

# **Engineering a Place for Women: Gendered Experiences of the Music Technology Classroom**

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<b>Date</b>	10 <sup>th</sup> July 2017
<b>Word count</b>	21,616

# ENGINEERING A PLACE FOR WOMEN: GENDERED EXPERIENCE OF THE MUSIC TECHNOLOGY CLASSROOM

## ABSTRACT

*Women's participation in music technology education has been described as a 'leaky pipeline', analogous to the drop-off rates from women in STEM (science, technology, engineering, maths) subjects. From one educational level to the next, music technology courses see the number of participating women decline. As a result, university level music technology degrees witness a gender imbalance of up to 90% men to 10% women. Unsurprisingly, figures estimate that 95% of music producers are men.*

*This paper explores the complex intersections of gender, technology, music and education. First, its research question asks what the classroom experiences of women in music production and sound engineering courses are in relation to gender. Second, this research understands music education as an important precursor to artistic careers, and this approach seeks to primarily provide an understanding of women's experiences of music technology courses, and to secondarily understand how those experiences compare with post-educational ones. Therefore, this paper also addresses the relationship between their experiences in these courses and experiences within the field afterwards.*

*These questions were addressed by conducting semi-structured interviews in Manchester, UK and Berlin, Germany, with women who studying for, or had completed courses in music production and sound engineering. Interviews focused on (i) classroom experiences, experiences of classmates (ii) experiences with teachers and, (iii) how experiences within the educational setting compared to those in the field.*

*This research found that respondents experience the music technology classroom as a male space, and that teachers, while not immune from inserting their own gender biases into their evaluations and interactions with students, do make efforts to be more inclusive of female students. Comparisons between educational experiences and workplace experience were mixed, but provided further support for suggestions of the maleness of the music technology sphere.*

**KEYWORDS:** *gender, music, education, technology, music producers*

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## I Introduction

“An exclusive focus on women’s supposed failure to enter the field... is insufficient for understanding how our stereotypical notions have come into being; it tends to put the burden of proof entirely on women and to blame them for their supposedly inadequate socialization, their lack of aspiration, and their want of masculine values. An equally challenging question is why and how boys have come to love things technical, how boys have historically been socialized as technophiles” (Oldenziel, 1997).

As noted by Oldenziel, when women are somewhat absent from, or less visible within a given field, questions are raised around the scope of women’s abilities, ambitions and the very nature of womanhood. This would appear to be the case in the sphere of music technology. As encapsulated by women’s electronic music network female:pressure in their statement on visibility “‘Why are there so few women active in the electronic music scene?’ - each one of us has heard this question a thousand times... Here is the answer: It’s not our number, it’s about how and if we are recognized!” (Female:pressure, n.d.), preoccupation with the numerical minority of women in music spheres can be a source of frustration for many women who *are* cultural producers, especially when emphasis is continually placed on the shortage of women in a given sphere, as opposed to the actual creative output of women.

At present, however, it is undeniable that women make up a small minority of musically technological professions, and music technology is an area in which women are vastly underrepresented. Producers are almost always male - over 95% are, and the Music Producers’ Guild in the UK reports that only 4% of its members are women (Doubleday, 2008, p.15; Savage, 2012 August 29). The work of female producers also goes largely unrecognised: only 3 women have received Brit or Grammy nominations for best producer, none of whom won (Savage, 2012 August 29). The smaller percentages of women observed in music production roles can also be noticed at the preceding educational level. Figures suggest that music technology degrees are 90% male to 10% female, while figures also show a decline in the numbers of women studying music technology from one educational level to the next (Born & Devine, 2015, pp.146-147). Consequently, music technology education has been described as a ‘leaky pipeline’, an analogy often used to describe similar drop-off rates observed in STEM (science, technology, engineering and mathematics) subjects (Blickenstaff, 2005; Born & Devine, 2015, p.147). Yet while STEM disciplines have witnessed a discernable improvement in gender representation (particularly in biosciences and medicine), the ‘leaky pipeline’ analogy remains a rather fitting description for the relationship between gender and music technology (Born & Devine 2015, p.148).

Music technology is an important area of enquiry as it is a vital cornerstone of the music industry, being both of great practical and artistic significance: music technology is

imperative to the reproducibility of music and consequently, the music industry as we know it, as well as the evolution of music and sound. Music producers and sound engineers make up the fundamentals of the music industry, while also possessing a significant amount of creative control over the artists that they work with. As a result, relations between female bands/artists and male producers can become problematic (Leonard, 2007, p.53), on both a professional and personal level. Indeed, as it is the case in society at large, gender prejudice, discrimination and harassment remain prevalent in music industries and communities (Gadir, 2016, p.115). With this in mind, the marginalisation of women in popular music in particular has largely been attributed to their lack of control over male dominated, essential parts of the music industry including the domains of production, management and journalism (Farrugia, 2009, p.337). Of this triad of areas in which women lack power, this thesis aims to draw attention to the role of women within the sphere of production and its affiliated music technology disciplines.

While recognising the numerical minority of women within music technology, this thesis aims to dig deeper on the subject matter, understanding music education as a pre-cursor to artistic careers. By exploring the area where gender, music, technology and music education meet, this thesis asks: *what are women's experiences of music technology education in relation to gender?* In doing this, this thesis will firstly ask *what are women's gendered experiences of the music technology classroom/classmates?* Secondly, *what are women's gendered experiences of music technology teachers?* And thirdly, *from a gendered perspective, what are, and how can women's post-educational experiences be compared to their classroom experiences?* It should be understood that this research intends to draw attention to women's experiences as producers and engineers within the educational sphere as a precursor to artistic careers. The focus is not on women as artists and performers, or even necessarily on their creative output, but on women as students pursuing masculinised subjects, in a male-dominated space, that often feed into careers in a male-dominated field. This research focuses on music production/sound engineering/audio engineering courses, and consequently, this thesis' purpose is to contribute to a better understanding of the experiences of women within music technology (the technical areas of the music industry), and therefore the wider music industry (which will be taken to refer to the many institutions that it is comprised of: labels, studios, musicians, producers, etc. (Leonard, 2007)), and perhaps even to broader literature on women's experiences of male spaces.

Exploring the educational experiences of women within the technical areas of the music industry, particularly sound engineering and music production, is significant since much of the pre-existing research exploring women and music technology to date has focused on women as DJs or DJ/producers, particularly within the field of electronic music (Gadir, 2016; Farrugia, 2009; Farrugia & Swiss, 2008; Reitsamer, 2012; Gavanis & Reitsamer, 2013;

Rodgers, 2010). Previous research on music technology and education has also tended to focus on compulsory education, and music technology as it is presented within the broader taught subject of music (Armstrong, 2008; Armstrong, 2011; Comber, Hargreaves & Colley, 1993).

