

**Incorporating recording technology into
practical project-based music units in a contemporary
tertiary music degree**

Thesis re-submitted in fulfilment of the requirements for the degree of
Master of Applied Research

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Abstract

The increasing popularity of home and project studio recording for musicians can be partly attributed to the availability and falling price of digital recording equipment and the evolution of how modern music is made and consumed. Changes to the recording landscape have revealed a need for the modern musician to possess self-recording skills. Implementing a recording project stream into a tertiary music degree, where students actively learn recording and mixing skills and processes, has highlighted the need for directed research to better understand and facilitate such learning. Case study research into local contexts and specific local conditions—including organisational culture, learning spaces and student attributes—have been shown to have direct and positive outcomes for students and institutions. There is limited published research on incorporating technology into tertiary music education in Victoria or, more specifically, in western Melbourne. This research will contribute to existing knowledge by addressing gaps in qualitative case-study research, specifically in incorporating recording technology into a project-based music unit in contemporary tertiary music education in western Melbourne.

Analysis of data collected from participants in the Bachelor of Music cohort at Victoria University contributes towards formulating recommendations for effectively designing and implementing recording technology into practical projects in a tertiary music degree. The findings from this research project provide valuable insights into student identity and agency, resourcing and the role of creativity and idiosyncrasy in music technology teaching and learning.

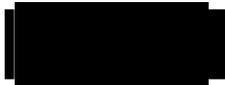
Master research degrees student declaration

Master of Applied Research

“I, *Darren Thomas Reston*, declare that the Master of Applied Research thesis entitled Incorporating recording technology into practical project-based music units in a contemporary tertiary music degree is no more than 50,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work”.

“I have conducted my research in alignment with the Australian Code for the Responsible Conduct of Research and Victoria University’s Higher Degree by Research Policy and Procedures.

Signature



Date 22/05/23

Ethics Declaration

“All research procedures reported in the thesis were approved by the *Low Risk Human Research Ethics Committee VU HRE18-240*.”

Signature:



Date: 22/05/23

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Contents

Abstract	ii
Master research degrees student declaration	iii
Acknowledgements	iv
List of tables	viii
List of figures	ix
List of abbreviations	x
Glossary	xi
Chapter 1. Introduction	1
1.1 Introduction	1
1.2 Background	3
1.3 Research aims	6
1.4 Research questions	8
1.5 Thesis structure	8
Chapter 2. Literature review	11
2.1 Introduction	11
2.2 Music-recording technology	12
2.3 Learning in music technology education	14
2.4 Facilities, time and resources	28
2.5 Limitations and policy	31
2.6 Student voice, autonomy and agency	33
2.7 Conclusion	36
Chapter 3. Methodology	39
3.1 Methodological choice and justification	39
3.2 Method	42
3.2.1 Participants and recruitment	42
3.2.2 Data collection procedures	44
3.2.3 Applied data analysis	45
3.2.4 Validity, reliability and trustworthiness	46
3.3 Ethics	50
3.3.1 Ethics approval	50
3.4 Occupational health and safety risks	50
3.4.1 Identification of hazards	50
3.4.2 Assessment of risk	51
3.4.3 Safeguards and controls	51
Chapter 4. Results	52
4.1 Data presentation	52
4.1.1 Participants' backgrounds	52
4.1.2 General music experience	52
4.1.3 Musical preferences	53
4.1.4 Recording experience	53
4.1.5 Music education	55
4.1.6 Education opportunities in recording	56
4.1.7 Participants' thoughts about recording before study	56
4.1.8 What participants thought they needed to learn	57

4.1.9 Summary of the background of participants	59
4.2 Participants' experiences in formal recording study	59
4.2.1 Aims and reasons for undertaking the class.....	60
4.2.2 Different levels of experience and skills and their effect upon learning.....	62
4.2.3 Space and number of students	64
4.2.4 Equipment.....	65
4.2.5 Time	66
4.2.6 Areas of learning and scaffolding in the recording class.....	68
4.2.7 Students' learning style	72
4.2.8 Teacher's teaching style.....	73
4.2.9 Learning outcomes	75
4.3 Suggestions for improvement.....	78
4.3.1 Increasing the time allocated for recording classes	78
4.3.2 Multiple classes according to skill or experience level.....	78
4.3.3 Smaller class sizes	80
4.3.4 Increasing studio facilities and technical support resources.....	81
4.3.5 Time	81
4.3.6 Technical support	82
Chapter 5. Discussion.....	84
5.1 Data analysis.....	84
5.1.1 Introduction	84
5.1.2 Theme 1: Previous experience with music-recording technology.....	84
5.1.3 Theme 2: Different levels of experience and their effect on learning.....	84
5.1.4 Theme 3: Facilities, time and resources	84
5.1.5 Theme 4: Financial considerations	84
5.1.6 Theme 5: The role of idiosyncrasy, creativity and innovation	85
5.1.7 Theme 6: Agency	85
5.2 Discussion of themes.....	85
5.2.1 Theme 1: Previous experience with music-recording technology.....	85
5.2.2 Theme 2: Different levels of experience and their effect on learning.....	90
5.2.3 Theme 3: Facilities, time and resources	94
5.2.4 Theme 4: Financial considerations	96
5.2.5 Theme 5: The role of idiosyncrasy, creativity and innovation	99
5.2.6 Theme 6: Agency	105
Chapter 6. Recommendations and conclusions	108
6.1 Recommendations	108
6.1.1 Introduction	108
6.1.2 Clear scaffolding of recording technology throughout the course ...	108
6.1.3 Split experience-level classes and drop-in sessions.....	111
6.1.4 Creativity and flexibility in teaching methods.....	112
6.1.5 Facilities resourcing.....	114
6.1.6 Soundproofing	115
6.1.7 Improved after-hours support resources.....	115
6.1.8 Reflexive teaching practice for continual innovation	116
6.1.9 Further research	116
6.2 Conclusions.....	117

6.2.1 Achieving aims.....	118
6.2.2 Thematic areas from this inquiry.....	119
6.2.2.1 Theme 1: Previous experience with music-recording technology	119
6.2.2.2 Theme 2: Different levels of experience and their effect on learning	120
6.2.2.3 Theme 3: Facilities, time and resources	120
6.2.2.4 Theme 4: Financial considerations.....	120
6.2.2.5 Theme 5: The role of idiosyncrasy, creativity and innovation....	121
6.2.2.6 Theme 6: Agency	121
6.2.3 Contribution to knowledge.....	121
References	123
Appendices	137
Appendix 1	138
Appendix 2	139
Appendix 3	140
Appendix 4	144
Appendix 5	146

List of tables

Table 1.1. Study aims.....	7
Table 2.2. Teaching and learning goals for the Bachelor of Popular Music, Queensland Conservatorium.....	27

List of figures

Figure 2.1. Popular music production.....	23
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List of abbreviations

DAW	digital audio workstation
DI	direct injection
EP	extended play
LMS	learning management system
mic	microphone
PA	public address
VET	vocational education and training
VU	Victoria University
VU Music	Victoria University Bachelor of Music

Glossary

Amp	amplifier; increases and controls audio volume levels
Auralia	music aural training software program
Bleed	unwanted sounds that escape into another environment
DI box	direct injection box; converts unbalanced instrument signal to balanced mic level
Effects	devices to change or manipulate audio signals
EP	extended play or mini album (3–6 song release)
Foldbacks	speaker facing the stage for performers to hear themselves
GarageBand	beginners recording software program
Hardware inserts	hardware equipment that can be inserted into a signal path to manipulate the sound
Logic Pro	intermediate-to-advanced recording software program
Mic	microphone
Mixing	blending the multiple tracks of a recording into a stereo mix
Musition	music theory software program
PA	public address system
Patch bay	analogue matrix for routing signals, often to compressors and effects
Polar pattern	pick-up pattern of microphones

Pro Tools	industry-leading recording software program
Recording desk	electronic device for inputting, blending, controlling and routing audio
Sibelius	music scoring software
Track laying (tracking)	the physical recording of instrumental and vocal parts
UniChoonz	end-of-block performance showcase event at Victoria University
XY configuration	positional technique for stereo microphone set-up

Chapter 1. Introduction

1.1 Introduction

The rise of computer-based music making has shifted the location of a large proportion of the recording industry from the commercial studio to the project or home studio (Anthony 2020). These changes have been caused by technological advances in digital audio recording, the availability of affordable recording equipment and the migration of the music consumer to online resources (Brown AR 2015). Further, the role and viability of record companies and high-budget recording deals have been challenged by the rise of the self-recording musician. Emerging music technologies have brought 'radical changes in the creative and technical aspects of music making' (Macedo 2013, p. 211) and have had a major influence on almost every aspect of music, from songwriting, performance and recording to how music is communicated, consumed and remunerated. The significance of this research lies in these broader changes in the music industry over the last 15–20 years and the important questions raised for music education—specifically, how best to facilitate the incorporation of essential recording technology skills into higher education programs.

Innovation in music creation techniques and software development is now as strongly harboured in online user communities that interact with industry developers as it is in corporate research and development departments. It follows that music students must be effectively and efficiently equipped with these skills and innovative mindsets. Spending time in the recording studio allows musicians to be immersed in a creative professional environment and form new ideas for the potential and possibilities of music and its production. Experiences such as these are not necessarily obtained through music performance or in the classroom (Thibeault 2011).

This research project examines how to effectively incorporate recording technology into a practical project-based music unit in the Victoria University (VU) Bachelor of Music course (hereafter referred to as 'VU Music'), a course with a contemporary, popular music focus that is based in western Melbourne. In the constantly evolving and shifting landscape of music technology, practice-

based research projects and methods are integral to better understanding this emerging field. As a lecturer in the VU Music program since 2014, I am uniquely positioned to understand the challenges and rewards of delivering music-recording pedagogy.

The research is based on the proposition that the current availability, cost and generational connection to music technology and software, coupled with the growing trend towards independent home recording, suggests that recording will likely become an increasingly relevant and desirable component of contemporary music education courses. The importance of ongoing development and continuous curriculum improvement cannot be underestimated. The current situation with the COVID-19 pandemic and the propagation of remotely delivered learning and isolated music recording has further highlighted the need for musicians to gain the skills to record their music autonomously in home studios.

This research will address gaps in research into how to effectively incorporate recording technology into practical project-based music units in a contemporary tertiary music degree. Further, it will add to local investigations into student voices and experiences conducted at VU Music by Aronson (2016). There has been significant research into the curriculum and pedagogy of contemporary music education in Australia (Carey & Grant 2014; Carey & Lebler 2012; Green 2006, 2007, 2008; Randles 2014). However, aside from Lebler's investigations into independent, project-based units in contemporary music education in Queensland (Lebler 2007, 2012) and Anthony's recent work on popular music production (Anthony 2018, 2020), there is a lack of national and international research into incorporating music-recording technology in project-based units in tertiary music curriculums. There is a need to inquire further into this area and build an understanding of incorporating recording technology into the contemporary music curriculum and teaching by investigating local contexts to inform broader considerations in music education.

By listening to and highlighting the student voice, this research will directly inform teaching pedagogy and curriculum design by examining the skills gained, the challenges students face in succeeding, how the skills fit within course structures and how this learning experience can be more effectively facilitated. Finally, this

research will also contribute to a better understanding of the benefits of building carefully designed reflective practice, as action research, as a standard expectation of learning and teaching within contemporary tertiary music education.

This project has been inspired by and aims to build upon the work of Dr Greg Aronson at VU and the approach taken to uncovering the student voice to explore the musical backgrounds and experiences of VU students. This work aimed at uncovering the background, trials and tribulations, aims, objectives and experiences of the music students at VU and how staff and students 'might work together to make things better' (Aronson 2016, pp. 1–2).

Due to the localised nature of this research and the relatively small number of participants, the specific outcomes and applications of this inquiry may be somewhat limited. However, localised investigations like this research play an important role in contributing to qualitative case-study research in tertiary music education contexts by incorporating the rich, place-based human experience of VU Music students and staff at a particular moment.

1.2 Background

This research into how to effectively incorporate recording technology into a practical project-based music unit has been undertaken within the context of VU in western Melbourne. VU has a proud history of providing education to students from diverse socio-economic and cultural backgrounds. VU students are often the first in their families to undertake tertiary study. The VU Music department currently inhabits a shared arts precinct hub called Kindred Studios, where independent arts-related companies conduct their business activities, such as music and tour management, music creation, dance classes, DJ school and rehearsals. Local community groups use the spaces for performances, rehearsals and meetings.

VU Music leases approximately half of the Kindred Studios space, where bespoke music rehearsal, recording and performance spaces have been created along with two 21-seat Mac labs. This shared space has a special atmosphere

and collective spirit; many cooperative events and activities occur within its walls. VU Music has a cohort of around 150 students across the three year levels and shares the space with VU Polytechnic Music, which provides a pathway from TAFE into higher education for a cohort of about 30 students.

Since arriving from the United Kingdom in 2003, I have studied music formally, gaining a Bachelor of Music with a major in Audio engineering. I have worked extensively as a sound engineer, mixing live gigs, theatre and radio performances, as well as writing and performing music on guitar and vocals. After completing my degree at Box Hill Institute, they invited me to teach part time as a sessional teacher in music performance and music production. After working with the course chair of VU Music, Dr Greg Aronson, on an external musical project and numerous conversations about music and education, I was asked by Dr Aronson to teach at VU as a sessional. During the nine years of splitting my time equally between industry work and teaching, I became increasingly embedded at VU Music. The vision and genuine passion for the course that the existing staff maintained influenced how my sessional work transitioned from various institutions to solely VU. As a full-time lecturer, I now share the dedication of the teaching team to develop and evolve the course into a modern contemporary music program with a unique position within the Melbourne tertiary music education landscape.

The Melbourne tertiary music education landscape needs to be identified, as the offerings and institutions vary in the styles and genres of music they focus upon and the amount of funding and resources they receive. The major music universities in Melbourne predominantly deliver either classical-based or jazz-based curriculums compared to the contemporary focus developed at VU. The other institutions in Melbourne with a contemporary music curriculum are private education providers that focus more on contemporary commercial music performance and charge much higher course fees. VU is situated in the historically working-class area of Melbourne and offers a contemporary music degree supported by Commonwealth funding with the offer of a Higher Education Contribution Scheme and Higher Education Loan Program (HECS-HELP) loan to cover the student contribution.

The ongoing review, development and evolution of the VU Music course identified the need to include recording skills for musicians, which inspired the creation of a music-recording class within the practical music stream. In this stream, second-year and third-year students can choose between a solo performance project and a recording project for the semester to learn the basics of the equipment required and processes undertaken to self-record music. Students learn about the different types and uses of microphones (mics), signal flow and the mixing desk; headphone mixes and monitoring; and the digital audio workstation (DAW), which is essentially a computer with music-recording software, like Pro Tools, and an interface that converts analogue electrical signals from mics and instruments into digital samples for the computer software to aggregate. We discuss, demonstrate and practice music-mixing and manipulation techniques—such as editing, volume and pan placement and effects like modulation, reverberation and delay—and tools, such as equalisation, where sounds are sculpted to fit together and work as a whole to create a final mixed song. The students complete a pre-production document plan, create a musical notation chart of the song and lyric sheet (if applicable) and record a rough demo version for analysis and feedback. This information informs the revision of their plan for the final recording and mix of their chosen song.

The modern musician must possess an array of skills, ranging from technical ability on their instrument to an understanding of music production techniques, software and online promotion and communication (Brown AR 2015). Once, a whole team of professionals was involved in recording; now, it is often just the artist who undertakes this role until a significant level of success has been achieved. As a musician, I have navigated this path and gravitated towards the music production side of the industry, gradually becoming more skilled in the art of recording and mixing music. In the 1990s, this path was undertaken by a relatively small number of musicians (Colleti 2012); then, it was more common for musicians to employ a recording engineer and or a mix engineer to make recordings. Now, it is commonplace for the individual elements that contribute to a successful recording (e.g., songwriting, performance, programming, editing and mixing) to be undertaken, at least in part, by the artist; these historically individual job roles have significantly blurred (Anthony 2020) and must now be considered

in the pedagogical approach. These industry developments have led to curriculum development in the tertiary music education sector, such as introducing the recording stream into VU Music.

1.3 Research aims

This research aims to explore students' experiences in practical recording-based projects delivered within music units in a contemporary tertiary music degree (see Table 1.1). The analysis of these experiences assists in forming recommendations for the curriculum design and facilitation in the music-recording unit of VU Music and elucidates recording and technology-based teaching and learning in contemporary music education.

This research will help to understand how best to facilitate musicians' learning in recording technologies at a university of opportunity. There is a lack of research in universities with similar student backgrounds to that of VU, where access to equipment and technology, in general, may have been limited. More-generalised applications may arise from this research, for example, how best to incorporate software technology into project-based units in other disciplines, such as multimedia, music business or web design. Aiming this education at musicians rather than audio engineers is a relatively new development in the original music-making process; thus, it has only recently been included in university curriculums. Research is needed to make evidence-based recommendations for designing and facilitating this learning. This research will contribute to case study research in contemporary tertiary music education.

Table 1.1. Study aims

Aims	Data required
Identify and understand students' perceptions of undertaking practical project-based units involving recording technology	Students' experiences of the implementation of recording into practical music units
Interpret data to inform the continuing development of this area of the curriculum and pedagogy	Logico-inductive analysis of interview transcripts to identify common themes, patterns and differences
Explore how the content and learning outcomes of project-based recording units can be most effectively incorporated into other course content and learning outcomes	Learning outcomes from the recording unit; learning outcomes of the VU Music course; analysis of the scaffolding of skills and knowledge throughout the course
Make recommendations for effectively incorporating recording technology into contemporary tertiary music education	Themes generated from participant data on the challenges and experiences of students in the current recording unit
Contribute to qualitative case-study research in contemporary tertiary music education	Case study data from VU Music students

This research aims to discover what aspects of self-recording and mixing are most useful to musicians at VU. This information will inform how these skills can be taught more effectively, efficiently and sustainably in a project unit as part of VU Music. Further, these findings will further inform the pedagogy of higher education contemporary music.

1.4 Research questions

The primary research question of this investigation is:

- What are students' experiences of incorporating recording technology into practical project-based music units in a contemporary tertiary music degree?

The secondary research questions are:

- What are the students' general expectations of recording within the practical components of a music degree?
- Why do the students want to learn recording skills?
- What do students expect to learn from this aspect of the curriculum?
- How do the students expect to learn recording skills and knowledge?
- What are the challenges for students in incorporating recording technology into practical project-based music units in a contemporary tertiary music degree?
- What kinds of backgrounds, experiences and skills do students bring to recording projects?
- How do the students measure success in recording music?
- What skills do students need to start recording?
- What skills do students possess that will help in the recording unit?
- What equipment will students need to record their music?
- What specific support do students need for recording?

1.5 Thesis structure

The thesis is structured as follows. Chapter 1 introduces the research project and provides pertinent background regarding the current context of music education at VU, including pedagogy and curriculum. It also outlines the research aims and research questions.

Chapter 2 reviews the literature and examines and acknowledges international, seminal texts on recording and mixing music. The chapter also addresses literature on the interdisciplinary nature of music technology education; recording

projects in education; incorporating technology into recording projects; scaffolded approaches to music education; designing technology education for maximum engagement; modern learning concepts like pulled and flipped learning; supporting resources for music technology; and projects undertaken in modern local contexts. These areas have been merged into five subheadings:

1. music-recording technology
2. learning in music technology education
3. facilities, time and resources
4. limitations and policy
5. student voice, autonomy and agency.

Chapter 3 identifies and outlines the rationale for the methodology and conceptual framework, including the qualitative research and interview processes undertaken. Chapter 4 presents the data collected from participants. Chapter 5 discusses and interprets the data to inform the continuing curricular and pedagogical development and learning outcomes of practical project-based recording units in a contemporary tertiary music course.

Chapter 6 concludes the thesis and includes recommendations for effectively incorporating recording technology into contemporary tertiary music education. It elucidates and discusses various issues arising from the interviews and pedagogical context. The project outcomes are discussed, and their potential to contribute to qualitative case-study research in contemporary tertiary music education is examined. Further, future actions are proposed to continue researching in the VU Music department.

In summary, it is essential to recognise that the modern portfolio musician must be able to record and self-produce and that these skills are essential to being a successful musician. This research specifically targets the key question of how best to teach recording technology to musicians. The last 10–15 years in tertiary music technology education have centred around teaching a cohort of specialist audio engineers whose sole job is to record musicians. Separate units, such as software instruction, recording techniques and mixing techniques, contribute to the skills required to record and mix contemporary music, rather than a practice-

based integrated approach that is now more commonplace for musicians. However, the growing trend towards self-recording has highlighted an urgent need for a different approach for music students and teachers. As we transition from excellence in reproduction towards excellence in creation, what is taught, how it is taught and how best to support this new approach to music learning and teaching must be purposefully considered.

Chapter 2. Literature review

2.1 Introduction

This research focuses on how to best design, facilitate and support musicians' learning of music-recording technology. There has been an emerging need in the field of music technology research in the last 10 years to investigate the links between creativity, technology and pedagogy due to the evolving nature of the music industry and the blurring of traditional job roles in the recording of music (Bell 2014; Burnard 2012; Kardos 2018; King & Himonides 2016). The existing research presented in this chapter contains themes, theories, concepts, issues and ideas relevant to this investigation.

The literature is organised thematically, starting with the broad issues and then funnelling down to the most specific and relevant available information. The first theme, 'music-recording technology', concentrates on the use of recording technology by musicians. The theme describes the most pertinent areas of audio engineering, the underlying concepts, technical information and professional processes involved in recording music. The second theme, 'learning in music technology', reveals the blurring of traditional job roles within the music industry, the skills and knowledge musicians require to be job ready and how different learning models can support the aspiring modern portfolio musician. The third theme, 'facilities, time and resources', focuses on how technology is incorporated into music education, including what is currently provided, what is ideally required and how best to support this kind of learning and its idiosyncrasies. The fourth theme, 'limitations and policy', concentrates on political policymaking and its influence on providing adequate resources for music education. The fifth theme, 'student voice, autonomy and agency', investigates how previous levels of experience can influence students' abilities when starting tertiary music education and how music technology can empower their creative voice and fulfil the needs of a 21st-century musician.

Although contemporary tertiary music technology education is a relatively new field of research, inquiry has focused on areas such as technology-assisted instrumental skill acquisition (Blackwell 2020; Kaya 2019; Silveira & Gavin 2015;

Waddell & Williamon 2019; Zhukov 2015), ‘informal’ music pedagogy and its intersection with formal music education (Creech, Varvarigou & Hallam 2020; Green 2006, 2007, 2008), practice-based learning in music (Burwell & Shipton 2011; Grant 2013; Lebler 2012; Schiavio, Kussner & Williamon 2020; Watson 2016) and, more locally, musical backgrounds and the learning experiences of music students undertaking tertiary music study at VU (Aronson 2016). Since starting this investigation, more research has been published on music-recording technology in education (Anthony 2018, 2020; Benedict & O’Leary 2019; Eyles 2018; Parasiz 2018; Purves & Himonides 2021; Ruthmann & Mantie 2020), which adds to the work of AR Brown (2015), Colleti (2012), Collins and Halverson (2009), King (2009), Lebler (2012), Macedo (2013) and Thibeault (2011).

There is a need to inquire further to build an understanding of incorporating recording technology into contemporary tertiary music curriculums. Such a crucial and growing side of the music industry must be reflected in music education. Evidence collected from industry professionals, current and past music students and music teaching staff can inform an effective, coherent, structured and sustainable approach to how recording is integrated into VU Music.

2.2 Music-recording technology

There has been much written on recording techniques in the music industry. Historically, this information has been aimed mainly at recording engineers tasked with recording musicians. *Modern recording techniques* (Huber & Runstein 2018), *Recording tips for engineers: for cleaner, brighter tracks* (Crich 2017), *Mixing audio: concepts, practices and tools* (Izhaki 2013) and *Mixing with your mind: closely guarded secrets of sound balance engineering* (Stavrou & Westbrook 2003) all concentrate on recording techniques (e.g., mic types, choices and placement; recording levels; and mono and stereo applications) and theories for recording and mixing in analogue and digital formats.

