Figure 1 - Performing at The Crown Hotel, Dunedin, 2018 (author's own)

Masters of Professional Practice
Inquiry Report and Critical Commentary
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Acknowledgements

I would like to acknowledge the support of my family and friends, and their willingness to read and re-read the many iterations of this work, especially my wife, Felicity, and my friend and colleague, Claire, who are probably sick of my writing style (with my tendency to constantly add asides in parentheses) by now. I am also extremely grateful to my colleagues at SAE London for their encouragement and involvement in the research.

Note

This MProfPrac was started in 2014 at SAE Online, a distance learning provider accredited by Middlesex University (UK), while the author was a teacher and Programme Coordinator at SAE London. The Learning Agreement and Review of Learning were completed during that time, as well as the bulk of the work on the practitioner research thesis.

The remainder of the work was completed after transferring to the CapableNZ MProfPrac programme in early 2018.

Note regarding references

Several of the sources listed in the bibliography were read as Kindle e-books. As such, the page numbers are omitted from the in-text citations.

Executive summary

My slightly unconventional four-year journey towards achieving the Master of Professional Practice has traversed three broad phases, corresponding to the evolution of my professional persona. The first of these, covering the Review of Learning and Learning Agreement processes, led to in-depth reflection on my professional and academic experiences over the previous fifteen or so years. This reflection brought to light some of my early assumptions about academia, specifically the focus on the award or qualification, rather than the learning undertaken in achieving that award, and also the naïve acceptance of transmission-model lecturing as the default mode of teaching. More positively, the process allowed me to recognise the work-based learning I had undertaken in my professional practice as an audio engineer. The broad range of knowledge and skills developed during that practice constituted a solid foundation upon which I could build the rest of my study. Further reflection upon my changing professional persona, as I started to embrace my role as a teacher, began to unearth ideas around education which have carried forward into my current practice: the potential pedagogical benefits of blended learning models; the role of the teacher as a facilitator rather than the font-of-all-knowledge; the importance of experiential learning, especially in a vocational training environment.

Phase two of the journey was the practitioner inquiry research. The project investigated ideas around creativity, looking specifically at the creative process of the mix engineer and trying to identify a method by which this could be fostered in novice audio practitioners. The hope was that this would lead to a transformation in teaching practice. Several ideas emerged from this which have continuing broader relevance: that creativity is not some magical gift from the Muses, but instead is a collection of skills and processes that can be learned and applied; that a practitioner's skills, while essential to their practice, need to be applied with both an awareness of the context of their practice and with reference to the knowledge and shared understandings which permeate their field of practice.

The third and final phase was a reflection on the practitioner inquiry process and the implications for my new professional persona as a leader, first as Programme Coordinator in London, and then as Learning and Teaching Specialist at Otago Polytechnic in New Zealand. Where previously my focus had been on audio-related knowledge and the skills and concepts

required to successfully teach my students, now I was drawing upon yet another body of work-based learning to benefit other teachers. Initially, this involved mentoring and supporting my colleagues in London. Upon returning to Dunedin, this transformed into a wider role in supporting my teaching colleagues at OP, taking advantage of my acquired skills in educational technology, learning and teaching practices, and curriculum design.

Collectively, these three phases represent a transformation in my professional persona that continues to this day.

"Strange how you never become
The person you see when you're young"
'Where We Would Be' (Wilson, 2000)

Section 1- Who am I?

Introduction

> “The thing about witchcraft," said Mistress Weatherwax, "is that it's not like school at all. First you get the test, and then afterward you spend years findin' out how you passed it. It's a bit like life in that respect” (Pratchett, 2003)

The four-year journey towards completing my Masters in Professional Practice (MProfPrac) has been challenging and, in many respects, unusual. There has been a marked change in my personal and professional contexts during that time, which has shifted the focus and significance of what I have learned from the process. I have structured this report chronologically, to provide the clearest picture of how the lessons from the MProfPrac process have influenced me. I have broken the chronology into three broad sections which roughly correspond to the development of my professional persona, and the values and ideas which now inform my professional practice.

The first section deals with lessons and reflections leading up to the start of my practitioner inquiry project, and deriving mainly from my experience of the Review of Learning and Learning Agreement processes. The second section is the inquiry research report itself, originally conducted in the context of my teaching role in London. Section three is a reflection on the lessons learned during the inquiry project, the changes to my practice at the time as a result, and the impact on my current practice at Otago Polytechnic (OP).

These phases are represented visually in diagrams which illustrate the transformation of my professional persona from audio engineer through teacher to leader. The diagrams also explore how my persona intersects with my developing views on the role and purpose of education, and learning and teaching, two areas which were central to my role in the UK and remain my core focus at OP.

Prologue - London 2014

I had been teaching on the School of Audio Engineering (SAE) London Diploma in Audio Engineering programme (equivalent to NZQA level 6) for six years before deciding to begin my MProfPrac. The decision was prompted by a change in the environment and expectations at SAE.

I, like most of my colleagues, maintained the identity of audio engineer, rather than teacher. The nature of the music industry was such that a teaching position, particularly one which encouraged freelance activities in parallel, was one of the more reliable sources of income until the 'big break', always just over the horizon. The diploma programme was more vocational than academic; the graduates were not expected to continue into higher level programmes, but would instead compete for the ever-dwindling number of studio assistant or post-production runner positions in London. My professional development, such as it was, remained focussed on music and audio practice. There was no formal staff capability framework in place and, other than informal mentoring from more experienced teachers, no training in educational practice.

Changes in the tertiary sector in the UK in 2012 and a takeover of SAE by a multinational corporation spelled the end of this state of affairs, which had persisted, largely unchanged, since the 1980s. Study fees at all UK tertiary institutions increased dramatically. Previously, the higher-than-average student fees at SAE and relatively niche nature of the audio profession meant that most students were relatively dedicated and interested. Now there was an influx of students, many trying to emulate the new batch of 'celebrity' music producers (Mark Ronson, Timberland, for example), who had different expectations of us. Simultaneously, the Diploma was dropped as an offering and all new students were enrolled on the full Bachelor programme (previously an optional extra year upon completion of the Diploma, and never particularly popular as it was not seen to improve employability). These changes had a significant impact on my practice, particularly in terms of what and how I taught.

Over the years leading up to these changes, I had, without being aware of it, been engaged in an informal version of Schön's (1983) reflective practice model. The annual cycle of programme delivery allowed me to reflect on my teaching ("reflection-on-action"), usually at the level of individual lessons or activities, and to formulate improvements for the following iteration. This was an informal but active process, involving sharing of ideas with colleagues and discussion with students. However, there was still no attempt to place my practice in any formal context; I continued to see myself as an audio practitioner first and foremost.

The changes at SAE forced a re-assessment of that image. Teaching now on a Bachelor programme required that I gain a higher-level qualification. Thus, I enrolled in the MProfPrac with SAE Online, a sister organisation providing distance education. The choice was motivated more by convenience than anything else: SAE would pay the fees, provide professional development time in which to complete the project, and would support the research required of the programme. If I am honest in my reflection, I would have to admit that the motivation to undertake the MProfPrac was entirely extrinsic; as an audio engineer, my only intrinsically-motivated professional development was in the area of recording, mixing, and producing music. Had I the time, I would much rather have enrolled in a taught Masters programme and developed my skills in those areas. Nevertheless, the MProfPrac seemed the simpler option. So, I began the programme in mid-2014.

Early Reflections

The first lesson learned from the MProfPrac was about my own desire and capacity to reflect upon myself and my practice. As someone who has struggled with depression and anxiety since his teens, I have always been reluctant to examine myself too closely. At the time, my perception of my practice, both in audio and in teaching, was tied very closely to my perception of myself as a person.

As an audio practitioner, this arose from the largely subjective nature of the judgements required at every step of the audio production process. No matter how good one's grasp of the technical aspects of the practice were (and I can say, without feeling too immodest, that I had a very good grasp of those aspects), the final and most important factor in the quality

of any output came from those thousands of subjective decisions (a little more/less compression, this choice of reverb over that choice, every touch of a control or fader). These seemed very personal judgements and those who could make them all 'successfully' must have, I thought, some innate ability that I worried I lacked. Did I have some personal failing that kept me from confidently making these decisions in my practice? Too deep a reflection might reveal an imposter. Indeed, the fear that I might be unmasked held me back from exploring some opportunities that were presented to me.

As a teacher, without any professional framework to hang my practice on, I was, like my colleagues, finding my own way. Choices about how to best teach a particular topic, or how to present or describe a difficult concept, were based on personal experience and experimentation. If my students succeeded, I shared their success. If not, then I blamed myself for their failure. Reflection on this, too, was risky, as any deficiencies in my practice would highlight personal inadequacies.

The prospect of active reflection as part of the MProfPrac was therefore alarming. However, I began to find the reflective process beneficial. One of the benefits of the MProfPrac process began to materialise: an awareness of structured models of reflection. As mentioned previously, I had unknowingly dabbled in Schön's (1983) reflective practice model in my teaching as each new cohort of students came and went. However, that had still been rooted in the "technical rationality" that Schön (1983) criticised; focussing on "knowing what" rather than the more intuitive knowledge based on experience and reflection which he calls "knowing-in-action". Further investigation of Van Manen's (1977) and Valli's (1992) levels of reflection provided tools with which to assess my practice in a structured way. What I had been engaging in previously, in both my audio work and teaching practice, was "technical reflection", namely thinking about the "effectiveness and efficiency of achieving predetermined goals" (Sellars, 2013, p. 7). I had reflected on the output of my work (the quality of my recordings or the success of my students, for example), but had stopped there, attributing the result of the reflection (satisfaction or otherwise) to my own abilities and personality. Guided by these models, I began the process of reflecting more deeply; thinking about the "why" rather than the "what". For example, in the context of my audio work, my

technical reflection on the quality of my recordings gave way to a “practical reflection” (ibid.) on the processes I employed in creating them.

The topic of my practitioner inquiry project came directly from this sort of reflection. Having identified that the inability to confidently make subjective judgements was a barrier to my audio practice, I set about challenging the idea that this ability, this creativity, was innate to only some people. What if it could be learned and developed? This led me to investigate concepts around creativity and the relatively young academic field relating to creative processes. There was evidence that creativity was as much a process as a talent.

From a teaching perspective, I had an opportunity to revisit my practice at a deeper level. Rather than focussing on the surface – how the ideas were being communicated – I began to look at the ideas themselves. What was it that would benefit my students the most? Again, Schön’s (1983) “technical rationality” presented itself. The curriculum I was teaching had its roots in the old studio recording industry of the 1970s and 1980s. In this, the role of the engineer was very technical but not especially creative (BBC sound engineers used to wear lab coats). If lucky, a good engineer might, in time, become a producer, with a more creative role, but, fundamentally, knowledge of how a tape machine works was more important than creative flair. Since the huge shift in the music industry, caused by the introduction of digital tools for music production in the early 2000’s, technical knowledge has become less important as more and more aspiring music producers can create their art in their bedrooms without having to spend tens of thousands of dollars hiring a studio with a knowledgeable engineer. Now creativity is key – finding that thing which sets you apart from the countless other producers flooding the internet with content. Added to this is the ease with which technical information can now be found online.

Over my several years teaching at SAE, a pattern had emerged which now began to form the core of an idea. The curriculum and assessment within the programme were still heavily focussed on the (now less-relevant and therefore less interesting) technical side of the practice (try teaching SMPTE/EBU bi-phase Manchester encoding to a group of 20-year olds and see how long they stay awake…). Nevertheless, every so often a student would ask “Can you teach us how to mix?”. The usual response was that we could teach the tools, but that

the creative part was too 'personal' to be taught. I began to wonder what we were there for. Worse, when assessing students' work, we would often make comments about subjective elements of the productions ("The vocals are too loud", "That's the wrong reverb for the snare drum"), despite the fact that we had apparently decided that we would not teach students how to make these decisions, but would leave it up to them to figure out for themselves! These were exactly the sorts of subjective judgements that I found myself struggling with. However, I had also identified that these could potentially be learned. Could I teach them? Would this help my students more than knowing about Delta-Sigma Modulation (answer: yes).

Recognition of Prior Learning

> "Without knowledge, action is useless, and knowledge without action is futile" (Abu Bakr, cited in Masud-ul-Hasan, 1982).

The first stage of my MProfPrac process, along with developing a plan for my inquiry, was gathering evidence to apply for recognition of prior learning (RPL). For me, this was an intimidating prospect. I had attended Otago University (1997 to 2000) but had not completed a degree. I had initially enrolled in a Bachelor in Computer Science, largely on the basis that I was good with computers, and had already taught myself the basics of programming. I found the course interesting, in an academic way, but I lacked the motivation to pursue it to completion. With only two papers remaining to achieve my degree, I withdrew from the programme. I was not aware of it at the time, but this was a symptom of what I now recognise, upon reflection, as one of my personality traits: an unhelpful combination of curiosity, innate talent, and a short attention span.

It is uncomfortable to write it, but I am, in many ways, a very intelligent person. I excelled at school in all my chosen subjects without having to really make any effort. I was fascinated by everything: science, history, maths, languages, music. I even studied what was, at the time, known as Technical Drawing, normally the domain of the less academically able students (for some reason), winning a national high school award for architectural design. My skills in maths were immortalised on the front page of the Otago Daily Times, where I was

photographed, along with my twin sister, opening my School Certificate results and finding out that I had achieved 99% in maths (in hindsight, I should have known that being quoted in the paper as saying “Oh no, only 99%” would not help my reputation at school).

I mention my achievements not to boast, but because this natural talent eventually became a hindrance. Because I was good at everything, and because I was interested in everything, I was passionate about nothing. I could as easily have studied classics as computers at university. For any path I went down, a dozen other paths beckoned. Computer Science was a sort of default option, one that seemed sensible in the late nineties with the rapidly emerging IT sector. While it was interesting, however, I had no desire to be whatever a degree in Computer Science would lead me to be: a coder, systems architect, or whatever. In fact, I had no idea what I wanted to be.

Well, that is not entirely true. I knew I wanted to be a rock star. I had begun playing guitar in my early teens and had fallen in love with music. Music filled a gap in my life that I had not realised existed. Music was emotional, but also analytical. Music had patterns and rules, which appealed to my mathematical brain, but transcended these rules to become something much greater. The act of performing music, especially with other musicians, was one of my greatest pleasures. The connection and co-operation, the opportunity for expression, the appreciation of each other's roles in producing something greater than the sum of its parts, and particularly (as my tastes moved towards the heavier, louder end of the music spectrum) the raw power and release. All of these drew me to music. Finally, of course, around the music was the culture - the “sex, drugs and rock & roll” that, to a socially awkward teenager, seemed so exciting and enticing.

Figure 2 - The Crown Hotel, Dunedin, approx. 2007 (author's own)

Music, though, was always a hobby rather than a serious career option. That was until the announcement of the university's Contemporary Music programme in 2000. The "rock degree", as it was called by the students, gave me what I saw as an opportunity to pursue my musical interests while, at the same time, doing what was expected of me by my parents, myself and by society; namely gaining a degree. As the child of academics, there had always been the assumption that I would achieve at least a Bachelor's degree, if not a Masters or Doctorate. It was not to be. For a number of reasons, including the early manifestations of my recurring mental health issues, I withdrew from the programme after the first year.

At the time, this felt like failure. However, reflecting on this now, that period began the development of my own ideas about the concept of tertiary education; ideas that now shape much of my current professional practice (as we shall see). The assumptions about my academic pathway meant that I had seen the qualification as the end goal. University study was not 'for' anything other than achieving a degree. Indeed, if it had any purpose, it was to prepare me to go on to achieve an even higher qualification. I had never questioned this assumption and, in much the same way, had never considered that the style of teaching so common at university, that of the 'chalk and talk' lecture, of the teacher as the font of all knowledge, was not the best approach. Those revelations would come later though; in the meantime, having tried two different options at university and deciding that they were not for me, I needed something else to do.

I became interested in audio engineering accidentally. While at university, I had worked for the Otago University Students' Association as part of the Social Activities team. Our role was to organise student events throughout the year: Orientation, the Capping Show (which I was in for seven consecutive years) and various other musical or beer-related events. A big part of this organisation revolved around the event production elements of lighting and sound. I naturally gravitated towards the sound desk, taking more and more of a role, initially, helping with the sound system at these events and, later, overseeing it. There was no formal training, just occasional mentoring from other more experienced sound engineers. However, it ticked all the boxes: I was around music constantly, and the equipment and processes of setting up and operating the sound systems were sufficiently technical to keep my analytical mind busy. More importantly, audio engineering touched on a wide range of topics: music, acoustics,

electronics, digital signal processing, psychoacoustics, and physics. All of the things I was interested in converged in audio. Later, as I moved into the studio and began recording music, other subjects became connected: cultural theory, music business, psychology. It was a broad and fascinating field, and one in which I wanted to learn more.