Instead, this research will focus on post-compulsory tiers of education that are more closely preceding music technology careers. This is significant, since this project focuses on women who have actively taken interest in and have chosen to pursue music technology, as opposed to school-age pupils who are taught music technology as part of a broader, compulsory musical education. Focusing on varying levels of music technology education contributes further to understanding the apparent 'leaky pipeline' paradigm. The focus on experience in this project is also important, since it offers greater insight into the personal and lived gendered encounters and incidents that arise for women studying music technology, as well as feelings, thoughts and opinions about these occurrences. This thesis explores both the encounters themselves, and where necessary, how the women who have experienced them interpret them, as opposed to solely documenting them. Additionally, higher education classes place greater responsibility on individual student performance and are therefore significantly less supervised by teachers. This makes it possible to explore gender and class relations, homosocial activity and to what extent male classmates exercise their masculinity, since behaviour and choices of language are subject to fewer constraints. This has been unexplored by previous research, since generally, teachers heavily moderate class discussions and work in compulsory, school-level education, and class relations in higher education can perhaps be likened to a studio environment.

The following chapters will include a discussion of theory and previous research (see section 2), a breakdown of the methods used to conduct this research (see chapter 3), the results of the research (see chapter 4) and finally, conclusions, findings and limitations (see chapter 5).

## 2 Theory and previous research

### 2.1 Gender, gender socialisation and gender inequality

When making sense of **gender**, we can understand it as something that emerges from social circumstances, as opposed to attributing gender to a person's individual nature (West & Fenstermaker, 1993, p.158; 1995, p.9). Understanding gender as an organisational force in social relations means that within a given social situation, individuals consider how they should behave and present themselves in relation to others (Ridgeway, 2011, p.6). Essentially, sex (physical status of male or female) and gender (the cultural expectations attached to sex) are used to define self and others as a means of coordinating behaviour (Ridgeway, 2011, p.7). This view can be summed up as gender being a "system of social practices" that results in defined sex categories into which people are sorted, and whose relations are organised based upon presumed differences (Ridgeway & Smith-Lovin, 1999, p.192). This is reflective of the Simone de Beauvoir's saying, "One is not born, but rather becomes, a woman," (as cited in Connell, 2002, p.4). While the same is true of men, the important implication here is that gender is something constantly under construction, and gender expression i.e. femininity and masculinity, are acquired and enacted rather than innate (Connell, 2002, p.4). Gender as this system of social practices ensures gender inequality, since gendered relations and resulting social practices are enacted on unequal terms (Ridgeway, 2011, p.16; Ridgeway & Smith-Lovin, 1999, p.192).

Aside from understanding gender as a product of social circumstances, another key to understanding gender is acknowledging gender as distinct from biology, and understanding the role that equating the two plays in **gender socialisation**. Typically within society, ascribed biological sex has erroneously been considered a matter of fact, resulting in assumptions that social and psychological tendencies are connected to reproductive capacities (West & Fenstermaker, 1995, p.20; West & Zimmerman, 1987, pp.127-128). Many do equate sexual dimorphism with biological fact, in turn justifying the creation of two entirely separate categories of human (Breedlove, 1994, p.390; Wharton, 2012, p.10). This typically comes about through gender, or sex-role socialisation (West & Zimmerman, 1987, p.141). From a young age, children are prone to categorisation processes: children soon learn to recognise and use sex categorisation (which is fundamental to the adoption of feminine and masculine behaviours) to regulate their own and other's behaviour (Cahill, 1982; 1986a; 1986b; West & Zimmerman, 1987, p.142). In doing this, individuals take on gender ideals and gender identities that they endure to upkeep, which normalises these gender differences and enables their acceptance as fact (West & Zimmerman, 1987, p.142). Since conceptions of "womanly" and "manly" natures are then considered natural, the existing social positioning of men and women, the division of labour, gender identity development and women's subordination is

therefore validated (Berk, 1985; Cahill, 1986; Fenstermaker, West & Zimmerman, 1991; West & Fenstermaker, 1995, p.22). Variations in behaviour that are attributed to sex differences should instead be understood as the result of gender socialisation processes involving the sanctioning of behaviour that deviates from assigned, gender appropriate behaviour (Ampofo, 2001, pp.197-198).

Historically, unequal treatment based on gender (**gender inequality**) has been justified because of alleged biological and/or genetic differences (Wharton, 2012, p.55). Despite women moving into the labour market, gender inequality between men and women in terms of material resources, power and status has persisted, continuing to place men at an advantage. In this way, gender inequality can be understood as a categorical form of inequality based on a person's membership of a social group or social category (Ridgeway, 2011, p.3; p4). Gender provides a basis for inequality in many domains (Ridgeway, 2011, p.3). This applies domestically – for example, women continue to carry out more household work than men whether in employment or not, or economically, where gender pay disparity prevails: in Europe, women earn an average of 16% less per hour than men, or on a global level, women achieve 56% of men's average incomes (Gender pay gap, n.d.; Connell, 2002, p.2). In the political domain, most of the world's leaders are men, while in the labour market, occupations remain segregated by sex, and senior and managerial positions are the reserve of men, (Bianchi et al, 2006; Connell, 2002, p.1; Reskin & McBrier, 2000).

## 2.2 Women and the cultural workplace

Indeed, gender based inequality as described can also be witnessed in the wider cultural industries: women working within artistic and music industries face a number of obstacles, including encountering greater difficulty in acquiring paid work, generally earning less than their male counterparts, and experiencing conflict in trying to balance work and family life (Miller, 2016). In the broader music industry in the UK, women make up 30% of senior or executive roles while comprising over half of entry-level positions (UK Music, 2017, 1<sup>st</sup> January). The statistics are not only divided along gender lines but age too: more than half of the women working in the music industry are between 25 and 34 years of age, compared to 33% between the ages of 45 and 63 (UK Music, 2017, 1<sup>st</sup> January). In more artistic and technical areas, according to PRS Foundation, female songwriters and composers make up only 13% of their membership (PRS Foundation, n.d.), while the UK Music Producer's Guild estimates that 4% of its members are women (Savage, 2012, August 29).

The underrepresentation of women within the music industry is accounted for by Acker's (1990) theory of gendered organisations, which suggests that gendered logics (organisational norms, practices and procedures) in the workplace result in inequalities and

perceptions of the ideal worker image as a masculine subject. The image of the **ideal-worker as masculine** is related to organisational preference for workers who are considered staunchly dedicated, available and free from distractions or outside commitments, and who are more inclined to suppress sexuality, reproduction and emotional expression. While such a description sounds gender-neutral, it most closely resembles the work situation of a white, middle-class male whose personal and familial matters are attended to by a wife (Acker, 1990), granting him the privilege to fulfil the above criteria. Further to this, according to Britton (1997), if a policy perpetuates organisational gender inequality, it should be considered gendered, even if it is presented as gender-neutral.

