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The role of failure in developing creativity in professional music recording and production

Mark Thorley

Abstract

This study details the approach and results of a project which sought to apply the concept of "productive failure" in the learning of professional music recording and production. The approach was taken in response to the fact that although there is significant evidence that failure should be utilised in developing expertise for the music production and wider creative industries, factors often discourage this from taking place. Eleven Music Technology students were involved in a music production task where they took existing multitrack session recordings and produced a final master recording using whatever approach they thought appropriate. The results were then assessed for their success or failure by an industry professional. The manner in which creativity and thinking skills relevant to the practice of music production were developed were examined through the use of in-depth interviews (with the students and the industry professional). Results showed that the industry professional assessed the work as successful or failing in elements which came under the broad themes of technical approach and creativity. The student participants developed creativity and thinking skills under the themes of working with material from others, using influences or reference points, developing a personal vision, technical process, thought process and self-evaluation. The study concludes by summarising the results, outlining the potential in such an approach, and suggestions for its further development and application.

Keywords

Failure in learning
Music production
Creativity
Thinking skills
Creative music production

1. Introduction

> If you're going to be a professional musician, you have to learn to embrace failure - it's the greatest teacher. I've had a lot of success but I've had a hell of a lot more failure. The way I cope with failure is I try to make another hit (Nile Rodgers in Hayes, Younghusband, Armstrong-Dampier and Bruce 2017).

The world of professional recording and production is one which is typically thought of as glamorous, exciting, rewarding and often, somewhat frivolous. Whether seen in films or on television, the process of recording looks enjoyable and far from hard work. The reality is however that of an industry which is fiercely competitive and over-run with keen new

entrants eager to make their mark. Those who become successful (and more importantly, continue to be successful) have done so through many years of study, personal sacrifice, door-knocking, rejection and hard work. As the quotation from multi-Grammy Award-winning Record Producer Nile Rodgers (reflecting on his forty-year career) shows, practitioners' professional development is intertwined with failure – failure to find a first paying job, failure to be selected for a particular contract, failure of a particular recording to be released and so on. Setbacks such as these are often dependent upon the opinions and decisions of others, and so the practitioner has one of two ways to respond. Firstly, they can give up completely. Or secondly, they can respond constructively and creatively by altering their approach, developing new skills, applying new knowledge or developing new products. Perhaps unsurprisingly for a sector that is part of the creative industries, the response to failure must be creative.

Bearing this in mind, this paper defines failure as reaching an impasse in the music production process which presents the need for the practitioner to change themselves or their work. This happens frequently, and importantly, can take place at any stage in the production process. For example, a music practitioner may need to react immediately to the opinions of others who they are working with. At the other extreme, a large project which is essentially complete can fail to be released commercially. Although at different points in the process, both are examples of an impasse which requires a response and some sort of action from the practitioner. Educators therefore have a responsibility to include failure both as a reflection of the reality which graduates will experience and also, as a valid approach to teaching and learning. Typical pressures of student recruitment and progression, and the desire to shield students from the harsh realities of the creative industries can, however, discourage such an approach.

This paper presents an innovative approach and the findings of a project which engaged the recording industry in students' music production work. Using concepts of productive failure in authentic settings (Kapur and Toh 2013), the project aimed to foster the skills of critical thinking, inventiveness and creativity needed in professional music production. The paper firstly outlines how failure features in the practice of professional recording and production and within the creative industries more widely. It then examines how thinking skills and creativity feature in the professional world, and how this is not reflected in education as perhaps it should be. It then goes on to explain the project approach before finally outlining the results and conclusion including how such an approach can develop thinking skills and creativity.

2. Theoretical background

2.1 Failure and the world of music production

The recording industry has been driven by technical innovation right from the invention of sound recording through to the latest streaming and download technologies (Eisenberg 2005). Its very existence is attributable to technological inventiveness and creativity. Prior to the invention of sound recording, however, the only way music could be experienced was in the same time and space as the performance. Sound recording allowed the music performance to be heard in a later time and different space, giving rise to the concept of "schizophonia" (Schafer1949: 43-47). This has a number of implications, though of most concern here is the amount of creative freedom that those involved in music production have without any real

idea of how music listeners will ultimately respond. This creative freedom is often driven by the need for commercial and critical success as those involved in the process continually develop new technologies, approaches and techniques. Although highly technical then, there is as much "art" in the process as there is "science" (Moylan 2002). Furthermore, because of the "schizophonia" to which Schafer (1949) refers, and the drive to produce interesting new sounds, there is often no "right" approach or definitive "correct" answer. Whilst success is founded upon producing recordings which are sufficiently different to others, the actual end product which embodies this continues to be difficult to define (and therefore manage).