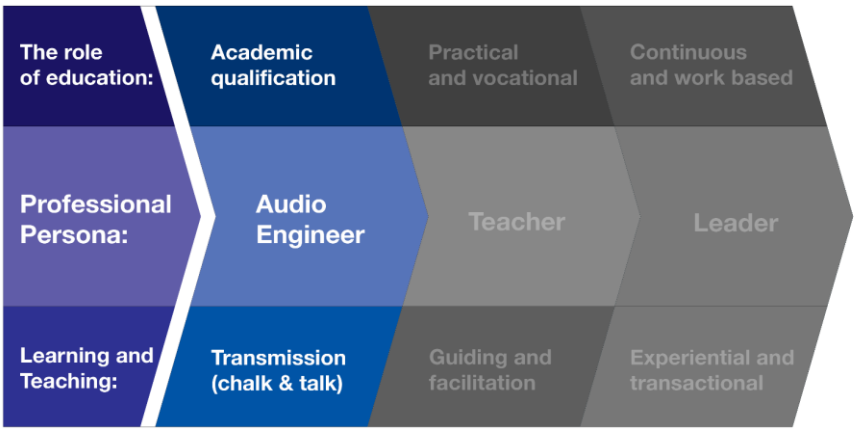

Figure 3 - My early professional persona (author's own)

Despite the number of academic subjects that touched on audio engineering, there did not seem to be many academic opportunities in the field. I could study any of the individual related disciplines mentioned earlier, but there were no degree programmes which combined them all. There were options though: The School of Audio Engineering (SAE), a private international audio school, and Tai Poutini's Music and Audio Institute of New Zealand (MAINZ, now part of Southland Institute of Technology), both offered diploma courses in Auckland. My girlfriend (now wife) had enrolled in the new Masters in Forensic Science programme at Auckland University, so we packed our bags and moved north. After four years of learning on the job, I enrolled at SAE in July 2005. I completed the diploma nine months later, graduating at the top of my class. I was immediately offered a job as a studio supervisor which I gladly accepted; I enjoyed being surrounded by other passionate audio engineers and the job provided a stable income while I tried to progress in the competitive and uncertain freelance scene. Within three months, I was given a teaching role. It seemed a natural progression, but, in my mind, still a temporary one.

I have already described aspects of the role, which were the same in New Zealand as they would later be in London: the lack of formal teacher training, and the maintenance of an identity as an audio practitioner rather than teacher. It is worth re-emphasising, though, the vocational nature of the programme. SAE was founded in Australia in 1976. At the time, music production was a technical, labour-intensive, and expensive endeavour. Large-format recording consoles, costing hundreds of thousands of dollars in today's money, and analogue tape machines dominated the industry. The technology was such that the recording process required precision and attention to detail; the industry did not yet have the digital tools which now allow us to so easily correct mistakes or enhance substandard recordings. The recording industry demanded technicians who understood the high-pressure environment of the studio and the processes and expectations involved in recording the next big hit. SAE's curriculum was designed to produce these technicians. Despite minor adaptations to incorporate new digital technologies, the curriculum remained largely unchanged for the following 30 years. The focus of my learning and teaching was therefore on the concrete technical aspects of audio engineering; we were producing tradespeople rather than academics.

Figure 4 - SAE Auckland studios, 2007 (author's own)

The audio industry itself was often equally non-academic. Even though SAE had been in New Zealand since 1990, most audio engineers in New Zealand (and worldwide) were either self-taught or had developed their skills as assistants (basically unpaid apprentices) before moving into a formal engineering role. Industry was generally sceptical of the new generation of 'educated' audio professionals. I can attest to this: Before studying at SAE, almost all SAE or MAINZ graduates that I had encountered had barely known how to connect a microphone (or so I thought). Their education was no substitute for experience, we told ourselves. Even as a

graduate of and now teacher at one of these schools, I considered my experience prior to my study to be more valuable than my formal learning at SAE.

Having said that, there were academic organisations in the audio world. The Audio Engineering Society (AES), for example, publishes a peer-reviewed journal on audio-related topics. National broadcasters (The British Broadcasting Corporation, the Deutsches Institut für Normung, for example) and other organisations (including the The European Broadcasting Union, the Society of Motion Picture and Television Engineers) produce white papers on their own research. However, there was a vast gulf between the authors of those papers – acousticians, electrical engineers, audiologists – and the audio engineers who benefitted from their output, usually in the form of some new technology, practice, or standard. Audio engineers did not need to understand the research. They simply had to apply the outcomes, in much the same way a plumber does not need to understand fluid dynamics in order to benefit from a new valve design (I assume; I know nothing about plumbing or fluid dynamics).

I had adjusted to this less-academic environment. My academic expectations going into university had meant that I had dismissed the possibility of vocational education. Polytechnic study had never been an option. So, it was refreshing to have my ideas of education challenged again. Here I was, teaching people how to *do* something. Underneath it all was the science and music theory and all those things written about in the AES journal. Fundamentally, though, it was about the practice, the application of theory, which had been missing from my own ideas of education. Knowing was not enough; doing was what mattered. As a teacher, this meant a change in practice. The 'chalk and talk' approach to teaching, which I had experienced at university and had taken for granted, would not work in this new environment. I consequently adopted a more applied, hands-on approach.

In the context of my audio practice, I remained focussed on the underlying theory. Part of what attracted me to the audio industry were the relationships between all of the things happening under the surface; the acoustical, electrical, digital, and mechanical principles which allow it all to work. As a teacher, I also wanted to be able to answer the ubiquitous "why?" questions that my students would ask when presented with a new "what". There was also the constant hope that a greater understanding of the theory would enhance my

practice. For, while I was teaching a topic I loved, I did not have much time to advance my own audio practice. Looking back now, I wonder to what extent my fear of confronting my limitations affected my motivation to advance my freelance career alongside my teaching. I did continue to work as a freelancer, but always in familiar contexts, never stretching myself. The adage that those who can, do, and those who can't, teach, began to intrude on my thoughts. When my partner and I moved to London in 2008, I decided to focus on developing my freelance career. A chance meeting within 24 hours of landing in London put paid to that idea; I was offered a job teaching at SAE London and started the following Monday.

London was a step up in both my teaching and audio practice. SAE London was a larger school than the Auckland campus, and students came from all over the world to study there, drawn largely by the perception of London as one of the centres of popular music and music production. I had access to technology and facilities that were hard to find in New Zealand, either because of the cost, or because of their vintage. I learned a great deal very quickly. I also became accustomed to the idea that I was primarily a teacher; my London colleagues were closer to my age (in Auckland, they had been older), the role gave me security in my new city, and, as my teaching improved, I began to gain greater satisfaction from the role. Where previously I had been concerned about teaching people who would eventually compete with me for work, now I enjoyed the idea that I was playing a part in developing people who would, I hoped, go on to great things. This change in perspective was eventually rewarded when one of my students, Ricky Damian, won a Grammy for recording *Uptown Funk* – I still proudly tell everyone within earshot whenever the song comes on the radio. I realised that my particular interest in the workings of audio engineering contributed to making me a good teacher, able to provide the support and background to allow others to become successful practitioners.

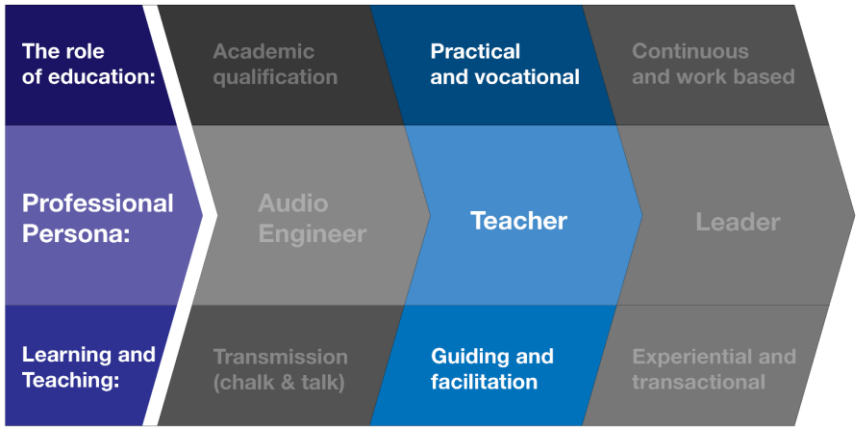

Figure 5 - My developing professional persona (author's own)

When I undertook the Recognition of Prior Learning (RPL) process, it was an attempt to quantify and recognise the knowledge that I had gained around audio engineering. The concept of Work-Based Learning was new to me, at least in terms of linking it to formalised education. I had previously dismissed much of my learning; it had not been part of a structured academic programme and so could not possibly have value in an academic context. I knew that my knowledge was of practical importance to me as an audio engineer and that my students benefitted from that knowledge, but I had never considered that it might amount to more than that. Therefore, the RPL process was, in the end, positive. Without a previous qualification (beyond the SAE diploma), I had worried that there would be insufficient evidence to present. Instead, I found that I had accumulated a great deal of knowledge and skill in a variety of areas. The most obvious areas were those directly related to the practice of audio engineering: mathematics, acoustics, electronics, music theory, and digital signal processing. In these areas, I could quickly draw parallels with programmes of study in the corresponding disciplines and determine the depth of my knowledge and skills in reference to those frameworks. The less obvious knowledge and skills were those that I had developed through immersion in the industry, such as music history, culture and media theory, music law and business, or through the other related roles that I had as part of my career, such as those in events management and promotion, web design, computer programming, and, of course, teaching. My knowledge and skills in these areas were more fragmented, learned as needed or picked up piecemeal as part of my work, and less likely to be structured according to any particular academic framework.

Figure 6 - Behind the class. With students in the studio. SAE London, approx. 2010

During the RPL process, I discovered that, in many cases, the specific concepts I was addressing did not necessarily correspond to a single level in the UK's academic qualification framework (as I was undertaking this process in the UK, I was using UK-based courses as a reference). Instead, the level of a concept or skill seemed dependent on the context of the qualification. For example, the Masters in Audio Production at Westminster University was very similar in content to much of the first year of the Bachelor's programme that I was teaching on, despite being several levels 'higher'. Similarly, digital signal processing was taught as a fundamental subject in many computer science courses, but dealt with as an advanced topic in other Masters programmes. There were Sonic Arts Masters programmes (Middlesex and Goldsmiths) which contained topics and concepts that many of my students had experimented with before arriving at SAE, such as live interactive electronic music performance and electroacoustic composition. The difference seemed to be less in the level of the content itself, but more in the level to which students were expected to engage in the material.

The idea that concepts and skills did not have a 'fixed' level, was interesting to me. It helped reinforce an idea that I had already developed in my teaching: that some of a student's ability to grasp new concepts and skills was based on the context in which they were presented. This would quickly become useful to me. After being promoted to Programme Leader (equivalent to Head of Department) at SAE London, I became involved in the curriculum redevelopment process that had begun in 2014. Some of the lessons I learned from this will be discussed later. Of immediate relevance was the application of my 'discovery'. The previous SAE curriculum had been based on the old system in which students enrolled for the largely

vocational diploma and then, if they wished, supplemented this with another year of study to be awarded a Bachelor's degree. The extra year focussed on the more 'academic' topics required to make the course suitable for the higher qualification. This had previously been undertaken only by the more able and academically minded students; the majority left upon completing the diploma. Now that all students were enrolling for the full degree programme, we had noticed a significant drop in performance in the degree year across the entire student body. We tried to identify the cause, looking at assessment workloads, teaching styles, and other factors. The content of the degree year was not, in our eyes, difficult; students were being exposed to the basics of cultural and media theory, music business and law, and music history. These were topics presented in the first year of other programmes. After discussion with several students, I decided that one of the reasons for the students' poor performance at this stage was the context in which these topics were being presented. Until that point in the programme, the focus had been on technical and practical learning, the how and the what of audio production. The academic expectations were still there, but they were either focussed on technical, scientific concepts like electronics and acoustics, or on hands-on application of those concepts: recording, editing, and mixing audio content. The sudden shift to the more academic approach of the degree-year topics was difficult for most students. They went into the degree year with the expectation that it would be difficult. And so it was.

When the new curriculum was presented in 2015, the students, in their first week, were immediately presented with an introduction to cultural theory, as part of a strand that took these topics right through the programme in parallel with the practical and technical subjects. We asked them to think about definitions of culture, what they thought popular culture was, and how it differed from other types of culture. We did this without presenting these ideas as advanced or difficult. Instead, we tried to make it seem like the most natural and obvious topic for them to discuss: "You want to be part of the culture industry. Well, let's talk about culture". The difference was startling: The students became interested in the ideas and discussed them in depth, enjoying the opportunity for debate. Their assessment results in these areas improved dramatically. The majority of students were still more practically-minded, more interested in the 'doing' part of what they were learning. However, by presenting these topics as a normal part of their learning and by linking it to their practice, they found the content more relevant and engaging. Jumping ahead in time three years, this

experience is directly relevant to my current practice; it has made me more aware of the importance of curriculum design in fostering student achievement.

Why are we here?

As previously mentioned, I was promoted to Programme Coordinator (PC) for the Audio Department at SAE London in early 2015. The previous holder of that position, my long-time friend and mentor Carlos Lellis, left to take up the same position at the newly formed Abbey Road Institute. SAE had recently been taken over by Navitas, an Australian-based education provider, who had installed a new campus manager in London. The London campus academic staff had some concerns about what the new leadership style and potential changes might mean and were worried that a new PC, appointed by the campus manager, might not share the culture and ideals of the existing staff. The teachers on the audio programme were enthusiastic about sharing their knowledge and experience with their students, most of whom were there because of a passion for music and sound. The new management were, rightly or wrongly, focussed on enrolment numbers and other metrics of success in the private higher education sector. This did not sit well with the teachers. After lengthy discussion with my colleagues, I decided to “take one for the team” and apply for the PC role. My application was successful.

The challenges of my new role immediately put the brakes on my MProfPrac. It was an extremely stressful and difficult adjustment. On reflection, the only reason I felt comfortable applying for the PC role was that I had the support of my colleagues. Carlos, who had been the previous PC for thirteen years, had fostered a culture of equality and comradeship within the department. There was little hierarchy in the team; each person was recognised as being good at some things and perhaps less good at others, but we all had complementary skills and worked as a team. We could all learn from each other and were all happy to teach each other. Carlos, as the most experienced member, sometimes had the final word in some matters, but generally saw his role as one of support and coordination. He was there to allow us to do our jobs. We, in turn, were there to allow the students to succeed.

When I became Programme Coordinator, it was with this 'inverted' hierarchy in mind. Despite being my colleagues' line manager, I never saw myself as their superior. Rather, I was there to smooth the way for them to do their work, to remove obstacles from their path. Upon reflection, this mirrors my, originally unconscious, approach to teaching. When in the classroom or the studio with my students, I saw myself as someone who simply happened to have more knowledge and experience in whatever (the way my university lecturers had tried), but rather to guide them to come to this knowledge themselves, to support them to take ownership of their new-found understanding by taking a more *transactional* (Johnson, 2010) approach to teaching. Many times, the students themselves would have prior experience or knowledge of the current topic. These different perspectives were equally, if not more, valid than my own and I would try to work them into the learning journey. The same applied to my leadership role; I tried to lead by consent, taking a democratic approach and never asking my colleagues to do anything that I would not.

There were areas in which I could have been less accommodating. One of the biggest challenges for me as Programme Coordinator was in relation to 'difficult' students. As PC, I was, for example, responsible for granting extensions to assessment deadlines where there were extenuating circumstances. My tendency to give people the benefit of the doubt meant that I was perhaps a bit of a 'pushover' for students wanting to take advantage of that. It took me some time to learn that, often, the best response was to be firm.

There were areas, though, in which I was firm in my leadership. As a private education provider, SAE's primary motivation was profit. With new ownership came a drive for both cost-cutting and increased revenue. An additional responsibility was now added to my role: to try to oppose changes which we thought would negatively affect the students and to try to shield the staff and students from any such changes that were implemented. I will present two examples of this, both of which continue to inform my current practice.

In an effort to attract more students, and therefore generate more revenue, a decision was made, at some higher level, to relax the entry requirements for prospective students. The academic staff already had some concerns about what they felt were very low requirements; given the maths-heavy nature of much of the theory involved in the programme, we felt that

accepting students who did not have a solid maths foundation was setting them up to fail. Now that Cs in General Certificate of Secondary Education English and Maths were enough to qualify for a place, we were even more worried.