Ultimately, this puts women at a disadvantage in the workplace since male workers are more likely to be valued and rewarded for meeting implicit expectations of what constitutes a good worker (Acker, 1990; Kelly et al., 2010). Artistic careers face the same structural problems in terms of combining caretaking responsibilities with occupational demands (Piitro, 1991; Stokes, 2013), since many careers in the creative and artistic sector require from workers constant and last-minute availability and the ability to travel for work (Miller, 2016, p.122). Sometimes, difficulty finding a work-life balance may become even greater since much of the work in artistic fields requires workers to perform artistic labour on top of full-time work (Menger, 1999).

For the cultural industries, labour markets are uncertain and are comprised of much freelance, temporary work and self-employment, meaning that ‘climbing the career ladder’ as such is not determined by rising through the ranks of a given company, but by forging a strong reputation, network and portfolio (Stokes, 2017, pp.6-7). This poses a problem for women, since procuring work in cultural industries requires the adoption of characteristics that are far more acceptable in men (Martin, 1998; Ridgeway, 2011), such as being risk-taking and self-promoting (Banks & Milestone, 2011; Tams, 2002). On top of this, the work is often acquired across **informal social networks** in cultural industries, which can become problematic; mostly, these social networks can be likened to “old boys clubs”, where many job openings are distributed to the friends of the men who participate in them, to which women have more limited access (Banks and Milestone, 2011; Cohen, 1997; Finney, 1993). Musical activity is indeed often structured around pre-existing, gender divided social networks, drawing attention to the homosocial and collective nature of musical activity (Bielby, 2003; Clawson, 1999). This is evidenced by the typical formation of bands, which often serve as a medium through which members of the same sex (mostly men) can bond without the constraint of or threat of interference from the opposite sex (in many cases, women) (Clawson, 1999; Miller, 2014). In terms of music technology, the exclusion of women from electronic scene networks can be a form of gatekeeping for the young men who typically organise them, granting themselves and their network social, cultural and symbolic

capital (Bourdieu, 1993; Reitsamer, 2012, p.401). Practices surrounding DJing, for example, rely on access to social networks that are more accessible to men (Farrugia, 2009, p.338).

The continual exclusion of women from scene networks has led to the formation of independent women's networks (local, translocal and virtual) as an alternative to the entrenched, male-dominated scenes. In music technology, one such network is Female Pressure, a hub of female artists, producers, DJs in electronic music, where women are able to virtually collect and reflect on their experiences of the male-dominated scenes within which they negotiate, provide support for one another and a sense of solidarity, as well as offering a place for music sharing (Reitsamer, 2012, p.402; p.405).

The discussion to this point has largely focussed on gender inequality and women in the broader cultural/music industries, gradually beginning to touch upon music technology and gender. The following sections, however, will focus on two factors, firstly the gendering of instruments, genre and sound, and secondly gendered evaluations in music technology, before finally addressing the focal point of this research: gender, music technology and education.

### 2.3 Gendering instruments, genre and sound

Women are more commonly found within music industries taking on administrative or 'handmaiden' roles that nurture and provide support artists (Negus, 1992). Otherwise, women typically fulfil the roles of fans, consumers, or dancers instead of acts in their own right, producers or managers (McRobbie, 1994). When women do take on musicianship, they have been limited to a narrower range of instruments than their male counterparts (Bayton, 1998). Indeed, as women were obstructed from entering the professional arts, orchestras were historically the reserve of men until the late nineteenth century (Doubleday, 2008). Limitations of female musicianship can be related to the relegation of women to the role of vocalist, gendering of genre, and explained by the association between technology and masculinity that informs the former two.

Although there is evidence to suggest that gendered instrument stereotyping is in decline, instrumental music and performance remains male dominated, despite the transgression of women into this sphere (Doubleday, 2008, p.16). Even in more recent times within the field of rock and pop music, women have largely been **relegated to the role of vocalist**, since 'vocalist' is commonly perceived as an acceptable feminine occupation (Doubleday, 2008, p.16; Leonard, 2007). In fulfilling the role of vocalist and select other instruments, women evade technology and corresponding 'techno-phobia', which results in the rather more limited scope of female musicianship (Bayton, 1997; 1998). Additionally,

musical instrument performance is also related to power and cultural ideas relating to gender and control in ways that vocal performance is not (Koskoff, as cited in Doubleday, 2008).

Yet, particular instruments and technologies remain male-coded with the most prominent examples being the electric guitar and turntables (Green, 1997). Technology and masculinity also play a role in **genre divisions** with masculinity being ascribed to guitars in rock music and DJ equipment in electronic genres, both of which require typically masculine skills and technologies. In fact, music magazines specialising in production and gear are even typically found under men's sections, and gear advertisements typically feature men (Farrugia & Swiss, 2008). Femininity has instead been ascribed to singing, singer-songwriters, and pre-produced music (Leonard, 2007). Further to this, music belonging to genres that make use of masculine technologies are typically considered to adhere to higher aesthetic standards (Leonard, 2007). This is further demonstrated by the pejorative use of 'girly' to describe sounds in DJ cultures and electronic music, while the use of vocal sampling (a technique thought to be preferred by women) is thought to threaten the authenticity of music selected by DJs (Gadir, 2016, p.122). The gendering of digitized instruments and music education has extended male domination within music from classic/avant-garde to technologically dependent genres such as rock, hip-hop and dance (as cited in Born & Devine, 2015, p.149). Additionally, it has been culturally more acceptable for boys than girls to express themselves through electronic and loud instruments (Green, 1997, p.197), with the gendering of noise aiding in the construction of female stereotypes of, "shrieking and hysterical madwomen, deadly sirens, meddling gossips and hectoring scolds to toxic twitter feminists" (Thompson, as cited in Born & Devine, 2016, p.11). The gendered segregation of instruments is also related to expectations that girls will avoid performing with loud or electric instruments that boys are expected to take interest in (Green, 1997).

Furthermore, technology has been associated with masculinity and men through the affiliation between **masculinity and technological skill and control** (Cockburn & Ormrod, 1993; Wajcman, 2004). The enduring association between masculinity and technical "prowess and power" comes as a result of gender segregated childhoods, exposure to technology, role models and the jobs market (Wajcman, 1991; Cockburn, 1983). These on-going processes result in the construction of men as technologically able, and on the flipside of this, women as technologically incompetent (Cockburn, 1983). Cockburn's (1985) encapsulation of this states that "femininity is incompatible with technological competence; to feel technically competent is to feel manly." It is therefore to be expected that the recording studio, as a technological environment, has been coded as masculine due to the prevailing association between masculinity and the "'mastery' of 'complex' technologies" (Leonard, 2007). Indeed, the recording/studio environment is widely considered as such, with a male subject naturally assumed as the subject of studio work (Leonard, 2007).