Since the 1980s, music recording has been transitioning from analogue to digital (O’Grady 2019). Combining audio samples, digital software instruments and analogue recordings is now an accepted norm. There is an abundance of literature focusing on the transition from ‘old school’ analogue to ‘new school’

digital recording. Authors such as Bartlett & Bartlett (2016), Collins, Schedel and Wilson (2013), Reveillac (2018) and O'Grady (2019) discuss the similarities and differences in techniques and results. These texts are generally instructive, marrying technical skills and equipment knowledge with more overriding techniques and paradigms.

Many of the techniques described in this literature are the basis for anyone starting out in recording audio. In these holistic recording texts, there are many insights into the thought processes that drive our actions while in the recording studio. In *Mixing with your mind: closely guarded secrets of sound balance engineering*, Stavrou and Westbrook (2003) discuss the thought processes and techniques involved in learning how to record and mix music effectively. In *Recording tips for engineers: for cleaner, brighter tracks*, Crich (2017) describes processes and techniques for recording engineers, musicians and home studio users and provides theoretical and practical instruction on relevant areas of sound recording and reinforcement, from the basic characteristics of sound to tips and techniques for recording specific instruments. This content is relevant as a learning resource and for elements of 'curriculum design', defined by Taba (1962, p. 421) as a seven-stage model for 'diagnosing needs, formulating specific objectives, selecting content, organizing content, selecting learning experiences, organizing learning experiences and evaluating'.

These texts are intended for audio-recording engineers and project studio owners rather than student musicians. The instructional nature of these texts combines tried-and-tested paradigms with practical applications and techniques, including the cultivation of results-based listening. These seminal music-recording resources are generally aimed at the traditional role of the audio engineer. Although this role still exists, it has become far more common for artists to cross over into the field of audio recording, at least to some degree, due to the emerging interdisciplinary nature of the modern musician (Lebler 2012). This trend has continued to gain pace over the past 15 years, with Purves and Himonides (2021, p. 217) stating that 'music technology skills were traditionally defined in relation to the requirements of the professional recording studio'. Although these texts are

more industry based, 'education in the modern age almost always involves commercial components and interests' (Ruthmann & Mantie 2020, p. 1).

The potential pitfalls and limitations of the segregation between music industry roles—where performers focus on their instrumental development and songwriting and engineers learn about recording techniques and software and hardware operation and manipulation, as noted by Kardos (2018)—are pertinent to the creation of a recording-focused curriculum for musicians. There is little research into this evolving area of recording techniques specifically for musicians, but it deserves further exploration. Music students who are seeking to become modern portfolio musicians must gain the skills and techniques to self-produce and record (Anthony 2020; Bell 2014; Colleti 2012; King & Himonides 2016; Rowley, Reid & Bennett 2021).

2.3 Learning in music technology education

Since the early 2000s, the music industry has observed a mainstream crossover from analogue to digital recording (Randles 2014). The cost of equipment and improvements in the standardisation of the user experience across software has opened opportunities for high-quality recording outside large, expensive recording studios. A good example of this is the first album of Billie Eilish *When we all fall asleep, where do we go?* (Eilish 2019). Although this album was recorded using a mix of software instruments and analogue sounds, the lead vocal was recorded in a bedroom studio (Harvey 2022). The hybridisation of musical styles and techniques and the subsequent absorption of these new combinations of sounds and styles by artists and consumers have proliferated a multitude of crossover styles, like the pop–electronic dance music–industrial combination employed by Eilish or the neo-soul combining of soul, hip hop and jazz of Hiatus Kaiyote.

Techniques and processes involved in music production have also evolved to reflect this change. For example, large format analogue recording consoles are now often simulated virtually with digital software program interfaces and room ambience is replicated with a reverberation plug-in. The effects have been so far-reaching that the lines between historical job roles within the recording of music

have blurred to the point where many artists are now seeking out the skills and techniques required to self-produce and record themselves on home-based DAW (Bell 2014). There has been an accelerated rise in the number of self-recording artists since 2010, which requires an expansion of the audio production skills and techniques musicians possess (Colleti 2012; Lebler 2012; Macedo 2013; Thibeault 2011). Even when an artist records their release in a traditional professional recording studio using a producer, recording engineer, mix engineer and mastering engineer, it remains invaluable to be able to record and post updates and teasers to social media to keep a content-hungry consumer market engaged with the artist's work and entice the market to buy their music (Bartlett & Bartlett 2016).

Recording engineers, producers and musicians are currently programming performances to emulate instruments and instrumental loops that they cannot physically play on a traditional musical instrument. The many and varied roles in the music industry are now often amalgamated (Carey & Lebler 2012; Kardos 2018; Macedo 2013; Watson & Forrest 2012). In addition, it is now an established paradigm that the nature of music technology education is interdisciplinary (Lebler 2012). Including a recording technology stream into a music performance degree follows the same principles and caters to the needs of the technology-savvy musician of today.

In response to the MayDay Group's *Action ideal VIII*, Kardos (2018) discusses the hybridisation of music styles that has emerged in the post-digital landscape and how inclusive interdisciplinary trends can be best reflected in the pedagogical approach of inquiry-based learning. There is a hypothesis that music-recording software, such as Pro Tools, Logic Pro and GarageBand, no longer require specific instruction as part of higher education due to the proliferation of online tutorials and help functions (Kardos 2018). However, the fundamental software skills—such as navigating around an operating system and software space, selecting tools, using copy and paste, clicking icons to open windows, using shortcuts and saving your work—and, often, even exposure to such programs is not universal among all students. The challenge of creating effective curriculum that is inclusive of all artists, genres and cultures and the cross-pollination that is

now common between them is highlighted when considering how creating resources enables students to 'bridge the practical, conceptual and philosophical gaps between imagination, creativity and practice; literacy, competency and mastery; identity, tradition, community and culture' (Kardos 2018, p. 40) and how this can be implemented through careful curriculum design.

When discussing learning in tertiary music technology education, it is pertinent to consider the level of knowledge and skills that students initially possess. Pascoe et al. (2005) reflected on the *National review of school music education: augmenting the diminished*, which surveyed Victorian government secondary schools to highlight issues related to access, equity and the provision of music education resources. The authors noted that although there are instances where excellent music education is present in secondary schools, there are also many Australian students who do not receive effective music education due to the absence of 'equity of access; lack of quality of provision; and, the poor status of music in many schools' (Pascoe et al. 2005, p. v).

The nature, quality, style and pace of tertiary music-recording technology learning are affected by differing levels of previous. These challenges to students and teachers alike are contemplated in the work of various scholars (Blackwell 2020; Cain 2011; Carroll 2017; Chan et al. 2015; Schiavio, Kussner & Williamon 2020; Sheldon & Gregory 1997; Southcott 2003; Watson 2016). This phenomenon can be ameliorated with foundational music technology and recording education at the secondary school level (Crawford 2008; Eyles 2018).

The uptake of technology by musicians is well documented. As stated by Mackrill and Daubney (2016, p. 157):

Over the past thirty years, the use of music technology in education has moved from the introduction of hardware such as synthesisers, portable keyboards and four-track cassette recorders to computer suites running industry-standard music software and full multi-track studios.

However, despite the potential of this computer-based multitrack recording, the results of a survey on technology use of 338 amateur, student and professional

musicians by Waddell and Williamon (2019) showed that although a 'large majority' recorded their playing practice, these recordings were infrequently reflected upon. The study also showed that the majority of the music technology software used was on a smartphone instead of a bespoke recording device, which suggests that there is still work to do in upskilling musicians in using professional recording software.

The effect of technology on music education and its interdisciplinary nature cannot be underestimated, with its reach touching almost every aspect of music. Advances in technology affect how music is made and consumed and the range and availability of instructional resources and instrumental skills via software manipulation techniques (Boehm 2007).

In *Music technology and education: amplifying musicality*, AR Brown (2015, p. 1) describes a 'theoretical and philosophical framework for examining the use of technology in music education' that examines the available music technologies and techniques required to make music and learn musical skills. Brown offers suggestions on what is required to embed technology into teaching practice and how teachers can simultaneously develop their own technology skills. According to AR Brown (2015):

In order to maximize student learning through computer-based musical experiences, educators need to consciously contextualize technological changes, develop appropriate music making activities and provide adequate opportunities for reflection. (pp. 12–13)

The idea of embedding opportunities for reflection into curriculum design resonated with breakthroughs in my own journey as a musician and audio engineer and, in part, has motivated the need for this research.

Brown's (2015) seminal text explains the overarching principles of music technology and how it can be best used in primary and secondary education. Brown discusses the areas of 'technology as a musical tool', 'technology as a musical medium' and 'technology as a musical instrument'. These three uses are included in the recording project units that are being investigated in the current research and are directly relevant to reflecting upon students' experiences when

recording and mixing their own compositions. Although the main area of investigation is using technology as a tool to create or document creative works, some of the participants' projects contained the use of technology as an instrument with hybrid recording using midi-controlled software instruments or manipulated loops and samples. Technology as a musical medium is a broad category that includes areas of current growth. For example, streaming innovations affect how music is consumed and shared. Music technology can also lead to a more involved online consumer collaboration through creating remixes and mashups (Homan 2009; Shuker 2017). It is important to examine how musicians interact with recording technology to determine its relevance to the current study.

The relevance and importance of incorporating recording technology in music teaching have been recognised since 2010. Although this phenomenon is no longer regarded as a recent development (King & Himonides 2016), the area has not been thoroughly explored and is critical to this investigation. Further, while most of the research in this area has been conducted in primary and secondary education, insights can be gained and approaches expanded upon in the higher education context.

Schwartz (2010) highlighted the benefits for students and teachers of introducing music technology practices through a primary school classroom composition and recording activity. The three key benefits of music technology were increased motivation for students to practice their instrument at home, increased willingness for students to share their creative ideas and additional opportunities for teachers to explain the difference between musical tasks (e.g., arranging and composition). There were challenges around providing space, facilities and equipment for production quality; however, at the primary school level, the benefits were perceived to have come from the process rather than the final outcome.

Although many different challenges and more complex tasks are involved in the higher education sector, there are some overriding benefits for music students of all ages in recording their original compositions. Creative expression can help students communicate and share feelings and ideas that they may not have had

the skills or medium to explore in the past. Schwartz (2010) notes that music educators aim to instil the skills of independent thought in students, which is gained through experimentation in composition and recording. Different mediums of artistic expression, such as the recording of original compositions, are important and cultivate beneficial skills, for example, in the objective analysis of performance and songwriting skills. AR Brown (2015) notes that when music students listen to recordings they have made, they are often more open to critique and feedback as there is an emotional disconnect and distance from the performance that allows for clearer objectivity.

Incorporating technology into education and the need for education on using emerging technologies are now intertwined. Collins and Halverson (2009, p. 133) state:

As a society, we need to understand how new technologies turn kids and adults on to learning, in order to redesign our learning environments to provide positive motivational experiences for all learners.

Collins and Halverson (2009) explore the definition, experience and role of the school within the developing technological infrastructure and recognises education as a lifelong learning enterprise that occurs inside and outside formal education.

The modern portfolio musician will most often 'hold multiple concurrent identities' (Rowley, Reid & Bennett 2021, p. 367). This is clear when considering the self-recording musician and the traditionally separate roles within the recording industry that a musician must now transverse. An emerging theme in music education is combining, blending, bridging or borrowing from external learning practices or environments and incorporating these techniques and approaches into formal education design (Anthony 2020; Scott & Vella 2015; Watson 2016). Music technology education also displays these characteristics, and this area is worth further consideration and exploration in the current study.

At this point, it seems pertinent to establish which areas of music recording are most important for musicians to understand and have experience with. AR Brown (2015) defines the elements of a music-recording system. These elements can be grouped into the following general categories:

- sound and signal flow
- plugs and connectors
- mics and direct injection (DI) boxes
- DAW operation
- recording levels
- audio editing
- filters and equalisation
- reverberation and delay
- plug-ins and digital audio routing
- spatial mixing.

These general categories can help to guide the basic level of recording knowledge that is important for music students to learn and explore. These areas are broad, and the extent to which each area is explored can depend on many factors, including the areas of particular interest to the student, the need created by their specific project and the facilities, time and resources allocated to the subject. Careful consideration must be given to the design and content of recording technology units for musicians for units to be relevant, effective and engaging.

Considered approaches to design and production in technology can help to engage a user or learner. In the computer gaming industry, developers have long recognised the benefits of including customisation and design of the game environment to maximise the interest, number of plays and brand loyalty. It follows that students undertaking similarly meaningful tasks will show benefits in their level of understanding and dedication in the time spent on the task (Collins & Halverson 2009). A more-thorough understanding of recording will enable projects with greater complexity, and even basic recording knowledge will allow for success and development in other curriculum areas. For example, more-

advanced software manipulation techniques (e.g., Auto-Tune and Beat Detective) can be used to mitigate the recording of musicians with less experience and skill in performing the instrumental part, and both can lead to a similar result.

In King and Himonides' (2016) book *Music, technology and education: critical perspectives*, Slater (2016) explores music production and musical creation, experience and understanding, discussing topics related to formal and informal learning in the studio and the order and type of learning that takes place. The chapter is informed by a collaborative music project case study where recordings were made, mixed, released and performed by 28 professional musicians, technicians and visual artists who were asked to keep diaries for further analysis and undertake a series of semi-structured interviews. Slater elucidates five dimensions of learning: intentionality (the minds' hierarchy of importance between the learning and the task), agency (the motivation of intention and who does what), patterning (the order in which learning takes place), experience and concept (the mix of experiential learning and conceptual knowledge) and socio-architectural dimension (where the learning is situated). Slater (2016, p. 16) explains the term 'patterning' as the sometimes haphazard and evolving order of learning that is often idiosyncratic to the specific project. This idiosyncrasy related to recording projects is present in the current study. It gives credence to the notion of supporting learning design that allows students to select when they require certain information, with the assumption that they will self-select the point at which this information is vital to the progression of their specific project and, therefore, most effective and appropriate for their learning style.

As noted by Green (2008), there are palpable improvements to student learning when students are 'given more autonomy to decide on curriculum content and to direct their own learning strategies' (p. 185). This flexible, interconnected learning is prominent in music education. Parasiz (2018) notes that it takes time to learn and gain confidence with music production tools, but there is no better way to gain experience than to use them. Moreover, this use has benefits in increasing understanding of other musical aspects. Parasiz (2018, p. 1006) states, 'the use

of music production tools together with the students is a great way to give them composing, sound phonics and critical listening abilities’.

According to Tozman (2012), the phrase ‘pulled learnings’ refers to the user ‘pulling’ the information from the online resource when required rather than being exposed to the material regardless of their specific need at that time. The need for this style of ‘on-demand’ technical equipment and software information resources seems inevitable. Information that is directly needed at a specific point in time will be more relevant and, thus, more readily consumed and absorbed. This ‘pulling’ of technical information resources is especially poignant in project-based recording units that require multiple skill sets for successful completion, including production techniques, software skills, specific hardware knowledge and songwriting and listening skills. It is naïve to think that students would already possess or be able to gain these complete skill sets in a 12-week unit or a 16-week block mode semester. It is more likely and useful for students to research and apply specific techniques and skills directly related to their project, gaining complexity and specificity as and when required by their own project’s landscape. These factors are intrinsically relevant in the creation, review and evolution of the VU Music recording unit.

Self-directed, interactive, pulled and flipped learning models are discussed by Lebler (2012), Tozman (2012) and Grant (2013), particularly how students of popular music learn inside a higher education facility and externally with peers and mentors. Lebler (2012, Fig. 1, p. 208) has developed a framework to display the popular music production learning process, as shown in Figure 2.1.

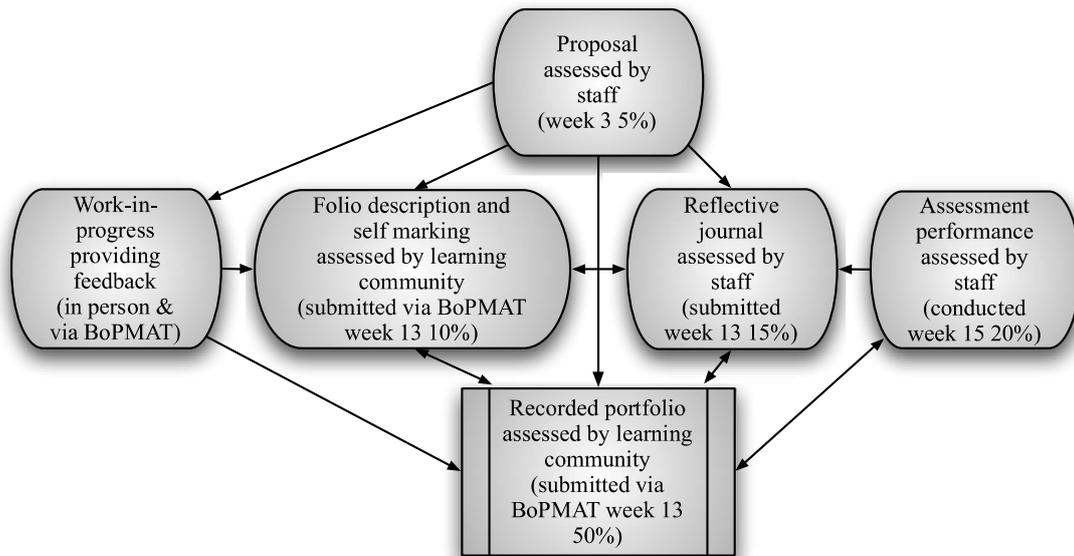


Figure 2.1. Popular music production. BoPMAT: Bachelor of Popular Music Assessment Tool. Source: Lebler (2012, Fig. 1, p. 208). This framework lays out the process and timeline and includes elements of peer feedback and assessment as well as the role of technology in simplifying and supporting the process. Notably, there is also mention of continuing to adapt to student expectations for the inclusion of streamlined technology uses. There are many similarities in the work of Lebler (2012) and my research: both examine Australian tertiary popular music degree courses and consider how best to incorporate technology into this learning. There are also areas of difference surrounding the inclusion of student feedback and assessment in this curricular model. While this is an area of relevance and possible inclusion in the future design of the VU Music recording stream, the current research focused on uncovering the experiences and challenges for students of incorporating this style of unit. This project aims to discover which specific aspects of the curriculum are important and how best to facilitate and support the learning, which Lebler (2012) does not address.

Biggs and Tang (2011) discuss the concept of the three P's learning system:

- Presage refers to the pre-existing factors (e.g., skills, experience, socio-economic factors, historical factors, external commitments) that influence

student learning and engagement and any existing structures or parameters portrayed by the education establishment.

- Process refers to the factors present during the learning process (pedagogy, curriculum and assessment).
- Product refers to the outcomes and effects of learning activities on student learning.

This learning system can be applied to the current research and will help to form the structure of recommendations for the design of the VU Music recording unit.

Further, a specific focus on how the three P's influence musicians' ability to effectively learn musical recording skills will inform my investigation. This approach is aligned with previous sentiments discussed by Kincheloe et al. (2011) on the need for constant dialogue between teachers and students to hear what they think of their learning communities and the challenges they face. Aronson (2016) conducted in-depth interviews and focus groups with students from VU Higher Education Music and VU Polytechnic Music to create vignettes that explore his observations on student expectations, engagement and the challenges they face in their learning. Analysis was conducted using a cultural theory lens to discuss the concepts of habitus, capital, agency and field to reveal students' experiences. Themes relating to power and agency were uncovered; for example, students' previous informal musical experiences affected their confidence, engagement and empowerment in learning in a more formal university setting. Participants flourished and achieved learning objectives and perceived success when their practical experience was 'acknowledged and accommodated'. According to Aronson (2016, p. 258):

They developed confidence and agency by exploring, challenging and testing the conditions of formal education fields. Students developed resilience and a sense of belonging in collaborative and shared spaces, and so were able to flourish as students, musicians and individuals.

This suggests that the tailoring of pedagogy to include, value and build upon students' previous informal musical experiences could be powerful and relevant to the recording context.

Voss (2016) utilised questions seeking attitudinal responses and open-ended questions to elicit student responses about the resources required to support learning in a studio recording project environment. A total of 36 students participated in the initial survey from a cohort of 125, and a focus group of 10 students was used to gather detailed information. The number in the cohort is very similar to that in the VU Music course; 10 participants represent 15% of the total VU Music cohort. Using thematic analysis to reveal commonalities and recurring themes, Voss (2016, p. 37) concluded that:

A virtual space where the latest information can be shared, with updates on equipment outages and issues could be highly beneficial to these users. Managed by a central facilitator, equipment repairs, fault reporting and equipment demonstrations could be managed from an accessible, mobile, on-demand resource hub.

Specifically, troubleshooting, the equipment set-up procedure and the availability of online resources were the most highly regarded resources, as were the speed and ease of access to these materials. Chapter markers and short video tutorials were highlighted as navigational improvements from the existing system. The importance of creating and maintaining a relevant learning technology interface to support after-hours project-based studio recording was well noted. Voss also mentioned that self-directed technical project tasks require on-demand resources for troubleshooting equipment and software issues.

Voss (2016) explained the process that the teaching team undertook to highlight the need for their pilot study. This process included consultation with the music technology teaching staff to identify the skills that require development in their recording unit. It is this step in the creation of a recording project stream that has been highlighted for further investigation in this current research. The assumption that teaching staff are intrinsically aware of the skills, techniques, processes and information that would most benefit students in a recording project unit is not

necessarily universally accurate. Due to the speed and rate of technological changes and the way software and technology have seeped into almost every aspect of modern life, there could be aspects from another similar technology that students already have experience with. Conversely, it could also be the case that some aspects typically taken for granted may not have been experienced by students before. For example, the operation of a DAW's 'transport' section is similar to and, in fact, mimics that of an audio cassette player. But how many 18–25-year-old students will have experience operating a cassette tape machine? These factors are the drivers for this research into how best to incorporate recording technology into practical project-based music units in a contemporary tertiary music degree.

Anthony (2018) conducted a case study on the Bachelor of Popular Music at the Queensland Conservatorium, Griffith University, Queensland, Australia, to determine the pedagogical considerations when designing a curriculum about mixing as a performance. He explored the evolution of digital 'in-the-box' mixing as an evolution of the pre-automation analogue mixing craft. The Bachelor of Popular Music is a similar course to VU Music, and many of the pedagogical challenges and discussions in Anthony (2018) align with the current investigation.

The Queensland Conservatorium conducted surveys of professional mix engineer practitioners to elicit responses around the most important skills of 'mixing as a performance process' (Anthony 2018, p. 8). This information was then contextualised with the curriculum and scaffolding currently in place at Queensland Conservatorium to inform contemporary music pedagogy design. The three-year course is divided into streams similar in general areas to the VU Music course: songwriting, major study (performance and recording of original material), history and analysis of popular music, and music production and the recording studio. The Bachelor of Popular Music at Queensland Conservatorium scaffolds the area of mixing a recording across the three year levels, with the structured teaching and learning goals for each year level building on the previous year's skill base, as shown in Table 2.2 (Anthony 2018, p. 19).

Table 2.2. Teaching and learning goals for the Bachelor of Popular Music, Queensland Conservatorium

Pedagogy	Year 1	Year 2	Year 3
Pedagogy topics	Basic engineering concepts, critical listening and DAW operation	Advanced engineering concepts, digital and analogue alternatives, advanced critical listening	Creative mixing practice and mixing as a performance
Pedagogy methods	Formal, teacher-led	Formal, teacher-led, informal	Practice-led, student as teacher

DAW: digital audio workstation.

Anthony (2018) discussed issues relating to the technology of the studio—including analogue mixing desks and hardware, and DAW-based recording and mixing set-ups—and how this kind of musical activity is akin to that of performing on an instrument except that in this case, the instrument is the recording and mixing equipment. Anthony drew parallels between performance outcomes and recorded mix outcomes and their associated skills and development. The main focus of this text is the element of performance while constructing a mix and how techniques and teaching methods can allow this concept to flourish. The overall framework of how mixing technology processes and skills are embedded across the curriculum is useful to inform the practical implementation of recommendations made to improve the offering at VU.