The term "recording" therefore understates the complexity of the process, implying a focus upon capturing a musical performance. Instead, contemporary recording technologies present the practitioner with a whole host of tools and techniques which can create and manipulate (as well as capture) sound. This opens up new possibilities for creativity and experimentation which draw upon the fields of music, acoustics, electronics, digital technology and project management. As Moorefield (2010:44) notes, "the most creative acts and producers enhanced both aspects of the evolving art of recording, weaving conventional songwriting and instrumentation together with sound effects, imaginative use of the latest studio gear, and deft splicing and elaborate mixing to create vibrant new records". The music producer is often central to this process, and as "project manager", has ultimate responsibility for bringing together technology, techniques, performances, technical and creative personnel towards a desired end (Wainmann 1996: 396). However, many other personnel from musicians through to specialized sound programmers or engineers also play a crucial role. All of the people involved need to be creative and able to offer different approaches and solutions, some of which will work and some of which will not. So typically, when an approach fails to work, it may be jettisoned in favour of another, or may be altered slightly until it does work. It is therefore a process full of constant problem-solving and creativity in a context of high ambiguity – particularly because of the "schizophonia" to which Schafer (1949) refers.

Personnel involved in the process not only need to manage their own failure, but also that of others. Perhaps the most obvious is the co-ordination, direction, and coaching of music performers who contribute to the recording. Here, a musician produces a performance, other personnel express an opinion towards it, further to which a slightly altered performance takes place. It is iterative rather than dictatorial, with the need to be able to respond to the opinions of other "co-creators" in the absence of an audience. Creativity therefore takes place in a social context where interaction with others and the artifacts produced contribute to the process (Fisher 2014: 198). Dialogue can also occur in the music (Morgan, Hargreaves & Joiner 2000). Specific research on this is scant, though authors such as Ferreira (2013:256) do focus on the issue of "studio psychology" and its importance in managing performance. Issues such as "red light fever", "unnatural under or over confidence", "change in planned recording parts", "lack of feeling", "lack of objectivity", "lack of drive" and "aggressive behavior" are examined with a series of practical approaches suggested to deal with such problems. Overseeing such a process therefore often demands communication and social skills which Bielmeier (2016) notes are presently only developed in the workplace, and not commonly in education.

Whilst the recording session is often thought of as the most important part of the overall production of recorded music, there is in actual fact a whole plethora of personnel and structures that proceed and succeed the recording session. To start with, before a performer or recording artist can begin the process of making a commercial recording they need to navigate the process of gaining support (financial and logistical) for their work, often by

engaging with "gatekeepers" (Hirsch 1972: 128). This is the case for the recorded music industry as well as many other creative industries. Such a process relates to Csikszentmihalyi's (1997) description of the systems model of creativity being made up of domains and fields, with the gatekeeper exerting control over whether an individual practitioner is admitted to the domain. Should the individual find a lack of support or fail in being "admitted" to the domain therefore, they need to change their approach and the work they produce. In the case of music production, this could mean engaging with different performers, using different tools or techniques, managing a project differently, or a combination of all of these. Whatever specific approach is chosen approach however, it demands thinking about the rejection in order to formulate a creative response. To make matters even more challenging though, a surplus of potential workers (Faulkner 1983) are doing exactly the same in competition, in a context where the "right" answer (discussed earlier) is illusive.

Interestingly, although contracting the best creative talent would seem to be crucial to its success, the recorded music industry actually has a very poor reputation in choosing what will be successful (and so often backs failure to a point). For example, according to Frith (2001:33), 90% of records make a loss whilst according to Kretschmer, Klimis & Wallis (2001:425), 10% of records released account for 90% of turnover for labels. The industry is therefore likely to record and endeavor to market recorded music which is in the end, a commercial failure.

The issue then is that despite its portrayal of success, the recorded music industry has little clear idea of what will be commercially successful. Instead, it relies upon being fed large numbers of "possibilities"- some are immediately rejected as failures, some are developed further before being rejected as likely to ultimately fail, and some find their way to market. The manner in which this takes place reflects Simonton's (1988) concept of 'Chance-configuration theory'. This theory purports that creative scientific endeavour requires the creation of many ideas by chance, which are progressively filtered out or developed, the last one remaining being the "genius" idea. The structure of the recorded music industry means that although such ideas (or "possibilities") are unpredictable, they are not, however, totally random (Simonton 1988: 7). In fact, in a bid to maximise success (and minimise involvement with ultimate failures), specific personnel known as Artists & Repertoire (A&R) (Passman 2004: 125, Krasilovsky and Shemel 2000:19) decide what music is recorded and promoted. Their role reflects that of the cultural intermediary outlined by Bourdieu (1984) and similarly, the concept of the gatekeeper. When dealing with such personnel then, a prospective recording artist or producer really has little idea of what is being sought, mainly because (as the figures show), the A&R person cannot truly know what will be successful. Dealing with this is therefore complex and rejection is the norm. The music producer who fails with a product needs to take what feedback there is, and interpret it in order to change their work in some way in conjunction with their collaborators before re-presenting it or taking it elsewhere. This scenario reflects the "situated creativity" which Csikszentmihalyi (1997) portrays as taking place between the individual, domain and field. Furthermore, the communities of practice that support the process in and around music production form sites for "situated learning" (Lave and Wenger 1991), influencing the development of individual practitioners within the community. According to Glaveanu's (2014) sociocultural perspective, however, interactions for music composers (alongside four other 'creative' domains) can be even more widespread and complex, and can include family and friends, peers and students, clients and funders, critics and gatekeepers and the general public. The manner in which music composers interact can include checking if work is liked (in the case

of family and friends), testing ideas (with their peers who may be singers or musicians) and getting clear instructions or briefs from clients and funders. The process of using thinking skills to interpret the dialogue of rejection and doing something creative in response to it is therefore a crucial part of honing musical capabilities and output. Without such ability, work would have to stop at the first sign of a negative response. Furthermore, exposure to cultural intermediaries continues throughout a music practitioner's career as they are constantly subjected to personnel who express opinions on their work and decide how to support them with financial and logistical resources. It is probably true to say that as a career develops, interaction with friends and family at the one extreme becomes less influential, whilst the influence of critics and gatekeepers and the general public becomes greater. It is not merely about the work itself therefore but also, its sociocultural context - in actual fact, getting a particular "domain" to accept ideas is a greater challenge than coming up with the ideas to start with (Sawyer 2006, Sternberg 2006).