## 2.4 Gendered evaluations and expectations

Women in the cultural workplace, and indeed within music technology, are also subjected to gendered evaluations: for women, perceptions and critique are influenced by gender in almost all domains of life, and certainly in musical and artistic fields (Miller, 2016). In music cultures, the position of women is widely derided, with women being considered poor record collectors (Straw, 1997), or being judged as passive musicians, producer, and even passive in event organisation (Cohen, 1997; McRobbie, 1994; Reitsamer, 2012). Women's artistic and creative output, as well as productions, have been subject to questioning in terms of aesthetic legitimacy; historically, many women produced artistically under adopted gender-neutral or male names to avoid gender-based devaluation since women are sanctioned for seeking attention (Miller, 2016), while Olszanowski's (2011, p.8) reported that more currently, it is common practice for female music producers to send demos to record labels under gender ambiguous names, reaffirming the idea that being male (or being presumed male) is the most effective way to present one's music.

These kinds of gendered evaluations and expectations manifest in a number of ways: women's sexuality and appearance can be related to their abilities, beliefs that women are generally technologically inept are apparent, while male appropriation of expertise and notions of male genius have also been documented.

Gendered artistic evaluations of women are thought to relate to **sexuality and appearance**, with audiences often considering attractiveness and ability to be mutually exclusive, or assuming that sexuality and attractiveness are used to benefit a female musician's own ends (Miller 2014; 2016). This has been consistent with findings of women in some music technology circuits, too. Historically, turntable technology used by DJs has been masculinised ever since the male appropriation of the phonograph in 1920s America (Katz, 2006, p.584). With this considered, Gadir (2016, pp.118-119) found that female DJs face issues negotiating conflicts between the audience's expectations that they should be physically attractive in order to be marketable, with simultaneous assumptions that female DJs acquire bookings solely based on their appearance. Perhaps even more concerning are accounts of mass harassment of female DJs, with audiences chanting, "Tits out for the boys, tits out for the boys," at one female DJs mid-performance (Gadir, 2016, p.119).

These examples can be related to literature on tokenism. Tokens are usually a minority within a given group, always less than 15% (Kanter, 1977), and one of the possible consequences of being part of a numerical minority is greater visibility. This greater visibility means that women are faced with stronger performance pressures and may be evaluated on the basis of their gender or traits unrelated to ability rather than on merit (Schaap & Berkers,

2014, p.102; p.106; Johnson-Grau, 2002). Such judgements and heightened levels of visibility can result in objectification, sexualisation or assessment as a potential love interest thereby satisfying male desire (Mulvey, 1975; Schaap & Berkers, 2014, p.106).

There are also wider conceptions of women as **technologically incompetent**; one female DJ reported that she refuses to take Friday or Saturday night bookings because she grew tired of clubbers physically entering the booth ‘pretending that she does not know what she is doing’ (Gadir, 2016, p.120). Incidents like this can be related to the widespread consideration of music technologies as masculine, with Gavanas and Reitsamer (2013, p.57) addressing the exclusion of women from male-coded spaces. This is exemplified by consistent reports from female DJs that promoters, booking agents, audiences and even their DJ peers rarely expect competent operation of DJ hardware and software from them (Gadir, 2016, p.120), perhaps resulting from longstanding expectations that women will not have acquired the skills necessary for making, maintaining and playing complex instruments (Doubleday, 2008, p.18).

In music technology fields, these kinds of judgements go beyond assumptions about women and technical competence, but extend to the aesthetic worth of women’s work; music produced by men is considered “authentic and deep”, while women’s work is “manufactured and superficial” (Frith & McRobbie, 1990). This often means that when a male consumer considers music performed by a woman aesthetically worthy, such worth is attributed to a male mentor, or the involvement of a man (Gadir, 2016, p.120). Similar findings have been reported by Schmutz & Faupel (2010, pp.700-701) in their study on music reviews and cultural consecration. Findings suggested that male artists were more likely to be cited as the sole creative force behind their work than their female counterparts, and that reviews of female artists are more likely to ascribe success to the “paternal guidance” of those surrounding them.

Another two aspects of tokenism in terms of gender are relevant, here. One is that, again, due to greater visibility of tokens, they are more likely to receive gender-biased evaluations, the other that when gender roles are broken by tokens they are likely to be met with reactions of surprise or negativity (Schaap & Berkers, 2014, p.105). Additionally, there are often pre-judgements and assumptions about how a token should behave or present themselves, which can limit tokens to fulfilling certain or limited roles (Kanter, 1977, p.230). Perhaps tokenism can be encapsulated in the phrase, “A token does not have to work hard to have their presence noted, but has to work hard to have their achievements noted,” in this, Kanter (1977) captures the ways that women, when part of a minority within a group, are likely to face harsher appraisal despite demonstration of equal or superior capabilities to male counterparts (Roth, 2004, p.193).

Gendered perceptions of **genius** are also disadvantageous towards women; notions of the artistic genius are entwined with ideas of an individual who experiences life differently or more deeply than others, who struggles to belong within society, an image which ultimately suggests antisocial behaviour, behaviour that is arguably more acceptable when carried out by men (Miller, 2016). The influence that gender has on aesthetic evaluations is significant because artistic careers rely on appreciation and hype: symbolic capital (Miller, 2016; Bourdieu, 1993). Research carried out by Werner and Johansson (2016, pp.184-185) suggests that notions of music and **expertise** have also been gendered. In their study on music, technology and gender, they found that male participants were more likely to refer to themselves as experts or even “nerds”, a term implying extensive musical knowledge or expertise, arguably loaded with implications of a male subject. They also found that their female participants were more likely to cite boyfriends as having influenced their musical taste, or were more inclined to ascribe musical “nerdiness” to their boyfriends, while equivalent discussions by male participants lacked the same reference to girlfriends (Werner & Johansson, 2016, p.186). This is consistent with the masculine archetype of the nerdy record collector, on which Straw (1997, p.15) remarks, “the nerdish homosociality of those who collect popular music artefacts is fundamental to the masculinism of popular music as the general valorisation of technical prowess and performative intensity more typically seen to be at its core”. Similarly, there has been a rationalization of stereotypical macho masculinity with geek stereotypes (Kendall, 2011). While working with computers has typically been associated less with strength and athleticism, rhetoric has shifted from “only the strong will survive” to “the geeks will inherit the earth” (Royal, 2014, p.177). Additionally, women have not embraced geek stereotypes in the same way that men have, with men perhaps viewing ‘geekiness’ as a route to wealth creation in the modern world (Royal, 2014, p.177).