The last step of the application process for prospective students was an interview with the Programme Coordinator. I used this as an opportunity to enquire about an applicant's abilities with maths and physics. While a 'formal' examination was not allowed, I could show the applicant an equation (usually the general equation for room mode calculation, a fairly basic acoustics formula – see below) and ask them how they felt about it.

$$f = \frac{c}{2} \times \sqrt{\left(\frac{p}{L}\right)^2 + \left(\frac{q}{W}\right)^2 + \left(\frac{r}{H}\right)^2}$$

Hardly a robust method, but this, along with the rest of the interview, would help me decide whether to approve an application. It was often a difficult decision; many of the applicants were very enthusiastic about the programme (or, at least, appeared so during the interview), and to accept or deny an application could mean changing the course of someone's life. However, my colleagues and I were very conscious of the consequences for students who were unsuccessful in their studies. Despite attempts to intervene and assist at-risk students, there were, inevitably, some students who did not complete their studies. I felt that it would be better, if those students could be identified during the application process, to encourage them to pursue more suitable opportunities. If, for example, they were still determined to follow a pathway in audio production, they could enrol in our Certificate in Electronic Music Production, which had far less theory content, and progress into the degree course (with some cross crediting) once that was completed. There were instances when I even suggested that an applicant investigate one of our competitors instead (Point Blank Music School, for example, offered music production courses with an emphasis on composition and performance, rather than engineering, and was less than a mile from the SAE campus). Needless to say, this was not welcomed by the recruitment team or by management and several times I was put under pressure to accept an application from a student who I had found wanting in some area. By and large, however, I stuck to my decisions. I did not enjoy

this part of the role, but felt that it was something worth pushing back on. We had long had concerns about the way in which our programme was marketed. Within our team we described it as “selling the dream”. Much of the marketing material emphasised the glamour of the music industry and highlighted the successes of students, such as Ricky Damian, who had gone on to great things. The reality was far different. For every Ricky, there were dozens of graduates who would never find work in the audio industry, let alone find themselves in one of the rare but much-desired studio engineer roles. Those who did continue in audio would find themselves making advertisements in radio stations, recording audiobooks, working in corporate audio-visual or one of the other far less glamourous roles in the audio industry. Increasing the number of students would not help matters. I was always honest with applicants about the state of the industry and the fate of our graduates. If they chose to continue, then they did so with their eyes open. Through this, I developed a strong and persistent view that education, especially when provided for profit, should be fair and relevant to the student’s abilities and needs. When I could not reconcile my responsibilities to my students with my responsibilities to my company, the students always came first.

While trying to increase revenue, SAE was also trying to cut costs. One of the first changes after I became Programme Coordinator was around how timesheet hours were calculated for waged staff (most of the faculty). The number of hours a teacher was paid for was based on their contact time, which was then multiplied by 1.5 to account for preparation and grading of assessments. Staff were not happy about this; their experience was that assessment grading took much longer than this. Indeed, when the staff resolved to work only the hours they were paid for, a backlog of ungraded assessments developed and our two-week turnaround time was consistently unmet.

I approached management about this. After some investigation, they decided they had identified the problem: We were spending too much time providing feedback and needed to spend less time on each submission. For example, twenty minutes should be more than enough to mark a 3,500-word essay. The staff were outraged. Their view (and mine) was that, as much as being a test of whether a student had met certain learning outcomes, an assessment was also a learning opportunity. Without detailed constructive feedback, how

would a student know why they had received a certain grade and, more importantly, how to do better next time?

I regret that this issue was never fully resolved while I was Programme Coordinator at SAE London, but it did lead to several insights and developments in my own practice as we worked to come to a resolution. First of all, as part of a deal with management to pay for the time spent marking, I investigated tools and methods which could improve efficiency. I ended the practice of students submitting hard copies of their work and switched to entirely digital submission. For written work, this allowed for grading with the then-new Turnitin Feedback Studio. This had several advantages (after the initial adjustment period), including streamlined moderation processes and more robust assessment archiving. I also developed better marking rubrics, aligned with learning outcomes and with more detailed descriptors. This streamlined the feedback process and led to more consistency in grading. Finally, I re-evaluated all of our assessments. I looked at alternative forms of assessment that would allow students to demonstrate the same learning outcomes, but would not require as much time to mark and would also represent real-world scenarios. For example, an early assessment in which students had to mix a piece of recorded music (applying processing, level balancing and so on to achieve a 'good' overall sound) was changed. In the new version, students were presented with a series of instructions from a hypothetical client about how they wanted the mix to sound. While this still allowed for some individual creative input, the submissions could be compared to a model answer which was later made available to students so that they could see what a 'professional' would have done in that situation, thus making the marking less subjective and providing good feedback to students. It also mirrored the practice in many situations in which the engineer must translate the instructions of the producer into reality. All three of these outcomes now inform my practice when working with other teachers to design assessments.

Figure 7 - Recording with The Baddest, London, 2014 (author's own)

Section 2 – Practitioner Research Inquiry

Introduction

This research inquiry investigates the idea that successful mix engineers begin their work with a strong creative 'vision'; a vision that many aspiring mix engineers lack. The hypothesis of this research inquiry is that engaging in a process to build a vision of a mix will lead to more creative outcomes.

Since the invention of the phonograph in the late 19th century, technology for the performance, production, and distribution of music has developed at a rapid pace. These new technologies have opened up previously unforeseen avenues in musical creativity, allowing composers and performers to explore new techniques and sonic outcomes. Along with this has arisen an industry supporting specialist roles dedicated to capturing, enhancing, and distributing this music; the recordists, editors, mixing and mastering engineers who, among others, are involved in the production process. In the relatively short history of recorded music, these roles have evolved from white-lab-coat-wearing technicians into creative practitioners who, to some degree, imprint the production with their own sonic identities. The degree to which this occurs varies significantly between projects and individuals, but this involvement in the creative process has, towards the top end of the industry, brought to public awareness names which might otherwise languish only in album liner-notes; George Martin, Alan Parsons, Timberland, to name a few. These producers and engineers are, in some cases, held in higher regard than the musicians and composers for whom they perform their services, and are often instrumental in the success, or otherwise, of a product.

With the growth of the music industry and the recognition of these supporting technical roles came the birth of another industry: audio education. Since the opening of the School of Audio Engineering (now SAE Institute) in Sydney in 1976, the concept of a formal education in audio production has spread internationally with an increasing number of colleges and universities providing training in this area. Where previous generations of engineers usually had backgrounds in broadcast or electronics (or, in the case of Tom Dowd, nuclear physics) and learned their craft through years of experience and experimentation, the current generation of prospective music producers can, if we believe the claims of these education providers,

undertake two to three years of training and enter the industry as audio professionals. Couple this with the numerous resources available elsewhere, from books and magazines (a quick search for “audio production” on Amazon.com yields over ten thousand search results) to online resources (made by, and for, audio practitioners of all levels, from amateurs to professionals), and it appears that the path to professional audio practice has never been smoother.

Questions are being asked, however, about the value and focus of these educational pathways. While many provide excellent and very valuable training in the technical aspects of audio production, there is a lack of focus on other areas, particularly in regards to the creative process. In a 2013 presentation to the Audio Engineering Society, Davis and Parker suggested that “the educational models used over the past 20 years have tended to focus on areas such as tools and technology rather than the social, aesthetic and human skills that the apprenticeship model promoted”. Phillips (2013) found that, in the United States, most certificate programmes did not even begin to cover music proficiency, an essential element in the creative process, focussing instead on technology. Anecdotally, based on the author’s ten years of experience in audio production education, this appears to be the case. A number of factors provide justification for this. First, many training providers still approach audio production from a more traditional/historical perspective, more akin to the ‘old-school’ technical roles of the past (witness the number of education providers who base their courses - and marketing - around now largely defunct large-format recording consoles (Boehm, 2006)). Secondly, audio production *is* very technical and requires some understanding of maths, physics, acoustics, electronics, and digital audio theory just to form the foundation before practitioners can even start learning all the standards, practices, jargon and other industry-specific knowledge that is expected of audio professionals. Covering all of that in two or three years, especially with students who may have no prior experience in the field, is already challenging. Third, in the relatively young field of audio engineering and production, much of the innovation, direction, and academic authority in the field comes from organisations which were traditionally focused on the technical aspects of the industry, such as the Audio Engineering Society (AES), European Broadcasting Union (EBU), and the Society of Motion Picture and Television Engineers (SMPTE).

Finally, and perhaps most importantly, a perception exists that, while technical topics can be taught and learned, creativity is something that is innate and specific to the individual. In *Mixing Secrets for the Small Studio* (2011), Mike Senior states "... no book can teach you creativity …". In doing so, he is repeating an opinion, commonly held even now, that research suggests is incorrect. Since J. P. Guilford presented the first serious academic paper on the subject of creativity in 1950 (McIntyre, 2008), more and more research is showing that certain aspects of creativity and the creative process can in fact be taught and learned.

This inquiry will investigate some of these concepts. We will start with an overview of research methodologies and methods applied in this project. Discussion of the topic proper will begin with investigation of some current theories regarding creativity. These will then be discussed in the context of music production, with a specific focus on the role of the mixing engineer and their creative contribution. From this we will explore the concept of a creative 'vision' and suggest a method through which this vision can be developed in novice mixers. This method will be tested, through a series of experiments, in a real-world educational context to assess its effectiveness and the possibility for further investigation.

Overview of Research Methods

The word 'research' can have many meanings to different people. To most students, for example, 'research' implies a *research paper*. Equally, it may describe the process of informing oneself about things unknown. It is often seen as something divorced from day-to-day life; an activity which occurs solely within the 'ivory towers' of academia.

> Most people associate the word 'research' with activities which are substantially removed from day-to-day life and which are pursued by outstandingly gifted persons with an unusual level of commitment. There is of course a good deal of truth in this viewpoint, but we would argue that the pursuit is not restricted to this type of person and indeed can prove to be a stimulating and satisfying experience for many people with a trained and enquiring mind. (Howard & Sharp 1983)

Research, however, covers much more than this and often finds a role in the everyday activities of working professionals. Leedy (2013) describes research as "... a systematic process of collecting, analysing and interpreting information in order to increase our understanding of a phenomenon about which we are interested or concerned."

One factor confronting the novice researcher is the often intimidating variety of jargon associated with academic research, and the broad range of research methodologies utilised. While the demands of any research are the same, namely developing a topic and objectives, collecting data, and analysing and presenting the results, each research situation requires a suitable approach or methodology which provides a framework within which the research is conducted. The chosen methodology serves two main roles: It provides guidelines for the ways in which we gather our data, and gives us a context for the analysis of that data. The importance of selecting the correct methodology is made clear by Leedy (2013) who tells us "Ultimately the research methodology directs the whole research endeavour."

While someone new to research may be put off by the seemingly bewildering array of recognised methodologies, it is worth the time and effort to familiarise oneself with the options available before commencing any project.

> It is perfectly possible to carry out a worthwhile investigation without having detailed knowledge of the various approaches to or styles of research, but a study of different approaches will give insight into different ways of planning an investigation, and, incidentally, will also enhance your understanding of the literature. (Bell 2005)

Research methodologies can generally be divided between *quantitative* and *qualitative*. Before discussing specific methodologies within each category, it is worth outlining the differences between the two. Quantitative research deals with data that can be collected and analysed using numerical and statistical methods, often incorporating elements of empirical research. Qualitative research, on the other hand, concerns itself with more open-ended concepts, focusing primarily on more complex 'real-world' situations. While both types of research involve similar processes, these processes "are often combined and carried out in different ways, leading to distinctly different research methods" (Leedy, 2013). Many studies incorporate aspects of both quantitative and qualitative research.

Qualitative research methods

Qualitative research involves assessing those aspects, or qualities, of a phenomenon that cannot be easily represented numerically. It often concerns itself with learning "participants' views about a particular phenomenon" (Creswell, 2007). Qualitative studies are aimed more at describing, explaining, and building theories, operating under the assumption that "reality is not easily divided into discrete, measurable variables" (Leedy, 2013). The data takes the form of words and ideas and, as a result, the analysis is largely subjective, relying more on inductive reasoning to draw conclusions. Many studies which may end up employing quantitative research methods often involve some elements of qualitative research, even if only to find out what needs to be studied.

Creative Media fields, dealing primarily with social and cultural phenomena, are well suited to qualitative analysis and so it is worth investigating some methodologies in this area.

Grounded Theory studies

Grounded Theory studies start without a specific hypothesis and use the analysis of the data to help build a theory about a certain phenomenon. Developed in the 1960s by Glaser and Strauss, Grounded Theory is more about letting a theory evolve during the research process without restricting the researcher to any particular specific lines of inquiry which may limit development of a complete picture. Grounded Theory as such is not a complete methodology but more a "style of doing qualitative analysis that includes a number of distinct features, such as theoretical sampling, and certain methodological guidelines, such as the making of constant comparisons and the use of a coding paradigm, to ensure conceptual development and density" (Strauss, 1987).

Grounded Theory studies can be useful in areas in which there may be no existing theories or where existing theories are incomplete. While many agree that the researcher should have in-depth knowledge of theories underpinning their particular discipline, there is disagreement about how much of a literature review should be conducted prior to collecting and analysing data; too much advance knowledge may inhibit the researcher's ability to maintain an open mind during the development of their theories (Glaser, 1978).

The process of Grounded Theory research involves collecting and analysing data right from the beginning of the process, and developing a coding system to classify the data into categories. The goal is to *saturate* each category, essentially learning as much as possible about each category. At the same time, the researcher is keeping an eye out for any data which may disconfirm their previous categorisations and suggest a revision of the data and its relationships (Leedy, 2013).

> The process of conducting grounded theory research isn't just a matter of looking at the data and developing a theory from it. Instead, it is what researchers call an iterative process – that is, a cyclical process in which theoretical insights emerge or are discovered in the data, those insights are then tested to see how they can make sense of other parts of the data, which in turn produce their own theoretical insights, which are then tested again against the data, and so on. (Hayes, 2000)

Bell (2005) offers some criticism of Grounded Theory: “The analysis of grounded theory data is, to me at least, quite complex”, as the identification of themes and concepts from the broad base of data is a skill which requires time and skill to develop. Another potential difficulty is that, as the evolved theory is based entirely on data collected in the researcher’s specific domain, “the theory which is produced using a grounded theory analysis may sometimes be very context-specific” (Hayes, 2000).

Action Research

Action research is an applied research methodology focusing on finding “a solution to a local problem in a local setting” (Leedy, 2013). In other words, action research is a research method which allows practitioners to build their understanding of their practice and, at the same time, implement some positive change to their environment. As the name implies, the methodology incorporates ‘action’, the change or improvement informed by the practitioner’s theory, and ‘research’ into the effectiveness or otherwise of that action. The researcher questions their immediate work environment, with a goal of solving an ongoing problem within that environment.

Action research is a cyclic process of developing a course of action based on current data, implementing that course of action, assessing the effectiveness of that action, and formulating a new action based on data collected from that assessment. The research involves “a feedback loop in which initial findings generate possibilities for change which are then implemented and evaluated as a prelude to further investigation” (Denscombe, 1998). In this regard, action research has similarities to Kolb’s (1984) Experiential Learning model. Indeed, the practitioner pursuing the action research study must regularly engage in critical reflection during the process.

There are caveats to the use of action research in a work environment. Bell (2005) states “There is nothing new about practitioners operating as researchers, but as in all ‘insider’ investigations, difficulties can arise if dearly-held views and practices of some participants are challenged, as can happen if the research evidence appears to indicate that radical changes

must take place if progress is to be made." The researcher must therefore consult with stakeholders, making clear the purpose of the research and possible outcomes.

Soft Systems Methodology

Similar to action research, Soft Systems Methodology is an approach aimed at developing solutions to problems in real world situations. Developed by Peter Checkland (1998), the methodology follows a seven-stage process. It starts with the researcher developing their own experience of the problem, and then developing a 'rich picture' of the environment in which the problem exists. They then define the root definitions of the system under analysis, and formulate a model of how those systems might ideally function, while considering the needs of stakeholders in the systems. These models are compared against the real world, possible changes are identified and finally implemented. As with action research, the core of this process is cyclic, the difference being greater emphasis is placed on analysing problems and planning solutions before action is taken.

Quantitative research methods

Quantitative research is based on looking at amounts, or quantities, associated with a particular phenomenon and concerns itself in many cases with "[seeing] how data provided by participants fits an existing theory (i.e., model, framework, or explanation)" (Cresswell, 2007). It usually involves asking 'closed-ended' questions about a limited number of variables and collects numerical data (or data that can easily be converted into numerical formats) using standardised instruments (Leedy, 2013). The data are subject to logical analysis based on deductive reasoning (beginning with a certain premise and drawing conclusions from the data), and the researcher attempts to maintain an objective stance, taking steps to remove bias.

Experiments

Experiments provide a powerful tool in quantitative research. They allow us to examine cause and effect, and to draw conclusions about the impact of actions suggested through other forms of research (such as action studies). Experiments draw data from more than simple observation; they involve direct manipulation of conditions in an attempt to test a theory.

The purpose of an experiment is to establish the effect *independent variables* have on *dependent variables* (Leedy, 2013). The independent variable is a factor that the researcher identifies as a possible cause for something else (the dependent variable). However, valid conclusions can be drawn only if the experiment has been properly designed (Bell, 2005).

An important consideration in any experiment is the concept of *internal validity*; that is, "the extent to which its design and [the] data it yields allow the researcher to draw legitimate conclusions about cause-and-effect and other relationships" (Leedy, 2013). Given that, without internal validity, any conclusions drawn will be open to criticism the importance of good experimental design cannot be overstated.