In summary then, the recorded music industry (in common with other creative industries) trades on rejection and failure, from which music practitioners must learn and develop. When a practitioner reaches an impasse in the process, a creative response is needed either in the practitioner themselves or in their work.

2.2 Creativity and thinking skills in professional music production

Perhaps due to its relative youth born of technological innovation, much of the music production literature is orientated towards the technicalities of equipment and process. "Classic" texts such as of Bartlett & Bartlett (2009), Rumsey and McCormick (2014) and Huber and Runstein (2014) concentrate on how equipment works and how it should be used in a recording session. These practices are complex, combining scientific and technical knowledge with hands-on expertise, working alongside other personnel, the result of which is a creative product. It could therefore be argued that such an activity cannot be anything other than "creative". Of those texts however, only Huber and Runstein (2014:20) refer to creativity, stating "All the technology in the world is of little use without the existence of the central ingredients of human creativity, emotion and technique" (though there is nothing mentioned beyond this). This seems to reflect the traditional view critiqued and updated by Williamson (2011), of scientists and engineers as logical and artists as creative. Such a problematic and somewhat outmoded lack of attention is however similar to that of the fashion industry explored by Karpova, Marcketti & Kamm (2013:160) who emphasize that "Professionals in creative industries observe, practice, exchange, adapt, and cultivate creative strategies as part of their daily routines."

The ground has moved slightly in recent years however, largely because of music technology innovation which is blurring the lines between technical and musical elements. This has sometimes been called the democratisation of music production which, as Watson (2015:150) notes can "enable musicians to record and produce music outside of the 'formal' industry, that is to say without the need for record companies or recording studios". Or, as McLeod (2005:527) outlines, "Today, the means of producing and distributing music has shifted to individual artists, which means one does not need a major label contract to reach thousands of people." This is a somewhat simplistic view though as just because the cost of recording and producing music has lowered, it does not necessarily mean that everyone has the necessary expertise. In fact, it puts greater emphasis upon the focus of this paper – namely developing the ability to produce music creatively and effectively in order to compete against

the greater numbers now in a similar position. To address this, Hugill (2008: 104) puts the concept of creativity in the context of "intention and result" – that is, how an end product provides focus and the extent to which the practitioner achieves such a result. He outlines the four "elements"– namely how well technology is used, critical reflection, evidence of creativity and lastly, a sense of purpose. In terms of technology, this refers to how technical knowledge and proficiency is applied to ensure an end result that sounds to be of good quality. Critical reflection refers to thinking about the appropriateness of the decisions made to the ears of the listener. Creativity refers to the generation of new ideas and the presence of originality. Lastly, a sense of purpose refers to having a clear of idea of why a piece of work is being completed and its reasons for existence.

Taking a more general view, the most common definition of a creative idea is one which is new and has some usefulness (Runco and Jaeger 2012, Csikszentmihalyi 1997, Robinson 2011, Robinson & Aronica 2009). To create such an idea, Sternberg (1985, 2006) notes that creativity requires the confluence of six distinct but interrelated resources: intellectual skills, knowledge, thinking style, personality, motivation and environment. Furthermore, three intellectual skills are crucial: skills of synthesis to see problems in new ways, analytical skills to recognize which ideas to develop, and practical or contextual skills to sell ideas to others. In terms of the kind of person or behavior who can be creative, typical traits associated with creativity are divergent thinking, openness and preference for challenge (Amabile 1989, Furnham and Bachtiar 2008). Creativity does not occur in isolation though as the environment can have a crucial role (Sternberg 2006, Suwala 2012, Williams, Ostwald and Askland 2010).

Given this, professional music production would seem to also demand critical thinking. Fisher and Scriven (1997: 21) define critical thinking as "skilled and active interpretation and evaluation of observations and communications, information and argumentation". In terms of education, although the UK's Quality Assurance Agency details critical thinking in benchmark statements for subjects, it is not detailed as to how this differs when in fact, students may be developing generic critical thinking or subject-specific critical thinking. On this point though, Garside (1996) notes that sufficient subject knowledge is needed in order for thinking skills to be demonstrated. Furthermore, Stupple et al (2017: 92) note that thinking skills need to be conceptualised in a subject specific way.

Creativity in music production therefore means being able to generate "new" or "useful" ideas, the result of which is work that finds support with co-creators, gatekeepers and ultimately music consumers. Such creativity draws upon many of the previously discussed concepts however. For example, intellectual skills are needed to frame challenges in new ways, to decide which ideas to develop further and to sell those ideas to others. Knowledge of music production technology and techniques is necessary for the actual realisation and demonstration of such ideas. Environment is also key, not only in terms of physical space but also with the provision of technical equipment and the presence of other "creatives" who are focused on the same end point. Furthermore, high levels of personal motivation, divergent thinking, openness to new approaches, and a liking for challenge are likely to foster creativity in music production.