## 2.5 Music technology, education and gender

The creative control, field and genre dominance experienced by men can perhaps be understood by exploring the precursor to careers: education. First, education in general, music education, and a comparison with music technology education must be discussed, before expanding on the focus of this study, music technology education. Turning our attention to university level education, men in Britain are less likely to attend and complete their university course of choice than their female counterparts, while women are also more likely to outperform men in degree classification (Weale, May 16 2016). This is also true of other Organisation for Economic Co-operation and Development (OECD) member countries; until the mid-1990s, men outnumbered women in terms of university attendance and obtaining

degrees (Vincent-Lancrin, 2008, p.265). All of this considered, increases in female student figures can be in part attributed to the introduction of female dominated career courses such as education, health, social sector and teaching at university level, while male students remain dominant in subjects including engineering, technology, the physical, computer and mathematical sciences (Weale, May 16 2016; Vincent-Lancrin, 2008, p.274).

This is also true of music technology degree courses, where students in Britain are almost 90% male to 10% female compared to traditional music degrees, which have a more or less equal gender divide among students (55% female, 45% male, roughly in line with the national average of students by sex between 2007-2011) (Born & Devine, 2016, p.2). Music technology degrees may have a slightly higher acceptance rate for women, perhaps as a way to address perceived gender imbalances (Born & Devine, 2015, p.146). Regardless, the majority of applicants are male, and it is suggested that there are not enough women applying to music technology courses to reach equal numbers, causing the apparent gender gap in music technology courses (Born & Devine, 2015, p.146).

A higher proportion of young women take music technology A Levels in Britain (17.5% of those taking MT A Levels are female), compared to those enrolling on music technology degrees (12%); for the fact that women are not necessarily being denied degree places at the application stage, this drop-off in numbers can be compared to the 'leaky pipeline' analogy often used to describe the shortage of women in STEM (science, technology, engineering and maths) fields (Blickenstaff, 2005; Born & Devine, 2015, pp.146-147). This paradigm describes the drop off in the numbers of young women studying music technology at one educational level to subsequent higher tiers of education. Between the ages of 5 and 16, 40% of children that chose 'music technology' as their instrument of choice were female (Hallam et al., 2008, p.12), suggesting that there is a rather leaky pipeline indeed. There are several possible explanations for the underrepresentation and drop-out rates of women: teacher-focused, organisational and student-focused.

The concept of a hidden curriculum is one such **organisational explanation**. The idea of the hidden curriculum suggests that schools transmit concealed lessons that are taught as a means of social control, involve teaching differently within the class, political socialisation and covert training in compliance (Giroux & Purpel, 1983; Jackson, 1968; Anyon, 1980; Bowles & Gintis, 1976; Carnoy & Lervin, 1985; Wasburn, 1986). Other organisational explanations refer to course content: previous research carried out in schools teaching music technology has found that women and girls are institutionally excluded in music technology educational programmes, and that music technology is gendered at both secondary and higher levels of education (Armstrong (2011). Examples of this in classroom settings include the depiction of males as technological experts in dialogues between male teachers and pupils, while classrooms designated for teaching technology have also been

perceived as male spaces, giving the impression that they are ‘off limits’ to female students (Armstrong, 2011).

Additionally, course structures have also proven problematic, further contributing to the construction of music technology classrooms as male spaces. Within school level education, music technology falls under the broader subject of music. Within music education, very little formal training is allocated to music technology, meaning that boys enter music technology lessons usually having acquired hours of home computer usage, resulting in self-assurance for boys and the reinforced stereotype of technology as a masculine pursuit (Comber, Hargreaves & Colley, 1993, p.129). Boys tend to see technology as a shortcut to composition or an easier route to musicianship, where girls are more likely to express anxiety, a lack of confidence and a fear of failure when using technology in music lessons (Comber et al, 1993, p.130). Consequently, girls have expressed a desire for more formal tuition on music technology – i.e. having instructions and guides available on how to use software, while boys tend to contend that they are capable of working things out for themselves, ‘picking things up’, and pride themselves on their seemingly effortless technological capabilities (Armstrong, 2008, p.382). Girls are less inclined towards the trial and error methodology of music technology lessons, which is the shape lessons tend to take (Armstrong, 2008, p.383; 382).

Indirect discrimination theory plays a role in **teacher-focused explanations**. Indiscrimination theory is the idea that teacher’s own gendered preconceptions seep their way into interactions with and in assessments of students. This theory therefore suggests that teachers possess their own gendered biases that influence their interactions with students in music education (Green, 1997; Born & Devine, 2015, p.148). This can influence the discourses surrounding the artistic output of men and women in the ‘discrete critical vocabularies’ used to describe them respectively; for example, men’s work being “powerful” or “virile”, women’s being “delicate” or “sensitive” (Green, 1997). Further to this, teachers may fail to recognise gendered behaviour as such. For example, in a case where boys dominated equipment and girls were reluctant to use equipment with boys present, teachers did not highlight this as a gendered occurrence (Armstrong, 2008, p.380). Again, this may be because teachers are unaware of their own gender biases and their subjective understanding of gender equality (Younger, 2007; Armstrong, 2008, p.380). Indirect discrimination can also manifest as micro-aggressions towards oppressed groups, which can be characterised as more subtle or covert forms of discrimination, particularly where more obvious forms of discrimination are unacceptable (Nadal, 2013).

Within the educational setting, not only are males are constructed as technological experts by teachers, but students too: male and female pupils almost always cite a male peer as their in-class expert on music technology, and in practice, students more often ask male

classmates for help (Armstrong, 2008, p.383). Armstrong (2008, p.383) witnessed a case where a female music teacher would call upon a male student for advice, thus conferring the male student as more knowledgeable than herself and other female classmates, who by Armstrong's judgement, appeared equally technologically competent. Teachers also reportedly focus on individual student levels of interest and skill rather than gender when introducing music technology into lessons, feeling confident that after an initial period of familiarisation, both boys and girls will develop similar attitudes towards music technology and produce work of a similar standard. However, as already mentioned, boys tend to have familiarity and experience with technology prior to music technology lessons - a predictor of their confidence with music technology, and even still, girls in classes also perceived male teachers as giving more time and encouragement to boys (Comber et al, 1993, p.132; 131).