Reviewing this literature has reinforced the notion that practical project-based music-recording units are becoming commonplace for musicians. However, there are gaps in research knowledge, especially in local contexts, relating to the content included in the curriculum and how it is most effectively facilitated and supported. Most relevant research is from the last five years and focuses on specific challenges and ways to support the cohort through challenges related to music technology. Specific research into how best to incorporate recording technology content into the curriculum of a practical project-based music unit at

VU will help to address this immediate and specific gap in research. Further, this research will add to the growing scholarly writing on the broad subject of technology in music education. The ever-changing and developing landscape of technology education suggests that research like this study must become an integral part of pedagogical development to stay current and relevant in content, design and thinking. The recognised and reinforced importance of listening to students' voices to help guide curriculum design will give this research a solid foundation upon which to base recommendations. The literature considered herein has elucidated similar projects within Australia, specifically focusing on challenges that students face when away from their teacher's guidance. One such area of investigation is online technical and equipment support resources.

2.4 Facilities, time and resources

Providing adequate facilities, time and resources has been a challenge for music education providers for at least 20 years. Pascoe et al. (2005, p. iii) found that the *National review of school music education: augmenting the diminished*:

Revealed patchiness in opportunities for participation in music, significant variability in the quality of teaching and teacher education, a need for much greater support for music teachers and unintended detrimental impacts on music education arising from changes in the place of music within the overall curriculum.

The facilities required to teach music recording to musicians are akin to what one would find in a professional recording studio. Huber and Runstein (2018, p. 4) define the following features of a professional studio environment:

- Professional staff
- Professional equipment
- Professional yet comfortable working environment
- Optimised acoustic and recording environment
- Optimised control room mixing environment.

Adequate physical spaces with separation between tracking rooms and a control room would be the minimum requirement for auditory-related decision-making

during a recording process. The number of rooms, dimensions, materials and aesthetics are subject to many variables and individual requirements and should be 'acoustic spaces that are specially designed and tuned for the purpose of capturing the best possible sound on a recording medium' (Huber & Runstein 2013, p. 3). The physics of acoustics and acoustic architectural design is extremely complicated and is a specialist area outside this investigation's scope.

Further, providing adequate time within the curriculum for students to receive instruction and to practice and explore possibilities is paramount to the successful uptake of music-recording skills. As Slater (2016, p. 19) states, 'people get better at controlling technology through practice'. Smaller class sizes—where teachers can spend more time per student and students can have more time working with new technologies and equipment—can ameliorate challenges around facilities, time and resources and lead to better outcomes and experiences for students and teachers (Blatchford & Russell 2020; Harfitt 2015; Sapelli & Illanes 2016; Watson et al. 2013; Zyngier 2015).

The equipment-related resources required to teach and practice music recording depend on many different factors. For example, what kind of music will be recorded? How many instruments will be recorded at the same time? Will it be a live recording or involve overdubs? What kind of audio fidelity will be required? As previously mentioned, the music-recording industry has evolved into a hybrid of analogue and digital equipment ranging from analogue sound-capturing devices, like mics and DI boxes, to audio-routing and control devices, like analogue and digital mixing consoles. This audio is recorded using various devices but, most common since the early 2000s, with a digital computer-based software system like Pro Tools, Logic Pro, Cubase or even GarageBand. Since the rise of digital recording, the recording studio has been 'shrinking' (Huber & Runstein 2018, p. 14). The emergence of the project studio utilising the power of the DAW has meant that many functions, aspects and results previously only attainable from the professional recording studio can now be achieved outside these expensive, bespoke facilities. Further shrinking has occurred with the introduction of handheld recording devices on phones and tablets, although the functionality and user-friendly experiences provided are incredible. Nevertheless,

it is still relevant to interact with the individual elements of a more traditional recording studio to gain a clear understanding and functional knowledge and fully understand the processes, equipment and techniques that handheld recording devices are mimicking (Brown AR 2015).

King (2009) researched the benefits of providing students with a computer-based learning technology interface resource to support a studio recording project. The creation of a learning technology interface was conducted within a similar year level of a higher education music degree to the context of the current inquiry and in a similar project-based music-recording unit. King concluded that there is value in providing after-hours online technical resources, but more specific research is needed into what to include and how to display the content. In the 13 years since King's research, there has been a significant uptake in the provision and use of learning management systems (LMSs). It is now common for entire course information and resources to be hosted online through a bespoke LMS.

Voss (2016) conducted a research project at the Queensland Conservatorium on the sharing of on-demand technical information resources in an Australian higher education popular music degree. This research focused on the technical information required, how it should be delivered and where to host such information. Many commonalities exist between the research by Voss (2016) and the current study, as both are set in the context of Australian higher education popular music degrees and are interested in how best to support the inclusion of recording technology for musicians in project-based units. However, there are also areas of difference. For example, Voss (2016) concentrates on how best to support this learning with online resources and effective communication strategies, while the current research concentrates on the experiences and challenges of including this style of unit at VU and how it can best benefit the VU cohort.

In conclusion, the importance of facilities, time and resources is highlighted in the literature, along with class sizes and formal and informal access by students to equipment and facilities. These components, so crucial to supporting the student experience, lead into a discussion of the literature around the limitations and policies affecting the delivery of music programs in higher education.

2.5 Limitations and policy

When considering the limitations and policy decisions that affect education, it seems pertinent to acknowledge the political ideology that influences and drives decision-making. Definitions of neoliberalism are somewhat contested in academia. However, most agree that it derives from the laissez faire liberalism (government non-intervention) of philosopher and economist Adam Smith (Smith 2018). It is now generally used as a term to describe a political ideology and economic and social theory where deregulation of capital markets eliminates control over price to create freedom of trade and capital investment and reduces the influence of the state in the economy and social dealings, with sustained economic growth as the main driver for the furtherment of mankind (Brown W 2015; Louth 2020).

‘Neoliberalism is most commonly understood as enacting an ensemble of economic policies in accord with its root principle of affirming free markets’ (Brown W 2015, p. 28).

These overarching principles have been the dominant force in education reform over the last three decades, with policy initiatives guiding education towards a ‘global knowledge economy’ (Louth 2020, p. 3). Neoliberal thinking posits that financial markets drive the economy and all social life. It encourages and rewards self-interest and promotes a culture of individualism, reinforcing the trope that consumption enables agency, making profit is at the core of democracy, and ‘competition is a central concept for defining human freedom’ (Giroux 2018, para. 3). Within the neoliberal framework, education is considered to supply human capital to the global labour market, with initiatives like ‘job ready graduates’ (Hil 2019; Daly & Lewis 2020; Warburton 2020) dictating standards, pedagogies and curriculum to increase global economic revenue (Mullen 2019).

Students have evolved into education consumers (Woodall, Hiller & Resnick 2014), with individuals undertaking increasing personal responsibility for learning and ‘success’. Themes relating to race, poverty, family violence, geographical location and social standing are less likely to be acknowledged or ameliorated (Pitman et al. 2016).

Neoliberal educational changes have attempted to directly address shortages in areas of labour that are seen as in demand by large multinational businesses. 'Neoliberal reforms in education have redefined both the purpose and process of schooling to satisfy the labour demands of multinational corporations' (Mullen 2019, p. 47).

Tertiary education is now generally considered a 'commercial enterprise' (Kramer 2015; Reid 2009; Rochford 2014), with student consumers seeking out perceived value in a landscape of reducing budgets. Homogenisation of commodified, branded education culminates in over-administration and a 'one-size-fits-all' policy that is woefully inadequate to meet the learning needs of individual, idiosyncratic education disciplines (Johansen 2009). This homogenised curriculum design model can seriously affect the enjoyment, engagement and uptake of skills and knowledge within a music course (Green 2008). Micromanagement and overly administrated procedures—induced by a distrust that academics can and will do their job—hinder educators, who are left to ameliorate the challenges of those who do not fit into these preconceived structures (Connell 2019; Smyth 2017; Spicer 2018).

Governments aligned with neoliberal thinking have consistently cut funding to universities (Brasche & Thorn 2016; Heffernan 2017; Krause 2017). Funding cuts have contributed to strained education budgets and amplified education inequality, instead moving towards commercial funding models that have become heavily reliant on full fee-paying international students (Caldwell 2021).

These funding cuts or 'cycles of neglect and inequity' (Pascoe et al. 2005, p. iii) result in difficult decisions where education providers must make near impossible choices to allocate funds, with some disciplines given less priority than other subjects due to the perceived market need. This is prevalent within the arts and, in turn, music education (Pitts 2003). Many schools receive inadequate or barely existing facilities, including music technology; consequently, students and teachers receive fewer opportunities to gain experience (Eyles 2018). All of this has a knock-on effect on tertiary education in music. This uneven playing field is further exasperated by the disparity between public and private schools (Homan 2009). Government funding to the private school sector means parents are more

likely to be financially able to support learning with private tutors and technology in the home. These differences in funding and resources have created a three-tiered music education system: underfunded, basic minimum and well funded (Heffernan 2017; Pascoe et al. 2005).

Music subjects and instruction in schools has often been considered as a peripheral area of the core school curriculum and often faces funding challenges. As Karlsen points out, 'Our field has a long history of perceiving music as a threatened and vulnerable school subject, one that can easily be erased if politicians decide to do so' (Karlsen 2019, p. 192).

Limitations and policy settings can profoundly affect the students' voice, autonomy and agency. A one-size-fits-all approach neither accounts for nor helps ameliorate the variety of backgrounds, opportunities and experiences students display.

2.6 Student voice, autonomy and agency

Student voice, autonomy and agency are terms used to describe how students are empowered within an educational context. Agency is a complex and contested notion; the definition is hard to determine and endures as a point of contention among academics (Matusov, von Duyke & Kayumova 2016). In the context of this study, student voice, autonomy and agency are interpreted as ways in which students can assert their opinions as important stakeholders within the decision-making pertaining to their education.

A broad range of previous experience has been a challenge across many adult education sectors since at least 2001 (Brady & Allingham 2007; De Clercq, Pearson & Rolfe 2001). In addition, the backgrounds and experiences of music students can also be varied, which can affect their education and empowerment (Blackwell 2020; Cain 2011; Carroll 2017; Chan et al. 2015; Schiavio, Kussner & Williamon 2020; Sheldon & Gregory 1997; Southcott 2003; Watson 2016).

Arts and music education are influenced by neoliberal policies of limited and uneven funding, so it follows that experiences are varied and often limited (Brasche & Thorn 2016; Caldwell 2021). The National *review of school music*

education: *augmenting the diminished* (Pascoe et al. 2005) and the *Bridging the gap in school achievement through the arts: summary report* (Vaughan, Harris & Caldwell 2011) concluded that school music education is dependent on divisions of class. Only 23% of state schools provided music education; this rose to 88% for private school students (Pascoe et al. 2005; Vaughan, Harris & Caldwell 2011). Research and case studies 'reveal that even within the public sector, there is wide variation in the access, resourcing and delivery of music education and its associated benefits' (Brasche & Thorn 2016, p. 132). These reports were damning and strongly suggested the need for improved equity of access and opportunities for every student to participate and engage with music in school. Despite this, Brasche and Thorn (2016) note that 'in the 10 years since its publication there has been no increase in public investment into music education and a decline in preservice music preparation for teachers' (p. 124). This inadequacy of the provision of music education in schools affects students' readiness and experience in tertiary music courses, especially in music technology. As stated by Pascoe et al. (2005, p. 26):

From being a marginal activity 50 years ago, music technology has become one of the biggest shows in town and is involved in almost all mainstream music making. It impacts on all styles and genres and both schools and teachers need to address the knowledge and skills that are deficit in this area.

Students do not necessarily realise they have been offered limited time and resources and that what has been provided is too little to gain the required skills and knowledge. Brasche and Thorn (2016, p. 134) describe how lower investment and fewer facilities have become the accepted norm:

Australian parents, teachers and principals have been told repeatedly that the creative development of their child is an important educational goal of the system they inhabit, the reality is quite different.

According to Zack, Powell and Smith (2019), 'institutionalized music education has been structured in more or less the same way for centuries' (p. 212).

Historically, music has been taught with an overriding theme of reproducing excellence: students are taught to imitate and reproduce what has been created in the past (Gilfillan & Morrow 2016). This notion of excellence has become problematic due to the changes to the music industry brought on by technological advances and the splintering of roles within the music industry, meaning that musicians now hold multiple identities (Rowley, Reid & Bennett 2021).

One-size-fits-all learning does not acknowledge autonomy and creativity but is based upon imitation rather than innovation. Historically, education has relied upon hegemonic power and structures that limit autonomy, choice, creativity and voice (Powell, Smith & D'Amore 2017). Limited structures restrict students from their creative voice and education that is democratic, valuable and purposeful (Powell, Smith & D'Amore 2017).

AR Brown (2015) and Burnard (2012) implore the need to modernise teaching practices to reflect the needs of the 21st-century music industry and its musicians. More progressive pedagogies that involve ideas like student-centred learning, informal learning and autonomous learning are considered the way forward to empowering students (Green 2008; Lebler 2012; Tozman 2012). There is growing evidence that education should focus on production and creation, not imitation and reproduction. This leads to student creativity and innovation in an active, agentic sense:

Agency-based participation and education bring meaningfulness, excitement and humanity; while standards-based participation and education bring alienation, boredom and exploitation. (Matusov, von Duyke & Kayumova 2016, p. 442)

The democratising power of technology (Anthony 2020) can help to empower students by giving them skills that help them to be creative and have a creative voice. Placing recreation, leisure and enjoyment at the heart of music education helps students develop agency and autonomy rather than merely learning to reproduce information and 'compete' for grades (Powell, Smith & D'Amore 2017). A student-centred stance means allowing students opportunity, time and space

to link their creativity with emerging notions of who they are (i.e., their identity) (Powell, Smith & D'Amore 2017).

Students have more agency and power when working on their own material and end product (Green 2008). Autonomous, slow, supported (i.e., mentored rather than taught) learning nurtures these more progressive pedagogies (Powell, Smith & D'Amore 2017). If given the right time and resources, students can develop a more robust sense of agency and autonomy as students and creators through an increased sense of power (Creech, Varvarigou & Hallam 2020).

It seems that we know what it takes to create improved music educational outcomes but do not have the resources to do so (Brasche & Thorn 2016).

Deep or transformative music engagement through learner-centred activity goes a step further and helps learners recognize and understand something that is already in plain view and to use what they learn to make a difference to something that matters to them and their community. (O'Neill 2014, pp. 6–7)

2.7 Conclusion

The literature reviewed addresses many aspects that are relevant to this investigation. The seminal recording texts inform areas of learning that are traditionally associated with the recording of music. The discussions on the emerging interdisciplinary modern musician help to reinforce the notion that a change in thinking is required regarding the target audience of this recording knowledge and what areas are most pertinent. The information related to technology and music education shows the work being done in the more broad area of music education; however, it stops short of specifically examining how best to teach recording technology to musicians. The current research will add to the existing landscape by examining how we integrate recording technology education for musicians. A significant amount of the available literature in this area has focused on younger high-school students and how technology can help to engage and excite young musicians to improve their technical skills on their instrument or compositional techniques (Crawford 2008; Eyles 2018; Green

2006, 2007, 2008; Homan 2009; Schwartz 2010; Silveira & Gavin 2015; Waddell & Williamon 2019).

In conclusion, there is ample relevant information available on recording techniques, processes and equipment, which is mostly concentrated on informing recording engineers about the craft of audio engineering. The current research can use this information to guide curriculum design specifically for modern interdisciplinary musicians to learn the most relevant and useful areas of this craft. The last 10 years have observed emerging research on the uptake, uses, successes and pitfalls of teaching music technology, but this area is broad and covers many aspects, from electronic music creation to how technology can best support instrumental learning, music theory or musicology. Once the field is narrowed further to recording technology and musicians, there appears to be much less available research data. This is the area to which this research project will contribute.

Section 2.3 holds the key to discovering how best to implement the areas of recording technology most applicable to musicians, and many of the learning styles discussed are of great interest to this investigation. Determining how to resource and support this learning successfully seems crucial, especially for project units where much of the practical work occurs outside normal tutorial hours. These technical support considerations will be paramount to creating an efficient and smooth-running pedagogy for musicians learning to use recording technology at VU. The provision of facilities, time and resources are clearly influenced by political decision-making (see Section 2.4), and the review of literature in Section 2.5 outlines the decisions and effects of these budgeting choices.

Section 2.6 shows that students have a broad range of music experiences before commencing tertiary education. This broad range of previous and often limited experience can influence a student's subsequent education. The historical 'one-size-fits-all' education models are inadequate to ameliorate these different levels of experience. Newer models of student-centred learning, informal learning and autonomous, slow, supported learning can nurture more progressive and potentially more effective pedagogies. Furthermore, music-recording technology

can have a democratising effect, helping empower students through skills acquisition, autonomy and agency in creative practices that better match the needs of the 21st-century musician.

Chapter 3. Methodology

3.1 Methodological choice and justification

This inquiry uses a qualitative research framework, utilising a case study design to improve pedagogical practice by observing and reflecting on a specific teaching practice and curricular approach. According to Miller and Salkind (2002, p. 163):

The case study approach to qualitative inquiry is focused less on discerning patterns of the group and more on an in-depth description of a process, a program, an event, or an activity.

The inquiry is informed by a pragmatic and social theory of inquiry (Dewey et al. 2008) that seeks to understand and test the 'meaning and purpose' (Dewey & Ross 2008, p. 186) of sites of social practice to discover practical solutions to social situations and processes.

Pragmatic inquiry involves consideration of 'social amelioration' (Sorrell 2013, p. 811) that leads to a real improvement of circumstances for people in a given context, or as Patton (2015, p. 136) states, 'observing matters of interest in real-world settings to solve problems, improve programs or develop policies'. This research project aimed to enhance understanding and improve the experiences and opportunities for students in a local music education context. By seeking to comprehend the challenges and limitations of student learning within music technology, I wanted to address the kinds of social, cultural and economic challenges that participants faced in their educational experiences. Pragmatic inquiry allowed me to learn about the consequences of societal and institutional limitations and address some of the real issues that might be attended to by 'amelioration of social conflict' (Sorrell 2013, p. 810).

Social inquiry involves contemplating all factors in a given research context, including those 'additional factors' that may not ordinarily be attended to in investigations like this one (Sorrell 2013, p. 814). In this research project, pragmatic inquiry allowed for an investigation of the social, political, educational and economic conditions that have affected participants' experiences. In seeking

to enhance the understanding of students' learning and challenges in the recording stream, pragmatic inquiry led to valuable discoveries and contemplation of broader factors, such as education resourcing and the effect of historically structured power hierarchies and systems.

Pragmatic and social inquiry can lead researchers to understand and 'reconstitute' the meaning of practices (Sorrell 2013, p. 816). In the context of this research, practices may refer to general educational processes—schooling, curriculum, teaching and learning, educational resourcing and the like. Pragmatic inquiry can also warrant consideration of social, cultural and political processes, such as funding priorities and bureaucratic structures within government and institutions. These 'practices' often avoid scrutiny in strictly localised case-study research but may deserve rethinking. This project sought to understand why and how economic and political 'practices' affected music education experiences. This epistemology has allowed for some timely consideration of how educational practices might be reframed to improve circumstances and learning experiences for tertiary music students and meet challenges around resourcing, support and directions in music education contexts. This might be asking why and how limiting and unfair practices are 'justified' (Sorrell 2013, p. 818) and if, upon inquiry, they can be argued to be unjustified, then what alternative practices might be available for possible change.

Sorrell (2013, p. 822) states that 'pragmatic moral inquiry provides a reliable method for exploring and resolving moral problems'. My investigations into real people's lived educational and musical experiences have been grounded in the conception that challenges and limitations are morally problematic and that 'amelioration' (Sorrell 2013, p. 810) involves authentic, ethical reflection and action.

Qualitative research is suitable for building knowledge and appropriate for examining everyday cultural settings, and it allows an exploration of a range of viewpoints and ideas:

The strengths of the qualitative approach have resulted in a shift towards this type of research in educational settings. In particular,

educators have welcomed the richer and more varied insights into educational settings that qualitative research produces. The approach provides insight into the subtle nuances of educational contexts and allows for the exploration of the unexpected that cannot be accommodated in quantitative approaches. (Kervin et al. 2015, p. 34)

Qualitative methodology encompassing case study has been identified as a highly relevant and effective research approach ‘to find out what is happening in programs and other human settings’ (Patton 2015, p. 137). Therefore, this approach is appropriate and relevant for investigating specific teaching and curricular practice. Highly regarded music education researchers have used case study research methods to explore and reflect upon particular pedagogical and curricular practices in tertiary music contexts (see Burt & Mills 2006; Green 2006, 2007; Pitts 2003, 2012). The sample size of nine participants used in this case study was considered a manageable number of responses when transcribing interviews for master level inquiry and large enough to present themes and commonalities. Cohen, Manion and Morrison (2017, p. 375) observe that ‘rich description and details are often a feature of a case study’ and conclude that case studies have ‘a unique and distinctive contribution to make to educational research’ (p. 390). I wanted to deeply understand the situation, processes and experiences of the participants in the context of the recording class at VU Music.

Pelton (2010) surmises that research incorporates habits, methods and attitudes that are required to develop the traits of a reflective practitioner. The importance and significance of localised contexts of a particular university and its cohort should be acknowledged. Although many themes may be common among other universities, the most effective way to uncover practical observations on experience and implementation is to investigate the local context. Investigation into the local context underpins the decision to use a case study in my project. ‘based on the premise that local conditions vary widely and that the solutions to problems in both research and praxis cannot be found in generalized truths that disregard local conditions’ (Jenkins & Crawford 2016, p. 3).

A case in a case study is a bounded system, bounded by time and place, and the case may be a program, an event, an activity, or individuals. For example, the researcher might select for study several programs (a multi-site study) or a single program (within-site study). The 'case' may be a single individual, several individuals separately or in a group, a program, events, or activities (e.g., a teacher, several teachers, the implementation of a new math program). The 'case' may represent a process consisting of a series of steps (e.g., a college curriculum process) that form a sequence of activities. To learn about these systems, researchers collect multiple sources of information including observations, interviews, audio-visual material, and documents and reports. (Miller & Salkind 2002, p. 163)

3.2 Method

3.2.1 Participants and recruitment

The VU Music course is taught in Yarraville, in Melbourne's historically working-class western suburbs. The student cohort often contains members who are the first in the family to complete tertiary education; they are often from lower socio-economic groups and can include migrant and refugee communities with English as a second language. Many students have financial and family responsibilities and varied educational and musical backgrounds.

The recording class at VU was created after the review of student evaluation surveys from 2012 to 2015, which identified the need for skills in music recording. These data, combined with the knowledge of shifting industry trends and requirements and informal end-of-semester reviews with students, led to the creation and implementation of the recording class at VU in 2015. The Students Evaluation Survey only told part of the story, as the questions were not designed to elicit the required information. The current reflexive practice techniques in this area at VU have been a mix of considering formal responses from Students Evaluation Survey results and informal end-of-semester reviews with students and staff meetings. Staff felt the need to base the further development of this

curriculum area upon research findings and formal information from other institutions and practitioners in the field. This research was designed to formalise our reflexive practice and base our curriculum design on the most up-to-date information.

A non-random convenience sample (Creswell 2009) of nine participants (three who identified as female and six who identified as male) aged between 22 and 41 years participated in interviews. Participants were from the VU cohort and were alumni who had previously undertaken the recording stream of VU Music. Semi-structured, one-on-one interviews were conducted face to face and lasted between 30 and 45 minutes.

‘In many experiments, however, only a convenience sample is possible because the investigator must use naturally formed groups’ (Creswell 2009, p. 146).

Nine students comprise approximately 13% of the potential participants that have completed this new recording stream to date and includes a margin for students who cannot be contacted, do not wish to participate or lose interest after the initial consultation. This number of participants is similar to that reported by Voss (2016) from a similar-sized total cohort.

This potential participant group were identified due to their experiences with the specific teaching and curricular practice of these units; therefore, they were best placed to provide valuable and relevant information about this curriculum area. As stated by Kervin et al. (2015, p. 91), ‘the first thing is to identify the target population (the larger group of people that the researcher wants to generalize to) from which you will select your sample’.

An expression of interest document was created and emailed to all students who had previously undertaken the recording class at VU. Copies were also posted on noticeboards around the campus. This strategy failed to gather the number of participants required, so a second flyer with pictures and a more attractive format was created, emailed and posted to noticeboards. This approach secured the required number of participants (see Appendix 1 and 2). Once the expressions of interest were received, participants were emailed an information sheet (see Appendix 3) and were followed up a week later with a consent form (see Appendix

4). Once these signed consent forms were received, an interview schedule was created and communicated to the participants. Pseudonyms were allocated to each participant to protect their privacy.