The greatest factor affecting internal validity is the presence of *confounding variables*; that is, aspects other than the dependent variables in the experiment which may account for any observations, perhaps without the researcher realising. Campbell and Stanley (1963) describe the following confounding variables:

1. History
2. Maturation
3. Testing
4. Instrumentation
5. Statistical regression
6. Selection
7. Experimental mortality

History covers external events that may occur between measurements of the dependent variable, such as some event that may alter subjects' opinions or knowledge. *Maturation* describes any changes in the subjects themselves over the course of the experimental study, such as aging. The *testing* variable relates to the fact that the simple act of taking a test can improve a participant's skills in relation to future, similar tests. Any variations in assessing the outcomes of successive experiments (such as a change in personnel or new measuring equipment) would pose a threat to the *Instrumentation* in the study, leading to changes in the dependent variable that have nothing to do with participants. *Statistical regression*,

otherwise known as “regression to the mean”, was first noted by Sir Francis Galton (1886). It describes the tendency for any variable which may have initially produced an extreme measurement to move closer to the mean or average value upon further measurement. *Selection* covers any bias that may exist in how different experimental groups are chosen. For example, a study involving students from morning and afternoon classes might be confounded if, perhaps, early risers (the morning class) generally performed better at a certain task. Finally, *experimental mortality*, often renamed “attrition” (Leedy, 2013) describes problems due to differing rates of drop-out between experiment groups.

Research methods relating to this project

The research inquiry project arose from and relies on a mixture of research methods. In deciding upon a research topic, an informal grounded theory approach was used. The author, a professional audio practitioner and educator, was broadly interested in improving the outcomes for his students. The field of audio production is varied, requiring knowledge and skills from a number of disciplines. Through discussion with colleagues and students, and based on a review of students’ assessment outcomes, certain themes emerged highlighting areas for investigation. One which stood out was related to students’ mixing ability. Many students developed their technical proficiency during the programme. In most cases, the quality of their assessed mixing assignments objectively improved over the course of their studies, particularly when considered in terms of technical characteristics such as level balance, frequency content, and use of dynamics processing. However, the subjective elements of students’ mixes showed relatively little improvement. A review of assessors’ comments, even in more advanced mixing and production assessments, showed that criteria such as creativity, interest, production (in this case relating to musical arrangement and/or sonic elements which are meant to complement the music), and spatial perception (stereo imaging, and use of natural or artificial reverberation) were areas in which students were underperforming. The assessors’ criticism in these areas showed three themes:

Static

A very common criticism was that many mixes were well crafted but contained little, if any, variation throughout the course of the piece. These mixes would have benefitted from

changes in dynamics, arrangement, effects, and so on, which would help engage and maintain the listener's interest, and highlight the piece's progression and musical structure.

Conservative

> It's not just a thing of setting levels any more, but more about trying to get the energy of the song across. Anybody can make the drums or bass even out (Benny Faccone in Owsinski, 2013, p 12).

While many mixes were, for example, well balanced in level or frequency content, a recurring theme in assessors' feedback was that the mixes did not go far enough in emphasising unique or important elements in the music. A good mix might identify and draw attention to the 'hook' in the song, highlight interesting and unusual sounds or instruments, or emphasise the 'groove' in the rhythm. "Many mixes are technically great, but they are nothing more than that" (Izhaki, 2007, p xiv).

Inappropriate

While many mixes contained elements that sound 'good', these elements were sometimes inappropriate for the song in terms of the genre, mood, message, or mix. For example, a kick drum in a soft ballad which has been mixed as if for a hip-hop song; excessive reverberation (or too little reverberation) on one element, which has the effect of disconnecting that element from the rest of the mix; or inappropriate use of effects such as flanging on a traditional jazz recording. "Mixing is more about listening overall than it is about making each element sound great." (Chuck Ainlay cited in Massey, 2000, p 281)

The themes identified in assessment feedback were supported by discussion with staff and students. A common request from students was that they be "taught how to mix", despite the fact that they received extensive education in the tools and techniques of mixing. Many students felt that textbooks and online resources, while presenting detailed instruction on the tools of mixing, did not provide sufficient advise on how and when to use them.

The research can be seen as a single cycle of an Action Research methodology. Having identified the need for change, the action planning stage took the form of a detailed literature review.

The goal of this phase of the research was to investigate the role of the mix engineer and to identify those elements of the process which go beyond the tools and techniques used in mixing. This led to a deeper investigation of ideas surrounding creativity.

The action stage of research was to conduct an experiment to test the hypothesis developed during the grounded study and literature review. In order to provide more meaningful results, the experiment was designed to minimise the impact of confounding variables. The following measures were taken for each of the confounding variables identified by Campbell and Stanley (1963):

History and **Maturation**

As the participants in the experiment were to be current students at SAE, it is likely that their study would influence their performance. Knowledge acquired between rounds of the experiment might result in improved outcomes. However, as all participants were, in theory at least, progressing through the course at the same rate, any improvements due to maturation should be similar across all participants and differences due to the dependant variable should remain relative.

Testing

Much like maturation, the experiment itself will provide the participants an opportunity to practise their craft. Participants might learn from their mistakes in early rounds, leading to improved outcomes in later rounds. Again, this should be similar across the sample group and should not impact relative outcomes.

Instrumentation

To avoid variations in the assessment of outcomes, the same assessors will be used for all four rounds of the experiment. Quantitative results from each assessor will be analysed and scaled to provide parity between data sets; the results are based on relative performance which will not be altered with normalisation.

Statistical regression

The experiment will be conducted over four rounds. Any 'accidentally' high or low outcomes will therefore have the opportunity for correction from other rounds.

Selection

Participants will be grouped in a pseudo-random fashion. Without being able to control for pre-study experience or individual talent, the only remaining factor is the stage of progression through the participant's course of study. To avoid randomly sorting participants into more- or less-experienced groups, the groups will be populated randomly from cohorts, in other words, an equal number of first- and second-year students in each group.

Experimental mortality

In an attempt to minimise attrition, participants will be provided with an incentive to complete all rounds of the experiment. Specifically, the final round would involve mixing a song destined for commercial release; the best mixes will be considered for release (winning the mixer a professional credit), but only if the participants complete all rounds of the experiment.

Following the action stage, the results of the experiment will be analysed and findings used to suggest further action.

The details of the research follow, beginning with discussion of the ideas uncovered during the literature review, and how these ideas apply to the mixing process.

Creativity

The traditional view of creativity, still held by many people today, is that it is something innate and unique to the creative individual, manifesting only in a 'chosen few'. Early discussion on creativity focused on spiritual or mystical causes (Kaufmann, 2009), such as Plato's Muses. It was not until the mid twentieth century, after J. P. Guilford's address at the 1950 American Psychological Association convention, that creativity became a subject for serious scientific research (McIntyre, 2008). Since then, many theories and models describing creativity and the creative process have been developed. In this chapter, we will discuss some of these ideas.

What is creativity?

In attempting to define creativity and the output of the creative process, most models boil down to two basic requirements: Is it novel? And is it suitable? (Sternberg & Lubart, 1995). Diedrich et al. (2015) suggest "novelty can be regarded as a first-order criterion and usefulness as a second-order criterion of creativity: If an idea is not novel its usefulness does not matter much, but if an idea is novel its usefulness will additionally determine its actual creativity". Or, as Kaufmann (2009), puts it:

> If you hire a contractor to work on your house and tell her that you especially value creativity, you will nonetheless be disappointed if she paves your driveway with rotten salami. It's different, and your driveway will be the most original on the block, but I wouldn't call it creative, and you likely wouldn't pay her.

If we accept this general definition of creativity, in what specific ways does it manifest?

The Four C's

Beghetto and Kaufmann (2007) propose four categories. Their first, "Big-C", is the creativity associated with Beethoven, Mozart, and Shakespeare; the creativity that produces works which last for generations and find a place in the cultural consciousness. Big-C is what most

people think of when discussing 'creativity'. However, Kaufmann suggests that creativity exists in other, more mundane, areas.

"Little-c" is the creativity associated with day-to-day life. It is the creativity of everyday problem solving and creative expression. Little-c represents the small moments of creativity such as "making up parody song lyrics to amuse someone, figuring out what might be substituted into a recipe if you don't have any eggs or milk ..." (Kaufmann, 2009).

The third, "mini-c", represents creative activity which is not necessarily novel or appropriate on a larger scale, but nevertheless contains elements of those characteristics for the person concerned. This is the creativity of the student exploring new skills for the first time. Mini-c involves "personally meaningful interpretations of experiences, actions and insights" (Daniels, 2013). This level of creativity is relevant to this project, as it represents the initial stages of a student's learning.

Finally, "Pro-C" represents the creativity of professional practitioners who are not necessarily eminent in their field (which would elevate them to Big-C status). This category of creativity requires the practitioner to have a good level of knowledge of the area in which they are working; to be "domain competent" (ibid.). The goal of audio education programmes can be seen as an attempt to guide students to a Pro-C state (if not all the way to Big-C). In doing so, these programmes focus on "tools and technology" (Davis & Parker, 2013) to achieve domain-competency. However, as we shall soon see, the domain is more than simple technical knowledge.

The Four P's

When discussing creativity, the focus of the discussion may be on the creative person, their processes, their environment, the product of their work or some combination of these. Mel Rhodes (1961) discovered that most theories on creativity followed one or more of these strands and labelled them the Four P's: person, product, process and press (which Kaufmann (2009) explains is "a fancy word that means environment; using it enables the nifty mnemonic of the four P's"). This echoes the statement from Plucker et al. (2004) that "creativity is the interaction among aptitude, process, and environment by which an individual or group

produces a perceptible product that is both novel and useful as defined within a social context".

These categories are still widely recognised and, although there have been additional P's suggested (including "potential" and "persuasion" (Runco, 2007)), I shall investigate some of the more relevant theories in terms of these distinctions.

Product and Press

As I have described, a creative product is defined as one that is both novel and useful. But how are these two characteristics established? Two theories help shine a light on this question: Csikszentmihalyi's *Systems Model* and Sternberg's *Propulsion Theory of Creativity.*

Systems Model

With the Systems Model, Csikszentmihalyi (1997) proposes that creativity comes from the interaction within "a system composed of three elements: a culture that contains symbolic rules, a person who brings novelty into the domain, and a field of experts who recognize and validate the innovation".

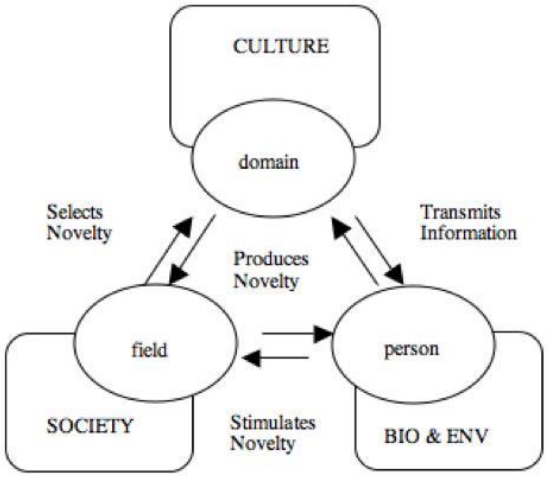

Figure 8 - Systems Model (Csikszentmihalyi, 1997)

The domain "is comprised of the conventions, the knowledges [sic], the system of symbolic codes and techniques the person must become immersed in, in order for novel variations to be made" (McIntyre, 2008). It also contains "all of the created products that have been accepted by the field in the past" (Sawyer, 2006). This enormous body of knowledge provides

the foundation and influence for the creative person to produce novel output. This output is then assessed by the field and, if successful, is selected for inclusion in the domain, beginning a new cycle. The field is "a complex network of experts with varying expertise, status, and power" (ibid.) or, as Kaufmann (2009) puts it, "the people who you need to impress if you want to be successful". The field both shapes the domain, through selection of new content, and is shaped by it, with the domain providing the rules for selection.

> For creativity to occur, a set of rules and practices must be transmitted from the domain to the individual. The individual must then produce a novel variation in the content of the domain. The variation then must be selected by the field for inclusion in the domain (Csikszentmihalyi, 1999).

The domain and field collectively influence the Press: the environment in which the creative process occurs and from which the creative product arises. The press covers the physical environment, for example, the sorts of spaces in which the process usually occurs, as well as the social and cultural environment. The physical environment can have a strong impact on creativity; for example, Kaufmann (2009) tells us that high ceilings and lighter colours have a positive impact on creative output. However, the physical environment is, to a large degree, also controlled by the conventions of the domain. An example of this is the traditional office space, an environment not particularly conducive to creativity, which is now being transformed by tech startups, such as Google (Coleman, 2016).

Propulsion Theory

While the Systems Model tries to explain how a product might be deemed 'creative' and therefore come to be included in the domain, Propulsion Theory (Sternberg, 1999) attempts to define the relationship of a new product to the domain. Sternberg provides eight ways in which a piece of creative work can relate to the body of work preceding it. The first four all describe contributions which, to a greater or lesser extent, remain within the existing framework of the domain. These are *replication*, *redefinition*, *forward incrementation*, and *advance forward incrementation*. All four of these contributions accept the current state of the domain and build upon it in increasingly significant ways.

Sternberg's remaining definitions describe creative products which reject the current state of the domain and seek to divert it in a new direction. *Redirection, reconstruction/redirection,* and *reinitiation* seek to redefine the domain, while *integration* draws upon another domain to provide new ideas to the existing domain.

Person

As Csikszentmihalyi (1997) suggests, a creative product must come from somewhere. Central to that 'somewhere' is the person creating the work. What personal attributes provide greater agency to creativity? Kaufmann (2009) highlights a number of studies linking various characteristics to different levels of creativity. Number and order of siblings, parental loss and hardship, to name a few, are all indicators for creativity. However, for the purposes of this investigation, I am interested only in those personal attributes that can be affected in adults. Prospective music professionals, particularly those taking the formal Higher Education path, are already the product of their makeup and background; these have already made their impact. However, as the person learns their craft and takes in new knowledge, what happens to their level of creativity?

Some scholars (Bloom, 1985; Hayes, 1989) suggest that an average of ten years is required before a practitioner reaches the point of making substantial contributions to their domain (reaching Pro-C level). This time is spent learning the mechanics, rules, practical issues, and so on, associated with the chosen area, along with years of experimentation and new ideas (Gardner, 1993). It can then take another ten years to progress to true greatness (ibid.; Kaufmann, 2007).

Others, however, suggest that the knowledge gained during this time may have an adverse effect on creativity. Frensch and Sternberg (1989), and Schooler and Melcher (1995) argue that too much knowledge can lead to inflexibility, hindering creativity. Also of note in this regard is the 'Path-of-least-resistance model' in which

> the tendency is to retrieve fairly specific, basic level exemplars from their cultural domain, select one or more of those retrieved instances as a

> starting point, and project many of the stored properties of the instances onto the novel ideas being developed (Ward et al., 2004).

This tells us that people will tend to return to previously-successful solutions to problems when new, similar problems arise, leading to stereotypical responses over time.

Nicholl and McLellan (2007) are quick to point out that this happens "when people draw on a limited range of previous knowledge, which is knowledge that readily comes to mind", indicating that this 'path-of-least-resistance' may only be a problem with practitioners in the early stages of their development. Similarly, Bilalic, McLeod, and Gobet (2008), in a study of professional chess players, found that although *some* expert chess players were inflexible, those that had a greater level of expertise were *more* likely to display flexibility (creativity) in their tactics. This may indicate that Alexander Pope (1709) was correct when he wrote:

> *A little learning is a dangerous thing;*
> *drink deep, or taste not the Pierian spring:*
> *there shallow draughts intoxicate the brain,*
> *and drinking largely sobers us again.*

Finally, it is possible to avoid the 'path-of-least-resistance', if the person is given instruction that encourages them to think more abstractly about the task (Ward, Patterson, & Sifonis, 2004). Later in this paper, we shall investigate this idea further in relation to novice mix engineers.

Process

While both the person and the product may have concrete, measurable attributes, the creative process is harder to define. Kaufmann (2009) likens the study of the creative process to "trying to hit a moving target—indeed, one that is zooming around the room like a deflating balloon". The process may be unique to each individual and "many great creative people be less skilled at articulating and explaining their own creative process" (ibid.). However, some theories have arisen that attempt to provide us with an understanding of aspects of the process.

An early theory (Wallas, 1926) follows a five-step process beginning with *Preparation*, in which the mind is focused on the problem and its parameters. Next is *Incubation*, a period of internal, almost subconscious, processing. This is followed by *Intimation,* in which the person has a feeling that a solution is coming (although this step is sometimes dropped from the model for being too vague (Kaufmann, 2009)). The fourth step is *Illumination,* in which the creative idea manifests consciously. Finally, during *Verification*, the idea is tested, elaborated, and applied.

A more recent, but similar, idea is the Geneplore model (Finke, Ward, & Smith, 1992). This is a two-stage model consisting of generation (of new ideas) and exploration (or evaluation of those ideas).