2.3 Fear of including failure

Failure as a route to success has gained significant attention in the relevant literature (Harford 2011, Lim 2004, Matson 1991, Matson 1992, Petroski 2006, Sitkin 1992). Furthermore, as has been outlined, this is particularly relevant to working in music production and the wider creative industries. There is also considerable support for this to come from the industry itself through networks and collaboration (Ashton 2010).

In reality however, what may be termed as "fear of failure" often prevents it being used as much as it could be in Higher Education settings. For example, Universities are under significant pressure to recruit students to courses, and furthermore, to ensure that they progress and eventually graduate. As Sitkin (1992: 232) notes, "Not surprisingly, evidence suggests that organisations, like individuals, prefer success over failure". Given the fact that employment openings within the creative industries can be more limited than other subjects (DCMS 2006), reference to (and use of) failure is not immediately attractive.

There are also challenges in engaging with, and preparing students for work in the creative industries. For example, consensus is difficult to reach due to the extent of self-employment – this stands at 42% in the UK (Arts Council of England 2009) and is similar in other countries such as the United States (Carey and Naudin 2006) and Australia (Bennett 2009). Furthermore, what was already a fragmented set of industries has become more so, accelerated by digital technology (Lewis, Graham & Hardaker 2005).

3. Method

In order to explore these concepts, a task was designed with the following key characteristics. Firstly, it needed to have a high degree of ambiguity in the task, uncertainty and risk of failure to reflect the reality of the professional recording industry. Secondly, it needed to exploit this risk of failure in facilitating the development of students' creativity and thinking skills. Thirdly, it needed to offer an interface with the professional recording industry to create an authentic learning experience. Lastly, it needed to be supported with adequate access to appropriate music production technology and resources, to allow students to "fill the gaps" with other research activity, creative experimentation and their own thinking skills. In this way, the task made uncertainty, failure (particularly the anticipation of such at the hands of an industry professional) a pivotal part of the learning process, thus exploiting the potential of productive failure (Kapur and Toh 2013).

3.1 Project approach and procedure

The task consisted of a creative production exercise whereby an experienced industry practitioner provided multitrack recordings which covered a variety of genres from jazz through to rock. These recordings were then made available to eleven Music Technology Undergraduates in the second year of their study. Each student chose one, and had to produce a final master which would be assessed by the industry professional. Importantly though (and contrary to most academic practice), no particular guidance was given on what to do with them or indeed how much of the material to use. So, at one extreme, the student could simply "mix" the multitrack recording, or at the other extreme, sample tiny parts of the recording and

use it as part of a more original new work. Similarly, the industry professional was given no guidance on how to assess the work. The task was therefore highly ambiguous due to its cross-cultural approach, utilised the latest audio and educational technology and offered a higher potential for failure compared with more "traditional" assessments that take place within the immediate educational environment.

3.2 Interviews

Once they had completed the task, the students were filmed whilst taking part in a semi-structured interview, the aim of which was for them to explain the approach they took to the work. Their interviews were then transcribed before being analysed using the approach outlined later.

The industry professional was then given the work and asked to assess each final master by listening alone. Having had access to the recordings for a number of days, the industry professional was filmed whilst taking part in a semi-structure interview to assess the work, in effect judging its success or failure. The interviews were then transcribed and the results analysed.

3.3 Analysis

As the aim of the study was to gain a deeper understanding of how the students may have thought and acted when working on the task, interpretative phenomenological analysis (IPA) was deemed to be appropriate. IPA has a number of key characteristics which make it suitable. According to Smith and Osborn (2003), IPA is suitable for analysing the underlying psychological meaning of statements and for analysing how respondents make sense of their experiences. It also involves a "double hermeneutic" whereby just as the respondent tries to make sense of the situation, the researcher is trying to make sense of of the respondent trying to make sense of their situation (Smith 2004: 40). Larkin, Watts and Clifton (2006:104) express this as "to think about 'what it means' for the participant to have made these claims, and to have expressed these feelings and concern *in this particular situation"*. The "particular situation" element is pivotal here given that the learning situation experienced was unusual. Furthermore, the need to go beyond the text and discover the true meaning is important. The number of respondents here (eleven) is also in keeping with the numbers recommended by Smith (2004).

The semi-structured interviews followed the approach of Smith (1995). So, although there was an interview schedule outlining the areas of interest, it was not prescriptive – rather, it formed a guide. During interview, questions could be adapted according to context, and the emergence of issues which warranted greater depth. The interviews were viewed and interview transcripts were read several times to get a general sense of the responses and notes made of possible themes also based on seeing the interviews. Each interview text was then reread and emergent themes identified tentatively. The themes themselves were then considered in order to define them in more detail, and establish their relationships with each other. The themes were then organized to make meaningful and robust statements which contributed to the respondents' experience. The themes therefore emerged from the transcripts rather than being envisaged in advance.