3.2.2 Data collection procedures

Data were collected from participants in February and March 2020 via methods that are consistent with the case study design, according to Creswell (2009), Kervin et al. (2015) and (Merriam 2014). In-depth, semi-structured interviews were conducted face to face and recorded via a laptop and phone backup. Questions were designed to elicit how students have experienced the implementation of recording projects into practical music units. A series of set 'global questions' (Kervin et al. 2015, p. 94) are posed verbally to participants and are followed up with 'prompting questions' (Kervin et al. 2015, p. 94) to clarify points and expand upon answers. The first question was always the same, but interviewees were then guided through the questions depending on the natural direction and order of the interview to keep the interviews informal and a true reflection of the respondent's experiences.

According to Kervin et al. (2015, p. 94), global questions comprise three subtypes:

Grand tour questions:

these questions are general and allow for participants to respond to what is being asked in their own words.

Typical questions:

these questions enable participants to talk of the ways events usually occur.

Specific questions:

these questions focus on specific events or phenomena.

These initial questions were then followed up with 'prompting questions'. According to Kervin et al. (2015, p. 94), 'prompting questions allow the researcher to gain further information about what the participant has said. These encourage the participant to reveal additional information about what is being discussed'.

Interviews are a valuable way to engage in conversations with students about their perceptions of embarking on and completing recording projects within the context of practical music units in their degrees (Voss 2016). The interview technique was guided by that described in Kervin et al. (2015) to show a genuine interest in what the participants were saying, physically acknowledging their responses and asking pertinent follow-up (prompting) questions:

Good interviews are those in which the subjects are at ease and talk freely about their points of view. Good interviews produce rich data filled with words that reveal the respondents' perspectives communicates personal interest and attention to the subject by being attentive, nodding his or her head, and using appropriate facial expressions to communicate. (Kervin et al. 2015, pp. 77–78)

Semi-structured interviews with music teachers and pupils, including field notes of anecdotal evidence from informal conversations with music staff, were also used to cross-reference and contextualise the data and inform the interview question design. This approach is described by Creswell (2009, p. 164):

Qualitative researchers typically gather multiple forms of data, such as interviews, observations, and documents, rather than rely on a single data source.

3.2.3 Applied data analysis

Applied data analysis has been undertaken in this project by transcribing transcripts and then reading and re-reading. Logico-inductive analysis (Kervin et al. 2015, p. 123) of interview transcripts was employed to code the data into general categories. Then each transcript was investigated further to identify common themes, patterns and differences. Analysed data were used to explore and answer the initial research questions and make recommendations for effective design, implementation and incorporation of recording technology into practical projects in a tertiary music degree.

The data analysis process outlined by Creswell (2009) was followed. This process involves six steps:

1. Organise the data for analysis.
2. Read all the data to obtain an overall picture and reflect upon the holistic meaning.
3. Conduct analysis based on the theoretical approach and method by coding or organising related data segments into categories.
4. Formulate a description of the setting or people and identify themes from the coding. Search for theme connections.
5. Present the data in a research report.
6. Interpret the larger meaning of the data.

Voss (2016) used thematic analysis successfully to reveal commonalities and recurring themes in a context similar to this inquiry. Participant answers were analysed for common themes on how to best resource and support studio recording projects for musicians. These highlighted themes were used to drive design principles for the online LMS that supports students with technical equipment and software resources. Thematic analysis was utilised as it is best suited to exploring and highlighting opportunities to improve the student experience. Voss's study was set within an Australian tertiary music course, like the current investigation. However, the current study differs from Voss (2016) in that Voss was only concerned with the online LMS system as opposed to incorporating recording technology into practical project-based music units in a contemporary tertiary music degree.

3.2.4 Validity, reliability and trustworthiness

Validity, reliability and trustworthiness in research concerns authenticity and ways of establishing truth (Golafshani 2015). In qualitative research, terms such as credibility, transferability and trustworthiness are used to describe validity and reliability (Golafshani 2015).

I acknowledge that I potentially bring bias to the study that could manifest in several ways during data collection and analysis. Creswell and Creswell (2018, p. 260) state that:

Inquirers explicitly identify reflexively their biases, values, and personal background, such as gender, history, culture, and

socioeconomic status (SES) that shape their interpretations formed during a study.

I am a 51-year-old white male from an English background with a middle-class upbringing from working-class parents. Heralding from this relatively privileged background could influence what I perceive as adequate regarding the opportunities and support provided to students in this area of their learning. I needed to consider how my background differs from the respondents' and ensure that the questions I asked were suitable for participants with different backgrounds. Being mindful of these potential biases allowed me to concentrate on what was said in the raw data and to look for patterns and themes explicitly supported by the raw data. I have been a musician and sound engineer for more than 20 years and have taught in this area at various institutions for 15 years.

I have existing relationships with the participants in this study; I was one of their teachers for three years before they completed their studies and were subsequently participants in this research. This previous relationship could influence what the participants say, as they could, for example, feel a need to be overly positive in their responses. At the end of each semester of recording class, there is an informal review where the students and I discuss what went well and areas that could be improved upon. This reflexive practice encourages honest dialogue that can potentially help to elicit reliable data as the students have previous experience and confidence in this kind of reflection.

When conducting interviews, there is a need to ameliorate 'any power relationships between the interviewer and the interviewee' and to help participants 'feel relaxed' during the process (Kervin et al. 2015, p. 77). The interviews were conducted in a meeting room at Kindred Studios that was separate from the teaching spaces of our usual interactions to provide a more neutral setting. Each interview began with an opening statement to reinforce that they were no longer my students, their identities would be protected via pseudonyms, and I was interested in their honest responses solely to learn about their experiences as former students of the recording class.

The use of open questions and non-judgemental verbal and physical reactions (body language and facial expressions) from the researcher during the interviews aims to enable the participants to be open and honest in their responses. The use of audio recordings of the interviews helps to ensure that the raw data captured is a true record of what was said. Listening, transcribing, reading, re-reading, comparing and checking the raw data allows confidence that the interpretation of participants' meaning is correct.

I have taught the recording class at VU since designing and implementing it in 2016 (for further information, see Section 1.2). This previous experience could have influenced how the interviews were constructed and guided and how the data were interpreted. Teaching the class and reflecting on its effectiveness each semester has no doubt informed my opinions of areas that are working well and areas that need further attention, resulting in the forming of a bias. In fact, this reflexive practice has purposefully driven changes to the curriculum and activities before this research study. Creswell and Creswell (2018, p. 274) assert that 'good qualitative research contains comments by the researchers about how their interpretation of the findings is shaped by their background, such as their gender, culture, history and socioeconomic origin'.

The language used in questions and follow-up prompts could be influenced by my inherent bias. I have been careful to use neutral language that is not 'biased against persons because of gender, sexual orientation, racial or ethnic group, disability, or age' (Creswell & Creswell 2018, p. 153). The questions were checked for this bias by my supervisor before conducting interviews, and relevant changes were made to maximise neutrality with clear and appropriate language. A trial interview was conducted with my supervisor before interviewing the participants to practice techniques to elicit information. I was encouraged to ask more follow-up questions, seek the 'why's and the 'how's and delve deeper to gain richer descriptions and insights that would help to create a fuller picture for data analysis. It was also suggested that I employ 'member checking' (Kervin et al. 2015, p. 79) by intermittently providing interviewees with a summary of their responses, when appropriate, so interviewees could check and clarify whether what they said accurately described what they meant.

Response bias 'is the effect of nonresponses on survey estimates, and it means that if non respondents had responded, their responses would have substantially changed the overall results of the survey' (Creswell & Creswell 2018, p. 335). Using semi-structured face-to-face interviews allowed non-responses to be further probed by reframing the question or using additional questions to reveal answers or reasons behind the initial reluctance to respond.

Merriam (2014) describes external validity or transferability in qualitative research in terms of the degree to which findings can relate or be applied to other situations. I was interested in understanding the experiences of this relatively small sample size in a rich and detailed way, to 'understand the particular in depth, not to find out what is generally true of the many' (Merriam 2014, p. 224). Further, Merriam (2014, p. 227) states that:

When rich, thick description is used as a strategy to enable transferability, it refers to a description of the setting and participants of the study, as well as a detailed description of the findings with adequate evidence presented in the form of quotes from participant interviews, field notes, and documents.

Transferability relates to how the research results can be 'transferred' to other settings (Denzin & Lincoln 2008). I have thoroughly described the context and setting of this research to enable readers to make informed judgements about the appropriateness of any potential transfer of the findings to a new or different context or setting.

Trustworthiness can be enhanced through 'prolonged engagement and persistent observation' (Denzin & Lincoln 2008, p. 272). The participants of this study were gathered from ex-students who undertook the recording class in their second and third years of study and with whom I have built solid trust and rapport over that time. This has helped to elicit detailed, honest and considered responses to the questions posed.

In this qualitative case-study research, I strived to ensure that the data collected and the findings presented credibly represented what participants said in the interviews. When discussing credibility, the role of bias must be considered

(Kervin et al. 2015), in this case, the researcher's bias. This bias can manifest in creating questions that may lead the respondent in one way or another and in how the data are interpreted. This acknowledgment allowed me to remain conscious of this bias and avoid steering questions in a certain way or coercing participants' answers to meet a preconceived narrative rather than answering freely and honestly. During analysis, this awareness, along with the 'triangulation' of data collection (Merriam 2014) from recordings and previous end-of-semester reflections, helped to allow the interviewees' voices and stories to form naturally and rise to the surface by constantly looking for proof in the raw data to support themes and assertions.

3.3 Ethics

3.3.1 Ethics approval

Ethics approval was sought and obtained from the Low Risk Human Research Ethics Committee at VU. Provisions were included to avoid exposing the participants to negative psychological effects by carefully explaining the reason, scope and intended uses of the research to the participants. Participants were informed that participation was voluntary, confidential and could be terminated at any time, and they were not required to discuss anything that made them feel uncomfortable. Participants' names were changed to protect their privacy in any published data. I am aware of the VU ethics guidelines and used the VU templates for the participant information sheet and the consent form as communication tools for initial participant consultation.

3.4 Occupational health and safety risks

3.4.1 Identification of hazards

There are hazards associated with any human research, such as exposing the participants to negative psychological, social or workload stresses. Ensuring good communication between the researcher and participants in the areas of confidentiality, consent, intended uses of the research, timeline and expectations help to minimise the associated risk (Ross et al. 2010).

3.4.2 Assessment of risk

The risk associated with asking questions of the participants could manifest in them feeling pressured to give the researcher what they assume is required, feeling pressured to participate, feeling too busy to continue, fearing a breach of confidentiality or any combination of these feelings. The perceived power imbalance between the participants and the researcher might be amplified because the researcher was the participants' teacher. Keeping the interviews as informal as possible and allowing the interviewees to tell their stories in their own order, with minimal prompting to ensure that the important areas questions were covered, minimised this risk. No risk was not apparent or raised by any participants during the process.

3.4.3 Safeguards and controls

Applying for formal ethical approval and using the communication devices provided to clearly communicate the purpose, confidentiality, timeline and expectations of the research project to the participants safeguarded them and minimised risk. Careful and constant review of the role of the researcher throughout the process was conducted to maintain the balance of power between the researcher and the participants. The wellbeing and safety of the participants was considered at all times. Participants were reminded that they could take breaks or even discontinue interviews if they wished, but this offer was not taken up apart from the occasional refilling of drinks bottles. All participants were instructed that they could terminate their participation at any time without explanation. All participants were informed that they would be de-identified in any publication of the data.

Data were backed up daily onto a password-protected USB for daily backup and monthly onto a hard drive via Mac Time Machine. Only personnel directly associated with the research project have access to this material.

Chapter 4. Results

4.1 Data presentation

This chapter presents the data collected from participants, starting with the participants' general music experience, musical preferences, previous experience and opportunities in recording, thoughts about recording and what they thought they needed to learn, and a summary of participants' backgrounds. The data on participant experiences of formal recording study is then presented, including their aims; the different levels of experience and its effect on learning; the space, time and equipment provided; the areas and outcomes of learning; and the style of teaching and learning that occurred in the class. The chapter concludes with suggestions and ideas for improvements to the recording class.

4.1.1 Participants' backgrounds

This section discusses the backgrounds of the nine participants, all of whom are graduated ex-students. Ricky is a 25-year-old male singer–songwriter and guitarist with a folk, jazz, roots and world music background. Jackie is a 32-year-old female keyboard player with a classical background and interests in jazz and pop. Ron is a 25-year-old male drummer and guitarist interested in rock, metal and hip hop. Dan is a 28-year-old male singer–songwriter and guitarist interested in rock, electronic and experimental music.

Hally is a 22-year-old female singer–songwriter and keyboard player interested in folk, indie, gospel and soul. Yumi is a 24-year-old female singer–songwriter interested in garage, punk and rock. Hamish is a 28-year-old male bass player and songwriter with a rock and metal background. Frank is a 41-year-old male singer–songwriter and guitarist interested in rock and pop. Finally, Ian is a 26-year-old male trumpet player, bass player and singer–songwriter interested in reggae, jazz, rock, country and folk.

4.1.2 General music experience

Participants related a broad range of formal and informal musical experiences. Participants undertook school and private music lessons (the latter often

encouraged by parents), played in amateur bands with friends, sang in churches and explored music by themselves. Hamish recalled an experience common among participants of 'playing a few high school bands and then a little local band' in Wollongong, where he grew up. Another familiar story among participants was encapsulated by Ian, who:

Started playing trumpet in year 7, got a music scholarship at high school and started out doing orchestra ... and I was getting private tuition and then a few years later I was a founding member of our school's jazz ensemble.

All participants had experienced some previous musical activities to reach the level of competency required to undertake a Bachelor of Music.

4.1.3 Musical preferences

Participants expressed various musical preferences, from jazz and folk to punk, ska and metal. A theme of expanding their listening throughout the course was apparent. Hally noted:

I really don't listen to the radio that much anymore. I find they're all pretty yeah snooze worthy but indie folk soul I like and I like writing in these genres as well a bit of country yeah pretty much any everything except for heavy metal.

Frank stated:

I was narrow minded I guess ... I just basically was all guitar drum bands before I came in here, it was all into Foo Fighters and Green Day and Deep Purple and ACDC, your old school rock and then your kind of more-modern rock like even a softer rock with Chili Peppers ... that was my interest in music.

4.1.4 Recording experience

The previous recording experience of the participants is an important area of investigation. Knowing what level of skill and how familiar with relevant topics the

participants were when initially embarking on recording study would help to inform future curriculum design.

Participants reported a variety of recording experiences. One of the nine participants had no recording experience and had only ever played their instrument live or in a rehearsal or practice environment. Three of the nine had been informally recorded by someone else, either at a live gig or at church, but had not been involved in the recording process, apart from performing on their instrument or with their voice.

Two of the nine participants had made music on a computer—not necessarily involving recording an instrument, but rather programming sounds or using loops to create songs in software programs like GarageBand. Participants noted that this experience was useful for the software aspect of recording and had given them confidence so that they could understand the general idea of the software elements of digital recording.

Five of the nine participants in this investigation had various levels of experience with amateur recording, such as self-recording on a phone or camera or recording a demo at school or through a youth group. Two of the nine participants had experienced recording as part of gigging, at a studio or even through informal amateur connections where ‘my friend has a microphone and laptop’.

Hamish and Dan had extensive recording experience, playing on two or three albums accompanied by a growing interest in how their music was being recorded and mixed. Hamish explained his previous recording experience:

Very much just a muso being recorded but I was also very interested in how it all worked ... it did give me a little bit of knowledge coming into when I actually did do recording here at VU.

Frank had a similar story of relying on others to record his band and, thus, having limited input and control over the recording:

With my cousin having control over all the recordings in the past I didn't know how to record myself, yep I had an idea but I didn't know how to do it properly.

Most of these experiences focused on the performance role rather than understanding or learning the principles, techniques and processes involved in recording music. A recording engineer generally managed the technical aspects of these recordings, although some participants had picked up on various techniques, equipment and process-related components of recording along the way.

4.1.5 Music education

Seven of the nine participants had undertaken some kind of formal music education before commencing the VU Music, and music lessons in high school were a common starting point for their formal music education. These lessons involved a range of efficacy, from a well-organised curriculum and skilled music teachers to less organised and focused music appreciation classes. Three participants in this investigation expressed frustration at having to learn classical repertoire and what they perceived as old-fashioned songs, while others had the chance to explore more-contemporary repertoire with school performances and recording opportunities.

Ian noted that he 'got this kind of mixed background of classical and having to learn everything by ear which I really like' while he was also able to begin playing bass, piano and singing as part of his high school music program. Hamish had a similar background of starting on a classical instrument and moving into more-contemporary styles: 'I started on the flute, switched to bass guitar in high school and then kind of throughout high school'.

Three participants had started or completed Certificate II and Certificate III courses in music, and one had completed a Certificate IV course in music recording and business. Again, there was a broad range in the perceived quality and value of these experiences. Jackie had a classical background throughout high school but completed a VET (vocational education and training) course that opened up the possibility of a more-contemporary music education:

I got introduced to the contemporary course through Southern Cross University because that's where I did my media course and we used to have to film the music students performing every week.

4.1.6 Education opportunities in recording

Formal education in music recording at the secondary school level is uncommon. Basic recording software, like GarageBand or REAPER, is regularly embedded in music classes or individual music lessons, often as a tool for furthering instrumental skills.

Only one participant, Hamish, had undertaken any previous formal recording education; his education was part of a Certificate IV in music. He felt the course was taught at a very basic introductory level but was useful in conjunction with informal recording projects that he was undertaking at the time. Hamish recalled:

So, I did a TAFE course at Kangan Institute ... a recording class ... so I had a bit of an understanding of Pro Tools and stuff ... then also recording with (my band) a bit we did some home recordings ... I was never engineering any of our stuff but I had an insight and I had opinions on how to mix stuff ... like the mix I understood a bit about mixing and stuff.

4.1.7 Participants' thoughts about recording before study

Somewhat surprisingly, participants had either not really thought about how music was recorded or had been overwhelmed by the technical nature of recording and the specialist equipment. Even the participant with the most recording experience had concentrated on their instrumental part and how the quality of performance and sound affects the quality of the final product. Hamish stated:

I'd never thought about it really at all, like the ins and outs of it, the technical side of it ... how different mics and different rooms and stuff could affect a recording. I've never thought about what made a recording sound a certain way or like why it might speak to me in

any way yeah so going into it setting up and I've never seen a set-up before ... it makes you think more about how you're playing especially dynamically ... if you're playing inconsistently then the mixer isn't going to have as good a signal to work with ... Yeah and I think it is important to have good-sounding bass on recordings.

Jackie felt apprehension and overwhelmed by the technical nature of recording and the equipment, including setting up and understanding the functions of the equipment. Jackie took some solace from drawing some basic parallels to her experience of video recording in a previous media course.

Ricky reflected on physics and production principles, noting that he had no previous experience recording in a bespoke studio space before and was unaware of the effects of sound treatment and room dimensions on reverberation and tone.

4.1.8 What participants thought they needed to learn

Participants thought they would cover a broad array of topics as they contemplated undertaking the recording class. Those with previous recording experience had recognised specific areas for which they required more information or practice. These can be categorised into four main areas: basic principles of audio (including the basic physics of sound), how to use the recording equipment (software, hardware and routing), mic choice and positioning, and mixing techniques and tools.

Dan had some previous recording experience, mainly as a performer, but he had started taking an interest in how his sessions were being recorded. Thus, he had areas that he knew required further investigation:

I had a pretty good idea of what I needed to know from all the previous recording I did. I addressed some of them. With mixing, just the more sophisticated types of mixing like compression and limiters things like that, it's like I get what it does, I don't understand the complexity of it and exactly what every dial does.

Hamish succinctly expressed what many others had said regarding learning how to use the equipment: 'I needed to learn how to use that desk for sure'. A more specific request based around their particular instrument, but still pertinent to the mic choice and positioning heading, was the desire to learn how best to record the instrument or instruments they play. Hamish was unaware of techniques to record multiple signals from his bass guitar through a DI box and a mic on the speaker cabinet. He also wanted to learn 'effective isolation techniques when you've got a limited space'.

Frank was mainly the performer in a recording scenario, but this gave him many areas to consider gaining further knowledge. He had identified needing to learn about mic choice, signal flow, software knowledge, techniques like editing and compiling and general mixing processes. He stated, 'I knew like I had an idea for all that stuff but I didn't know how to do it, I knew that was stuff that I needed to know'.

Those with less recording experience had fewer specific expectations. Ron wanted to understand all instruments and how they work together in a recording: 'I didn't really know anything about recording, I was willing just to take on anything and everything'. Ricky mentioned more-general areas in which he wanted knowledge: 'different mic positioning ... understanding of the programs ...how to mix that was a big, big thing'.

Jackie had no recording experience coming into the course. This was highlighted by the general nature of what she perceived she needed to know: 'I came in with not being able to even use the desk in the practice room, there's a lot of buttons yeah it's very scary'. Coming from a purely classical background meant that Jackie had little or no practical experience plugging instruments into amplifiers or adjusting volumes on a mixing desk or public address (PA) system. All of the other participants had some experience amplifying their instrument, either by plugging it into an amplifier or connecting their vocal mic to a mixing desk. Jackie's initial focus was to obtain a general idea of how contemporary instruments work before understanding how to record them. Her aim in the 'initial stages was to get more of a grasp on like the tech side of everything especially in contemporary because you always plug everything in'.

The recording curriculum focuses on the process of self-producing a recorded work, including recording a basic demo, reflecting upon it, planning for a final recording, laying instrument and vocal track as required, and editing and outputting a basic final two-track mix. It does not involve the initial songwriting, but, in practice, it is common for substantial rewrites, changes and additional sections to be added between the demo and final recording stages. The aim and expectation of the recording stream are to give musicians an understanding of a basic professional recording process and impart the skills and knowledge necessary for them to record demos of their musical works for the chronicling, communication of ideas and promotion of their art. It also gives students the experience of recording in a studio environment as an instrumentalist or vocalist.

4.1.9 Summary of the background of participants

The VU Music student cohort arrives with varied life experiences (including refugee, migrant and lower socio-economic backgrounds) that provide rich material for self-expression and storytelling (Aronson 2016). Participants' backgrounds are broad and varied, and this theme flows throughout the various questions about their previous experiences. Seven participants had at least some fundamental musical knowledge through either school, TAFE music lessons or private tuition, and two were self-taught or played in bands with friends. Eight had little or no formal recording education, and only two had experience recording in a music studio. There was some fear and trepidation towards the specialist equipment and music technology in general, especially among the less experienced. Participants relayed a general opinion that learning about recording was important, but they had not given much thought to how professional recordings were achieved. The benefits of learning these processes and techniques were widely acknowledged. Seven participants mentioned the potential positive effects on their musical progress and careers, especially in autonomy, creativity, innovation, collaboration, power, control and confidence.

4.2 Participants' experiences in formal recording study

The following section provides information regarding participants' experiences while undertaking the VU Music recording class. It investigates the participants'

aims and reasons for undertaking the class; the students' different skill levels and potential effects on their learning; the space and number of students; and the equipment and time aspects.

4.2.1 Aims and reasons for undertaking the class

Seven of the nine participants had similar aims for undertaking the recording class. They wanted the ability to record their own music from start to finish to understand the entire recording process better and have an original end product of their own work and creativity.

Seven of the nine participants' aims were tied to the bigger picture of what they wanted to do with their musical careers—either to learn skills they would build upon in the future or to create a product to develop their portfolio of work. Ron stated, 'recording music is going to be what I want to be my life and you know get original music out there, so I need to have an understanding'. Dan also had aims related to outputting a product to further his career: 'I knew that I would probably do an album and so I always knew I was building up to that point'.

Ricky felt that this lesson would be a good introduction to a lifelong learning process of recording. He stated, 'I wanted to be able to record at a semi-professional level I guess, just to have an understanding of how to do that yeah even if I don't like actually do that right now just have the platform to learn how to do that'. Hamish recalled, 'well I wanted a usable recording of [his original band]'. Hamish also spoke of the importance expanding his current mixing skills.

More specific stuff about mixing like I was pretty interested in compression and EQ [equalisation] and stuff like that. I had an understanding of it but not how to necessarily make it sound good for the music ... I knew what I wanted, I knew I could record the song, I didn't know as much about mixing so I wanted to give myself more time to get to you about the mixing process.