While both models do reflect the earlier definition of creativity - novelty (illumination/generation) and usefulness (verification/exploration) - neither sheds much light on how novelty is generated. We may gain some insight from the concepts of Homospatial and Janusian thinking (Rothenberg, 1991). Homospatial thinking is the process of taking two separate ideas and combining them into one new idea. “In the creator's mind, the superimposed and interposed elements begin immediately to interact and produce new identities, including new ideas.” (Rothenberg, 2015a). Janusian thinking, named after the two-faced Roman deity, “consists of actively conceiving and using multiple opposites or antitheses simultaneously” (Rothenberg, 2015b).

Everything is a Remix

Homospatial thinking has parallels in another theory, more recently developed, that explores the long-term process of becoming a creative practitioner. Kirby Ferguson (2015) proposes three “basic elements of creativity”: copy, transform, combine. He suggests that creative people begin their career by copying existing work from within their domain. This reinforces Sternberg’s *replication* and Kaufmann’s mini-c; the product is not new or ground-breaking, but is suitable and, more importantly, helps the person learn their craft.

Copying is followed by *transformation*, in which existing ideas are modified to provide new perspectives or interpretations. This mirrors several Propulsion Theory categories. Finally, the creator begins to *combine* concepts to generate new ideas; the process described in Homospatial thinking and Sternberg's *integration* definition. Ferguson argues that the greatest contributions to creative output come from this last stage.

Mixing

Music composition and performance are creative acts (ranging from the mini-c of the novice to the Big-C of renowned musicians) appreciated by audiences for centuries. Since the birth of recorded music in the late 1800's (and, in terms of live performance, the maturation of live sound reinforcement technology since the 1960's and 1970's), another layer has existed between the music and the listener. This layer consists of the various people or groups who, whether technically, financially, or culturally, facilitate the production of the final creative product. "In the studio technical decisions are aesthetic, aesthetic decisions are technical, and all such decisions are musical" (Frith & Zagorski-Thomas, 2012).

For the purposes of this investigation, I shall focus on one member of this group: the mix engineer (or mixer). Since the development of multi-microphone recording techniques and, more importantly, multitrack recording technology in the 1950's, the role of the mix engineer has first arisen and then evolved significantly. Where previously a recording "document[ed] and preserve[d] something that had happened" (Milner, 2009), these new tools allowed the creation of a piece of music that had never actually been performed in reality. The mix engineer is empowered to edit, enhance, recombine, and rebalance the discrete elements of the recorded music long after the musicians have completed their performances. By the 1980's this led to

> the complete jettisoning of the idea that [musicians] should make records based on real-time performances; the desire to 'fix' everything, down to the individual note; the power of twenty-four-track consoles to allow bands to amass huge collections of parts, then spend years building a sonic edifice; the idea that the sound of a record should be tailored explicitly toward salability, rather than a traditional idea of fidelity (Milner, 2009).

In this new world of recorded music, the mix engineer has significant impact on the final product. How creative is their role? To what extent can these people influence the creative product? What is their role in the creative process? What makes a *good* mix engineer? I will examine the role of the mix engineer in light of current theories on creativity.

As I have described, creativity requires both novelty and suitability. Novelty has long been a factor in the role of the mixer as technology and techniques advanced.

> The range of available processing and effects has evolved from mere gain changes, notably employed by Stokowski in 1929, through outboard EQ [sic] and dynamics processors in the 1960s, through analogue then digital hardware, to the plethora of software systems of today, often operating in the spectral domain (Paterson, 2011).

Big-C practitioners such as George Martin, Joe Meek, and Phil Spector developed now-commonly-used mixing techniques, including artificial double tracking (ADT), flanging, parallel compression, and side-chain dynamics processing (Izhaki, 2007); techniques that, at the time, pushed the boundaries of what was possible and acceptable in mixing but are now taken for granted. As George Massenburg notes: "... the production of iconic records is clearly at least equally about the record and about innovation" (in Massey, 2009, p. ix). As the music industry constantly sought out the new and interesting, mix engineers (along with other practitioners) have worked to provide this, evolving the sonic palettes of recorded music over the decades (witness the change from 'dry' recordings in the seventies to the heavy-handed use of reverb in the eighties (Milner, 2009)). "Mixing has always evolved. A good mix from the 1980s is likely to have more profound reverbs than the mix of a similar production from the 1990s. Part of the game is keeping up with the changing trends" (Izhaki, 2007, p. 27).

Suitability is a more complex issue. Following Csikszentmihalyi's Systems Model, the field selects for creativity, meaning novelty *and* suitability. Who is the field in this instance? In the immediate vicinity are other industry professionals such as the mixer's "peers in the studio, that is, other producers, engineers and musicians, as well as A&R [sic] executives" (McIntyre,

2008), who provide input during the creative process and act as experts in the domain. More generally, professional critics and the listening public act as members of the field by selecting with their opinions and attention (and money). “The ultimate test for a creative work is whether or not it’s accepted by a broad audience” (Sawyer, 2006).

The field’s selection is based, in turn, on their acceptance of the product in relation to the domain. In the domain of popular music, certain musical characteristics (such as tempo, time signatures, instrumentation, and even lyrical subject matter) gain traction with the field and, in turn, influence their selection, leading to the development of musical genres. Over time, the field “can allow a significant number and variety of novel changes into the domain or narrow the prospects of success in producing original works by only selecting a limited number of changes to the domain” (McIntyre, 2008), as genres increase in popularity and are then discarded in favour of newer forms. This follows too from Sternberg’s Propulsion Theory, in which products conforming to, for example, *Replication* or *Forward Incrementation* are firmly entrenched in a particular genre and represent only minor variations on the associated conventions, as with the slow transition from early Punk Rock to ‘SoCal’ punk bands. Sternberg’s *Redirection* or *Reinitiation* represent branchings of genres, such as the re-purposing of blues into ‘heavy metal’ by bands such as Led Zeppelin (Ferguson, 2015), and which were originally selected by more adventurous elements of the field before, in turn, becoming established conventions within the domain. On a technical level, recording techniques and objective audio quality behave similarly to musical factors. Audience expectations vary from the realistic high-fidelity surround recordings favoured in classical music circles to the intentionally poor quality recordings found in Black Metal. The sonics are as much part of the genre as the composition and arrangement.

> The sonic qualities of music are inseparable from the music itself - the Motown sound, the NEVE sound, the Wallace sound and so forth. Mixing, to a large extent, entails crafting the sonic aspects of the music. We shape sounds, crystallize soundscapes, establish sonic harmony between instruments and fabricate sonic impact - all are the outcome of many artistic and creative decisions we make, all are down to the talent and vision of each individual, all have a profound influence on how the music is perceived. It is

> in the equalization we dial, in the reverb we choose, in the attack we set on the compressor, to name a mere few. There simply isn't just one correct way of doing things - a kick, an acoustic guitar or any other instrument can be mixed in [a] hundred different way[s]; all could be considered technically correct, but some would be more breathtaking than others. A mix is a sonic portrait of the music (Izhaki, 2007, p. xiv).

In any case, the field's selection is made in the context of their (often subconscious) knowledge of the domain. Even between products of similar genre, there are deeper, often less tangible, considerations which can impact the field's decision. Psychoacoustic cues, emotional contexts, and sonic signifiers (such as creation of distance and perspective through the use of artificial reverberation) are embedded in the domain and influence the field's reactions to a new piece of music (McIntyre, 2008). In this context, the role of the mix engineer is to understand and utilise these concepts, in order to support the underlying characteristics of the song, such as the artist's original intention:

> Mixing is the final stage of creating a piece of music that has been conceived by the artist, reinterpreted by [the producer], put on tape, and tweaked and messed around with. It's a reading of a person's musical ability - their songs, their emotions, all the stuff is on tape and you've now got to sculpt it, shape it (Eddie Kramer, cited in Massey, 2000, p. 135);

the emotional context of the song:

> As mixing engineers, one of our greatest abilities, which is in fact our responsibility, is to help deliver the emotional context of a musical piece … It would make little sense to distort the drums on a mellow love song, just like it would not be right to soften the beat of a hip-hop production (Izhaki, 2007, p. 4);

and the music itself: "There's no set formula; the purpose of the mix is to complement the music, nothing else" (Bruce Swedien, cited in Massey, 2009, p. 48)

Returning to the Four P's of creativity, if creative products are required to satisfy the demands of the press (the field and domain), what can we say about the person (the mix engineer) and their creative process?

Person

What characteristics should a creative mix engineer possess? In order to produce output which meets with the approval of the field, the mixer must have a thorough understanding of their domain. This is a huge amount of technical and cultural knowledge that can take decades to absorb. In the current industry, education providers are attempting to fast-track this process. As I have described, the focus of such programmes tends to be on the technical aspects of audio production, rather than on the creative and cultural areas, leaving much of the domain unexplored. Nevertheless, a solid technical foundation is important. "You have to understand your equipment. You, as the engineer, have to share in the painting with the artist" (Phil Ramone, cited in Massey, 2000, p. 50).

> In terms of recording equipment, you need to understand every parameter and know what every knob is controlling, because you can't properly fulfill your responsibility to the music if you don't have that knowledge. We as engineers have a responsibility to the music, and you have to know at least basic technical principles in order to record music properly (Bruce Swedien, cited in Massey, 2009, p. 44).

As previously mentioned, a limited amount of experience can lead to novices pursuing the 'path of least resistance' and adopting previously successful, but perhaps non-optimal, solutions to new problems. Two renowned engineers suggest that foundational knowledge is nevertheless important:

> Well, I'm all for creativity, and it's true that sometimes not knowing too much is great and having too much knowledge can be a hinderance, but if you want a flute to sound like a flute it may not be a bad idea to know where to place a mic, and history has deemed that there are certain ways of doing things that yield the best sounds (Hugh Padgham, cited in Massey, 2009, p. 177).

> There are some exceptions, but understanding what the rules are doesn't make you less creative - it makes you more creative. In terms of equipment, you can get much more out of gear if you first know how to push the parameters as far as you can … but not too far, not to the point where it can degrade the music (Bruce Swedien, cited in Massey 2009, p. 45).

Moreover, the tendency to follow this path of least resistance can be avoided given appropriate instructions (Ward, Patterson, & Sifonis, 2004). A famous example of this comes from producer Brian Eno who employed *The Oblique Strategies*, a set of cards with written instructions (now commercially available), designed to redirect him from this path when inspiration failed him:

> The Oblique Strategies evolved from me being in a number of working situations when the panic of the situation - particularly in studios - tended to make me quickly forget that there were others ways of working and that there were tangential ways of attacking problems that were in many senses more interesting than the direct head-on approach. If you're in a panic, you tend to take the head-on approach because it seems to be the one that's going to yield the best results. Of course, that often isn't the case - it's just the most obvious and - apparently - reliable method. The function of the Oblique Strategies was, initially, to serve as a series of prompts which said, "Don't forget that you could adopt *this* attitude," or "Don't forget you could adopt *that* attitude" (Eno, 1980).

Knowledge of other aspects of the domain is equally important. An understanding of music, its rules, and its history is essential for music industry professionals (Bielmeier & Gordon, 2017). The domain "includes the body of songs they use as a template to make judgements in the studio" (McIntyre, 2009). The development of such knowledge and understanding can be seen as part of the long-term process of becoming a Pro-C mix engineer. "The mixer requires more than a sonic understanding of the recorded material, perhaps a relationship to

the song itself, its lyrical meaning, and the intended artistic, social or cultural goals" (Anthony, 2017).

Process

The long-term creative process

Ferguson's "Copy, Transform, Combine" (2015) gives us an insight into a novice mixer's creative journey from mini-c to Pro-C. Copying existing works and techniques helps cement a practitioner's understanding of the past and current state of the domain, providing a starting point for them to develop their own creative style. "I think you really have to hear the song and to go by your past influences, to bring out from your heart and your soul what you think the music is" (Chuck Ainlay, cited in Massey, 2000, p. 280).

Many educational programmes and instructional books take advantage of this idea of copying as a learning tool. For example, for several years SAE London has asked new students to match an existing mix using the original assets to develop an understanding of basic mixing techniques. William Moylan, in *Understanding and Crafting the Mix* (2007, p. xvi), suggests analysing previous works (in his case, the work of The Beatles) in order to understand "the sound qualities of recordings that will bring them to craft recordings that reflect focused artistic and aesthetic vision." Once the person has achieved a suitable level of understanding they can then move on to *transform* and *combine* their influences, producing output which progresses through Sternberg's Propulsion Theory contributions, advancing and eventually redefining the domain. "Sure, we all start off as copycats, but at a certain point you have to find your own thing, whether it's a combination of different sources that you've drawn together or something totally new" (John Simon, cited in Massey, 2009, p. 54). "As most professionals in the record business will tell you, it's when the tried and true meets the new and bold that real magic happens" (Massey, 2009, p. xi).

The short-term creative process

When it comes to the immediate creative process of producing a mix, there are as many different approaches as there are mixers. "Different mixers start from different places when building their mix" (Owsinski, 2013). In investigating the work of successful engineers, certain common themes emerge which relate to theories of the creative process generally. The

Geneplore model of generation and exploration is central to many modes of operation. Humberto Gatica explains that “after the mix is done, my assistant and I dissect it from many different points of view” (cited in Massey, 2000, p. 67), suggesting an iterative process of action and evaluation. Many engineers use the domain as a benchmark for evaluation: “And the way I do that is you have to have something to compare [the mix] to, so I’ll constantly be playing CDs.” (Andy Johns,cited in Massey, 2000, p. 139).

Roey Izhaki (2007) proposes a variation on the Geneplore model, involving a cycle of three stages: Vision, Action, and Evaluation. He argues that, while novices engage in a two-stage process of action and evaluation, this is not sufficient as “the process of mixing for them is a trial-and-error affair between acting and evaluating. But how can one critically evaluate something without a clear idea of what one wants?” (ibid., p. 26). Izhaki suggests that evaluation (or exploration in the Geneplore model) can only be successful if done in reference to a “vision”; a preconceived idea of what the end product should be.

The concept of a pre-mix vision is popular amongst professionals:

> If you can’t imagine a sound, then you’re really just on a search-and-destroy mission - sort of an experimental, exploratory surgery kind of thing - and so you’re just hoping you’ll come up with something. Then you’ll either have a good accident or a bad accident - but you’re going to have an accident (Michael Bradford, cited in Massey, 2009, p. 277).

> Know what you’re going for first; have an idea of what you’re going for first. It’s like if you walk into a kitchen and you don’t know what you want to eat, you end up opening the fridge and the cupboards, just looking around. If you know what you want, you get a pot, you turn on the fire, you put the water in it, you have an objective (Darryl Swann, cited in Massey, 2009, p. 291).

> I think one of the things that helps me as a mixer, and one thing that helps all of the ones that have made a mark, is what I call “having the vision.” I always try to have a vision of the mix when I start. Rather than just randomly pushing

> up faders and saying, “Well, a little of this EQ or effect might be nice,” I like to have a vision as far as where we’re going and what’s the perspective (Ed Seay, cited in Owsinski, 2013, p. 7).

The vision provides the mixer with a frame of reference against which all actions can be evaluated. How is this vision established? William Moylan (2007, p. 321) suggests that

> How one arrives at a vision of what the song needs to sound like is not important. What is important is having a strong sense of the desired overall sound qualities of song, and a strong sense of how some (or most, or all) of the details of the music will bring this to reality.

These “desired overall sound qualities” are derived from the artistic intention and emotion of the piece of music.

> Much [sic] of the creative aspects of mixing establish themselves through this core objective [reflecting the emotional context of the music] … Heavy compression, aggressive equalization, dirty distortion and a loud punchy snare are very likely to defeat any emotional content of a mellow jazz song (Izhaki, 2007, p. 59).

The vision begins with an analysis of the composition, its instrumentation, its lyrical content (if any), its arrangement, and the sonic qualities of and relationships between the various recorded materials in the mix. For Moylan (2007), this process helps identify the “musical message” or purpose of the music. Owsinski (2013) describes this process as an attempt to “Figure out the direction of the song”. The mixer must then use their knowledge of the domain to judge the sonic qualities that best support the message or direction. This requires that the mixer understand the emotional and psychoacoustic effects of the sonic and musical attributes of the materials in the mix, and whether these attributes need to be enhanced, altered, replaced or, occasionally, left untouched. Some of these attributes, such as the acoustics or reverberation in a recording, are purely psychoacoustic and largely independent of cultural differences. “The listener will conceive the performance as existing in a real,

physical space, because the human mind will interpret any human activity in relationship to the known physical experiences of the individual" (Moylan, 2007, p. 177). Others, for example the musical or sonic clichés commonly found in film soundtracks, might be specific to a particular demographic with a shared cultural heritage; "It is easy to imagine a Western chase scene, or an impending shark attack, when listening to certain pieces of music—after one has heard the music and seen the action together enough times" (ibid., p. 62)

The creation of a vision for the mix begins with an analysis of the music and materials in the piece. This analysis draws upon the mixer's knowledge of the domain and their understanding of the emotion and intention behind the music. For some mixers, this process may be unconscious and instinctive. For others, particularly those new to the role, their vision, and therefore the final mix, might benefit from a conscious and structured analysis of the music.