Finally, attention should be given to previous research on women's experiences as numerical minorities within the music technology classroom, since these have the potential to provide **student-focused explanations** for underrepresentation and drop-off rates of women; McCartney (1995) found that women studying composition (and, as expected, were one of few) did not identify themselves as women, reported experiencing isolation and did not attempt to engage with other women on their courses in a bid to prove themselves. Additionally, one of McCartney's respondents explained her efforts to fit in, which required the expression gender in a way that did not emphasize femininity and encouraged the adoption of masculine working habits that are privileged in digital cultures. This is further supported by Caputo's (1994) suggestion that cultural understandings of technology are related to idealized, masculine forms of knowledge associated with rational processes and accomplishment. Caputo argues that this results in girls having to conform to 'malestream' processes and ways of thinking or be silenced.

Considering the cumulative discourse above, this research therefore seeks to primarily address what the gendered experiences of women are within the educational domain of music technology, as a precursor to artistic careers in the wider field, and secondarily, how these experiences compare to those had within the wider field.

## 3 Method

### 3.1 Choice of method: Interviewing

The method chosen and considered most appropriate for this research was semi-structured interviewing. Support for this method comes from Wengraf's (2001) assertion that the purpose of interviewing for research is to gain a greater understanding of reality. Gubrium and Holstein (2002) posit three premises upon which modern research interviews are based, the third of which considers respondents as a "vessel of answers", or a "fountain of knowledge", while Kvale (1996, p.127) suggests that interviewing is the most appropriate method when the subject of research focuses on human experience. Considering that the focus of this research is the classroom, taught and post-education *experiences* of women studying music technology, the most logical research method to undertake was interviewing.

Interviews were semi-structured: it has been suggested that the most effective methodology when presented with only one opportunity to meet with a respondent is semi-structured interviewing (Bernard, 2011, p. 212) since semi-structured interviewing anticipates that a respondent's answers cannot be predicted. By granting the researcher the freedom to probe respondents where more detail is necessary, or to follow interesting leads while maintaining control over the direction of the interview and its content, semi-structured interviewing grants the benefits of unstructured interviewing in many ways (Bernard, 2011, p.212). Less structured interviewing can also be beneficial for building rapport with respondents, particularly when trying to learn of their lived experiences and particularly when speaking with respondents who would be unappreciative of more formal interviewing (Bernard, 2011, p.213). Music technology is a relatively informal domain; an informal approach seemed fitting. Additionally, in many cases, attempts were made to build rapport with respondents prior to, during and even after the interviews had finished. Also, rather importantly, semi-structured interviewing allowed for the fostering of empathy and understanding. According to Chaim (2008, p.334), this relationship between the researcher and informant can influence further research. Being unable to deviate from the interview script could have potentially prevented respondents from feeling comfortable enough to share personal information and experiences, or to suggest further respondents. Semi-structured interviewing granted the freedom to judge the respondent's mood, tone, manner and to shape the interview as necessary.

This type of interviewing allows respondents to elaborate where they please, make connections to the topics they feel are more relevant, and allows respondents to develop their own narrative (Marvasti, 2004). This is important, since it has been argued that structured interviews, although methodical, reflect the interviewer's implicit or explicit assumptions in

the questioning, leaving little room for alternatives offered by the respondent (Marvasti, 2004).

### 3.2 Sampling and data

Sampling took place between April and June 2017, and selection criteria were: 1. women, who were, 2. in the process of completing, or who completed post-compulsory educational courses (diploma and bachelor degree) related to music technology, sound engineering and/or music production in the last 10 years, 3. in Manchester, United Kingdom, or Berlin, Germany. The majority of respondents (seven) had studied, or were in the process of studying at one of four institutions in Manchester (Manchester Midi School, School of Sound Recording (SSR), Futureworks, or Salford University), however the final two respondents were in the process of completing studies at dBs Berlin.

Manchester was selected as a city with a rich musical history. Manchester has contributed to the “global cultural industry” through its intrinsic ties to the internationally famed cultural and musical movement of Britpop (Bader & Scharenberg, 2009), while being lesser known for its contributions to electronic music, specifically acid house (Brown, O’Conner & Cohen, 2000, p.441). In past decades, the achievement of international recognition, success and cult status by Manchester’s home grown artists contributed to the development of local music scenes, a strong local music industry and corresponding businesses (Brown, O’Connor & Cohen, 2000, p. 441). The thriving Manchester music scene in the late 1980s and early 1990s (of which record label Factory and venue the Hacienda formed the core) was even thought to have contributed to an increase in student applications to Manchester’s main three universities of up to 25%; young people were attracted to the city not only as a market for music businesses, but were also keen to set up their own (Brown, O’Connor & Cohen, 2000, p.441). Currently, Manchester is home to a number of music schools that specialise in music technology or offer specialist music technology courses.

Further to this, after the development of its club scene in the 1990s, Berlin emerged as a city with a thriving electronic music scene (Bader & Scharenberg, 2009) providing an appropriate location from which to source final respondents. Further to this, the musical genres with strong affiliations to Berlin such a techno and electro (amongst others), were originated and evolved in the “deindustrialised Detroit and Manchester, or the dilapidated Bronx,” (Bader & Scharenberg, 2009) with Berlin now having arguably superseded the reputation of Manchester (despite its enduring night-time and electronic music scene). Additionally, both Manchester and Berlin have been testament to cultural and creative production as a result of deindustrialisation. (Baden & Scharenberg, 2009).

Initially, snowball-sampling techniques were used: contact was made with informants via Facebook based on referrals from known individuals in my own social network. Relevant informants were then able to suggest respondents who had been studying at the above named institutions in Manchester. However, in acquiring the sample, numerous problems were encountered. In a number of cases, snowball-sampling techniques proved ineffective. Some respondents were unable to make referrals as they were the only woman in their class and knew of very few, or no others (perhaps reflective of the reality of there being few women who study music technology). Otherwise, referrals made bore little fruit and did not materialise into interviews. Attempts to make contact directly with institutions were unsuccessful. However, reaching out to respondents through targeted Facebook searches granted three more respondents/interviews. The above problem quickly became apparent again, however. Because of this, as a final measure, snowball sampling was implemented once more in order to make up the final numbers of respondents/required amount of audio content, however this involved making use of contacts in Berlin, outside of the Manchester area, as initially planned (refer to appendix 1 for further background information on sample).

In total, 9 interviews were conducted. Three were held face-to-face in casual café/bar settings in Manchester, while the remaining six were conducted via Skype. Interviews were recorded on an iPhone 5, and transcribed verbatim using transcription software ExpressScribe. Interviews varied in length, with the shortest being 50 minutes, the longest approximately 1 hour 30 minutes in duration. While initially a goal of conducting 10 one hour interviews was set, the scarcity of available respondents, research time constraints and longer than anticipated length of interviews meant that 9 interviews could be considered sufficient.