Yumi also wanted more input into the overall sound of her music. She identified that this would evolve with a greater understanding of the recording and mixing process:

I really wanted to have a say because with the band we've been recording ... everyone really could say different opinions and I wanted to have more of a say because I just wanted to understand, and I wanted to contribute in making it [the recording] better ... I'd like to know what kind of effects I can do to like and to mix it how you like turn different parts down or make different parts sound a little bit different. I wanted to know how to help clean it up in the program and to know the equipment better.

Four participants aimed to use the recording class to learn practical skills for creating an audio recording. The audio recording would either be the incarnation of a songwriting or arranging task or the product for a project unit that may involve topics like artist promotion, a music video or grant application. Ian planned to tie the recording class into other subjects within the course:

I really just wanted my own song ... because in first semester of second year my solo performance project was to write three original songs and I did that, and then my plan for the rest of my time was to record each of them and I did that you know awesome. So, I just really wanted to come out with something of my own so my own original work like made completely by me.

Jackie had also realised that the recording class could be used to reinforce and put into practice skills from other areas of the curriculum and to give her the freedom to be able to record music at home:

I just wanted to be able to record a song first up but then I realised like I could use this, I knew more information then to go out and buy like a cord for my keyboard to go into my computer and I could start recording stuff at home which then led to my studio project as well and mixed in with everything that we were doing in uni and yeah that's been really handy.

The aims for undertaking the recording class varied, but seven of the nine participants described reasoning based around acquiring the skills to record their own musical ideas for communication to others now or in the future. Many

expressed that they considered these skills essential for their musical career development.

4.2.2 Different levels of experience and skills and their effect upon learning

Eight participants commented on the different levels of experience of students undertaking the recording class. Three described how this affected their learning throughout the semester. The more-experienced participants generally mentioned that the broad range of experience levels negatively affected their learning within the class. Hamish commented that:

Because you've got such a large array of like experience levels in the class like some people have never been into a recording studio before it's tough to really give any solid criticism on that without being like okay you've got to only select students of a certain experience level.

Three participants noted that the curriculum was aimed more towards the lower experience levels. Although repetition of practical tasks, for example mic'ing up a drum kit, was necessary for some students, others would have preferred to move on to more intermediate skills and topics related to mixing. Hamish commented:

You've got to teach to kind of the baseline ... so I didn't feel like I was getting as much out of it towards probably the second half of the semester as I could have.

Ian summed up this sentiment, saying:

I think for the less-experienced students they want to spend longer in the studio but for when you become a bit more adept at it you kind of wouldn't mind just spending like four weeks in the studio then just get up to the labs.

Three participants commented on the usefulness of one-on-one mixing advice and instruction in the second half of the semester and how more instruction in

this area, as opposed to track laying, would be most beneficial for the more-experienced students.

The perceived lower level of organisation, instrumental skills and commitment from some students were also mentioned as detrimental to their progress. These comments were often related to the time that this took up, for example, in the number of takes required to obtain an accurate instrumental or vocal line recorded. Dan noted, 'I think that when you get a room full of people at entirely different points in their life and in their musical progress certain things just don't line up, like maybe some people don't prioritise time correctly'.

The less-experienced participants generally needed the repetition of practical exercises and found this to be a positive and rewarding process. Hally considered this a double-edged sword that is both rewarding and potentially frustrating, depending on your experience level:

We would go over mic'ing a drum kit five times or until people were comfortable doing it and that was something that I really liked but then there were times where I was like I wish we could do something else.

Some participants felt overwhelmed or lost when the more-experienced members of the class led the conversation and questions into more complex recording theories and practices that they were not yet ready for. This resulted in one participant often leaving answering questions or volunteering for practical elements to the more-experienced members and, thus, reduced their engagement with the class at times. On this topic, Ron described:

[His] lack of confidence I suppose you know and, in my mind, I'll be like, I'm inexperienced I'd rather someone else do it that's going to ... get through the process quicker.

Conversely, another less-experienced participant found it helpful to have more-experienced students in the class to ask questions or work with to gain confidence, especially outside class hours when teachers were unavailable.

Having a song already written and ready to record was stressed as an informal prerequisite before signing up for the recording stream, this was not always adhered to. In almost every case, this held back that student's progress and, on occasion, the class. Problems relating to songwriting and basic song structure needed to be discussed and ameliorated before moving on, which took valuable time that would be better spent on recording and mixing techniques. On this topic, Ian stated:

Well you always say don't come into this class if you don't know what you're doing, if you don't have anything [a fully written song] ready don't try to write here at the start of the semester have it rehearsed already, have it just ready to record by the start of the semester.

Participants' different levels of experience affected individuals' learning in different ways, depending on whether they were in the more-experienced or less-experienced category. A two-tier level of previous experience seemed to emerge: those with no real experience required more repetition of basic concepts and time in the studio tracking, while participants with some experience generally grasped the basic concepts of tracking but wanted to develop more in the areas of mixing and post-production. The current 'one-class-fits-all' approach often caters more to the lowest common denominator; thus, its effect on learning is most felt by the more experienced. It was also mentioned that the practical nature of the class offered the opportunity for a deeper discussion of related topics by the more-experienced students while the less-experienced students conducted the tasks.

4.2.3 Space and number of students

The recording class is currently an 'opt-in' variation in the Practical Music subject in the second and third years, where students can choose to undertake a recording project instead of a live performance. Numbers are limited to a maximum of approximately 15 students per semester due to the size of the studio facilities and the practical nature of the class.

Five participants mentioned that although the class size was small compared to other classes and subjects, this could still be reduced further to provide more one-on-one instruction specific to the project and the students' skill level.

Hamish commented that including more classes related to recording in the course would be beneficial, and although the class was not large compared to other subjects and classes in the course, it was fully subscribed. In his opinion, 15 was the maximum number of students that could effectively use the available studio space:

More contact hours in actual recording which I know may not be a viable option, and smaller classes basically yeah ... it wasn't a large one but it was maxed out, so 15 [students] probably.

Dan and Frank voiced concerns about the number of different people using the main recording studio and how this affected its availability. They suggested creating more facilities to help ease the pressure on the studio or limiting its use to those who need the studio for an assessment.

Seven participants discussed the space and the number of students using it. They appreciated that the current class size was small compared to many other classes they undertook but still stressed the importance of more one-on-one time to listen, discuss and implement changes to their process or mix.

4.2.4 Equipment

Four main themes concerned equipment: the number of facilities available, the quality of the existing soundproofing, overcoming problems when using the equipment outside class time, and damaged or faulty equipment.

Seven participants noted that it was essential to have a professional soundproofed recording studio, and the current arrangements could be improved by increasing the number of studios (there is currently just one studio) and the quality of the existing soundproofing. Two participants also mentioned the negative effects of damaged or faulty equipment. Hamish stated:

It's nice to have access to an actual studio and learn how that works and all the mics and stuff ... I think we used almost every single channel except for the one that didn't work and so there's a lot to go wrong ... so yeah you know every single time you go to record,

something doesn't work and there's so much shit going on ... I'd say yeah probably mostly just damaged gear.

Ricky recounted how the quality of the current soundproofing was substandard and how that affected the quality of the recording and concentration. Jackie raised an issue, which was also echoed by another participant, about accessing technical information and advice on using the equipment outside class time when the teacher was not present:

Yes, because we were googling some stuff at times that first semester. I did it to try and figure out what we may have pressed or what was on but we couldn't figure out the desk.

The number of available facilities was a recurring theme throughout the interviews (see Section 4.2.5). Four participants suggested that more equipment or another studio space would help to alleviate booking congestion.

Frank also noted that having his own equipment at home helped alleviate booking congestion issues, but he also needed the specialist equipment in the studio to be able to make accurate decisions on how his recording sounded:

I find it really helpful having my own set-up at home ... a real massive advantage ... but again having the right speakers to play it back, I had to come in here.

4.2.5 Time

All students commented on the time allocated to the recording class. Seven participants felt that two hours per week for 12 weeks was far too little to learn what they felt they needed to understand in the vast area of recording. Hamish noted that 'it's not easy with two hours a week ... for such a complex activity'. Yumi reported similar experiences: 'you could do recording you know for your whole time here and you still won't learn everything'. Dan felt that he needed more than one semester of recording to reach the skill level that he desired: 'I think that only doing recording once wasn't enough to develop my skills enough to make those recordings something I'm really proud of'. However, he still

considered this a valuable stepping stone to gathering the skills and knowledge he deemed vital for his career: 'yeah it was just like a good experience to like get over another speed hump'.

Six participants talked specifically about time constraints when booking the recording studio facility. They concluded that one studio running 12 hours per day could only offer a finite amount of time per student when multiple student cohorts use the facilities. Ian noted that 'halfway through the final semester ... we had to institute a cap on the time you could hire out the studio for'.

Interviewees noted that multiple cohorts used the studio for classes, and students booked it to complete their work. This made it difficult to schedule their recordings, especially towards the middle and end of the semester. Hally mentioned the oversubscription of the studio and how some students were recording at home because they simply could not book time in the studio: 'there was just not enough time, people were having to record at their house'. Many participants echoed these sentiments, and numerous suggestions were provided about creating more recording facilities. These will be expanded upon in Section 4.3. Dan spoke of a general understanding among students that:

Everyone knew that by the end of semester bookings would be hard but no one anticipated it would be as hard as it actually was, like we all needed so much more by the end. I think if there were more facilities it would be a lot easier.

Themes about personal time management and organisation emerged in many interviews. Allowing time for experimentation and problem-solving in the studio had generally not been fully considered by participants; this added to the overall feeling of not having enough time. The project management skills required to achieve a smooth and successful recording in a short time felt like a steep learning curve for most participants. Jackie stated:

I probably should have started recording a lot earlier ... that's a big lesson to learn you have to schedule a lot more time because ... things can go wrong.

Ron had a more pragmatic approach to the booking bottleneck and the opinion that if students were organised and booked the studio time early in the semester, they would not encounter problems around studio availability. However, he was the only respondent to hold this opinion.

Dan spoke of the idiosyncratic nature of recording projects and how that requires individual, one-on-one feedback and bespoke instruction tailored directly to that particular recording project and situation. Allowing more time for individual feedback was considered highly valuable by Dan:

This very specific thing that might take like a good 20 minutes of listening to actually nail, that's when you're busy with the other 20 students who are now also at that point. Yeah and now everyone needs that 20 minutes, it's like well we're only in like one two-hour class and that was kind of hard.

Most participants considered time allocated for recording within the course an important factor in their understanding and development as recording artists and musicians. They felt that more time would allow for a more-thorough understanding and experience of the necessary skills and techniques relevant to them as musicians to record and mix music. Three respondents felt that some areas covered briefly in recording class (e.g., the basic physics of sound or basic software instruction) could be further embedded into other classes within the course. This would allow more time for topics directly related to using the studio or mixing.

4.2.6 Areas of learning and scaffolding in the recording class

This section concerns the areas of learning contained within the recording class and the scaffolding of content, skills and knowledge from other subjects within the curriculum that are intrinsically linked to the recording class.

Participants commented on the various learning areas contained within the recording class. The main areas of learning respondents raised were: the basic physics of sound, signal flow and routing, mic types and uses, Pro Tools software,

critical listening, introductory production principles, managing a recording session and basic mixing techniques.

Dan, Ian and Ricky all commented on what they considered important learning areas within the recording class. They appreciated how the class was split throughout the semester, starting with track laying in the studio and then moving on to mixing techniques in the Mac Labs for the last 4–6 weeks.

Ian stated:

I really liked how we spent the first half of the semester down in the studio and then the second half up in the labs, it was pretty much just like if I have any questions that's just such a valuable time you know.

Ricky also stressed the importance of learning the Pro Tools recording software and critical listening skills relating to identifying and manipulating frequencies within a sound.

Just getting a hang of Pro Tools that was definitely important and yeah the software side. Listening to frequencies, yes the whole mixing thing that was probably the biggest challenge for me is when I was mixing my EP [extended play].

All participants mentioned how skills previously learned in the course or currently being studied in other subjects crossed over and contributed towards a successful experience in the recording class. Songwriting and arrangement, performance, critical listening, software knowledge and project management were areas participants mentioned as having a fundamental contribution towards a successful semester of recording. Thus, respondents saw the connection between successfully negotiating all units in the course and recording tuition.

Five participants mentioned the value of completing the second-year subject, The Technology of Music and Audio, where students learn the basics of using digital music production software, including Pro Tools, and practice some basic editing and mixing techniques.

These respondents spoke of the area of learning connected with using the software. It was suggested that ACO2015 (a technology class with a Pro Tools software instruction component) should be undertaken before opting into the recording class. Hamish recounted:

In second year I also did Rob's class in the labs [ACO2015] and I learned a lot from that going into recording. I think if this unit were taught before students did that unit it might help.

Jackie was also introduced to the software in another class. She described how that helped to ease the learning curve when undertaking the recording class:

I really liked when you guys started showing us the digital technology course where we did GarageBand and Logic Pro and then we went into Pro Tools, that was a really good introduction.

Hally expressed a similar opinion but expanded further by suggesting that due to the importance of having some basic Pro Tools software knowledge, ACO2015 should be a prerequisite for undertaking the recording class.

Hamish, Dan, Ian, Hally, Jackie and Ricky mentioned that other, more-general musicianship skills from Practical Music classes were also fundamental as a base skill level to bring into recording. Participants commented that the instrumental music performance skills required to perform the parts for a recording are worked on and honed in the Practical Music classes. Perfecting these techniques live is a good base for transferable skills to be used in track laying parts for a recording.

Dan spoke about Performance Workshop and how analysing live performances had similarities and usable crossover skills that could be used in the recording class. The critical listening, review and implementation of feedback skills were considered valuable for planning, producing and mixing a recording, as stated by Dan.

You analyse what you just performed and in a way it's kind of like analysing a mix and so suddenly you go into recording and you still have that kind of skill that you've developed from the first year.

Jackie highlighted how during the first year Performance Workshop classes, the basics of the equipment and technology required for music performance had laid a good foundation for the techniques and principles required for mixing recordings. Jackie had come from a classical music background where most instruments are acoustic, so she found any kind of electric or amplified instrument new and challenging. This steep learning curve included, for example, the process for amplifying electric guitars, bass, keyboards or vocals so that they can be heard in a contemporary music setting. Points were raised around how useful the first-year Performance Workshop was for learning 'how to plug everything in'. Jackie drew parallels between how a band looks on stage, where the sounds come from and how this can be recreated in an audio recording:

It made me understand a lot more about the set-up of how you would do sound on stage and why you have microphones where you have them.

Three participants mentioned that using the repertoire previously written or learned in Solo Project (a part of the Practical Music subject) or in the third-year Studio Project for recording class was a worthwhile endeavour. Hamish considered it important to encourage people to 'use their solo project as potentially something to record ... so, most people should have a year of experience doing a solo project'. This was perceived to be especially useful as the song's structure and lyrics will have then had the benefit of formal feedback and review before being recorded.

Frank stated he enjoyed using the recording class to make the content for his studio project class and linking the two. He was able to use the recording class to inform his skills and knowledge and then directly use them to help create the content (an EP of his original music) for his semester-long Studio Project class.

Three participants commented on how other classes in the course that involved critical listening had been helpful and that techniques learned in these lessons were also intrinsic to a successful recording project. Dan and Ricky described how they had improved their listening skills and awareness of production and songwriting elements during the Cultural Perspectives class. They considered the

activities of active listening, listening for different aspects from different periods and how they were recorded a good basis for starting to think about their productions. Dan recalled:

Picking apart the mix, here's the amount of instruments here's this coming in over here and they've mixed this in this way to create this and that kind of like songwriting approach to mixing.

4.2.7 Students' learning style

Eight participants commented upon the effectiveness and benefits of learning through practical instruction and experimentation. They enjoyed working together in class on small practical tasks that were supervised or reviewed and corrected as required by the teacher. It was common for participants to request more time to experiment, make mistakes and problem-solve. Ian explained that:

If I had my time again and if I had more time to do it, I'd definitely try it mic'ing up with different things and just like learning like oh this is how this sounds different.

Three participants noted that it was more difficult to problem-solve when they were in the studio outside class time and without a teacher present. The availability of information around the recording equipment, including the desk, routing of audio signals (especially for headphone mixes) and Pro Tools software, were the main areas that needed clarification with either written instructions, notes taken by students or videos to refer back to as the preferred methods. Ron recounted a story about his session being troublesome due to being unable to obtain a signal to the headphones when working in the studio outside class time:

Note taking is really important or even having that repetition and asking questions ... because it's the particular problem at the time, we just weren't getting a signal or we couldn't hear anything through the headphones ... there were issues and we didn't know how to fix them.

Three participants also required more time to experiment and learn techniques for mixing. Participants thought this should be in addition to the time allocated for tracking and work related to learning about the studio and its associated equipment and processes. Hamish stated, 'I would have spent more time learning mixing so I could have spent the entire semester picking your brain on mixing'.

4.2.8 Teacher's teaching style

There have been multiple slightly different iterations of the recording class's structure to date. Some participants undertook a more prescriptive class approach where the curriculum of basic fundamental recording techniques and processes was adhered to each week. For two semesters of the third-year recording class, after some initial basic information and explanation of the required outcomes and assessment, the class took on a student-led weekly topic targeted to specific areas or questions that students had relating to their recording projects. Almost all of the third-year students in this iteration were using the recording class to record their content for their Studio Project class, so this kind of on-demand approach to topics was widely appreciated. Dan commented:

Third year instead of being okay this week's based on this, this week's based on this, there was a lot more questioning as to what we needed at the time because most of us were in the middle of studio project and that was really handy.

Eight participants deemed the repetition of practical tasks as key to cementing processes and knowledge. Ron commented that 'it was repetitive which is good because it helps like I said to sink in'.

Three participants commented that they had undertaken the recording class more than once throughout their second and third years of study and had positive feedback about both approaches to the class. These students had undertaken the more prescriptive version first and then the more student-led version in the third year. This combination was deemed the best of both worlds. Participants provided good suggestions on how this can be formalised with two levels of recording class (see Section 4.3).

Dan had participated in both iterations of the recording class. He commented on how the more prescriptive approach had given him confidence in the basic skills and processes required, and the more student-led approach had allowed more tailored instruction for his particular recording project:

If I just did the third-year one and didn't do the second year one I'd probably go in with maybe not the same level of confidence, definitely less general skill to get me by ... I could kind of draw on the earlier knowledge from the first one so it really helped having a structured one and then a freeform one.

Ricky had similar sentiments about the evolution of the class from second to third year and raised a good point about the peer-to-peer learning that can be nurtured with this approach:

Having those kind of set [topics] at the start and then kind of branching into the questions later on when people are starting to form their projects and have more specific questions, I thought that was really helpful and even then, people are asking questions about their music that you might not have thought to ask and then you're learning something that you can apply.

Some of the participants had experience recording a class song where the recording students learned and performed a song for the other students to record. This was considered a useful experience. Four participants had recorded a band from outside the recording class, which was also considered a useful and worthwhile experience.

Both iterations of the recording class involved spending approximately three-quarters of the time in the recording studio learning and practising techniques for tracking (the initial capture of sounds). The other quarter was spent in the Mac Labs working on techniques for editing and mixing the recorded sounds to create a complete-sounding final product. Six participants felt that more time on mixing would have been helpful.

Overall, the comments from participants were extremely positive about how the class was structured and taught. Many participants looked forward to the recording class and described how having approachable teachers with real-world experience and anecdotal reinforcement gave context to the practical tasks they were undertaking. Initial fears and apprehension at the potentially daunting task of learning how to record music and operate recording technology were ameliorated through interactive, practical, hands-on instruction and practice. The more-experienced students felt that the opportunity was there to ask more complicated and technical questions when required but would have liked more time to experiment with further mixing techniques. The opportunity to send the teacher work-in-progress mixes for feedback outside class time was greatly appreciated and deemed an effective way of giving specific, individual targeted feedback on their progress.

4.2.9 Learning outcomes

All participants commented on their perception of learning outcomes from the recording class, and it was deemed by all to be an essential, rewarding and empowering positive experience. Eight participants noted that they greatly improved their knowledge of the overall recording process from start to finish, which was an invaluable experience for a musician, especially an independent artist. Ron stated:

I loved it, I always look forward to you know having those classes on, when you actually want to learn about a particular thing and knowing that it's actually going to help you outside of uni in your life ... the whole process of recording in general I use and I can comfortably do a demo from start to finish. I understand what you need to do in the recording process. So, I think we touched on pretty much everything that you need to know when you're like an independent artist.

Seven participants commented that they took away a usable final product in the form of a song or collection of songs that they would use for part of their studio project, for an independent release or for promotion. Hamish said, 'I got plenty of

good advice on how to record it and how to mix it which led to what I think was a pretty good recording’.

Three participants mentioned that they were surprised by the high quality of the final product they could achieve on their own. This was a source of pride and confidence. Dan noted:

I derived more than what I thought I would get out of it from the third-year class, like I didn't think my final product would be as good as what it was.

Five participants had only previously recorded themselves on a phone, tablet or laptop with the inbuilt mic generally aimed at recording people speaking at much lower levels than is often applicable to performed music. Participants mentioned their awareness and understanding of many individual technical aspects, including mic choice and placement, signal flow and routing, understanding and operating the recording desk, recording nomenclature, tools, effects, the physics of sound and production principles.

Five participants also mentioned more-holistic benefits for artists, which related to analytical skills, objectivity, confidence, power, organisation skills, understanding the recording processes and lower recording costs through the ability to self-record at least to a demo standard. Ricky proclaimed, ‘[the] big thing is money, like you know I don't have much money so yeah I can do it myself that's great’.

Three participants mentioned how the recording class had improved them as a musician. They had gained more-nuanced listening skills and more-objective critique of their performance and songwriting and arrangement skills. Of the benefits to her as a performing musician, Hally said:

Yeah better approach better just even within myself as a vocalist recording feeling more comfortable in the space knowing what I want out of my vocals when I'm trying to capture them.

Ricky also noticed an improvement in his listening skills and how this permeated throughout his music-related activities: 'it also helps with listening so much like not just listening and mixing but it's listening in music in general'.

Hally described the importance of understanding the recording process, especially for female musicians in what has been a male-dominated industry. Although there have been many successful female artists in the past, it has been historically uncommon for a female artist to be self-produced or to have overall artistic control of the technical production direction. Hally explained how understanding the basic overall process, nomenclature, equipment and techniques empowered and helped give her confidence and control over the production and recording aspects of her creative work.

Having a basic understanding of how to record is useful for me particularly as a female musician because I feel like the recording side of things in music and I could be wrong is very male dominated, as a female having a basic understanding of that kind of process gives me a leg up a little bit and also it kind of stops producers kind of walking all over you.

Another benefit revealed by one participant was for students who have pursued a career in teaching after graduation. They had the ability and confidence to explain and demonstrate the basic concepts and processes of recording technology to their high school students. Jackie told how she has since put this knowledge to use as a high school music teacher:

All that stuff that I now know about recording, I ran a class on GarageBand for year 7. I wouldn't have been able to do that without any of the information I'd learned here ... all the techniques like I wouldn't be able to do that, and they're using more technology in the schools out there now a lot of them are more contemporary based.

Eight participants mentioned that they had gained tangible recording skills by undertaking the class. They developed a basic understanding of the process of recording a song and valued these skills highly. Five respondents recognised perceived gaps in their knowledge but had a pragmatic approach to what was

possible in such a short time with the available facilities. Participants had reflected on this learning and were forthcoming with ideas and suggestions for improvements.

4.3 Suggestions for improvement

The interviews revealed some well-considered suggestions and ideas for improvement, all of which can be grouped into five main areas: increasing the time allocated for recording classes; multiple classes according to skill or experience level; smaller class sizes; increasing studio facilities; and technical support resources available for after-hours problem-solving.

4.3.1 Increasing the time allocated for recording classes

All nine participants relayed in one way or another that recording was an essential part of their music education. However, insufficient time was allocated for instruction and practice with a teacher present to guide and advise them or for booking the studio to experiment and work on projects. The recording class is currently an opt-in class of two hours per week for a semester, replacing a solo performance project. Unlike the solo performance project, a recording project requires the availability of recording equipment and the skills and knowledge to operate it, in addition to the skills required to write, arrange and perform the required parts that are also crucial to a solo performance project.

