data will be stored safely on a secure university website and backed up on a password projected laptop.

The Data Protection Act and UWTSD confidentiality policy will be followed, and this research has been approved by the UWTSD ethics committee.

What if you don't want to take part?

It is up to you and your child to decide whether you would like them to participate in the study. I will check for consent at every time data is being collected, and you and your child have the right to withdraw up until data is anonymised. If you do not wish to take part then your child will still be involved in the lesson as part of their required curriculum, but their data will not be used in the study.

Deciding not to take part will not cause any problems in your child's relationships with your teachers or anyone else at school.

Safeguarding

In line with the school safeguarding policy, any disclosures made during the study will be referred as appropriate to the school's designated safeguarding lead and/ or the police.

Who do I contact about the study?

If you have any questions about the study, please contact:

Name: Mr Rogers

Email: [redacted]

If you are happy for your child to be involved in this research, please complete the below consent form as soon as possible and return it to me at [redacted] or ask your child to give it to me at school.

Thank you very much for taking the time to help me with this research project.

Yours Faithfully,

Mr Rogers

Research Approved by University of Wales Trinity St David ethics committee.

Parent/ Carer Participant Consent Form

Title of Project:
Online music composing lessons at Key Stage 3 in a simulated online environment: An action research study to develop synchronous, asynchronous, and synergistic teaching models

Name and Contact Details of Researcher:
Mr Rogers, [redacted]

Parents/ Carers: by signing below, you are acknowledging and agreeing to the following terms:

1	I have been given a copy of this form and the Parent and Carer Participant Information Sheet.
2	I confirm that I have read and understood the Parent and Carer Participant Information Sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
3	I understand that participation is voluntary and that my child is free to withdraw at any time until their data is anonymised.
4	I understand that the information collected about my child may be used to support other research in the future and may be shared anonymously with other researchers.
5	I agree that my child's participation in questionnaires will be recorded and used as data. This data will be stored for the duration of the study only and will not be used for purposes other than as part of the study.

6	I agree that my child's contributions in interviews will be recorded, and the recordings will be transcribed and used as data.
7	I agree that observations made by the teacher will be recorded and used as data.
8	I agree that my child can take part in the above study.

Name of Parent/ Carer: Date:

Signature of Parent:

Appendix K - Questionnaire average numeric responses

All values are mean, out of 5.	Synchronous Cycle 1	Synchronous Cycle 2	Asynchronous Cycle 1	Asynchronous Cycle 2	Synergistic Cycle 1	Synergistic Cycle 2
The online lessons led by the teacher were enjoyable.	4.13	3.94	3.88	4.11	4	3.94
I felt confident in what the teacher was asking me to do	3.93	4.17	3.82	4.39	4.06	4.33
I was able to concentrate and stay on task.	4.27	4.17	3.82	4.5	4.11	4.11
I was able to follow the instructions easily.	3.93	4.5	4.24	4.39	4	4.22
I found the teacher's instructions clear.	4.07	4.56	4	4.28	4.06	4.39
I understood what I needed to do in the lesson.	4.27	4.44	4.18	4.29	4.28	4.44
I managed to complete all the work expected of me.	3.8	4.22	3.76	4.17	3.5	3.82
This online lesson was easy to access through Google Classroom.	4.67	4.5	4.12	4.5	4.28	4.44
It was easy to communicate with my teacher during the lesson through Google Meet.	4.07	4.11			4.11	4.17
I have made progress with my composition today.	4.13	4.44	3.94	4.29	3.82	4.22
I have improved my composing skills today.	3.8	4.11	3.71	4.11	3.72	4.28
Clicking in notes instead of using a musical keyboard was not a problem.	4.13	4.28	3.94	4.33	4	3.89
The explanation of how to use BandLab was easy to follow.	4	4.29	3.94	4.39	3.94	4.11
I found BandLab straightforward to use.	3.87	4.28	3.88	4.22	3.88	4.17
I had enough time during the lesson to complete today's task.	3.87	4.33	3.82	4	3.44	3.67
The online lessons enhanced my interest in learning.	3.71	3.89	3.53	3.72	3.67	3.67
I felt motivated in the online lessons.	3.57	3.67	3.59	3.89	3.5	3.67
I found the online lessons useful.	3.86	4.06	3.65	3.82	3.72	3.78
I found the online lessons interesting.	3.93	4.12	3.88	4.06	3.83	4
After taking online lessons, I look forward to the next one.	3.71	3.89	3.76	3.82	3.67	3.72
I communicate with my teacher for extra help.	3.5	3.56			3.89	3.17
I made a learning connection with at least one other student in class	2.92	3.28			3.17	2.88
I feel a sense of belonging in my online class.	3.57	4	3.71	3.78	3.83	3.67
How many times did you ask the teacher a question online today?	1.6	1.61	1.18	1.24	1.25	1.5
How many times did you speak online with other students in the class today?	1.2	1.5	1.12	1.06	1.33	1.11
Do you think the 'live' lessons this time were better or worse than last time? (out of 3)		1.72				
Do you think the 'video lessons this time were better or worse than last time? (out of 3)				1.94		
Do you think the 'part video/ part live' lessons this time were better or worse than last time? (out of 3)						1.94
Average	3.7004	3.832307692	3.612272727	3.795652174	3.6424	3.665769231