### 3.3 Operationalisation

The interviews sought to explore the wider research question of what the gendered experiences of women studying music technology are, and secondarily, to ascertain how student experiences compare to workplace experiences. The main topics relating to student experiences were divided into two categories, classroom experiences/classmate experiences and teachers/taught experiences. This decision was informed by previous research on the topic of music technology, education and gender, as demonstrated below. Interviews were structured as follows:

1. Individual background, reasons for studying and course background

This section existed to open the interview, build a rapport with the interviewee and enable more informed, tailored questions to be asked as the interview progressed.

2. Classroom/classmate experiences

This section sought to encourage respondents to talk about their feelings surrounding being one of few/the only woman in a class, and to a large extent, experiences of male classmates and relationships with male classmates, as well as some potentially gendered aspects learning. Previous research discussed classroom settings as male spaces, and male classmates as experts (Armstrong, 2011; Comber et al, 1993). The purpose of this section was to explore these ideas further.

### 3. Experiences of teachers

This section sought to address questions relating to teachers, including questions about the sex of teachers, how respondents felt about having few female teachers, gendered experiences of teachers and whether/how teachers addressed gender imbalances. This section was informed by indirect discrimination theory (Green, 1997), hidden curriculum theory (as cited in Martin, 1998), suggestions that women are excluded from music technology programmes, and suggestions that male teachers giving more attention to male students (Green, 1997; Comber et al, 1997; Younger, 2007; Armstrong, 2008).

### 4. Post-education

The fourth section was designed to ask respondents to consider how, with gender in mind, they would compare their course experiences to any experiences had within the wider field, in order to place sections 2 and 3 in the context of the wider industry. This section considered previous research on women's experiences working within music technology (Gadir, 2016; Gavanis & Reitsamer, 2013).

Because of the research focus on individual experience, it was important to create an interview guide that was informed by the theoretical framework surrounding the research, yet open enough to account for alternatives at the analysis stage; according to Berg (2009, p.347), presenting the perceptions of others as most important will require a more inductive approach to category formation. Questions were phrased openly allowing respondents to interpret them as they pleased (see appendix 2), however both inductively generated keywords as well as prompts informed by relevant theory and previous research were written below questions. This purpose of this was to provide suggestions if respondents were unresponsive, unsure of how to answer, or required guidance. The interview guide (refer to appendix 2) was designed in such a way that the overarching three topics could be addressed separately and given proper attention in interviews.

## 3.4 Analysis

Thematic analysis was chosen as a method of analysis, for it grants the opportunity to identify and report patterns in data, and proves an effective method for reporting on the “experiences, meanings and the reality of participants,” (Braun & Clarke, 2006, pp.80-81).

Analysis took place on topic-by-topic basis. Each interview question was considered a separate topic, and transcribed interview content was read and broken down into topics in coding software Atlas.ti. As interviews were semi-structured, this was a necessary step since questions and answers were not always corresponding and were often found at different stages of the interview; respondents often spoke freely and at length, meaning that answers were not always given to the question being asked at a given point, but rather at another point in the interview after a period of reflection on the subject area as a whole, allowing connections to be made between topics at earlier and later stages.

After breaking down the interviews into topics/questions, these were exported from Atlas.ti into word document reports, where all topics and responses were open coded. Open coding each topic separately allowed for patterns to be observed within the context of a given topic, and also enabled the easier observation of the frequency of certain responses or incidents, as well as the extent to which topics were discussed. This was helpful after the initial open coding stage, when axial coding was implemented. This involved looking for similarities and patterns established in the open coding stage in order to form categories and themes. In some topics, sub-themes relating to more salient themes became apparent, too. Attention was also given to any significant responses that fell outside of the parameters of established themes or could not be reconciled with pre-existing themes. This was not only to be aware of contrasting responses given, but also to be aware of any circumstances that were seemingly central to respondent's experiences and important to consider in the discussion.

A final stage of refining categories was necessary to further group together themes established at former stages and to see where themes were in fact overlapping or did not sufficiently cover all major aspects of the data. Finally, connections were made between the results and academic literature, and the results for each section were considered as a whole to create a concluding discussion of the results.

## 4 Results

Results below are structured along the same division lines as the interview guide, following the three main questions relating to 1. classroom experiences, 2. experiences of teachers and 3. post-education experiences.

### 4.1 Classroom experiences

#### 4.1.1 A minority in class

The majority of respondents (8 out of 9) reported taking part in more than one higher educational music technology course, however respondents that had done so consistently reported that in all cases they were either the only woman in their class or one of few. Additionally, the one respondent who had participated in only one course reported being the only woman in her class, meaning that all respondents were either one of few (the maximum one respondent reported was being one of three women to 15 men), or the only woman in their class, consistent with estimates that music technology degrees are comprised of a majority of men (Born & Devine, 2016). It is also worth noting that two respondents were also classmates, each being the only other woman in their class. Additionally, three respondents who told of being the only woman in their class also reported that while initially they were one of few, their female peers soon dropped out. Whether reasons for this were related to gender and expectations about the class was unknown: two respondents did not (or perhaps could not) account for the reasons why, while one respondent reported that her female peers left the course for personal reasons. Otherwise, one respondent did comment on the high dropout rate in her class irrespective of gender: therefore drawing any conclusions surrounding this is difficult.

Also notable is that contrary to the observable trend of women being the minority within the class, one respondent who found herself the lone woman on a purely technological audio engineering degree discovered a much more even in-class gender split upon transferring to a performance and recording degree; this is reflective of the higher numbers of women found studying traditional music and music performance degrees (Born & Devine, 2016).

#### 4.1.2 Reasons for fewer women studying music technology

Respondents highlighted a number of reasons for the lower numbers women choosing to study and pursue music technology, however the main reasons can be categorised as 1. the gendering of technology and the construction of music technology as a masculine, or 2. women lacking awareness and/or interest in music technology.

The most prevalent expression related to perceptions of music technology as a masculine pursuit or the gendering of technology. Five respondents cited this explanation, which generally described the ways that music technology is constructed as a masculine discipline. One respondent believed socialisation to play a role this, drawing attention to children's magazines as an example. Here, the respondent suggested that they are an example of the socialisation process that encourages scientific inquiry and productivity in young boys (and consequently, technological interest), which is absent from materials geared towards young girls:

“Look at children's magazines, the boy's ones are like ‘Look at space, isn't science fun?’ And all that sort of stuff, and actually making things and doing productive things, but then anything aimed at girls is pink and like ‘Go and ride ponies, paint your nails’ and not as educationally focused, maybe? I think that's a starting point... I think that could be because girls are not often encouraged to do stuff with technology from a young age,” (Suzanna).