Allowing more time for the recording class during the semester and creating more drop-in sessions for one-on-one questions and feedback was suggested. Hally summarised a point that was made by many respondents: 'more time, two hours just doesn't feel like enough'.

4.3.2 Multiple classes according to skill or experience level

Three participants deemed the varying levels of skill and experience in recording a point of contention. The repetition required by the less-experienced students was sometimes frustrating for those with more experience, and they expressed the desire to spend more time on advanced techniques, especially the mixing process.

Hally noted that if the topic had been covered previously, some students would get more out of moving on to something new rather than revisiting a previously covered area:

On one hand it was good because you could work on what you needed to work on and you could ask questions about what you were stuck on at the time, but then on the other hand if people want to go over setting up a vocal mic and we've done that two weeks ago and then it was almost like a little bit of a waste of time for people who knew how to do it.

Suggestions were made to create a multilevel recording class, where students are grouped and taught according to their previous experience and not necessarily divided by year level, as year level did not always relate to their previous recording experience.

Seven participants commented on the benefits of having multiple levels of the recording class. Some wanted more time to concentrate on understanding and perfecting the basic concepts and techniques, and other more-experienced participants wanted to delve deeper into more-advanced recording and, especially, mixing techniques. They suggested topics like introductory Pro Tools software instruction, basic live recording and setting up equipment. The majority of participants indicated that the classes may not need to be delineated between year levels and that experience or prior knowledge of recording may be a more effective way to split the classes. Ian stated:

Recording probably doesn't even need to be like a second-year recording third-year recording, because there are first years who come into this course who have three years recording experience maybe it would be worth considering like recording A and recording B you know for like more-advanced intermediate students and then like entry-level absolute beginners.

Participants mentioned that the split between more prescriptive lesson plans and needs-based lesson content was useful. The consensus was that increasing the number of prescriptive level one and level two recording classes would be most

helpful, with a level three drop-in-style needs-based class for the more experienced.

4.3.3 Smaller class sizes

Having the recording class as an 'opt-in' class per semester means that the class sizes to around 15 students per year level. The class size is also driven by the size of the space and the available facilities to be used at one time. Interviewees acknowledged that the recording class was relatively small compared to many of their other classes. However, due to the complexity of recording and the idiosyncratic nature of recording projects, even smaller class sizes for more tailored individual instruction was desired. Frank summed up how others felt about class size and more-personalised tuition:

Maybe if there was less people in the class then people could get more hands-on ... If there was less people or you could divide the class up somewhere, but then that's down to funding I guess.

Participants suggested smaller class sizes would achieve personalised, one-on-one feedback and instruction. Ricky explained:

It'd be cool to have smaller classes to be honest like when I did it the first year there was about six of us yeah which is awesome. Yeah I know it's kind of hard to do that when you're kind of the only person doing the course but yeah having that kind of more one-on-one personal time.

This was deemed most important in the mixing stage of the project when the specific techniques required depended on the content of that particular recording project. The idea of smaller class sizes was also considered a factor in the studio booking availability issues when trying to book time outside class in the recording studio facilities, a smaller class size would mean less studio use. Suggestion centred around further reducing the class size to between six to ten students to allow for more individual tuition.

4.3.4 Increasing studio facilities and technical support resources

An increase in studio facilities was highlighted by participants, related to the time required by each student to book the studio for the purpose of track laying and mixing. There is currently one recording studio in the VU Kindred Studios facility. It has four rooms but only one control room and recording set-up, which limits its use to one recording at a time.

Dan spoke of increasing the facilities and minimising the number of students using the main recording-studio space. This would create opportunities for less-experienced students to practice recording just one track first in a rehearsal room to gain experience before taking up the time and facilities of the full band recording-studio area. He stated:

I think if there were more facilities, it would be a lot easier it wouldn't like completely fix that problem but it definitely would have helped because the main recording studio which is where all the live stuff's going to be tracked that was always booked and like sometimes a week two weeks at bad periods like three weeks in advance.

Ricky echoed similar thoughts on increasing the number of available recording facilities, adding that 'maybe just upgrading the facility, so better soundproofing'.

Suggestions relating to having more facilities mainly focused on adding at least another control room to work alongside the existing one, adding recording systems to the rehearsal rooms and generally improving the soundproofing to reduce the amount of sound bleeding in from other rehearsals.

In summary, these were to provide another studio and retrofit basic recording devices into existing practice rooms to allow for overdubbing or other simple recording scenarios where the main studio and its facilities are not necessarily required.

4.3.5 Time

All participants suggested that more time was required to dedicate to recording. The majority wanted more time to experiment when track laying and trying out

different options, and most respondents asked for more time in learning the software, especially in the mixing stage. All of the more-experienced participants requested more time to learn and practice mixing techniques. Multiple participants suggested that more time be allocated to recording throughout the course, starting in the first year. Ricky agreed:

More class time ... yeah because we kind of did it once a week. Again, consistency I find is so important. It'd be cool to have smaller classes to be honest like when I did it the first year.

Five of the participants noted that it would be most effective to undertake the recording class for more than one semester, allowing more time to develop skills and absorb concepts. Hally noted:

I don't know whether it's having two recording classes a week, yeah that could be really cool to do, one prescribed one if the timetable will allow for it and the funding and then one drop-in session free rein.

Participants suggested having more time for individual drop-in sessions to discuss their specific project and receive feedback and for practical demonstration and practice of tracking and mixing. Further, most participants suggested allowing more time for recording, either by extending the class tuition time, having more iterations of the recording class throughout their course or having more time to work in the studio by themselves.

4.3.6 Technical support

The majority of participants highlighted issues in obtaining technical support regarding the recording studio equipment, software and general problem-solving outside class recording sessions. The participants noted that they were sometimes held up or frustrated by a problem and did not know where to go to find the answer. These challenges were often around routing the audio signal. Participants suggested having a hard copy technical manual that covers signal flow and routing for the studio and software. Hally stated:

I don't know whether we could get like a procedures manual together ... I think it would need to be a hard copy because sometimes it's the computer ... so hard copy that remains in the studio at all times as if it was like one of the mics.

Jackie added:

Maybe like a manual you can give a student ... one of the channels all the way through and just like step by step you plug this into here leading into here.

Further resources in the form of manuals or videos for after-hours support was suggested by multiple respondents so that they could work through problems when working in the studio on their own. Other suggestions included online chat support or an on-call function and posters in the studio showing mic polar patterns and frequency response charts. Such posters would be visual reminders of technical information and nomenclature.

This concludes the presentation of data obtained from the participants in this research project. The next chapter engages in an analysis and discussion of the data.

Chapter 5. Discussion

5.1 Data analysis

5.1.1 Introduction

Six main themes emerged from the data analysis. This chapter presents a brief synopsis of each theme, followed by a detailed discussion of the themes.

5.1.2 Theme 1: Previous experience with music-recording technology

This theme is related to participants' exposure to and experience with music-recording technology before commencing the course. This includes formal study and informal learning outside a school or institution. Participants had limited experience, which affected their learning experience and the teaching of music technology in several significant ways.

5.1.3 Theme 2: Different levels of experience and their effect on learning

Participants' differing experience levels influenced their learning in two ways: the skill and experience level that the curriculum is designed for and the amount of repetition required to complete practical tasks successfully. This theme's discussion includes the challenges that affect learning when different experience levels exist in the same class.

5.1.4 Theme 3: Facilities, time and resources

Providing facilities, time and resources to support learning emerged as an important theme. Constrained and limited resourcing presents several challenges to teaching and learning music technology and affects many aspects of the participant experience. Consequences of limited resourcing also relate to graduate capabilities, especially in the context of music industry expectations.

5.1.5 Theme 4: Financial considerations

Unsurprisingly, participant experiences were also affected by financial considerations. The constrained financial resourcing of tertiary education and the historic and continuing marginalisation of music programs present unique

challenges to teaching and learning music-recording technology. Such significant financial issues particularly affect the various opportunities for improving the overall nature and outcomes of music technology teaching and learning.

5.1.6 Theme 5: The role of idiosyncrasy, creativity and innovation

Participant data highlights the idiosyncratic nature of recording projects and how creativity and innovation can be fostered through curriculum design. However, the need for individuality and innovation in making and recording music becomes problematic within an educational landscape that often resorts to unified approaches and processes to learning and teaching. Fortunately, creativity and innovation can also be employed by education design and teaching practices to ameliorate the challenges.

5.1.7 Theme 6: Agency

This theme discusses the increased power and agency that the participants reported through acquiring skills and knowledge in the recording class. The current industry model of the self-recording musician highlights how applying these skills and knowledge enables musicians from all backgrounds to create and share their musical ideas. However, the research suggests that participant agency may well have grown further if not for the significant financial and resourcing limitations inherent within the tertiary education sector. Therefore, the analysis of participant data raised several significant opportunities to build student agency further and improve learning and teaching experiences in music technology.

5.2 Discussion of themes

5.2.1 Theme 1: Previous experience with music-recording technology

It is clear from the data collected in this study that participants have varied previous experience of music generally and, mostly, quite limited music-recording technology experience. This is somewhat surprising because music and technology have been intrinsically linked in all but the most traditional classical music settings for over 15 years. The majority of music recording has been

migrating from analogue to digital since the late 1980s (O'Grady 2019), and digitally created music using virtual instruments, loops and samples mixed with traditional instruments from the analogue world has accelerated over the past 10 years. Apple computers have come preloaded with the free powerful music creation software GarageBand since 2004, and many equivalents are readily available on all platforms (King & Himonides 2016).

Five participants said they had experienced little or no recording technology in their previous formal music education. In 2006, the Victorian government completed the *National review of school music education: augmenting the diminished* survey (Pascoe et al. 2005), which highlighted issues related to access, equity and the provision of music education resources in Victorian government secondary schools. The findings included low levels of digital and computer facilities, teacher training and up-to-date pedagogy.

Renée Crawford (2008) discussed the findings of this survey and the effectiveness of implementing its recommendations. Although schools must have the required physical resources relevant to music production—computers, interfaces, software and hardware—staff must know how to use this equipment. Crawford noted 'the survey indicates that the majority of music teachers have very little professional development in the use of new technologies'. While the survey results have contributed to investment in these areas, it could be that the full influence of change has not been fully realised, as training teachers in computer literacy, music software and new music production practices would need more time to be fully realised. This could be a contributory factor in the lack of previous recording experience expressed by the participants in the current study.

The musician experience of one participant, Frank, had given him a basic understanding of the importance of recording and an impression that it has its own set of techniques, equipment and knowledge. However, this was considered another job in the music industry and the realm of the recording engineer or, in Frank's case, a friend or relation with more experience and knowledge than him.

This kind of attitude is consistent with the music industry model of the pre-2000s and the separate jobs and responsibilities of a professional team that would all contribute to the writing, arranging, performing, recording, mixing and mastering of musical works. The evolution and blurring of roles within the music industry have been well documented and discussed in an academic context over the last 10 years. AR Brown (2015) and Burnard (2012) argue for the need to modernise teaching practices and curriculum design to mirror the real-world creative practices of modern musicians and the demands of the 21st-century music industry. King and Himonides (2016) discuss how technology can most effectively support music production and education. Kardos (2018) describes the dangers of the historical split between music industry roles and the associated sectional expression within curriculums, where performers concentrate on their instrumental development and songwriting areas while engineers learn recording techniques and software and hardware operation and manipulation.

The recording stream for musicians studying VU Music was created in response to this blurring of roles within the professional music industry. Staff were convinced that musicians needed to learn and understand the basic processes and techniques involved in recording their music to become well-rounded and industry ready professional musicians.

Beyond issues of vocational viability of graduates, such specializations can foster potentially crippling literacy issues (music performance graduates who cannot operate technology, music technologists who cannot read music, etc.). This style of curriculum creates boundaries between practices, which in the real world are becoming increasingly blurred and/or irrelevant. (Kardos 2018, p. 39)

Another participant, Hamish, commented that he had never deeply considered how music was recorded beyond the level of a consumer:

I'd never thought about it really at all, like the ins and outs of it, the technical side of it ... how different mics and different rooms and stuff could affect a recording.

It can be hypothesised that for a relatively young musician, the focus of their study to date has been on mastering a traditional instrument (e.g., piano, guitar, drums, bass or violin) and songwriting. Developing these skills to a standard that they feel is worthy of recording seems like a natural progression once this point is reached. Further, gaining recording experience tends to spark further intrigue and open up a whole new world with its own theory, knowledge, skills and techniques.

This historical delineation of roles within the recording of music is still prevalent in the minds of VU Music students. One can assume that this trope is reinforced (or, at least, not challenged) by the curriculum in the secondary schools attended by participants. It is pertinent to suggest that all music students need foundational technology and recording training as part of their general music foundation education (Crawford 2008).

As with contemporary music education, recording education needs time, study, thought and care to develop and incorporate it effectively (Brown AR 2015). This area remains underdeveloped and relatively unexplored in the context of performing musicians, especially given the continuing shift towards a portfolio musician that needs the skills and abilities to self-produce recordings (Anthony 2020; Colleti 2012). These skills and knowledge would seemingly be best introduced in the primary and secondary education sectors and then solidified and expanded upon in tertiary education.

Digital recording skills and knowledge are now widely accepted by the music education fraternity as essential for the graduating modern portfolio musician (Bell 2014; King & Himonides 2016). The falling cost, rising quality and user-friendly learning curve of music software must also be considered. Recording music outside a professional recording studio has never been more affordable or beginner friendly. There could still be issues with access to software and recording equipment related to the economic demographic of the participants of this study. Historically, VU attracts a cohort from a working-class area of Melbourne. The affordable price point of equipment may have only been reached in the last three to five years; thus, the experience and proliferation of home recording had not fully filtered through to participants at the time of the interviews.

The historical delineation of the roles of the music writer, performer or recording engineer is now often blurred into a combination of skills and knowledge requirements. The increased affordability and quality of home recording equipment have enabled musicians to release quality home recordings. The level of music technology experience has affected the pragmatic delivery of curriculum and the depth and breadth of topics that can feasibly be covered. Some of the more-experienced participants expressed a desire to delve further into mixing concepts and techniques, but it would not have been accessible to the other less-experienced respondents.

Although I do not fully ascribe to the notion by Kardos (2018) that it is now redundant to teach technology, I do understand the general point. Participants predominantly came from a background of severely limited interaction and experience with bespoke music-recording technology and, in some cases, limited experience with technology outside a smartphone and internet surfing. I do agree that software programming and architecture have such a focus towards the user experience (UX) that once the main commands in one software application are known, it is often applicable to another. For example, the shortcut commands for 'copy' and 'paste' are almost identical on most software applications, whether dealing with text, audio or video. This phenomenon is repeated throughout other commands and shortcuts.

'The lesson question has changed from "how do I operate Pro Tools?" to "how can I use Pro Tools to effectively realize my musical ideas?" ' (Kardos 2018, p. 40).

The fact that other institutions, music educators and researchers are considering (or have already instituted) similar areas of curriculum suggests that VU is on the right track with creating a recording project class for musicians. The technology is fluid and ever-evolving, and the focus of the curriculum is better suited to critical thinking, problem-solving and processes rather than in-depth specific software instruction and memory-related assessment styles.

Participants in this study expressed varied previous experiences with music-recording technology, but this was generally surprisingly limited and points

towards a lack of funding, time and resource allocation for music technology at the secondary schools they attended. The effect of this broad range of previous experiences on teaching and learning will be explored in the next section.

5.2.2 Theme 2: Different levels of experience and their effect on learning

A clear theme to emerge was the lack of previous experience with music-recording technology. There are many potential reasons for this; most relate to the inequality of education and the socio-economic group that constitutes a large proportion of the VU cohort. This disadvantage reveals itself in the lack of music-recording technology (and appropriate staff training) in previous schooling and continues in the home environment, clubs and churches that support these communities. This finding speaks to the necessity of foundational technology and recording training as part of general music foundation education at the secondary school level (Crawford 2008; Eyles 2018). There has been growing international research in this field, with Green's (2006, 2007, 2008) work at the forefront. This and related works may propel this change in time.

Broad experience levels often results in teaching to the lowest common denominator; this frustrated the more-experienced participants. Meeting students' skill and knowledge gaps creates additional curricular challenges, adding to the existing pressure to teach more content but less funded time and space to teach it.

The different levels of participant experience when embarking on recording study at VU affected the quality, nature, pace and style of learning. This is a longstanding and common trope within tertiary music education generally, as discussed by Schiavio, Kussner and Williamon (2020), Blackwell (2020), Cain (2011), Carroll (2017), Chan et al. (2015), Sheldon and Gregory (1997), Southcott (2003), Watson (2016). This phenomenon was expressed clearly in the participants' comments and suggestions.

A significant proportion of participants had very little knowledge of music industry recording technology and needed tuition and repetitive practice of basic techniques and processes. Conversely, some participants had a basic understanding of the recording process and some experience with recording,

either as a musician being recorded or some sort of home or hobbyist recorder creating music with limited equipment and less-than-ideal environments. Two participants had undertaken formal recording studies; they had a reasonable grounding in the processes and were keen to develop their post-production skills in editing and mixing.

At least two of the more-experienced respondents expressed frustration at the repetition required in the tracking process when they were more interested in developing their mixing techniques. However, the less-experienced participants were grateful for the repetition, and some suggested they could have had more time to practice the basics of signal flow and mic selection and placement. There was an understanding and appreciation that this repetition was required and useful for the less-experienced students, and ideas and suggestions around splitting the class according to experience rather than year levels were plentiful.

Students having a broad range of previous experience is a challenge across many sectors of adult education (Brady & Allingham 2007; De Clercq, Pearson & Rolfe 2001; Watson 2016). There seems to be some way to address this within the increasing commercialisation of the higher education sector. Universities and courses are under pressure to stay within financial budgets and make a profit. This has led to larger class sizes (or, at least, no reduction in class sizes), regardless of the significant evidence that smaller class sizes are often more effective (Blatchford & Russell 2020; Harfitt 2015; Sapelli & Illanes 2016; Watson et al. 2013; Zyngier 2015). Universities and their policies are often a 'one-size-fits-all' proposal that do not account for the discipline-specific learning requirements that music education craves (Johansen 2009). This homogenised curriculum design model can seriously affect the enjoyment, engagement and uptake of skills and knowledge within a music course (Green 2008).

The entry-level skill and experience requirements for VU Music are such that the student load is often prioritised over the applicant's current skill level, naturally resulting in a broad range of skills and experience in the cohort. It seems logical to consider participants' previous education as one reason for this broad range of skills and experience, especially with music technology. There is a broad range

in the quality of secondary music education, and public school music programs can have challenges in ensuring the funding matches the need.

The findings from the *National review of school music education: augmenting the diminished* (Pascoe et al. 2005) stated the challenges around the quality and equity of music education in Australian schools. It explains the current state of music education in Australian schools and the 'cycles of neglect and inequity' (Pascoe et al. 2005, p. iii) that have culminated in the broad range of skills and experience with music technology that this study's participants displayed:

While there are examples of excellent music education in schools, many Australian students miss out on effective music education because of the lack of equity of access; lack of quality of provision; and, the poor status of music in many schools. (Pascoe et al. 2005, p. v)

The teachers' responses in the review include some telling comments that would come as little surprise to music teachers:

A general perception was expressed that the amount of funding allocated to music is steadily declining and that this has enormous ramifications for the ways in which music is provided and paid for at school. (Pascoe et al. 2005, p. 61)

Homan (2009) explains some of these ramifications in the context of public schools. It is this inequity that I believe contributed to the lack of music technology experience in study participants:

Private schools and parents with the means to provide quality teaching and instruments, and with the means to supplement with external tuition, will remain at a significant advantage in relation to public teachers and parents. (Homan 2009, p. 43)

This lack of sufficient funding can lead to tough budgeting decisions within school programs, with music often considered a lower priority than other subjects, even within the arts (Pitts 2003). Thus, these schools have outdated facilities, including

music technology facilities, which reduces opportunities for students and teachers to gain experience (Eyles 2018). The differing levels of experiences offered by secondary schools continue into tertiary education and manifest in the broad range of experiences expressed by this study's participants. Jackie initially found the recording technology 'overwhelming' and the amount of 'buttons and amps scary'. This level of inexperience needs to be addressed. It further reinforces the need for basic music technology to be embedded in the curriculum from the start of the first year if all students are to be brought up to a sufficient level for using professional recording technologies.

However, it is worth noting that the cost of the associated equipment has decreased over the last six to eight years; as the uptake of prosumer and home studio equipment has risen, the cost of producing these items has decreased. This fact alone may start to negate this gap in experience as lower cost very quickly becomes greater availability in the home and for schools, churches and clubs.

Respondents saw benefits in smaller class sizes and sought personal, one-on-one feedback and tuition based on the idiosyncrasies of their project. The 'opt-in' recording class is placed within a solo project class where the main difference in deliverables is a recorded work rather than a live performance. The class size is generally 10–20 students, with 15 being considered optimal for the available space and facilities and the practical nature of the tuition. Even within this relatively small class size, a broad range of skills and experience still exists and is a challenge for teachers and students alike.

VU is situated in what is historically considered a working-class suburb. VU was previously referred to as a 'university of opportunity', often engaging students that are the first in their family to study at the tertiary level. Aronson (2016, p. ii) speaks of the challenges of a one-size-fits-all approach for VU and its students:

In an age of increasing competition and complexity in the tertiary education sector, issues of student attraction and retention dominate the landscape, leading to an increase in wide reaching, data driven, internal and external quality assurance monitoring. Whilst such

quantitative investigations and evaluations undoubtedly assist in comprehending the strengths, weaknesses and challenges for the sector, and individual institutions such as VU, they do not clearly explain the specific and idiosyncratic experiences of music students at a 'university of opportunity'.

Students' socio-economic background can significantly affect the experience of technology generally, as the cost is often prohibitive. Although music technology has become more affordable in the past 10 years, it would still be a low priority for families surviving on a minimum wage or government support.

Six of the nine participants had very little experience using music-recording technology through a lack of exposure. Reasons for this include the prohibitive cost for school or home budgets and curriculum design that is slow to react to the changing requirements demanded by the current music industry and its professionals. The factors contributing towards this broad range of skills and experience mostly seem to relate to inequity in previous experience. The participants often hailed from lower socio-economic backgrounds or attended schools in lower socio-economic areas and, quite simply, did not have the same opportunities as other more-advantaged students.

Therefore, I am taking a more pragmatic approach to ameliorate this problem and will discuss suggestions based on the streaming of recording classes and a more embedded and gradual uptake of technology within VU Music in Section 6.1. In a simplistic sense, the broad level of experience within a cohort could be solved by allocating more time and resources to creating smaller, split-level classes whenever this phenomenon is present. However, the greater funding required may be unrealistic. Facilities, time and resources do greatly affect curriculum design and delivery, and this topic will be discussed further in the next section.

5.2.3 Theme 3: Facilities, time and resources

Facilities, time and resources are required to support the successful learning of musical recording technology. These elements are critical in the research, inception, planning, design, development, delivery and review of music technology education. Considerations for facilities include:

- the physical space for a minimum four-room recording studio
- the design and construction of bespoke rooms using relevant materials
- the management and maintenance of rooms and equipment.

Adequate time (and staffing) should be allocated for each student for:

- recording within the course
- demonstrating, practising, questioning and making mistakes
- planning of recording sessions (pre-production)
- recording
- mixing.

The necessary resources include:

- learning materials
- videos
- tutorials
- assessment documents
- recordings
- recording equipment (e.g., mics, stands, cables, looms, DI boxes, headphone amps, headphones, mixing desks, power conditioners, ADAC converters, master clocks, powerful computers, screens, DAW software, plug-ins, midi controllers, hardware compressors and effects, patch bays, recording interfaces, amps, speakers, instruments, baffles and an array of miscellaneous other items).

Facilities, time and resources are critical areas for education in general, and they become especially pertinent when discussing music technology. Although the cost of home or semi-professional equipment has reduced significantly over the last 10 years, and the quality improved immensely, professional equipment is still expensive, and the facilities required are bespoke and costly to construct.

All participants commented upon the facilities, time and resources allocated to recording. Participants were critical of inadequate soundproofing and space allocation, limited class time and other limitations within the delivery of music teaching, as highlighted throughout Chapter 4.