Several mix engineers and writers (Owsinski, Moylan, Izhaki, to name a few) have touched upon this analysis in their works and, to a greater or lesser extent, have provided guidance for the novice on how to conduct such an analysis. However, the focus of most writing and education around mixing is on the technology and techniques involved (Davis & Parker, 2013), usually putting little emphasis on analysis. For example, in Izhaki's (2007) chapter on equalisation (EQ), he describes the types and controls of EQs, applications of EQ, and subjective terms associated with the audio frequency spectrum ("boomy", "nasal", "bright", "dark"). Izhaki presents some practical tips and even outlines common techniques associated with different instruments. He discusses ways in which EQ can be used to shape the "tonal presentation" of each instrument, making the sounds "thin or fat, big or small, clean or dirty, elegant or rude, sharp or rounded and more". This is a fairly typical (although, in this case, more thorough and detailed than usual) treatment of the subject, similar in structure and content to other textbooks. There is no denying that the information presented is useful. However, the final subjective evaluations of which EQ to use, how to use it and how to assess the end result, are left to the reader. While these decisions are, ultimately, the responsibility of the mixer, it is the ability to confidently make this evaluation that so many novices lack. Izhaki cautions the reader: "... taking too much of the mids creates a very distant sound …"; how much is "too much"?

To use an analogy, bland food can potentially be made more appealing by adding salt or other seasonings. The novice chef will, through lessons or books, be made well aware of the possibilities. However, they must also develop the ability to answer a number of questions: Is seasoning needed? Which seasoning is most suitable? How much is required? How much is too much? The answers to these questions come from the chef's knowledge of the domain and their vision of how the completed dish should taste, based on their interpretation of the recipe. Limited experience and knowledge of the domain might tell us that salt is not to be added to desserts, until the novice encounters salted toffee!

Research question

Knowledge of tools and techniques is not enough if the vision does not exist: The mix might be 'technically' acceptable, but would lack emotional context. If the novice cannot instinctively arrive at their own vision, can they be trained and encouraged to develop a vision through a directed analysis of the mix?

To try to answer this question, an experiment was conducted investigating the effect of a structured analysis process based on the work of Moylan, Owsinski, and others. The ideas presented by these writers and mix engineers were used to construct a questionnaire. This was presented to novice mix engineers, along with some unmixed recorded material which the participants were asked to mix. These mixes were assessed by experienced industry and audio education professionals to determine whether the analysis resulted in better outcomes.

The Experiment

An experiment was conducted to test the hypothesis that engaging in a process to build a vision of a mix will lead to more creative outcomes. Novice mix engineers (in this case, audio production students) were asked to mix three songs each. Some participants were given an additional task before beginning their mixes: completing a questionnaire designed to help them develop a vision for their mix. Each mix was then graded by three industry professionals and the average of their grades taken as the score for that mix. These scores were analysed to determine the effect, if any, of the intervention. I will discuss the details of the experiment in this section.

Designing the questionnaire

A questionnaire was produced for each song. The purpose of the questionnaire was to guide participants through a structured process designed to help them build their own vision. The process also helped in another way: Given that novices often fall into the 'path-of-least-resistance', discussed previously, the questionnaire acts as a tool to encourage them to think more abstractly about the task, reducing the risk of a creative rut (Ward, Patterson & Sifonis, 2004).

The questionnaire was in two parts. The first part consisted of questions about the song as a whole. Both Moylan and Owsinski suggest questions that can be asked about the song and/or arrangement as a whole. Moylan's numerous questions largely relate to the message, emotional context and relationship the song has to the listener, and will "lead the recordist with direction and purpose to crafting a mix that supports the music and presents it in the most appropriate way" (Moylan, 2007, p. 323); for example:

- How does the story of the text unfold? How does the music support this? How can the mix support this?
- What relationship do I want the listener to have with the music? (Observing from afar or intimately close? Maintaining a comfortable distance? In a large performance space or small? Focused on the text or feeling the beat? And many more.)
- What special qualities are needed to most effectively present what the song is trying to portray?
- How should each of the overall qualities contribute to communicating the music? (Moylan, 2007)

Owsinski (2013) is more concise, telling the mixer to "figure out the direction of the song" and "find the most important element and emphasise it".

The second part contained questions about each track in the project. Owsinski again is fairly brief in his analysis, telling the mixer to identify the role of each element (instrument or track)

within the mix. Mix elements can be grouped into five categories, helping the mixer to make decisions about the importance and treatment of each instrument. These categories are:

Foundation - the rhythm section, usually bass and drums, but possibly including rhythm guitars and/or keyboards.
Pad - sustained sounds which fill in the mix
Rhythm - rhythmic elements (such as percussion) playing counter to Foundation. Adds motion and excitement.
Lead - the lead vocal or instrument, an instrumental solo.
Fills - brief musical elements between the lead lines. Often an answer or counterpoint to the Lead elements.

Moylan (2007, p. 321) goes further, asking questions about each element in the broader context of the song's message, saying "a successful mix will be constructed with a returning focus on the materials of the song, and the message of the music. The musical ideas that were captured in tracking are now presented in the mix in ways that best deliver the story of the text and the character of the music".

For example:

- How can this instrument/voice, presenting this musical idea, be placed in the musical balance to contribute most effectively?
- What spatial qualities and relationships will most effectively present this instrument/voice and its musical material? (Moylan, 2007)

These questions, along with previously discussed theories on the creative process, formed the basis of the questionnaire.

The sections below list the questions and the rationale behind them. Note that only the text of the questions themselves were provided to the participants, not the rationale, which may have unduly influenced their responses.

The Questions

Section 1- Questions regarding the song as a whole

What genre would you consider the song to fall into?

Identifying the genre and, therefore, the piece's position in the broader domain is important for establishing a vision for the mix. The suitability of the mix, in terms of the creative product, is judged against the expectations of the field, which are influenced by the conventions of the domain. Otherwise we may find that "sweet reverberant vocals, sympathetic drum mix and quiet guitars will destroy an angry heavy metal song" (Izhaki, 2007, p 59). The importance of genre also follows from Sternberg's (1999) Propulsion Theory and Ferguson's (2015) "Copy, Transform, Combine": Most, if not all, mixes will be influenced by previous mixes of the same genre as the mix engineer draws upon their own experiences.

What is the lyrical message of the song? What is the song about?

In most cases the emotional context of the song derives from, or can be extracted from, the message contained in the lyrics. "The big picture is the song and its emotional impact" (Tharp, cited in Lingle, 2005).

How does the music support the message of the lyrics?

Compositional characteristics such as musical key (major or minor), tempo, instrumentation, arrangement, interaction between voice and lead instruments (call-and-response, counterpoint) can help support the message and emotion of the song. The mixer should identify these elements and work to enhance them (or, at least, to not damage them). A thorough analysis of the musical content of a piece would require a solid background in music theory; in this case, the intention is for the participants to identify the simplest, most readily identifiable themes.

How can the mix best support the message?

Once the message and the musical materials in the piece have been identified, the vision for the mix develops from the relationship between the music and the message. Do certain elements require emphasis? Should the overall character of the mix be soft or harsh, bold or delicate, dramatic or subtle?

What relationship should the listener have with the music?

"Observing from afar or intimately close? Maintaining a comfortable distance? In a large performance space or small? Focused on the text or feeling the beat?" (Moylan, 2007, p. 322).

The mixer is responsible for creating the 'space' for the music. The mixer can create a sense of intimacy or detachment with the performance. Sudden variations in the mix can shift the listener's attention, reinforcing their engagement with the music; alternatively, a consistent and unchanging mix might create a repetitive, almost hypnotic, effect.

What sonic qualities should the song have to achieve this relationship?

If the listener is to have a particular relationship with the music, how will the relationship be achieved? 'Space' can be achieved through the use of artificial reverberation and delay processing, relative levels of instruments within the mix, and other techniques (such as equalisation).

Section 2 - Questions regarding each element within the mix

In this case, the questions were repeated for each track in the Pro Tools project file ("01_Kick", "02_Snare", and so on).

What role does this element play in the song?

Identifying the role of each mix element can help determine what sort of treatment is required. Broad classifications, such as Owsinki's five categories, can help group musical materials together. Some instruments can play a variety of roles depending on context. For example,

> Acoustic guitars can play various roles in the mix. On some mixes, often sparse ones, the guitar is one of the main instruments, usually along with the vocals. In such circumstances, we often want the guitar sound to be rich and full-bodied. On other mixes, the acoustic guitars only provide a reinforcement of the harmony and rhythm, which means that their body is less important (Izhaki, 2007).

How important is this element in the song?

"The big question is, who's the feature? And who's accompanying the feature? Is it a piano, a guitar, a sax?" (Ralph Sutton, cited in Massey, 2000, p. 293). Owsinski (2013) tells us to "find the most important element and emphasise it". This is usually the case when a song has a noticeable hook, catchy melody or interesting sound that sets it apart. In many cases, the "most important element" is the main vocal part (Izhaki, 2007).

Relative importance can also be useful in determining the order in which the mixer approaches the instruments in the mix:

> ... important tracks are mixed at early stages when there is still space in the mix and so they can be made bigger. The least important tracks are mixed last into a crowded mix, but there is less of a consequence in making them smaller (Izhaki, 2007).

What sonic qualities does this element currently have?

> I tell my students, 'If it sounds good, it is good; taste your food before you salt it.' I know so many guys that feel that they're not earning their money unless they're pushing switches and turning knobs. No, you've got to listen to your sound (Darryl Swann in Massey, 2009, p 291).

Before applying any processing, it is important to assess the quality of each recorded mix element. This will help determine corrective processing (high pass filters to remove rumble, or low pass filters to remove hiss, for example) and establish a baseline for further processing in the context of the mix.

What sonic qualities should this element have to best fill its role in the song and help the overall mix?

On a smaller scale, this helps develop a 'vision' for each element in the bigger picture of the mix. Having determined the current sonic qualities of the instrument and the desired qualities, the mixer can readily decide upon a course of action for that mix element and, more importantly, will have a vision against which they can judge the success of their actions.

The Participants

As this experiment was aimed at novice mix engineers, the participants were students from the Audio Production programme at SAE London. All students enrolled at the time of the experiment were invited to participate. Approximately 30 students responded and were given further information about the experiment.

The participants were randomly divided into three groups. The only non-random factor in the distribution was to ensure that each group contained an equal mix of first- and second-year students, giving an equal level of experience to each group (individual pre-SAE experience aside).

All communication with participants was done via email. The emails are included in Appendix A. Participants were encouraged to avoid discussing the experiment with classmates in case this influenced the results.

Participants were given three songs to mix. There were no restrictions or guidelines on the methods, tools, platforms, and so on, used for the mixes, allowing each participant to choose tools most suitable to them and the mix.

Depending on the song and the group, the participants were also given a link to a Google Forms survey containing the questionnaire for that song, which they were asked to complete before starting the mix. The groups receiving the questionnaire in each round are detailed below: (N = no questionnaire, Y = participants received questionnaire).

	Group 1	Group 2	Group 3
Song 1	N	N	Y
Song 2	N	Y	Y
Song 3	N	Y	Y

Figure 9 - Pre-mix questionnaire allocation

Group 1 remained largely a control group. Without the questionnaire, the participants were expected to mix the songs using their usual methods.

Group 2 did not receive the questionnaire for the first song, but did for all other songs.
Group 3 were given the questionnaires for all songs.

The hypothesis was that the mixes which were performed after completing the questionnaire would receive better grades from the assessors (assessment will be discussed later in this section). Thus, we should expect Group 3 to receive better results than Group 1. Group 2's results should be better in round 2 than in round 1 and should be better than Group 1 in rounds 2 and 3.

Mix Assessment

Participants were instructed to submit their completed mixes as 320kbps MP3 files. These files were renamed with randomly generated ID numbers before being sent for assessment to ensure anonymity. Three assessors were used. All were members of the Audio Production department at SAE London and experienced audio professionals, with several years experience in assessing student productions. Each mix was independently graded by all three assessors, and the average of their grades used as the final score for that mix.

In assessing the mixes, both qualitative and quantitative feedback is important. Quantitative data is necessary to make objective judgements regarding the effectiveness of the questionnaire process and therefore the success of the experiment. However, given the subjective nature of mixing and creative expression, qualitative responses are also important in determining how and why the mixes differed in their grading.

William Moylan (2007), having provided some of the foundation for our questionnaire, also suggests a system for evaluating musical recordings based on various sonic characteristics. This is outlined in the table below, where the Elements of Sound describe broad characteristics and the Evaluation Graphs and Processes identify specific areas for analysis within the song.

Element of Sound	*Evaluation Graphs and Processes*
Time	Time line of song; with structure, phrase, and text indications Sound sources against time line
Pitch	Melodic contour Pitch area Pitch density
Dynamics	Dynamic contour Musical balance
Sound quality	Performance intensity Sound quality evaluation Timbral balance
Spatial properties	Distance location Stereo location and surround location Sound stage Perceived performance environment Environmental characteristics of sources

Figure 10 - Evaluation techniques for the elements of sound (Moylan, 2007, p. 101)

Moylan's intention is to use these criteria as a learning tool; the reader is encouraged to analyse these elements in existing recorded music, in order to discover the methods used by previous engineers. Moylan, for example, focuses a great deal on the works of the Beatles and therefore is analysing the techniques of George Martin and Geoff Emerick, the band's producer and primary engineer respectively. In making this suggestion, he is implying that these works represent a standard to aspire to and that they provide a benchmark in each criterion. However, this can also be a useful tool for assessing quality; an experienced practitioner can analyse a recording using these criteria and, in each case, compare that recording to their own expectations derived, from their knowledge of the Domain.

For the purposes of this experiment, we are interested primarily in those characteristics which can be controlled or affected by the mixer. Given that the participants were not involved in the composition or recording of the songs, certain criteria were less relevant. "Time line of song", for example, is determined largely by the composition. However, related criteria such as "Sound sources against the time line" and "Dynamic contour" (referring to the dynamic variation throughout the progression of the music) can be influenced by the mixer by either muting or varying the loudness of musical elements in the mix. Similarly, the song's "melodic

contour" comes from the composition. The mixer may have some role in clarifying or emphasising the melody, based on the balance of instruments in the mix.

As the pieces are already recorded, "performance intensity" is something over which the participants have no control. However, certain related characteristics may be under the mixer's control. "Performance intensity" refers to the loudness, physical exertion, emotion and so on, in the original performance. The mixer has no control over whether the singer was shouting or whispering, for example. "The listener recognizes the amount of physical exertion required to produce a certain sound quality on an instrument. This understanding becomes the perceived performance intensity" (Moylan, 2007, p. 141). On the other hand, some sounds and instruments are open to retrospective adjustment of perceived performance intensity. As an example, an electric guitar will tend to produce more harmonics if played harder; this could be simulated with distortion processing at mixdown.

The other criteria on Moylan's list are all able to be modified by the mix engineer through the use of processing tools such as equalisation, dynamics processing, time-based effects processing, and automation.

Owsinski (2013) also presents criteria for a successful mix:

Balance - the volume level relationship between musical elements
Frequency Range - having all frequencies properly represented
Panorama - placing a musical element in the sound field
Dimension - adding ambience to a musical element
Dynamics - controlling the volume envelopes of a track or instrument
Interest - making the mix special

As with Moylan's elements of sound, judgement of these criteria requires an understanding of the Domain in order to establish suitability. For example, knowledge and experience of the style of music would be necessary in determining whether the frequencies are 'properly' represented. Equally, the Interest criterion would be difficult to judge without a thorough knowledge of the Domain; this requires an understanding of what makes a song "sound

emotional and urgent and exciting so that it's not just a song, it's a record" (Ed Seay, cited in Owsinski, 2013).

Assessment criteria

For the purposes of this experiment, the mixes were assessed using a modified version of SAE London's assessment criteria for creative mix assignments. This method of assessment has been used successfully at SAE London for a number of years, and is designed to allow objective assessment of productions based on technical and creative characteristics. The mix is assessed on ten criteria, each of which is given a score out of 10. The overall grade for the mix is the sum of the ten criteria, giving a total out of 100.

One criterion was removed, leaving nine criteria and a grade out of 90. The removed criterion was "Presentation", relating to the written report that SAE students are expected to submit along with their assignments and was not relevant in this experiment. Other criteria were also slightly modified to account for differences between SAE assessments and the experiment. The assessors were given written instructions informing them of the changes.

The nine assessment criteria link closely to both Moylan's and Owsinski's criteria for assessing mixes, providing some additional weight to their usefulness as an assessment tool. The criteria are explained below and related to Moylan's and Owsinski's ideas.