4. Results

4.1 Student responses

The following themes emerged from the student interviews: Understanding of existing material, influences and reference points, personal creative vision, explanation of technical process, thought behind process, and self-evaluation.

4.1.1 Understanding of existing material

Under this theme, the student respondents talked about the material which they had been given to work with. This seems like a simple concept if it is thought of as merely explaining what they worked with. However, given that the music production process depends upon working with material for which someone else has had prior responsibility, sensitivity and thought become absolutely crucial and can be the difference between doing something which adds real value or destroys the original idea or performance. All but one of respondents described the material they had been given in some form. For example, at one extreme, respondent R6 made no reference to the source material and respondent R8 only briefly described the genre of the recording. However, at the other extreme, respondent R1 went into extensive analysis of the material including the following observation:

> The track was vintage sound with old school Moog instruments and more of an avant-garde sort of thing. I couldn't really place it in a genre but maybe just a bit trip-hop, maybe a bit chill-out. I suppose it used a lot of synthetic instruments and synthesis and that sort of thing.

Here, there is analysis of the existing work on a number of fronts – the instruments used, the genre, and an overall description of the sound. This depends upon being able not only to just listen critically, but also to link what they hear to other recordings, instrumentation of which they are familiar, and their previous production experience. The student also went on to explain elements which he found most attractive (such as the vocal sound and the bass), though at the same time acknowledging that he had actually manipulated these elements a great deal in his approach such that they were now quite different. Aptitude orientated towards this theme therefore means being able to critique a recording, and analyse its constituent elements to gain a greater understanding of it in order to work creatively but appropriately with the material.

4.1.2 Influences and reference points

This theme relates to how the student respondents made reference to other creative works which had formed an influence, inspiration or reference point for them to aim at. In section 1, it was noted how music practitioners often produce work "in the dark" with little idea of how well it will be received until it is heard by cultural intermediaries. This theme reflects that concept - without being able to describe fully and accurately how something will ultimately sound, referring to existing work can be useful. Furthermore, when working creatively,

having a "benchmark" to aim at, and evaluate progress can prove useful. With such an aim in mind, approaches used in the existing work can be applied to the new work.

With this theme, all but two respondents (R5 and R10) made references to other recordings as reference points. Examples of descriptions ranged from talking about particular technical approaches right through to musical arrangements and choice of instrumentation. Interestingly though, reference was made not only to particular recordings but also reference to particular practitioners. Such references were based on the idea that particular music practitioners have their own approach and "sound" which may have proved to be successful critically or commercially. One such example is R2 who explained that he followed the approach undertaken by DJ Rashad, a producer who worked in the "Footwork" genre emanating from Chicago:

> I found this to be really fun to work with the Shostakovich audio in the style of Footwork because Footwork is sort of characterised by really short stabs of audio over rolling 808 drums – just like a bit manic. The classic Footwork dancing, you just sort of dance up and down acting like a loon. But the style of music is really really intriguing because it's one of the few styles (if not the only style), I think it's the only style of popular dance music that is not four to the floor but is actually in compound time.

There are some key elements in this respondent's analysis. Firstly, he refers to the technology and instrumentation used (the 808 is a particular type of drum machine), musical elements (such as unusual time signatures) and also the cultural context of the genre of production.

4.1.3 Personal creative vision

This theme refers to how each student respondent expressed a clear vision (or the auditory equivalent) for what they intended to do with the work. There are a number of elements which flow into this concept – personal taste and motivation, existing knowledge and expertise, the potential in the material which they have to work with, and attitude towards risk. However, it would seem that having a clear idea of what was being aimed at provided focus, a rationale for process and an opportunity to sensibly evaluate work.

At the one extreme, respondents such as R6 were quite vague about their personal vision for the work. For example, they made relatively simple statements of intent such as making it sound "as nice as possible". Similarly, respondent R9 had little detail on an end result, concentrating more on how they could improve individual instrumental elements (such as guitars and drums). However, at the other extreme, respondents such as R1 went into far more detail about what they were aiming to do with the work. Another example was R4 who explained his vision for the work in extensive detail drawing upon the potential of the existing work, reference to the "Trap" music genre (emanating from the Southern United States), and his own expertise:

> I tried to think about that sort of style rather than go for an out and out electronic "Trap" sort of thing. I kind of toned it down a bit, made it a little subtler with the drops whilst still trying to keep the actual overall genre present.

Here, the respondent has a notion of what he is aiming at and this is likely to influence many of his creative and technical decisions. Although his vision is based around a "Trap" style, he

acknowledges that to be sensitive to the material, he needs to be subtler in his approach, and his choice of process offers the opportunity to do this. In the interview, he also explains that although he had worked in this genre before, on this occasion, he actually had to start again more than three times in order to achieve the subtlety which he was seeking.