There is a global trend in tertiary education towards producing ‘job ready graduates’ (Daly & Lewis 2020; Warburton 2020). Institutions are rolling out initiatives to ensure that their students are ready for their chosen industry when they complete their studies. The modern musician is no different and must be prepared to employ a broad range of skills from numerous areas within the professional music industry. A professional musician must understand and be able to use basic recording technology, as much of the industry is now at least in the early stage of careers self-produced, distributed and promoted, as discussed by Carey and Lebler (2012), Colleti (2012), Kardos (2018), Macedo (2013) and Watson and Forrest (2012).

There seems little doubt that modern tertiary music courses aim to prepare students to become multiskilled, technology and production-savvy music graduates ready for the professional industry. The question now is how music departments within universities with shrinking budgets and narrow commoditised measurements can provide quality education supported by up-to-date and fit-for-purpose equipment and facilities.

5.2.4 Theme 4: Financial considerations

It is now generally recognised that the tertiary education sector is a commercial enterprise (Kramer 2015; Reid 2009; Rochford 2014). Governments, influenced by neoliberal thinking, have consistently cut funding to universities (Heffernan 2017; Krause 2017) in favour of commercial funding models that have become heavily reliant on full fee-paying international students (Caldwell 2021). The neoliberal foundations of rationalisation and efficiency are measured more from an economic perspective, often ignoring cultural and societal influences and the potential benefits in these areas. In this new framework, individuals assume ever greater personal responsibility for learning and ‘success’, but themes relating to race, poverty, family violence, geographical location and social standing are less likely to be acknowledged or ameliorated (Pitman et al. 2016).

Arguably, neoliberal thinking assumes that financial markets drive the economy and all social life. It encourages and rewards self-interest and promotes a culture of individualism, reinforcing the trope that consumption enables agency and

making a profit is at the core of democracy. As described by (Giroux 2018, para. 3), 'under neoliberalism, life-draining and unending competition is a central concept for defining human freedom'.

The neoliberal trope of reliance on the free market leads to an intentional reduction in government regulation, oversight and responsibility that culminates in shrinking budgets for education and inequality of education (Brasche & Thorn 2016). This situation ultimately creates some high-end music course offerings that are well funded, staffed and resourced, a middle band of basic minimum standards and funding, and a poor lower band of underfunded, under-staffed, under-resourced music education for the less fortunate (Heffernan 2017; Pascoe et al. 2005). This has seriously affected the facilities, time, resources and quality of education across the board, especially in the lower socio-economic parts of the community (Pitman et al. 2016). The arts (including music) appear to be considered a frivolity or novelty sector by some sections of government and are similarly deprioritised by university boards.

Despite the huge revenue streams the music industry provides to the economy (\$542 million in revenue per year in 2020 from recorded music alone) (ARIA 2021) and the prevalent 'soft skills' like creativity, innovation and problem-solving, music is not considered a priority when budgets are created and reviewed. Underfunding, marginalisation and vulnerability have been the recognised landscape for music programs across tertiary education, as noted nearly 20 years ago by Pitts (2003). While many continue to vocalise the manifest challenges in the education (and creative arts) sector, realistically, this is unlikely to change in the short term, at least.

Musicians, music teachers and arts practitioners are resilient and creative intrinsically within their profession and out of necessity to survive in an environment that readily and hungrily consumes their product but with little understanding or sympathy for what is involved in creating or paying for it. This leads to the pragmatic acceptance, at least in the short term, that teachers must provide what they can within this limited framework. There is a constant search for cost-saving initiatives, efficiency and pedagogical reforms and a reality of teachers working over and above their hours with frustration at how much better

the course could be if it were properly funded and supported. Hil (2019) discussed the homogenisation of commodified, branded education and how academics are 'dragooned' into following corporate brand structures that are considered restrictive and regressive, and, thus, must 'pursue their work in spite of rather than because of the neoliberal university' (Hil 2019, para. 21).

The utilisation of different learning styles, like the pulled and flipped learning discussed by Tozman (2012), and after-hours technological resources and tutorials, as investigated by Voss (2016), can help support learning in project environments like the recording stream for musicians at VU. There are still costs involved in creating and managing these learning styles and resources. In reality, the brunt of the time and cost will be provided by the goodwill, passion and motivation of university teaching staff. These different learning styles and approaches will be discussed further in the following two sections.

The facilities, time and resources required to teach music technology to musicians rely heavily on money, that is, how well the program is funded. There can obviously still be variance in the outcomes depending on the skill, knowledge, experience, creativity and motivation of the staff involved, but having more resources to allow smaller, experience level–appropriate class sizes and more time for students to use appropriate facilities and gain feedback and demonstration from teachers really are crucial factors.

There is a mismatch between the funding and facilities required to teach modern recording technology methods effectively and the appetite of governments, university boards and finance departments to support and fund this properly.

It seems that tertiary music education might always face challenges in obtaining funding for time, resources and facilities to support teaching and learning properly. Further, there will be a broad range of experience levels among new students that requires time, resources and facilities to ameliorate. The welcome idiosyncrasy and innovation that music students develop must be fostered and nurtured. Music educators must find creative ways to minimise the effect of the lack of adequate funding available and keep pace with the changing requirements of the music industry with creative curriculum design and review that allows for

the flexibility and idiosyncrasy that the music industry now demands. Notably, as neoliberalism shifts the onus of responsibility onto the individual, it is individual teachers who are left to manage the consequences of scant resourcing.

5.2.5 Theme 5: The role of idiosyncrasy, creativity and innovation

Music, as with all artistic endeavours, is highly idiosyncratic, where creativity and originality are revealed through the interpretation of foundational techniques forged through years of musical investigation and reflection on feelings, moods, wants, needs and the challenges and successes of society. Many sections, subsections, styles and genres are loosely grouped under the heading of music, and recording projects can encompass any of these individual but broadly related areas of expression.

When examining the different experience levels of the study participants, it is pertinent to also consider the different levels of skills with their instruments and in their songwriting and arranging, as these are as relevant as their grasp of recording concepts and equipment. All of these different factors come into play when recording music. Until very recently, there has been a profound lack of literature on teaching music recording to musicians. Advances in recording technologies and music consumption have changed the music industry, and these skills are now essential for any music student to gain the most out of their time studying and flourish in their career. Recorded music is consumed more than ever, and a global reach has long been achievable from a bedroom studio with the correct skillset. Educators must create a body of work that informs our curriculum design to support this evolution.

There is a distinct difference in the creation and production of recorded music and the live performance field of music education and research. The historical delineation of these roles within the music industry is reflected in the amount of research on music recording for musicians, culminating in what King and Himonides (2016, p. 69) describe as:

The lack of a substantive body of theoretical analysis and understanding of this area which, in turn, flows from the fact that it is only very recently that there has been any research in this area.

The lack of research obviously affects knowing what areas are most pertinent to include in music-recording pedagogy for musicians. Some of these idiosyncratic differences can be ameliorated by providing relevant basic materials and teaching and practising the fundamental underlying practical and technical aspects that form the basis for recording music. Topics such as the basic physics of sound, mic types and uses, signal flow, software and hardware control, production principles and basic mixing techniques are all generally relevant to student recording projects. Thus, these topics form the outline of the current recording class at VU.

There are some interesting similarities between the recording projects in these contexts. Some are driven by the assessment criteria of recording an original song or a significant rearrangement and recording at least three instruments (including voices) with a mic. Most participants reported that they needed to focus on recording an original song that contains standard contemporary musical instruments (drums, bass, guitar, keyboards, percussion, strings, brass and voices) or a combination of this and software instruments either programmed or played via midi. There are often common structures or forms to the songs and similarities in subject matter; however, this is generally where the similarities end.

There were many differences within what the participants were trying to create that related to the influences and experiences encountered in their musical journeys. Participants' previous experience influenced the overall sound outcome that they imagined and were aiming for and is unique to that individual and their specific project. For example, many of the projects involved recording an electric guitar. An electric guitar can have many roles within a song and, thus, many sounds and ways of recording. This influences almost everything in the recording chain: which guitar to use, where on the fretboard to play the chords or line, whether to use fingerstyle or a pick, which pick-up to use, which amp to use, which setting on the amp to dial in, where to place the amp, which mic(s) to use and where to place the mic(s). Dan mentioned the idiosyncratic nature of recording projects and how one-on-one feedback directly applicable to their projects is highly desirable and effective. These idiosyncratic differences are part of what makes music such an endearing and exciting art form. Ignoring these

factors risks creating generic and unoriginal musical works that will not educate, satisfy or motivate the artist or the listener.

Modern tertiary education is highly cost based and cost driven due to the current profit-making business model. Education as a 'commodity' (Mullen 2019) has been enforced upon the industry, and we, as teachers and students, are charged with navigating this uneven playing field. This leads to generic one-size-fits-all approaches across almost all business areas, including teaching time, curriculum and assessment design, scheduling, staffing and facilities.

It has been common knowledge for over 30 years that students learn best with small class sizes (Blatchford & Russell 2020; Harfitt 2015; Sapelli & Illanes 2016; Watson et al. 2013; Zyngier 2015) and individual one-on-one time for questions and feedback, yet this is still not generally how the tertiary education system works. University procedures and initiatives with shiny branding corporatise the education landscape, and ideas and initiatives are often rolled out on trend or to trumpet the arrival of the next executive. However, as Spicer (2018, p. 55) comments, these are often 'cooked up far from the day-to-day realities of a workplace. When they are implemented, there is a profound mismatch between working practices and grand ideas'. To counter this juxtaposition, it often falls on the teachers to find creative and innovative ways of supplying what they know works within a framework that is not equipped to provide it. This results in a potential lack of clarity for students as university systems are not set up to allow such nuance and extra work for teachers to constantly find ways around deficiencies in teaching time, facilities, equipment and catering for idiosyncratic student needs.

It is paramount that we explore the vulnerabilities of our educational systems, the insecurities and failures embedded in them, their inclusionary and exclusionary traits and functions, and their many shortcomings. (Karlsen 2019, p. 191)

There is an abundance of research into music teaching, historically emanating from higher end universities and focused on classical or jazz repertoire. Different universities have different ratios of teaching and research capacity and outputs,

tied partly to their position in the national and international rankings and partly to funding levels. In many ways, contemporary tertiary music programs are 'the new kids on the block'. This perceived importance, legitimacy or worth of universities, types of courses and types of music style and education are subject to political decisions regarding university funding, arts funding and music resourcing. There are multimillion-dollar grants for the opera, theatre and ballet but a reticence to support contemporary music (Eltham & Verhoeven 2018).

This disparity between how governments and even university hierarchies perceive and rank the value of the arts differs from how the public sees it. This perception has a flow-on effect on how different art forms are funded and supported. It is remarkable how in a political climate of innovation and creativity buzzwords, older historical art forms are still considered more legitimate than contemporary music.

Contemporary musicians' perceptions of this lack of support are palpable by the number of artists that publicly denounce the use of their songs for political purposes. McFerrin (1988) objected to campaign uses of 'Don't worry be happy' by George H. W. Bush. Springsteen (1984) was critical of 'Born in the USA' being used by Ronald Reagan, Bob Dole and Pat Buchanan. Queen's 'We are the champions' (Mercury 1977) was controversially employed by Donald Trump in 2016. Tom Petty criticised Donald Trump on numerous occasions for misrepresenting the intentions of his lyrics (Bacle et al. 2021). Although there are many reasons why contemporary artists do not want to be associated with politicians and their policies, it is noteworthy that classical, opera and jazz, which are most heavily supported by government policies, grants and funding, do not seem to feature in delivering messages for political parties.

Eltham and Verhoeven (2015) note that contemporary music is more popular than many of the recipients of government arts funding like opera and theatre. Eltham and Verhoeven (2018) also discuss how government funding cuts have disproportionately disadvantaged companies and artists that produce new, more-modern work that attracts more consumers. This seems to support the notion that political support of the arts is heavily influenced by hierarchical historical traditions

that are arguably out of step with the modern demands and consumption of artistic endeavours.

The role of idiosyncrasy within education is amplified in a university of opportunity. Decisions on pedagogy, curriculum, teaching styles, time and where funding is most effectively spent are decisions arguably best informed by teachers in a collaborative framework with their students, understanding and empathising with the local conditions and the needs and expectations of their cohort. This widening gap between teachers' recognition of what is required and how to implement it and the overall 'big picture' systems and processes that university policymakers believe will deliver success to all leads to micromanagement brought on by distrust that academics can and will do their job (Connell 2019; Smyth 2017).

Music education (and the lifelong journey of being a musician) benefits from reflective practice. Despite this, there is little research on best practices for instructing musicians on recording processes and the equipment and technology involved. Some of the most up-to-date and practical literature states succinctly the obvious need for further inquiry in this area:

When actors and writers of drama are being educated they are taught about the different skills required on the stage and for screen, and yet this hardly ever happens when educating musicians about the concert stage in comparison to the recording studio. (King & Himonides 2016, p. 68)

Educators must constantly engage with the industry, extract its required skill set and continue to evolve and innovate the curriculum and teaching pedagogy to reflect what is required.

Using different learning styles can help support learning and simulate working environments. Pooled and flipped learning styles are suggested by Tozman (2012). Pooled learning can be utilised for online hosted tutorials in areas like software knowledge, mic techniques for different instruments, breakdowns of channels on the desk and common problem-solving procedures. The limitations of resources and facilities pose challenges, but project-style scaffolded

assessments can offer some flexibility in conjunction with creating resource materials that can be pulled when required.

Voss (2016) described in detail the creation of 'information on demand' resources for students of music technology, video tutorials and online manuals explaining the specific equipment in the university facilities for after-hours support. One of the participants, Dan, relayed that due to the individual nature of recording projects, individual feedback is most useful. The project-based learning activity that the VU recording class utilises would benefit from formalising the one-on-one personal feedback that occurs in a student-led way in the current format. Creating schedules for drop-in sessions and allocating time within the course would ensure that these crucial sessions are incorporated for all students rather than just the more organised and resourceful students seeking this kind of feedback. Multiple respondents expressed the desire to expand the one-on-one time for project-specific feedback, especially about mixing. This will be discussed further in Section 6.1.

The current structure of the recording class involves a blended and partially pulled and flipped model that provides information resources on demand for specific techniques, for example, using a stereo XY configuration of mics to record the overhead information of a drum set. These techniques are then demonstrated through practical demonstration in class with time allocated to practice, show understanding and inspire discussion and feedback. Students then apply these skills and knowledge to record their own specific projects outside the scheduled class time.

A pragmatist epistemology has enabled thinking to be directed towards solutions to these 'practical problems in the real world' (Kaushik & Walsh 2019, p. 4). Creativity and innovation are required in how educators create curriculum, resources and, especially, time allocation for the recording class. Scaffolded information related to the recording of music is already present within VU Music, but a review of 'what' happens and 'when' this happens could lead to a more efficient model considering that the creation and consumption of music have rapidly evolved in the last five to six years. The expansion and formalisation of

the learning styles included in the recording class will be discussed in Section 6.1.

This leaves us with the challenge of creating a curriculum that covers the recognised industry basic skills and knowledge requirements of music recording, including the latest technological advances in music and personalised tuition and feedback that allows for individual creativity and innovation in a university of opportunity, with all its limitations.

5.2.6 Theme 6: Agency

This research speaks to notions of power and agency, where respondents built agency by acquiring the necessary skills and knowledge to record their own music and share it with others. Multiple respondents were 'surprised' and 'impressed' with the quality of the outcome and final product of their recording project and spoke of how these new skills empowered them. This power to create and turn ideas into a physical product was valued highly by participants. Despite the many challenges faced by the participants around the lack of previous experience in music and specifically music technology, and the time restrictions and resourcing limitations expressed, the feedback from this study contains many comments about satisfaction, pride and achievement. Superficially, this would give the impression that VU Music is on the right track with this recording project class. However, it does raise questions about the expectations and confidence that participants had when commencing the class and, potentially, the lack of ability to differentiate and draw nuanced distinctions between the different qualities of recorded material. This potential lack of experience in making high-quality recordings of their music is quite likely a result of a lack of experience with 'high quality' and adequately resourced music education. A high proportion of participants had only limited experience with recording their music, often on equipment not bespoke for that purpose and, thus, producing less than satisfactory results. Recording knowledge gives power and agency to musicians. It breeds confidence in the studio and allows input into creative decisions that were once the responsibility of someone outside the field of control. This democratising power of technology (Anthony 2020) can potentially streamline and purify the realisation of the artistic vision.

The general musical experience, often including the resulting level of technical skill on their instrument, could also be a factor related to the 'surprise' in the perceived quality of participants' work. Many participants had only recorded playing live as a 'one-take', in-the-moment recording. This is a good snapshot of the instrumentalist's ability at that moment and could be accurately described as 'warts and all'. This is not how the majority of music for professional release is recorded. Usually, instrumental takes are individually recorded so that you are only, for example, playing guitar and not singing. This can raise performance accuracy greatly. Multiple takes can be recorded, selected and edited together to create something far above the level of technical consistency of the performer. Editing and processing in post-production can ameliorate a multitude of instrumental technique deficiencies. These editing techniques and skills are not best used to make up for poor performance, but increasing the perceived quality of one's instrumental skill level is possible if one has the equipment, skills, patience and time.

In one-size-fits-all learning, much of music instruction was based around the reproduction of excellence (Gilfillan & Morrow 2016), with the most time, resources and effort directed towards instrumental skill and learning existing repertoire and techniques. While this still has an important place within the required skill set of a modern musician, there is much more involved in achieving excellence in creation and production. This shift in focus towards creativity and innovation can be fostered through constant reflective teaching practice. This approach ensures careful consideration of what the music industry requires and how best to create and support this within a continually evolving learning environment driven by technological advances and music industry realities.

While the participants in this project derived a level of agency by developing music technology skills and producing creative output, it is clear that constrained resourcing, inflexibility and limitations within the tertiary education sector have resulted in a kind of 'cap' on the agentic ability of participants.

The democratising power of technology gives power, reach and market to musicians (Anthony 2020) outside the historical model of record companies allocating producers, recording engineers and distribution teams. This shift

towards self-recording musicians and the required skill sets have been noted by industry for more than 10 years (Colleti 2012; Lebler 2012; Macedo 2013; Thibeault 2011). There is now a model for the self-produced musician, and the skills, knowledge and techniques to achieve this must be taught, constantly monitored and evolved to ensure they stay current and relevant.

This research has uncovered a range of opportunities to further build student agency in music technology teaching and learning and ameliorate the music technology curriculum and pedagogy in the tertiary sector. These opportunities are explored in detail in the recommendations section (see Section 6.1) of the next chapter.

Chapter 6. Recommendations and conclusions

6.1 Recommendations

6.1.1 Introduction

I have collated the suggestions from participants discussed in the earlier chapters and reflected upon my experiences in teaching, working as an industry professional and my readings during this study. This has culminated in practical and implementable recommendations from a pragmatist standpoint (Dewey & Ross 2008) for incorporating recording technology into practical project-based music units in a contemporary tertiary music degree. The recommendations are as follows:

- clear scaffolding of recording technology throughout the course
- split experience-level classes and drop-in sessions
- creativity and flexibility in teaching methods
- facilities resourcing
- soundproofing
- improved after-hours support resources
- reflexive teaching practice for continual innovation.

6.1.2 Clear scaffolding of recording technology throughout the course

Scaffolding in an educational context relates to breaking down tasks or areas of learning into smaller chunks and spreading them across a larger denomination of time. Each step adds to the skills and knowledge acquired in the previous sessions, and, slowly, students build towards a working understanding of the topic area.

This scaffolding of skills and knowledge is already present in VU Music in many areas, including technology. For example, the first year includes instruction and tasks using GarageBand, Sibelius, Musition and Auralia. Second-year students graduate to using Logic Pro, Ableton and Pro Tools and more-advanced use of Sibelius. Finally, third-year students choose the software they think is appropriate to achieve the desired outcomes in project-related units. In first year, students

are given a grounding in the amplification of instruments and voices, basic signal flow of the stage, mixing desk and PA systems. In the second and third years, the recording class is offered as an option instead of a live performance recital. A clearer plan for the scaffolding of recording technology from the first to the third year that includes an assessment to determine the student's level of understanding before moving on would help ensure that most students have at least a solid foundation of core recording technology skills and knowledge.

Many other institutions are grappling with this same diversification of musical skills and knowledge, and similar solutions around 'opt-in' units dedicated to different areas of music technology are common. The framework outlined below describes 'the mixing student' as this course has an opt-in mixing unit for musicians. This idea could help to bridge the needs expressed by the more-experienced study participants about more specific mixing instruction. Anthony (2018, p. 16) states that:

Teacher-led frameworks in the first-year focus on generic sound engineering principles, including concepts of sound, gain structure, equalization, compression, use of effects and balancing techniques for mixing. The mixing student is taught foundation engineering techniques that are then practised throughout the second year, so that in the third year the student can undertake more creative processes like mixing as a performance.

The clarity and specific nature of King and Himonides' (2016) framework is similar to how this area is scaffolded at VU, but it is clearer and more nuanced and can be considered when making recommendations for the scaffolding of recording technologies at VU. However, 'compression' is a more-advanced area than our students are ready for in their first year, so this will feature more in the second-year and third-year curriculums. Effective scaffolding of recording technology skills and knowledge across the three years of the degree may reduce the effect of the broad range of previous experience and the relatively short amount of time per semester that is solely dedicated to the recording class.

A clear scaffolding of recording technology throughout the three years of the course will help to break down the associated fear and overwhelming nature of recording technology expressed by many participants. The first year can be used to provide a foundational knowledge of sound, basic sound engineering principles, live sound amplification, basic two-track live recording, simple DAW familiarisation, using software instruments and loops, and basic sound-levelling techniques. The second year can expand upon this knowledge by investigating multitrack recording, professional recording-studio operation, customising software instruments, loop manipulation and audio processing and effects. The third year will develop mixing techniques further, including using a patch bay and hardware inserts and implementing the skills and techniques they have learned using whatever technologies they deem appropriate for their projects.

The following list is a proposed framework of specific topics that are appropriate at the time of writing.

First year

- GarageBand, Sibelius, Musition and Auralia software
- basic physics of sound
- live sound equipment
- live two-track recording
- gain structure
- signal flow and routing
- software instruments
- loops
- volume balance
- pan.

Second year

- Logic, Pro Tools and Ableton software
- customisation of software instruments
- loop manipulation
- multitrack recording

- equalisation
- reverberation
- delay
- modulation
- compression.

Third year

- student-selected software
- advanced mixing techniques
- patch bay
- hardware inserts.

6.1.3 Split experience-level classes and drop-in sessions

Ideally, classes would be split based on experience level. However, with a small course and very limited resources, this is practically very unlikely to be achieved outside being split by year level. Therefore, the differences in previous experience levels could be ameliorated by introducing some foundational recording technology skills and knowledge (Recording 1) earlier in the course and opening up Recording 2 for the less-experienced third-year students. Therefore, I suggest creating three recording units of study:

- Recording 1 would be undertaken by all first-year students.
- Recording 2 would be an option for second-year or third-year students, chosen each semester.
- Recording 3 would be an option for third-year students who have completed Recording 2, chosen each semester.

Careful scaffolding could help to minimise the challenge of students' wide-ranging previous experiences. Further, introducing more recording technology at the first-year level will also help to fill some gaps and supply foundational knowledge to build upon. The use of drop-in sessions in the second and third years, where students can ask idiosyncratic project-related questions, has been highlighted by this study as valuable to students. These sessions could be open to all year

levels, with topic questions posted by students before the session so that other students could join if the topic is appropriate to them.

6.1.4 Creativity and flexibility in teaching methods

The recording class at VU is a project-based learning environment. There is a planned but flexible practical curriculum to provide the skills and knowledge required to complete a semester-long recording project successfully. These project-style units are ideal for exploring music-recording technologies and inherently provide opportunities for instant use of the skills, knowledge and processes discussed and demonstrated in the class. The class is blended in such a way that there are instructional videos to watch, online resources for expanding listening skills and further explanations of techniques, processes and equipment. This space must be constantly monitored to identify relevant resources in this growing market of home and project studio recording instruction.

Alternate teaching methods like pulled and flipped learning, one-on-one mentoring and blended learning can be used to maximise class time. In my experience, these alternate teaching methods work best when the students are truly engaged and have already begun to create their own needs-based inquiry. These situations make music recording an ideal place to use these teaching techniques. I recommend using pulled learning where possible, including to create a studio operation manual and video demonstration series as resources that students can pull after hours.