1. Format

This criterion covers a number of primarily technical characteristics. These include topping and tailing (removal of unwanted sounds such as amplifier hum from the start or end of the song), absence of unwanted clicks or pops (usually from bad edits or lack of crossfades when editing), absence of unwanted distortion (from overloading or 'clipping' in the signal path), suitably low noise floor and other measurable sound quality characteristics.

2. Level Balance

Referring to the relative levels (loudness) between instruments. While there may be some subjectivity in the finer details of level balance, objective assessment can be made based on whether instruments are audible when present in the mix and on the expectations of the

genre. It is also the mixer's job to "know that everything is properly balanced and that it will translate well to TV and radio and also sound good to people listening on earbuds or their laptop speakers" (Justin Niebank, cited in Massey, 2009, p. 253). This criterion corresponds to Moylan's (2007) "Musical balance" and Owsinski's (2013) "Balance".

3. Frequency Spectrum

The frequency content of the mix should be balanced in a way that is appropriate to the instrumentation and genre of the song and avoids prominent resonances. This corresponds to "Timbral balance" (Moylan, 2007) and "Frequency Range" (Owsinski, 2013)

4. Definition

Referring to the definition, clarity, and quality of individual instruments within the mix, this criterion relates to Moylan's "Sound quality" (2007). Definition is largely determined by the quality of the original recording, but can be enhanced (or damaged) by decisions made during the mix.

5. Dynamics Processing

This criterion refers to the mixer's use of dynamics processing, especially compression, in ensuring appropriate control of the dynamics and envelopes of sounds in the mix. Macro-dynamics (the variations in the loudness of a sound over periods of longer than a single note) can also be controlled using volume automation. This corresponds to "Dynamics" (Owsinski, 2013). Moylan's "Dynamic contour" (2007) relates more to long-term dynamics over entire songs and is more relevant to Level Balance and Creativity/Interest.

6. Effect Processing

Focusing primarily on use of reverberation to create a sense of shared space and depth, this criterion assesses the use of time-based processing (reverbs, delays, and modulation effect) in the mix. Artificial reverberation is usually required to recreate acoustic ambience, due to the prevalence of close-miking techniques in modern recording. However, some recording styles, notably those used in classical and traditional jazz recordings, rely on capturing the natural acoustics of the performance environment; in this case addition of artificial reverberation might not be suitable. This criterion covers several of Moylan's (2007) criteria:

"Sound stage", "Perceived performance environment" and "Distance location". It also corresponds to Owsinski's "Dimension" (2013).

7. Stereo Image

Placement of mix elements in the stereo field can be achieved through the use of time and/or level differences between the left and right channels, and can be important in creating separation and building a realistic image. This relates to "Stereo location" (Moylan, 2007) and "Panorama" (Owsinski, 2013).

8. Creativity/Interest

The previous criteria are focused on the mix successfully meeting expectations in largely technical characteristics and, in the context of determining whether a mix is creative, are assessing 'suitability'. This criterion allows assessors to judge those aspects of the mix which go beyond objective suitability and add novel elements to the mix. For example, a mixer might use unusual effects processing on certain elements, to create a particular feel or to recall a specific historical mixing style (for example, applying gated reverbs to drums is a signature effect used in the 1980s but not much after that). They might employ mute or volume automation to alter the balance of different sections of the song to enhance the progression and structure of the music. This would correspond to Owsinki's "Interest" (2013) and, in some aspects, to Moylan's "Dynamic contour" (2007).

9. Production

In many cases, the mix engineer might feel the need to add elements to the song or to improve the performance of existing elements. For example, mix engineers might reinforce a kick or snare drum with samples for extra punch. They could use pitch and/or time correction tools to correct mistakes in a performance or to make a good performance that little bit better. Mix engineers might add percussion (shakers, tambourines, and so on) to emphasise the groove of the song or a synthesised bassline to support the foundation of the music. The participants in the experiment were given free rein to do whatever they felt necessary for the music; any such additions would be addressed in the section.

The Results

The experiment produced both quantitative data, in the form of numerical grades for each mix, and qualitative data from the assessors' comments. The data is analysed and discussed in this section. The first analysis looks at the overall scores awarded to the mixes in the experiment.

Overall scores - Song 1

The results for Round one are displayed below.

Group	Results						Mean	Confidence
Group 1	54	63	65	74			**64**	8.04
Group 2	61	61	65	66	71		**64.8**	4.14
Group 3	59	63	66	69	70	74	**66.8**	5.08

Figure 11 - Mix assessment results for Song 1

A point to address immediately is the sample size. The initial call for participants resulted in 39 respondents willing to take part. This provided three groups of 13 participants. However, a large number of participants failed to submit, leaving only 15 mixes to analyse (a 39% response rate). The low sample and other experimental issues will be explored further at the conclusion of this chapter. For the purposes of the current analysis, the outcome of the small sample size is a lower level of confidence in the average scores for each group and, therefore, the effectiveness of the intervention.

The table above shows the individual results and the average result for each group. The 'Confidence' column shows half the width of the 95% confidence interval. That is, based on the data provided, there is a 95% chance that a value picked at random from the data set will deviate from the mean by less than the confidence value. The small sample size, particularly in Group 1, gives a fairly wide confidence interval.

Nevertheless, there is a small difference in the calculated mean for the intervention group (group 3). Group 3's performance is, on average, 3.7% better than the other two groups, while there is only a 1.2% difference between the control groups.

Overall scores - Song 2

Round 2	Results					Mean	Confidence
Group 1	63	65	68	75		**67.8**	5.03
Group 2	64	70	71	72	75	**70.4**	3.98
Group 3	63	67	72	73	76	**70**	4.87

Figure 12 - Mix assessment results for Song 2

In round 2, group 1 remained the control group while group 2 joined group 3 as the intervention groups, with both groups receiving instruction to complete the pre-mix questionnaire. Three points are worth noting. First, the overall results are better. The possible causes of this will be discussed later. Secondly, groups 2 and 3 have higher means than group 1 (3.9% and 3.3% improvements respectively). Finally, group 2's performance has improved from being on-par with group 1 to now being similar to group 3.

Overall scores - Song 3

Group	Results				Mean	Confidence
Group 1	64	65	71		**66.7**	4.28
Group 2	68	70	71		**69.7**	2.12
Group 3	68	68	69	74	**69.8**	2.81

Figure 13 - Mix assessment results for Song 3

Round 3 shows a similar pattern to round 2. The means for groups 2 and 3 are once again higher than group 1, by 4.5% and 4.6% respectively.

From the overall scores, there appears to be a small but consistent improvement in the outcomes of participants engaging in the pre-mix questionnaire.

Averaged across all three rounds, the mean of all control group outcomes (group 1 and the first round scores of group 2) is 65.69, while the mean of all intervention group outcomes is 69.17. This is a 5.3% improvement in outcomes for the intervention.

Experimental analysis

Before examining the data any further, let us discuss some concerns in the execution of the experiment. Campbell and Stanley (1963) list a number of confounding variables which may impact the results of an experiment.

1. History - events occurring during the experiment which may change later outcomes.
2. Maturation - changes in the participants themselves over the course of the experiment which might alter later outcomes.
3. Testing - the process of repeatedly undertaking tasks in the experiment might influence later outcomes.
4. Instrumentation - variations in how outcomes are measured can affect outcomes.
5. Statistical regression - outlying data might be anomalous; multiple tests may show regression to the mean.
6. Selection - improper selection of the sample groups might influence outcomes.
7. Experimental mortality - participants may not complete the experiment.

As several of these confounding variables may be at play in this case, it is worth discussing and, where possible, countering these variables. As the participants were actively engaged in the study of audio production and were associating with other participants over the course of the experiment, the *history*, *maturation*, and *testing* variables may affect the results. In general, it could be assumed that the participants' knowledge of the domain of audio production and skills in mixing would improve over time; they would continue to attend classes, gain experience and even learn from mixing the songs in the experiment. As the experiment was run over a period of three months, this may account, to some degree, for the overall improvement seen between rounds 1 and 2.

Instrumentation reflects variation in measurement and, in this case, would be related to the differences in grading between the assessors. The overall result for each mix is the average of all assessors' grades for that mix, which compensates for assessors who might grade towards the upper or lower bounds of the scale. However, there may have been differences in how the individual criteria were graded. Despite the instructions to assessors and discrete criteria (based on previous assessments and Moylan's and Owsinski's mix elements), there may be variations in interpretation of some sonic elements of a mix. For example, use of a rhythmic echo effect could be assessed and commented upon in Effects Processing (grouping the sound with other effects such as Reverb) or Creativity/Interest (by considering the addition of the effect to be something done to enhance the arrangement, rather than as a simple effect). This is likely to make it difficult to draw clear conclusions from a quantitative analysis of individual criteria across groups and/or rounds. Instead, the qualitative comments will play a more useful role in this regard.

The biggest concern is *experimental mortality*. As mentioned, the sample size is smaller than anticipated, resulting in fairly wide confidence intervals. There was further attrition through rounds 2 and 3, although the confidence intervals decreased due to the lower variation in outcomes. The attrition is another factor which may have contributed to the increased results in later rounds; the participants who continued with the experiment may be more dedicated and conscientious students who would tend to perform better due to their own self-motivated learning and experience.

Qualitative responses

The score derived from the mix assessment can be thought of as a measure of the overall quality of the mix. This is largely subjective, despite being based on well defined criteria. That is, each assessor will have a different opinion of what constitutes 'acceptable' in any individual criterion. A frequency balance that receives a score of seven from one assessor might be awarded a five by another. The discrepancy in assessors' standards limits us to relative comparisons of quality between mixes, rather than absolute measures of quality (an interesting and potentially enlightening experiment, beyond the scope of this project, would be to measure various assessors' grading of professional quality mixes - that is, mixes already deemed to be acceptable the field - to find the variability in subjective judgement).

A further consideration in this experiment is the ability of the participants to realise their vision for the mix (if, indeed, they have one). All participants in the experiment were novice mix engineers. Many may lack the requisite technical skills to implement their vision.

> To me, being an engineer is 85 percent creative and 15 percent technical. You really don't need any more technical knowledge than that; it's just a matter of knowing what button to push. Once you learn signal flow, it's really a matter of, what do you hear? (Larry Levine, cited in Massey, 2009, p 33)

Levine echoes other engineers' opinions of the importance of creativity (and, from this, a vision), but recognises that there is still a place for technical skill and knowledge. What if a novice mix engineer has a strong vision for a mix, but is let down by their ability to implement their vision? How are we to know, from numerical scores, whether a mix was technically proficient but lacked creativity or, alternatively, had a strong creative vision which was hindered by the mixer's ability?

Qualitative quantities

A deeper understanding of the rationale behind the assessors' scores can be gleaned from a review of their comments. A large number of the comments, across all mixes and most criteria, related in some way to a *quantity*. That is, the assessor used terms such as "more", "less", "too much", "too little". These terms are variously applied to the levels of individual instruments or elements within the mix ("the hi-hat is too loud", "the bass needs to come up"), to areas of the frequency spectrum ("a little too bright", "a very midrange focused mix"), to amounts of "wet" effected signals added to the mix ("the drums have a little too much effect on them","concerntrate [sic] on creating space") or to the balance of the stereo image ("the mix leans a little to the left").

All of these *quantity* statements relate to the suitability of the mix, and would not have been made had the assessor thought that the related characteristic was acceptable (relative to their understanding of the Domain). However, there are several important things to consider regarding these types of comments.

First of all, *quantity* statements appear consistently throughout all mix assessments; every mix in all three rounds was given at least one such piece of feedback by each assessor. Most of the *quantity* statements lack an objective measurement; if a mix has "too much bass", how far has the mixer deviated from the assessor's 'ideal' reference level? Even qualifying terms such as "a little" or "far too much" are subjective and offer nothing in the way of objectivity. This subjectivity helps us account for the ubiquity of *quantity* comments; unless the mix exactly met the assessor's expectations then the feedback is almost certain to contain such comments.

Secondly, the presence of *quantity* comments might be a factor, not of the mixer's vision or creativity, but of their technical ability. For example, a common cause of frequency spectrum imbalances is poor monitoring. If a mix engineer is mixing on speakers (or headphones) which do not accurately represent the frequency content of the material, then they are unable to make objective judgements regarding the spectral balance of the mix. A more technically proficient engineer may be able to compensate for this deficiency, but a novice would likely struggle. In a similar way the process of 'gain staging' a mix (namely, establishing the appropriate amount of gain applied to the signal at various points) can have an effect on noise levels, clarity, and successful use of dynamics processing; gain staging is a largely technical, objective process which novices may not be able to conduct proficiently.

Finally, given that all mixes received *quantity* comments in their assessment feedback, there appears to be little correlation between the presence of such comments and whether or not the participant engaged in the pre-mix questionnaire. As a result, these comments form a sort of 'white noise' through which we must search for more specific and useful feedback.

Comments on style

A second category of comments are those about *style*. This category covers comments related to any criteria in which a mixer made a choice regarding some element of the mix beyond a *quantity* judgement.

For example, a *quantity* judgement about artificial reverberation would determine the amount of 'wet' reverberant signal added to the mix. On a more fundamental level though, a *style* judgement reflects a choice about which reverb effect to use in the first place - a choice which has significant implications on the mix, as the choice of reverb can affect the listener's perception of characteristics such as the environment, genre, or intimacy of the mix.

Style also covers comments related to automation of levels, effects, stereo position and other parameters. Where the level balance of a mix might be judged in terms of *quantity*, the dynamic progression of the mix is a matter of *style,* as various elements are raised or lowered in level throughout the song to create variation leading to engagement, novelty, surprise, and so on. Similar "changes that will catch your ear a little bit, up the ante" (Ed Cherney, cited in Massey, 2000, p. 213) can be made through use of effects, equalisation, distortion, panning, and all the other tools at the engineer's disposal.

In my experience in working with novice engineers, matters of *style* arise only once the novice has engaged intellectually and emotionally with the material; enough that they no longer perceive the song as a collection of sounds which must be individually treated and then combined, but instead begin to comprehend the bigger picture of the music as a whole.

If we expect the pre-mix questionnaire in this experiment to guide participants through a process of engaging with the material, then is it reasonable to expect those who have undertaken this process to receive better *style* comments? Based on analysis of the mixes, the answer is a (tentative) "yes".

In round 1, 66% of the intervention group (group 3) received positive *style* comments ("good variation", "very interesting!" - regarding effects choice). Only one member of the group received negative *style* comments ("Not a lot going on" - creativity/interest). Compare this to the control groups (groups 1 & 2) in which only 37.5% received positive *style* comments (most received negative comments such as "static mix" or "the off-tempo delays are a bit distracting").

In Round 2, the difference is smaller with the intervention groups receiving 71% positive *style* comments and the control group receiving 60% positive *style* comments. The results in round 3 are similar, with both groups receiving approximately the same level of positive *style* comments (treatment 71%, control 66%). The most notable result in *style* comments is the change in group 2 from round 1 (40% positive comments) to round 2 (80% positive).

The results from round 1 and the change in group 2 seem to indicate a positive correlation between the pre-mix vision-building process and positive *style* comments. However, this correlation is strongest the *first* time a participant engages in the process, and becomes less apparent in subsequent mixes.

Discussion

What conclusions can be drawn from this experiment? There appears to be a small but measurable improvement in the creative quality of mixes produced after participants engaged in the pre-mix vision questionnaire. There also appears to be a slight improvement in *style*-related feedback in those participants' mixes. By both measures, these mixes are therefore more *suitable*, in that they are more likely to conform to the expectations of the Field in a variety of criteria, based on the Field's interpretation of the part of the Domain in which these pieces sit, and are also more *novel*, engaging with the listener and providing variation and interest rather than static repetition.

However, with the small sample size and high experimental mortality, the improvements are less than the confidence intervals, leaving open the possibility that the null hypothesis is true: that the variation would have occurred by chance.

One factor presents itself in favour of the intervention: The rate of experimental mortality was higher amongst the control group. We can tentatively draw two things from this. It may be that non-respondents were unhappy with the quality of their work, and would rather not submit their mix than receive a poor result. This would imply that the non-respondents would have lowered the average result of the control group, increasing the impact of the intervention. It is also possible that the questionnaire increased engagement amongst the

participants in the intervention group. It may be that, even if the intervention does not lead to statistically significant improvements in mix quality, it nevertheless provides an element of motivation. Finally, the difference in attrition between groups could be down to chance.

Nevertheless, the results are encouraging. As technology improves, the means of music production are becoming available to more and more people through the ubiquity of computers and mobile devices with enough power to easily handle even the most complex signal processing tasks. The audio production market is becoming increasingly flooded with products designed to simplify the process of achieving a 'good' sound, for example the Waves (2017) OneKnob plugins, which reduce the user's decision-making down to a single parameter (rather than the dozens found on older units). The global market and connectivity provided by the Internet means that listeners are able to access more music than ever before, and "there's a lot of stuff out there that's just terrible, both artistically and technically … and there's a lot more of it!" (David Hewitt, cited in Massey, 2009, p. 73). The Internet also provides aspiring engineers and producers with access to thousands of hours of tutorial videos and resources to help develop their skills. The industry is becoming ever more competitive (Phillips, 2013).