4.1.4 Explanation of technical process

This theme refers to how each student respondent outlined the technical process which they had gone through with the work, outlining particular pieces of equipment or software which they had used, and the techniques which they had applied with them. This largely follows the guidance of the existing works earlier which look at how sound is manipulated using various technologies and approaches. Perhaps inevitably, some reference had to made to the process which they went through, though the amount of description, and the degree of analysis and reflection showed considerable variation. For example, respondents R9 and R10 went into very little detail on either the process which they had undertaken or the equipment or software used. This is somewhat surprising as such work cannot be undertaken without making decisions based on a certain level of technical capability. Other respondents were more forthcoming with greater detail on the process. For example, respondent R8 went into extensive detail outlining not only his process but the various choices which he made at each stage related to a clear notion of what he was aiming at. An example of two of the detailed choices made are as follows:

> I used the actual kick mike in the end just as a sub so I used a Waves Plug-in which cuts off everything below about 80Hz. So just pushing the sub through gets some nice "punch" in the chest.
>
> I used about four tiers of compression on the drums as a whole so I'd compress using CLA Plug-ins on each of the drums.

Here, the respondent demonstrates knowledge of the scientific principles of sound (such as typical frequencies) as well as familiarity with techniques and appropriate software. They also demonstrate a clear rationale for the choices made based on what they are trying to achieve. This is being done through applying existing knowledge and skills to work on a task which has no clear guidelines.

4.1.5 Thought behind process

This theme refers to how each respondent outlined what their thoughts were during and towards the end of completing the process. Though it is closely aligned with the technical process theme, it draws more upon creative decision making with a view to the final aesthetics of the work. For example, R6 stated:

> It just sounded amazing where it was a stripped back ending. As soon as I muted it, I knew I wanted it to have that ending. I just had to find a way to make it sound really good because it goes from a kind of crescendo of the acoustics guitars at the end to just dropping out into a nice twiddley guitar bit.

Another example (R4) stated:

> The process meant that I was thinking more about the stuff that was being used. Like I started off just using the vocal, then realised maybe not. So, I started playing around, adding in extra pieces. Basically, I spent a lot more time looking at what had already been done and fitting it in which meant that each track had more time spent on it than I would normally.

These and other comments delve into the process taken in the task, in particular, the "experimentation" which was involved. These are likely to be based on aesthetic evaluation of each idea, which is then either jettisoned completely in favour of another approach, or customized slightly to improve the end result.

4.1.6 Self-evaluation

This theme refers to how student respondents evaluated their end product, and related to this, how well they thought they had approached the task. It is related to other themes – for example, evaluation is more straightforward if there is a clear vision to start with. Also, the greater their understanding of the process that they had gone through, the greater they could consider the implications this had on their work.

In terms of evaluating the work itself, there was actually very little in terms of concrete thoughts on the quality or outcome of their work. Typical of this was responses such as statements such as "I'm happy with it" (R6). There was however, considerable acknowledgment that the industry assessor's opinion was really what mattered. This may be why the student respondents were unwilling to express too strong an evaluation – either because it may differ to that of the assessor, or they may even acknowledge that the opinions of others are what ultimately matter. Typical statements included "I think they'll like it" (R1), "they'll be surprised" (R3) and "I hope they'd like it" (in the case of R4 before going in to some of the perceived positive elements).

However, there was considerable reflection upon how this particular exercise had served to develop their expertise, changed their way of working in future, and suggestions of ways in which they could develop further. Examples of how the exercise had forced them to develop their technical expertise included respondent R9 who referred to the manner in which they had developed expertise in the use of equalization and microphone placement. Similarly, others referred to how they had needed to think creatively about ways of working with the existing material.

4.2 The industry practitioner assessment

The inclusion of the industry assessor aimed to provide an assessment of success or failure in the task to effectively replicate real world professional practice. The industry assessor was therefore not given any criteria, did not allocate marks, and was provided with no guidance on how to judge the work so that their evaluation was purely based on their professional opinion.

In the first instance, it was noted that each piece of work assessed, rather than being declared a success or a failure overall, instead resulted in a series of "described" elements, each of which was deemed to be successful or not. A reference to the overall arrangement being too long for example would be considered to an element of failure, whilst describing the choice of sound processing as engaging would be an element of success. Similarly, a statement on some type of technical deficiency of the work would be considered to be an element of failure, whilst referring to an effective choice of instrumentation would be an element of success. All of these elements were noted, and allocated equal importance. This is shown in Figure 1 thus indicating clearly the "balance" between elements deemed to be successful and those deemed to be failures in the opinion of the industry assessor.

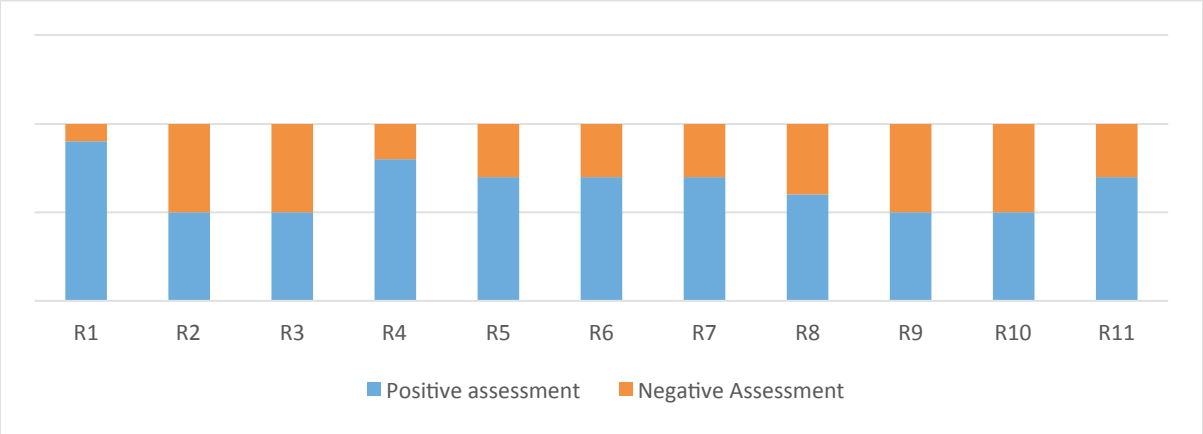

Fig 1: Proportion of "successful" and "failed" elements outlined by industry professional