Flipped learning, where students read, listen or interact with learning materials outside class time, can be utilised to encourage class discussions and practicum in areas such as techniques, styles, equipment or processes. In my experience, these topics and resources must be instantly accessible with clear introductions that hook the reader or listener. There should be an obvious reason to access this material (e.g., following a class discussion, practical demonstration or experiment in class) without too much disadvantage for those who do not access them because, realistically, this is likely to happen. One-on-one mentoring can be used to give idiosyncratic feedback and advice that is project specific. Student mentors can assist with this, using their experience as music technology

practitioners to help guide the less-experienced students and cement their knowledge through instructing others.

As identified in Chapter 5, time was an important theme. Most participants wanted more time for various activities, including instruction, activity and reflection; individual feedback; experimentation in the studio outside class; and experimentation with mixing techniques. Participants considered the available time insufficient to cover the wide-ranging skills, knowledge and tasks within music creation, production and performance. This resulted in addressing the three areas of music composition, production and performance in first-year, but only to a moderate level of understanding, with the choice of more-targeted recording and mixing instruction at the second-year and third-year levels.

There is only so much learning that can be covered in three years. The role of innovation in the types and structures of learning can be explored to accommodate how the music industry is evolving (Brown AR 2015). Utilising multiple learning styles like pulled and flipped learning can ensure class time is used effectively and learning materials and concepts are logical and relevant for idiosyncratic projects. Pulling the required information when it is most relevant and useful is ideally suited to inquiry-based experiential learning in project situations. Skills that can be instantly used with immediate, obvious practical and personal benefits are far more efficient in these circumstances than a theoretical concept with lists of commands that are irrelevant at the time or unnecessarily advanced for the task (Kardos 2018).

The respondents appreciated one-on-one time for feedback on elements idiosyncratic to their project, skills and experience. Creating drop-in sessions to allow for this information to be more informally pulled by the students provides instant relevance and application that is so desirable for effective learning. This learning activity could also be considered a flipped classroom as the nature of a drop-in session means that the student has engaged with the topic, prepared questions and created their own inquiry or relevant problem to be solved. Allowing time for these kinds of flipped and pulled sessions when timetabling and allocating teaching resources can lead to efficient use of time in practical project-based recording pedagogy and can help to smooth the different levels of skills

and experience. This same creative thinking can be applied to other associated facilities and resources.

6.1.5 Facilities resourcing

There is an inherent tension between what facilities and resources a university music department considers appropriate and what the university budget will allow; this naturally leads to compromise and difficult choices. VU currently has one main recording studio comprising a control room and three connected tracking rooms. There are also seven ensemble rehearsal rooms containing performance equipment like drums, amps, mics, stands and a small PA system. The participants were generally satisfied with the equipment quality, but many saw the advantage of having more studio set-ups so that multiple recordings could occur simultaneously. This would have further implications related to the existing facilities and involve upgrading the soundproofing to reduce sound 'bleed', as mentioned by some participants.

Creating several smaller studio set-ups (similar to that found in a home studio) in the rehearsal rooms would allow for demos and progress recordings to be made outside the main studio and free up time for final recordings. These would be a cheaper alternative or a great addition to another full studio set-up at VU. These smaller project studio set-ups would mimic well what many artists have at home, and the skills and knowledge required to operate them successfully would be highly relevant to any modern musician. Using a two-channel recording interface and a laptop or iMac would provide a more gradual learning curve with more instant results than a large mixing desk in a full studio set-up. Therefore, there is an argument that this is an even more relevant starting point for the less experienced especially.

Having one recording studio for 120–150 bachelor degree students plus another 20–50 students from VU Polytechnic courses seems unrealistic. Only one full recording session can take place at a time, and, in practice, class time takes up most of the 9 am – 5 pm time slots, leaving only evenings and weekends for student bookings.

Another control room (at a minimum) with associated equipment, even if this is connected to the existing live rooms, would be desirable. This would double the amount of recording activity that is possible at the same time and allow for breakout rooms for classes so that multiple activities can occur simultaneously.

Fitting out the existing rehearsal rooms with small recording set-ups, including a recording interface, computer and associated DAW items and ancillaries, to create Demo or overdub facilities is also possible. This is a reasonable and affordable solution that would yield significant benefits. Having more recording set-ups would enable more students to gain basic experience on project or home studio-style set-ups, relieve booking pressure on the main studio and bring the rehearsal rooms up to a standard expected of a university offering music education.

6.1.6 Soundproofing

Making music is noisy. One of the biggest monetary outlays in a recording studio is the construction and soundproofing of the rooms. This is a complex and bespoke area of construction and requires careful planning and a realistic budget. The results of insufficient soundproofing can be likened to digging a hole for a swimming pool but not tiling or grouting it properly. There have been attempts at soundproofing the studio and rehearsal rooms at Kindred Studios, but it is insufficient, despite many attempted upgrades and stopgaps to correct shortcuts during construction. If budgets allow, an acoustic technician should be engaged to advise on the most cost-effective way to reduce sound transference between rooms.

6.1.7 Improved after-hours support resources

Creating a studio manual that shows the basic operation of the VU recording studio would be highly beneficial in supporting students as they experiment with recording technology outside class time and practice skills and knowledge learned in class. The manual should clearly illustrate signal flow and equipment operation to assist students when there is no teacher to ask. A hard copy should remain in the studio at all times.

Creating or collating a video series showing basic recording techniques and processes appropriate to the VU facilities would provide a valuable ongoing resource for students. Students can watch them and implement the techniques and skills shown in their own projects in their own time.

6.1.8 Reflexive teaching practice for continual innovation

Conducting an annual course technology review as part of reflection and planning activities would be pertinent. The area of music-recording technology is evolving at a rapid rate. Software, processes and industry trends must be reviewed regularly and the curriculum amended to remain relevant and connected to the industry that our students will inhabit.

6.1.9 Further research

This research highlights a dearth of thinking and research about how we teach recording technology to musicians, especially if we compare this to areas of music education like instrumental virtuosity, music theory or even more current topics of health and wellbeing. This is especially surprising considering that music theory has undergone only limited change in the last 120 years and that music-recording technology is a constantly evolving influence, consistently driving major changes in music creation and consumption since the invention of Edison's phonograph cylinder in 1878.

The vast majority of music research has historically emanated from higher end institutions, conservatoriums and universities with budgets that allow for a heavier research focus. These are most often targeted towards classical or jazz repertoire rather than contemporary music. However, Tony Visconti or Brian Eno are arguably as innovative, valuable and relevant to the music industry as Beethoven. Continued research into the myriad of music contexts (including contemporary music-recording technology) is needed to keep up with current trends, help forecast or predict what might come next and ensure all human artistic and cultural activity is better understood and supported.

Music education, especially the area of recording technologies, benefits greatly from a reflexive teaching practice, where listening to students and keeping a close

relationship with the music industry is paramount to staying relevant and equipping our students with the most appropriate skills and knowledge to succeed in their chosen musical career path. Further research on the uptake of recording technologies by musicians with larger sample sizes and in even more specific areas will help to continually improve best practices in teaching styles, techniques and content. As stated by AR Brown (2015, p. 42), ‘there is a need for more studio observations and experiments in a greater number of cultural contexts and musical genres’.

6.2 Conclusions

This chapter began by describing the recommendations for improvement. The chapter continued with how the research aims had been addressed elucidating the six main themes that were revealed: previous experience with music-recording technology; different levels of experience and their effect on learning; facilities, time and resources; financial considerations; the role of idiosyncrasy, creativity and innovation; and agency. This chapter ends with an explanation of the inquiry’s contribution to knowledge.

This research into incorporating recording technology into practical project-based music units in a contemporary tertiary music degree was conducted by interviewing participants that had undertaken the recording class at VU. The research aimed to understand participant experiences to inform recommendations that maximise learning effectiveness in this curricular area. Interviewees were asked about their experiences of undertaking the recording class at VU, and these responses were analysed for commonalities and organised into coded categories and then into themes. The current relevant research landscape has been used to cross-reference themes common in other investigations with these discussions, and potential solutions to challenges have been considered in forming recommendations.

This research is limited to participants who have previously undertaken the recording class as part of VU Music. The investigation was designed to elicit their experiences of this particular area of study within the course. Although other areas of study are mentioned when referring to the scaffolding of technology, the

broader course curriculum unrelated to music-recording technology is outside the scope of this investigation. Other broader areas of educational technology and its effects on learning were considered at times through my reading in the context of how this influences recording technology, but the focus remained specifically on incorporating recording technology for musicians at VU. There are implications and points of interest contained in this study for other music technology and music-recording educators. However, many of the findings are bespoke to a university with a small music program, limited funding and a cohort from a similar socio-economic background with limited relevant previous music technology experience.

6.2.1 Achieving aims

This research achieved five main aims related to the understanding, interpretation and application of content and learning outcomes concerning students' perceptions of undertaking projects involving recording technology at VU.

1. Identify and understand students' perceptions of undertaking practical project-based units involving recording technology.

Appropriate participants were sourced from previous VU recording class cohorts and interviewed to understand their perceived experiences of the current recording class.

2. Interpret data to inform the continuing development of this area of the curriculum and pedagogy.

The data were thoroughly read, organised and coded, and thematic analysis was used to collate commonalities. These themes have then been considered and discussed to inform curriculum design and overall pedagogical considerations.

3. Explore how the content and learning outcomes of project-based recording units can be most effectively incorporated into other course content and learning outcomes.

The current appropriate research landscape has been explored, considered and compared to the existing recording class at VU to elucidate areas that can be improved.

4. Make recommendations for effectively incorporating recording technology into contemporary tertiary music education.

The recommendations relate to a slower and clearer scaffolded approach to recording technology throughout VU Music, utilising more-flexible teaching styles to allow for more-personalised feedback and instruction.

5. Contribute to qualitative case-study research in contemporary tertiary music education.

The available research into recording technology for musicians is relatively new and emerging. Green (2006, 2007, 2008) conducted similar qualitative case studies involving secondary school students in the United Kingdom, and Lebler (2012), Zhukov (2015) and Anthony (2018, 2020) have conducted similar studies in contemporary tertiary music students in Australia. This research into incorporating recording technology into practical project-based music units in a contemporary tertiary music degree will add to this growing knowledge, specifically in a university in western Melbourne.

6.2.2 Thematic areas from this inquiry

6.2.2.1 Theme 1: Previous experience with music-recording technology

The participants expressed a broad range of previous experience with music technology, with varied and limited experiences for most participants. This is likely the outcome of education inequality due to limited provisions and resources in the schools that participants attended. The informal experiences were also often limited in terms of equipment, resources and technical knowledge, and outcomes were often more focused on gaining a final product than learning the processes and techniques for themselves. The music industry has evolved from the strictly delineated roles of recording engineer and musician, with blurred lines of responsibility, especially in the early stages of a musician's career. Participants'

limited experiences before undertaking the recording class had not prepared them for this industry evolution, which affects the learning and teaching in this study area at VU.

6.2.2.2 Theme 2: Different levels of experience and their effect on learning

The broad range of previous experiences with music technology expressed by the participants affects the quality, nature, pace and style of learning and teaching in the recording class at VU. This can lead to a situation where educators teach to the lowest common denominator, and the repetition of basic techniques and processes can cause frustration, as expressed by three participants in this study. Consideration towards providing more facilities, time and resources may lessen the effect of inequality in previous experience on the learning and teaching of music-recording technology at VU.

6.2.2.3 Theme 3: Facilities, time and resources

The broad range of experience levels before entering VU Music reported by participants requires adequate time, resources and facilities to ameliorate. The modern portfolio musician must have the skills and knowledge to self-record (Anthony 2020; Colleti 2012), and VU Music graduates must possess these skills and knowledge to be 'job ready'. Providing appropriate facilities, time and resources is critical to the successful expansion of music-recording technology at VU so that graduates are appropriately prepared to meet this industry requirement.

6.2.2.4 Theme 4: Financial considerations

More funding for time, resources and facilities are required to improve the overall experience and outcomes for music-recording technology students and staff at VU and adequately support the associated teaching and learning. In the current political funding landscape, there are limited budgets for facilities, time and resources. A pragmatic acceptance steers thinking towards practical solutions to this real-world problem. Exploring innovative teaching practices like blended, pulled and flipped learning can help squeeze every experience out of each budgeted dollar.

6.2.2.5 Theme 5: The role of idiosyncrasy, creativity and innovation

Music-recording projects are idiosyncratic in nature. Fostering creativity and innovation requires time and resources to build skills and knowledge, allow freedom to experiment and provide individual feedback to guide techniques and processes. Individuality, time and flexibility are often at odds with a more generic, commodified landscape within tertiary education. Creativity and innovation in curriculum design and delivery can help to ameliorate this disparity by carefully scaffolding skills and utilising blended, pulled and flipped learning styles.

6.2.2.6 Theme 6: Agency

Participants revealed significant gains in power and agency through acquiring skills and knowledge in the recording class. The class outcomes included creating a musical work; this aligns well with the current industry model of how musical ideas are created and shared and supports the notion of the democratising power of technology. This research suggests that the power and agency achieved by participants could be far greater when adequate resources, time and facilities are provided to support teaching and learning.

6.2.3 Contribution to knowledge

The music industry and peers will expect graduating musicians to be multiskilled and able to record an essential part of their portfolio (Anthony 2020). These broader, more-holistic approaches to music creation must be reflected in the teaching practices and curriculum design of contemporary tertiary music education. This research contributes to the existing knowledge in this field by specifically targeting the experiences of musicians learning recording technologies in a tertiary music program in western Melbourne, Australia. There is emerging research on technology and musicians in Australia, including work by Jacka and Hill (2013) and AR Brown (2015) and the most pertinent work by Anthony (2018, 2020). This investigation contributes to this general area of music technology research.

Maintaining a reflexive teaching practice seems critical to success in the rapidly evolving area of music-recording technology education. Listening to students and

reflecting on my experiences in the music-recording industry has been an effective way to consider upgrades to the curriculum to maximise relevance and effectiveness. Thinking broadly about how to facilitate learning effectively with innovative teaching styles and creative timetabling (especially when students have a broad range of previous experiences and skills) can yield efficiencies and draw on elements from informal learning that are relevant and natural in music-recording settings, as noted by Green (2007, 2008) and AR Brown (2015). Carefully assessing and reviewing the facilities and resources that will maximise music-recording technology experience for most students within tight budgets will ensure we are providing the best possible platform for our students to explore and create.

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Appendices

1. Appendix 1 - Expression of Interests
2. Appendix 2 - Recording Research Recruitment Flyer
3. Appendix 3 - VU HRE Application Information to Participants Involved in Research
4. Appendix 4 - Consent form for participants involved in research
5. Appendix 5 - Questions for participants

Appendix 1

Expression of interest to participate in a research project by Darren Reston at Victoria University

EXPRESSION OF INTEREST

I am looking to recruit ten students to participate in a research project entitled 'Incorporating recording technology into practical project-based music units in a contemporary tertiary music degree'.

This project is being conducted by student researcher Darren Reston as part of a Masters by research at Victoria University under the supervision of Dr Sue Dodd and Dr Greg Aronson from the College of Arts and Education.

Participant pre-requisites

Participants in this research need to have previously undertaken the Recording stream of Practical Music in 2nd or 3rd year.

Project explanation

The aim of this research project is to inquire how to effectively incorporate recording technology into a practical project-based music unit.

The current availability, cost and generational connection to music technology and software, coupled with the growing trend towards independent home recording, suggests that recording is likely to become both an increasingly relevant and desirable aspect of contemporary music education courses.

This research will directly inform teaching and curriculum design by examining the skills being gained, the challenges students face in succeeding, how skills fit within course structures and how this learning experience can be more effectively facilitated.

What will I be asked to do?

One on one meeting with Darren Reston

You will be asked to participate in 1 x approximately 30-minute interview with questions designed to elicit how you (as a student) have experienced the implementation of recording projects into practical music units. This will involve reflecting upon your experiences undertaking the recording unit and answering questions.

Student Researcher: Mr Darren Reston, Academic teaching Scholar Victoria University.
Email: darren.reston@live.vu.edu.au
Ph: +61 3 9919 5966

For more information or to express your interest in being a participant please contact me at the above.

Appendix 2



VOLUNTEERS WANTED!

I WANT TO LEARN ABOUT YOUR EXPERIENCES OF THE RECORDING CLASS AT VICTORIA UNIVERSITY

I am looking for volunteers that have completed the Recording stream of Practical Music within the Bachelor of Music course at Victoria University to:

- 1. Participate in a 30-minute interview with Darren Reston about your experiences of the Recording stream of Practical Music.**

Your participation will help us to reflect and improve upon the Recording component of Practical Music at Victoria University.

To register your interest, or for more information, please contact:

Darren Reston (Academic Teaching Scholar, Bachelor of Music, Victoria University)

Email: darren.reston@vu.edu.au

Ph: +613 9919 5966

Appendix 3

INFORMATION TO PARTICIPANTS INVOLVED IN RESEARCH

You are invited to participate

You are invited to participate in a research project entitled 'Incorporating recording technology into practical project-based music units in a contemporary tertiary music degree'.

This project is being conducted by a student researcher Darren Reston as part of a Masters of education by research at Victoria University under the supervision of Dr Sue Dodd, Doctor of Philosophy (PhD) Victoria University. Head of Communication, Culture & Creative Art at Victoria University.

Project explanation

The aim of this research project is to inquire how to effectively incorporate recording technology into a practical project-based music unit.

The current availability, cost and generational connection to music technology and software, coupled with the growing trend towards independent home recording, suggests that recording is likely to become both an increasingly relevant and desirable aspect of contemporary music education courses.

This project aims to:

- identify the challenges and benefits of incorporating recording technology into the existing Practical music core units in a Bachelor of Music course,
- identify & understand students' perceptions of undertaking units involving recording technology,
- explore how the content & learning outcomes of the recording units relate to other course content & learning outcomes,
- gather & interpret data to make recommendations for the effective incorporation of recording technology into contemporary tertiary music education.

Analysis will be used to identify common themes, patterns and differences. After coding these themes into categories, analysed data will be used to explore and answer initial research questions and make recommendations.

This research will directly inform teaching and curriculum design by examining the skills being gained, the challenges students face in succeeding, how skills fit within course structures and how this learning experience can be more effectively facilitated.

What will I be asked to do?

You will be asked to participate in 1 x approximately 30-minute interview with questions designed to elicit how you (as a student) have experienced the implementation of recording projects into practical music units. This will involve reflecting upon your experiences undertaking the recording unit and answering questions.

What will I gain from participating?

Participants can expect to gain insights into their own learning through reflection and gain knowledge of some of the topics and scope involved in Masters level research. Your participation will also contribute to the continuing evolution of the Victoria University Bachelor of music course and music education in the west of Melbourne.

How will the information I give be used?

I will analyze the interview transcripts to identify common themes, patterns and differences, and then code these themes into categories. Analyzed data will be used to explore and answer initial research questions and make recommendations for designing and implementing the effective incorporation of recording technology into the Practical Music core unit in the VU Bachelor of Music course. Recordings made by the students as an assessment component of the recording unit of study will be also reviewed and analyzed as artefacts in order to contextualize other data collected.

What are the potential risks of participating in this project?

The research methods used pose a very low risk to the participants. Questions about background will only focus on musical background and training. Confidentiality will be maintained at all times regarding any confidential information acquired during the research process.

If you have any concerns or any issues arising from your participation in this project you may want to consult with a registered psychologist accessing the counselling service at Victoria University. If you have any

concerns or any issues arising from your participation in this project, you may want to consult the principal investigator Dr Sue Dodd.

I will check in with participants regularly and all participants will be reminded that they can take breaks or even discontinue interviews if they wish. All participants will be instructed they are able to discontinue participation at any time, without explanation. All participants will be informed that they will be de-identified in any publication of the data.

How will this project be conducted?

This inquiry is based within a qualitative research framework, utilizing case study to improve the learning outcomes of the recoding unit by observing and reflecting on a specific teaching practice and curricular approach.

10 participants will be invited from the Victoria University cohort and alumni that have previously undertaken the recording stream of the core Practical Music units in the Bachelor of Music. These participants are chosen due to their experiences with the specific teaching and curricular practice of this unit and thus are best placed to provide valuable and relevant information upon this area of the curriculum.

I will collect data from participants by conducting an in-depth interview with questions designed to elicit how students have experienced the implementation of recording projects into Practical Music units.

Analyzed data will be coded into themes and used to explore and answer initial research questions and make recommendations for designing and implementing the effective incorporation of recording technology into the core Practical Music units in the Bachelor of Music at Victoria University.

Who is conducting the study?

Victoria University, Ballarat Rd, Footscray VIC 3011.

Chief Investigator: Dr Sue Dodd, Doctor of Philosophy (PhD) focused in Creative Arts from Victoria University. Head of Communication, Culture & Creative Art at Victoria University.

Email: sue.dodd@vu.edu.au

Ph: +61 3 9919 2333

Student Researcher: Mr. Darren Reston, Academic teaching Scholar Victoria University.

Email: darren.reston@live.vu.edu.au

Ph: +61 3 9919 5966

Any queries about your participation in this project may be directed to the Chief Investigator listed above.

If you have any queries or complaints about the way you have been treated, you may contact the Ethics Secretary, Victoria University Human Research Ethics Committee, Office for Research, Victoria University, PO Box 14428, Melbourne, VIC, 8001, email researchethics@vu.edu.au or phone (03) 9919 4781 or 4461.

Appendix 4

CONSENT FORM FOR PARTICIPANTS INVOLVED IN RESEARCH

INFORMATION TO PARTICIPANTS:

We would like to invite you to be a part of a study into how to effectively incorporate recording technology into a practical project-based music unit.

Participants from the Victoria University Bachelor of Music cohort who have completed a recording component as part of the core unit of Practical Music are invited to undertake an interview with Darren Reston to elicit how students have experienced the implementation of recording projects in the current recording stream of the core Practical Music unit.

The aims of this research project are as follows:

- identify the challenges and benefits of incorporating recording technology into the existing Practical Music core units in a Bachelor of Music course,
- identify & understand students' perceptions of undertaking units involving recording technology,
- explore how the content & learning outcomes of the recording units relate to other course content & learning outcomes,
- gather & interpret data to make recommendations for the effective incorporation of recording technology into contemporary tertiary music education.

The research methods used poses a very low risk to interviewees and participants. Questions about background will only focus on musical background and training. Confidentiality will be maintained at all times regarding any confidential information acquired during the research process.

CERTIFICATION BY PARTICIPANT

I, "[Click here & type participant's name]"
of "[Click here & type participant's suburb]"

certify that I am at least 18 years old* and that I am voluntarily giving my consent to participate in the study:
"How to effectively incorporate recording technology into a practical project-based music unit" being
conducted at Victoria University by: Dr Sue Dodd.

I certify that the objectives of the study, together with any risks and safeguards associated with the
procedures listed hereunder to be carried out in the research, have been fully explained to me by: Darren
Reston and that I freely consent to participation involving the below mentioned procedures:

- 1 X approximately 30-minute interview reflecting upon your experiences of the recording component
of the core unit Practical Music.

I certify that I have had the opportunity to have any questions answered and that I understand that I can
withdraw from this study at any time and that this withdrawal will not jeopardize me in any way.

I have been informed that the information I provide will be kept confidential.

Signed:

Date:

Any queries about your participation in this project may be directed to the researcher Dr Sue Dodd +61 3
9919 2333.

If you have any queries or complaints about the way you have been treated, you may contact the Ethics
Secretary, Victoria University Human Research Ethics Committee, Office for Research, Victoria University,
PO Box 14428, Melbourne, VIC, 8001, email Researchethics@vu.edu.au or phone (03) 9919 4781 or 4461.

Appendix 5

Questions for participants

Interview participants were asked the following questions.

1. Talk to me briefly about your musical background and interests.
2. Tell me about your experiences in recording class, what was it like for you?
 - What challenges did you face? What inhibited your learning?
 - What successes did you have?
3. Before you did the class - What did you want to achieve in recording class?
 - What do you think you needed to learn?
 - What do you think we needed to teach you?
4. What specifically did you learn?
 - Techniques
 - Software
 - Process management
 - About yourself
5. What teaching in the unit worked well?
6. What teaching in the unit did not work so well?
7. If you had your time to do the recording unit again, what would be different?
8. What conditions do we need to create?
9. Is there anything else related to learning to record that might help us teach recording more effectively?