Engineers hoping to rise above the noise and to make a career and name for themselves must develop the skills that advances in technology cannot replace. This means identifying and enhancing the aspects of the music that touch people on an emotional level, something that, at least for the moment, technology alone cannot do.

The results of this inquiry hint that there may be a way to encourage novices to build these 'softer' skills to allow them to be more creative in their practice. The next step is to investigate this further. Additional experimentation with larger sample sizes would help to confirm the efficacy of a vision-building exercise before undertaking a mix project. Following that, further experiments with alternative forms of priming exercises would help to identify other, potentially more effective, processes for building a vision for a mix that fully supports the message and emotion of the song and of the artist; that engages with the audience, providing them with new and exciting experiences; that satisfies the expectations of the Field while

contributing to and advancing the Domain; and that is suitable and novel and, therefore, creative.

“It’s all about the music, and you’d better get that ingrained right away” (Bruce Swedien, cited in Massey 2009, p. 44).

Section 3- Critical reflective commentary

In this section, I reflect on the lessons learned from conducting my practitioner inquiry research project, and discuss the impact those lessons had on my practice at the time. I then explore the implications of these lessons on my current practice at Otago Polytechnic.

MProfPrac and Four more Ps

As I adjusted to my new role as Programme Coordinator, I found time to continue work on my MProfPrac. By now, I was well into my literature review and was reading a lot about concepts of creativity. While the ideas I was gathering were obviously important to my research, they also helped reinforce ideas I had had about my teaching practice and, particularly, what was important to the students. I had already identified that, if I could find a way to incorporate creativity into my teaching, then it would hopefully benefit the students in terms of their mixing ability. As I read more into the theories surrounding creativity, though, new ideas began to emerge. The "Four Ps" of creativity (Rhodes, 1961) provide a structure in which to discuss these new thoughts. I realised that much of our programme was focussed on the Product; that is, the finished musical piece or film soundtrack that is presented to the audience (or as part of an assessment). The Product also included the equipment we used; many hours were spent, in-class or out of it, talking about classic audio equipment, 'geeking out' about microphones, consoles, and compressors, and sharing reviews of the latest software. There was a widely-held belief, not only amongst students, but also many professionals, that just one extra piece of gear or new plugin would make the next production sound that little bit better.

The Process (with a big P) was not much discussed in our programme. What was discussed could be called the 'process' (little p); the use of equipment to manipulate sound, or how to place a microphone correctly. The larger ideas around the creative process, however, were not covered. This is likely because research into Process is a relatively young field; serious study of creativity is deemed by many to have begun only in 1950 with Guilford's presentation to the American Psychological Association (McIntyre, 2008). Furthermore, an individual's Process is often deemed to be a very personal, non-transferable thing. As I delved into creativity more, I realised that Process touched on other areas that are commonly included

in academic programmes, such as Reflective Practice and Experiential Learning. These ideas, and others, could help students develop as practitioners as well.

Person was difficult. Concepts of creativity that focus on the Person are often too personal to be useful in teaching. For example, the question of whether mental illness has an impact on someone's creativity does not really have much relevance to curriculum design (that I can see).

Figure 14 - Recording with Hannah Curwood (standing) for "Hannah In The Wars". Co-produced with Roger O'Donnell of The Cure (right). Assisted by Andy Gbormittah (left). 2013 (author's own)

It was Press (or environment, if we are not trying force it to start with P) which I found most interesting. In Press is the idea that the other three Ps do not happen in isolation; that the environment, including the time, place, society, and culture, what Csikszentmihalyi (1999) calls the Field and the Domain, fundamentally influence Person and the Process and help determine whether the Product will be accepted. New Products then advance the Domain in different ways depending on their relationship to existing works, as described by Sternberg's Propulsion Theory, and, in turn, help inform future People and Processes. Thus, the context in which creativity takes place is of fundamental importance to the outcome.

I had become concerned about the focus of what we were teaching. Large portions of the programme were dedicated to teaching what I saw as 'mechanical' skills: how to use specific software features, or how to operate a specific mixing console, for example. While these were

no doubt important skills, I was worried that we were being too narrow in our view. Graduates may not end up in studios with the console we taught them (or any consoles at all). Software would change rapidly and, unless students continued upskilling, the specific methods we taught would be quickly redundant. More importantly, it was now easy to learn these methods online, via any number of video tutorials; what was the point of me teaching these skills to paying students when they could be learned for free at home? There was certainly a role in guiding students so that they could identify which skills they needed to develop and, also, so that they could critique the various online sources for validity (I did have to spend much of my time correcting inaccurate information picked up from the internet). However, I felt that my time with the students could be better spent introducing them to new ideas that would support their practice.

Armed with my new-found ideas about creativity and the Press, I set about reviewing my approach to teaching the audio production programme. Some things that were already taught, I now viewed in a new light. For example, we routinely covered the history of music production, especially in terms of the development of technology. This was generally presented as an interesting background to the current state of the industry, relevant to students primarily as a way of explaining some of the seemingly arbitrary standards or practices (why 0dBu = 0.775 Volts, for example). Now, however, the history of the industry, the development of technology, the social and cultural events that both influenced and were influenced by the audio industry, all provided context to the music (Product) that was produced throughout the period. More importantly, they gave insight to the creative Processes, Press, and People who shaped it. Knowledge that had seemed tangential to the skills required for the practice of audio engineering now became central. To put this in the context of Bloom's Taxonomy (1956), we had minimised the importance of Knowledge, perhaps mistaking its low level in the hierarchy as an indication that it was something to be surpassed, rather than it being the foundation of the higher levels. In our focus on the 'doing' at the expense of 'knowing', we had focussed on the Application of skills. Without giving our students the frame of reference that comes with a deep and broad understanding of the Press, the Domain, the Field, were we limiting their ability to progress higher on Bloom's pyramid? If we wanted to produce graduates who were more than simply technicians, they needed to be able to analyse their work and the works of others, synthesise new and

interesting products from the myriad of ideas that had come before, and evaluate their decisions so that they could be confident that they were producing novel and useful outcomes that contributed to the Domain.

It was an important realisation for me. It was obviously still essential that students could operate their tools, that they were familiar with all the discrete skills required to practise as an audio engineer. Indeed, Csikszentmihalyi's 'Flow' state (1997), often a goal in many practitioners' processes, requires a balance between challenge and skill levels; any technical obstacles can interrupt the flow. A common message from experienced engineers is that practitioners must know their tools (Massey, 2000 and 2009). However, the more an engineer understands the context of their practice, the greater their ability to produce work which will succeed in that context (McIntyre, 2008). Taken more generally, this highlighted for me the importance of teaching a balance of skills and subject knowledge, of equipping students with the abilities they need to develop as life-long learners, without overlooking the knowledge and facts that form the foundation of their chosen field (Christodoulou, 2014).

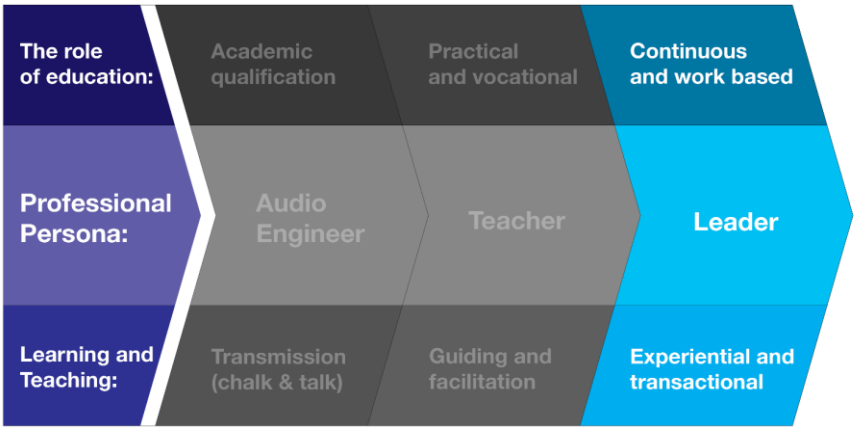

Figure 15 - The continued evolution of my professional persona (author's own)

New OP-portunities

My wife and I moved back to Dunedin in 2016. The delay in my MProfPrac caused by the promotion to Programme Coordinator and other events meant that I was in danger of leaving my studies behind, and never realising the benefits of my research and reflection. This worry was pushed to the back of my mind by the need to find gainful employment. I spent several

months as a freelance sound engineer, enjoying the return to my professional roots and relishing the opportunity to demonstrate my greatly-improved audio skills in the city in which I had started. However, Dunedin does not have the opportunities to make a freelance career sustainable. One day, while searching for more realistic employment, I found a job advertisement for an Online Learning Developer at Otago Polytechnic (OP). I realised that many of the skills I had developed as part of my teaching and leadership roles in London were applicable to the role. In a way, this mirrored my experience with the Recognition of Prior Learning process I had gone through two years previously; skills and knowledge that I had developed in the course of my work were now being listed, on paper, as desirable attributes for a job. It was something of a transition; the Online Learning Developer position was the first role I had applied for in over ten years which had nothing to do with audio production. It was, for me, a recognition of how much I had developed as, if not strictly a teacher, then someone whose focus was now in education.

Figure 16 - The Dunedin Musicians' Club, 2017 (author's own)

A number of the skills I had developed at SAE London were immediately transferrable to the new role at OP. My work on the updated curriculum at SAE and my continued involvement in the audio industry, meant that I had always kept learner and industry needs at the front of my mind. This continued at OP, where the emphasis is on employability, with industry engagement, experiential learning, and learner capability being central to the learning experience. SAE's place in the creative media industry encouraged the use of up-to-date e-learning and educational technology tools, as staff were all capable media practitioners. This meant that I had significant experience in creating multi-media and online learning experiences, many of which were hosted on SAE London's Moodle system. This experience was directly relevant to the Learning Designer role at OP, which was aimed at supporting OP's various schools in exactly this sort of activity.

It became apparent early in my new role that OP promoted learning and teaching practices that aligned with the ideas I had developed through my time in London. OP emphasises the importance of experiential learning, something which I had explored with my own students. The Learner Capability project, of which I am a part, addresses the need to develop and recognise soft or transferable skills, something which became part of my own focus as a result of my investigation into creativity as part of my research. This combines nicely with the adoption of more blended learning techniques at OP, giving the students an opportunity to learn and practise the content and 'mechanical' skills in their own time, and allowing more time in face-to-face sessions to discuss, debate, and explore the deeper concepts with the guidance of the facilitator and to work on broader capabilities. I had begun my own journey into Blended Learning at SAE London, working with a colleague to prepare multimedia content demonstrating important concepts and providing activities to students to complete at home, in a 'flipped classroom' approach.

Of particular interest to me is the current Learning Analytics project which I am engaged in at OP in conjunction with the Tertiary Accord of New Zealand (TANZ). As someone who studied computer science at university, I have always been in favour of evidence-based decision making, using data to inform and guide policies and processes. My experience with the MProfPrac has reinforced that. My literature review provided insights into creativity and the music production process, supported with research-based evidence, that were immediately

useful to my teaching. The concept of creativity, especially, had seemed so nebulous and open to interpretation that I had thought it impossible to approach it in a reasoned, rational fashion. Instead, it became clear that, even in this most ephemeral of subjects, research and evidence can inform and improve practice in predictable and repeatable ways. The Learning Analytics project provides another opportunity to use data and evidence to improve practice in a multitude of areas: in course and curriculum design, teaching practice, provision of support for at-risk students, and many more. At a recent meeting, colleagues from another New Zealand polytechnic revealed that they had used machine learning algorithms to discover that the biggest risk factor affecting a student's chance of success in a programme was the semester they started in, with students starting their programme in the second half of the year less likely to successfully complete it. Much like the revolution in the study of creativity caused by Guilford in 1950, Learning Analytics has the potential to cause a similarly impactful revolution in education.

Equally interesting is the mixed-reality project that I am undertaking in conjunction with the School of Nursing, investigating potential benefits of using mixed-reality (or augmented reality) technology in learning and teaching. This, too, will be informed by research and data gathered over the next eighteen months. My background has given me a love for gadgets and new technologies, but my experience during my research and my work in London has also given me the perspective that technology is only a tool. While it is important for a practitioner to master their tools, it should not be at the expense of their practice: creative output, in the context of my MProfPrac, and learning, in the context of this new project. The evidence will decide the outcome.

Many of the interpersonal lessons from my work and MProfPrac process are relevant to my new role, which is primarily focused on supporting academic staff who are making the transition to identify as teacher rather than practitioner in their background discipline, much like I did. I enjoy the opportunity to provide the support that I would have benefitted from in my own teaching career. That is not to say that I would have necessarily welcomed such an intervention, potentially seeing it as a challenge or imposition rather than a chance to develop. As a result, I try to maintain the same approach I did as a teacher and Programme Coordinator, namely of leading by consent and acting as a facilitator or guide, rather than

adopting the attitude that I am the authority on the matter and imposing my views. The role does have a strong leadership element, despite not having any management responsibilities. Indeed, these two things are, to me, quite different. After my PC role, I would not wish to return to management. Leadership, however, can be demonstrated amongst equals and can be a reciprocal relationship, without the power imbalance inherent in a managerial hierarchy.

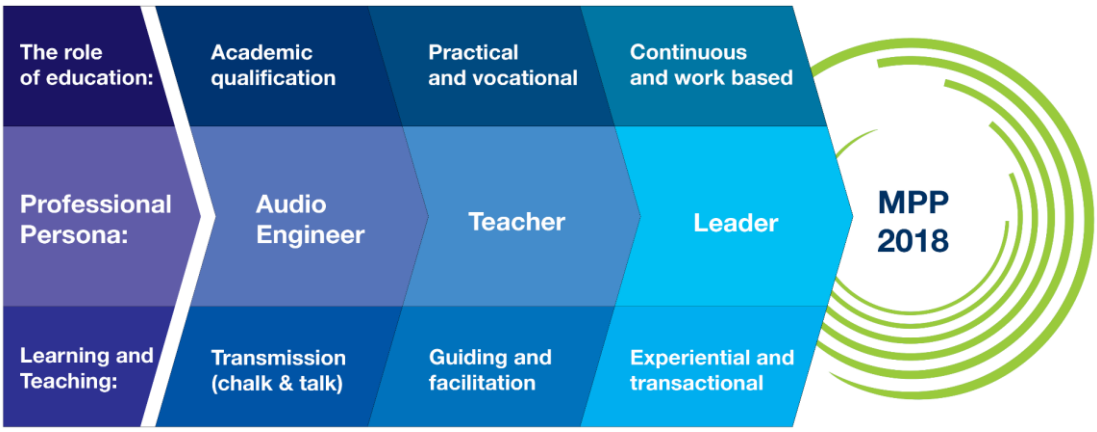

Figure 17 - Summary of the development of my professional persona (author's own)

Some time after joining Otago Polytechnic, I was given an opportunity to revisit and complete my studies. This reflection has been the culmination of that work. While the research component of my work is rooted in a different context, the review of that previous work and my reflection on the journey has been a useful and welcome process, highlighting for me the relevance of my learning to my role in education in the broader context. However, this reflection is only useful if it informs future actions. One of the repeating themes of my career has been the extent to which many of the most significant transformations in my practice have come about as reactions to external events or forces, rather than being self-initiated. Some of this can be traced to past uncertainty about my own abilities, and unwillingness to take risks for fear of failure. Engaging in the Recognition of Prior Learning process and identifying my successes has eroded much of that fear. Being honest with myself and others about my strengths and weaknesses has allowed me to transition into a more leadership-focussed persona, one in which I can use my skills and experience not just to help people, as I did as an audio engineer and teacher, but actually to guide them. The MProfPrac has given me a solid introduction to work-based research and the use of evidence to guide practice; opportunities like the Learning Analytics and mixed-reality projects will be an avenue through which I can continue that work.

As part of the Learning and Teaching Development team, I am in a position to take a proactive approach and be an agent for change within OP, rather than waiting for that change to find me. My new appreciation for continuous work-based learning is an asset that I can use to encourage the same in others at OP. My career has given me skills that allow me to support my colleagues and the organisation in a variety of ways. For example, I am now teaching acoustics on the Bachelor of Architectural Science programme, giving me an opportunity to revisit both my audio and teaching backgrounds, but also to engage with academic staff on that programme, and help forge relationships through which innovation and good practice can be shared. My relationships with colleagues at other schools provide similar avenues and will, ideally, allow for propagation of good practice across OP.

Throughout this report, I have identified and explored the lessons I have learned as part of my MProfPrac, both from the inquiry itself and from the reflection on my practice before, during, and after the research. I have shown how those lessons have informed my practice in my original context, and how they continue to inform my practice in my current context. Collectively, these ideas form, for me, a framework and philosophy that I will build upon as I continue to develop my personal and professional identity.

Figure 18 - The view from the office. Mixing the Dunedin New Year's Eve celebration in the Octagon, 2016/2017. (author's own)

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