The first thing to note is that even the most successful involved some elements of criticism. For example, R1, whilst successful overall had some very technical commentary on how its dynamic range (the difference between the quietest and loudest parts) could be improved. Similarly, even those considered to be unsuccessful overall had some merits where the industry professional made some positive comment. Beyond this (and in a similar way to the student interviews), the assessments were analysed to look for "themes" into which they fell. Overall, they all fell into two distinct themes – that of technical quality and creativity evident in the final master.

In terms of technical success, an example of a very successful assessment is given related to student R1: "As far as the mix goes, again, really strong, sounds like you've put a lot of work into using different systems and some reference tracks". Here, the industry assessor refers to the overall quality of the work and how the method chosen has made it that way. Specifically, they are referring to the practice of playing music on different playback systems to aid judgement of its merits – this would be considered to be "good practice".

Others were technically less successful in a number of ways. For example, the work which R9 produced was criticised in the following way: "If you'd have mixed in the studio control room with some reference tracks, then you'd have heard some key issues in this mix in terms of frequencies". Here, although the industry assessor has no idea of the process which the student has taken, they were able to pinpoint deficiencies in the environment and approach merely by hearing the result. Specifically, they are referring to the practice of working in an

acoustically treated room and playing other recordings as a reference point. Whilst this would be considered good practice, in this instance, it has not been followed.

Even examples which were successful overall received some critique in terms of technical approach. For example, with reference to the mix of R4, the industry practitioner stated that "There are things to be improved but it's 75% of the way to being a professional mix – it's more the icing on the cake kind of thing". He then went on to explain specific technical approaches which could have made the final result even better.

In a similar way, the assessments of creativity provided a variety of insights. One example of a very successful end result (R4) was typified by the following assessment:

> It felt stylistically coherent. Lots of interesting arrangement ideas, sounds coming from left and right. Lots of development, and repetition. Hooks being used and being repeated as well as variation stuff. Lots of cool stuff being used here.

However, at the other extreme, whilst the piece of work produced by R10 was technically proficient, it was somewhat lacking in creative ideas and realisation. In this case, the industry assessor referred to the problem as an "absence of all of the things you could have done with it". In this case, the potential was clearly missed through a lack of creativity ideas and realization on behalf of the student.

5. Discussion

The results show that students engaged with the task, and furthermore, developed creativity and thinking skills through the unique approach in the project. The use of material produced by others and the results being assessed by an industry professional reflected the realities of professional music production.

The more successful demonstrated the expertise of critical listening whereby careful listening to the material they had to work with (shown particularly in the "understanding of existing material" theme) was combined with analysis and thought. Those which were more successful had all spent time listening to the raw material and were able to articulate not only how they thought it sounded but also the intention of the prior practitioner and the techniques they had used. Such listening includes appropriate attention to both the technical details and those of an aesthetic nature. It therefore involved not just listening but also referring back to existing knowledge of production, or where there is none, spending time proactively in research.

Related to critical listening is sensitivity to the material. As this exercise was extremely open-ended, the students could respond to the material in a wide variety of ways (reflected in the "personal creative vision" theme), motivated by technical or creative ideas. Those with an overly personal vision or taste were in danger of doing so at the expense of everything else however. So where students took this approach but did so without sensitivity to the material, the result was a failure. Whilst arguably pushing the creative boundaries, these examples paid little reference or respect to the source material. By comparison, the more successful participants were able to critically appraise the material to a point where they could articulate the parts or characteristics which they found to be valuable or attractive in the source material. The students could therefore exercise their own creativity widely, but needed to

combine it with sufficient critical thinking and self-awareness to know where their approach was appropriate.

Whilst all of the students referred to existing work or practitioners ("influences and reference points") as a way to deal with the lack of guidance, the more successful also demonstrated the ability to critically analyse these references. This involved the student being able to dissect the recorded work in order to fully understand the technologies, techniques, aesthetics and motivations which had gone into making it. This firstly involves applying analytic skills in combination with what is being heard, together with the knowledge of how it may have been accomplished. Flowing on from this, the students here were then able to apply those techniques to their own work. Where students talked of the practice of particular producers as part of this, they were "modelling" their creative approach on others (Yi, Plucker and Guo 2015). There is further risk of failure however, as demonstrated here where students focused too much on their influences at the expense of sensitivity to the existing material. This approach therefore involves creativity as well as using critical thinking skills to apply approaches, techniques and models to a different context appropriately.

The task offered the flexibility for students to essentially decide upon an aim for themselves, and so had to have some sort of "personal creative vision" (or auditory equivalent). This is in keeping with Hugill's (2008) concept of "intention". Without some form of ultimate aim, planning cannot effectively take place, there is no tangible way to decide on appropriate techniques or approaches, and no way to evaluate the final work. The more successful had a clear idea of what they were aiming at from the start and were able to articulate it. At the other extreme, those who just took it as an opportunity to "experiment" were more likely to fail. Interestingly though, a strong personal vision was also shown to be more risky and prone to failure if it did not demonstrate sensitivity to the existing material or collaborators.

The exercise needed at least some degree of technical proficiency though the specifics of that expertise were not prescribed. Therefore, it could be said that those who already had a high degree of technical proficiency started the exercise with a clear advantage (this was often reflected under the "explanation of technical process theme"). However, the exercise also offered the opportunity to apply such expertise in new ways, or to develop new expertise specifically for the task. Many students referred to the opportunity to "experiment" with techniques ("thought behind process") and it seems that the specifics of the task supported this, and thus their abilities were developed accordingly.

There is, however, an important relationship between creativity and having the technical ability to realise such creativity. For example, on the one hand, not having (or being able to develop) technical expertise can limit creativity. This was the case where one approach, whilst competent, lacked any inventiveness and largely "played safe" – this turned out to be somewhat of a failure. An alternative would be to go for the "inventive" approach. However, in such an instance, there is a high risk of failure because the technical anomalies tend to stick out very obviously to the industry assessor. Interestingly though, the industry assessor found it relatively straightforward to indicate how technical shortcomings could be improved upon – this is in contrast to assessments of an aesthetic nature. Creative approaches therefore need to be backed up by a technical understanding of how they are achieved, and the confidence to do so.

In terms of thought process and evaluation, most students were able to articulate the process and the reasons for their decision. Interestingly though, they were less inclined to evaluate the

final product, instead recognising that the industry professional's opinion was what mattered. However, they did acknowledge ways in which they had developed during the task, and the manner in which it would alter their practice in future.

6. Conclusion

The outcomes of the project demonstrate the significant potential to learn professional music production through productive failure in an authentic setting (Kapur and Toh 2013). The project reflects the notion that "embodied" (rather than reflective creativity training) has an effect on creative production (Byrge & Tang 2015). It demonstrated that the fear of including failure in educational settings can be misplaced - instead projects that engage with failure can bring significant benefits. This is particularly pertinent given the amount of failure in the music and creative industries, where as Gaertner (1988: 316) notes "failure should be treated more as an episodic event from which a great deal can be learned".

Whilst taking such an innovative approach to the project seemed risky, in reality, it was not. For example, none of the student respondents seemed to exhibit "evaluation apprehension" (Svensson 2015: 33-34), and were not thrown by the relative lack of structure or approach which differed from the norm. All of the participants were all able to "fill in the gaps" to a greater or lesser extent and the degree to which the work succeeded or failed depended upon their ability to draw upon prior expertise and learning, use other influences or reference points and focus on a clear end result. Such a response in the students could have resulted from the task being grounded in a "real world" challenge, or even the fact that, as an innovative project, it resulted in the type of intrinsic motivation which is associated with low levels of evaluation apprehension (Amabile and Pillemer 2012). All of the participants were able to articulate and reflect to some degree on how they had developed and whilst the degree to which they could express this varied, they had all done so. The apparent lack of structure (and associated risk of failure) therefore provided an opportunity for them to at least do something, or at the other extent, produce something very impressive.

The particular areas where students were able to develop their thinking skills and creativity fell into some distinct themes such as working with material from others, using references or points of influence, having a personal vision, choosing and managing the production process, having thought about the process and exhibiting self-evaluation. The more effective the attendance to each of these elements, the more successful the outcome. Clearly though, these areas were interdependent and functioned together towards an end result. Furthermore, one could work to the detriment of another such as where an overenthusiastic personal vision overrode sensitivity to the existing material, the result of which was failure. The potential to have success in some elements but failure in others meant that none were devoid of merit. All had elements of success which could be built upon. Students therefore developed the skills of "self-managed learning" in the face of failure, as well as developing their expertise through the task itself.

It is likely that the industrial assessor provided some of the inspiration and pressure to engage with the task in reflection of the professional environment or social-cultural context. It can be imagined that if an academic were to be assessing such a task, they would be bombarded with questions about the assessment. The industrial assessor therefore gave credibility to the task and their involvement seemed to make the task more real. Certainly, as Alten (1999:427) notes "experienced audio producers listen differently to most people", and are more attentive

to a whole range of facets of sound (Ford 1993: 4). Furthermore, their inclusion in the process reflects Csikszentmihalyi's (1997) systems module where, by acting as "the field", they evaluated work as worthy (or not) of the music production "domain".

Lastly, this approach could be extended or refined to other tasks common in professional music production. Furthermore, other creative industries which feature similar levels of failure and risk (film, fashion etc.) could also benefit from such an approach.

Lastly, the approach taken in the paper could be extended or refined to further this important area of study. For example, the relationship between typical creative processes adopted by practitioners and how creative the resulting work is deemed to be by industry experts could be examined. Similarly, other tasks common in professional music production (such as Sound Design) could be examined in the same way. Furthermore, other creative industries which feature similar levels of failure and risk (film, fashion etc.) could also benefit from such an approach.

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