Three respondents developed this explanation further, providing practical examples of the ongoing gendering of technology, by suggesting that the advertisement and presentation of music technology is masculinised within and by schools themselves (from their logos, website design and online content, their course materials lacking in visible women):

“The way it's advertised. You know the logos, even when you go onto their website. The graphics, they all indicate it's very manly stuff and obviously it is targeting mainly young males,” (Georgia),

It was also noted that music businesses/equipment distributors similarly consider men their target audience, making them the focus of online advertising campaigns:

“I think a lot of the gear that's used it aimed at males as well and so like Facebook ads, a load of my mates from work will see certain brands' Facebook ads if they're launching a new product but I won't, so I'm guessing they've targeted this to males not only in like the content of the advert but also who they're sending it to on Facebook,” (Suzanna).

Indeed, even outside of the educational context, music magazines of any kind, as well as those that specialise in production and gear, are often found under men's sections, and gear advertisements more often than not feature men (Farrugia & Swiss, 2008). Additionally, Jessica reflected on the lack of visible women in music technology, which she believes renders the domain less relatable to women:

“You only see male engineers and stuff like that... the only kind of full female thing that I'd say our generation's got is Beyoncé, like a nearly full female band and nearly all the crew are female so... if you can't relate to it it's going to be hard to apply yourself to it.”

These reports are reminiscent of the current body of literature on technology and gender, which details the association between masculinity and technical ability, a result of gender socialisation (Wajcman, 1991; Cockburn, 1983). Gender socialisation results in the construction of men as technologically able, and on the flipside of this, women as technologically incompetent (Cockburn, 1983).

Other explanations included one respondent expressing her belief that fewer women studying music technology came down to women lacking awareness of (and interest in) the subject area. The suggestion that young women are simply unaware of music technology implies that one sex is made aware of music technology while the other is not; given the figures, young men seem well aware of music technology as a discipline. It may be the case that, as Jessica suggested, women instead find music technology less relatable and are consequently less inclined towards its pursuit. On a similar note, another explained how she believed that women are, generally speaking, inherently more interested in performance, creativity and the attention coupled with these aspects of music than the technical, behind the scenes aspects of music:

“I think that’s just a difference between men and women, women like creative things like performing whereas guys will be more into the technical side of things, get this right, that’s it... I think it’s an innate thing to be honest... In general women tend to be like, if they’re interested in music, they tend to wish to be the centre of attention in a way, which is why you get a lot of female singers but you don’t get, for example, live engineers... because that’s a behind the scenes work,” (Sara).

Here, Sara made a key observation. Women are indeed more likely to assume the role of vocalist (Doubleday, 2008; Leonard, 2007). However, whether this is an innate desire is a subject of further debate.

#### 4.1.3 Feelings about being one of few/the only woman in the class

A number of different viewpoints were raised when respondents discussed how they felt about being one of the few women or the only woman in their classes. Feelings tended to fall into three categories: 1. *seemingly* neutral, 2. negative and 3. positive. Three respondents reported feelings of what initially sounded like neutrality, “I don’t mind it,” “I’m just not that fussed.” However, when respondents expanded on these initial answers, they appeared less straightforward. One respondent reported having become accustomed to being the only woman in the class, “To be honest, after my college course, I was quite used to it because it was the same thing back in college,” (Sara), which perhaps does not convey neutrality but rather acceptance of the maleness of music technology. It is also notable that two of the three respondents who expressed neutral feelings also highlighted their comfort and familiarity

with men, as well as not identifying themselves as particularly feminine, perhaps as justifications for their alleged neutrality on gender imbalance:

“I don’t really care, doesn’t bother me I’m the only girl. I don’t like sitting here talking about make-up, straightening my hair for my Saturday night and the stilettos I haven’t ever bought in my life... gender just doesn’t really bother me,” (Alex).

This may suggest that possession of stereotypically masculine traits and a familiarity with men enables for better adaption to a male environment. If this is what is meant, then their statements were not particularly neutral at all.

In addition to this, another respondent reported that she, “tried not to feel the difference” since she believed it was important for women to make an effort on their part to de-stigmatise the role of women within music technology. Here, “try” is rather revealing, with the implication being that the respondent does indeed feel different in a class comprised mostly of men, despite her desire for gender to be rendered insignificant.

Second to this, three respondents drew attention to **negative feelings** surrounding being one of few/the only woman in their class: negative feelings ranged from feeling intimidated, (“It was a bit intimidating at first,”) self-conscious, (“I was definitely very, very quiet, very self-conscious,”) isolated, (“Isolating, a little bit,”), concerned about gender, (“Do those guys think the question I asked is stupid?”) lonely, and misunderstood:

“Sometimes boys just can’t get on your level with it, say if I was on my period and I had a migraine or something... or say that I wasn’t trying hard enough in the studio or anything like that, and it’s not that, I just have a migraine [laughter],” (Jessica).

Previous research by McCartney (1995) can be related to the above talk of gender expression, and to the expression of negative emotions; McCartney found that women studying music technology were isolated and did not identify themselves as women. In addition to the three respondents who provided automatic negative responses, another respondent also described feeling of disconnect and between herself and her male classmates when discussing classmate relationships/experiences. The respondent described the frustration felt when her male classmates seemed unwilling to empathise with her perspectives on gender in electronic music, expressing a desire for more female classmates:

“I just kind of felt like nobody had my back... I felt like I just got shot down by like everyone and I was just kind of like, ‘Damn’, I do think that if there was another female, you know, maybe... they kind of would have been like, yeah, no actually I can see where you’re coming from, but all these guys could not understand where I was coming from,” (Olivia).

While one respondent reported sometimes feeling uncomfortable, they were also able to recognise the relationship between feeling uncomfortable and the behaviour of male classmates:

“I didn’t feel too comfortable, and especially when sexist, misogynistic jokes were coming out and even if it’s just mention of porn or something, that just instantly makes you think, ‘Oh great, thank you, I’m the only female in the room but you’re making these jokes,’” (Davina).

The relationship between classmates and how respondents felt was not simply the case for negative emotions. Jessica, quoted above citing negative emotions, simultaneously acknowledged that, “Sometimes the lads were like big brothers and it was great and it was fun,” while on the opposite side of the above, one respondent reported overwhelmingly **positive feelings** about being one of the few women in her class, expressing feelings of pride and empowerment:

“Honestly? I feel really empowered... I kind of give myself a pat on the back and I’m like, ‘Damn, you’re doing such a good job being surrounded by so many men,’ because all my tutors are men right now as well,” (Olivia).

This response is particularly interesting, since it implies that after all, being in a class comprised of mostly other men and being taught by a purely male body of teaching staff *is* challenging, or does at times evoke negative emotions, and it is the respondent’s resilience that makes her feel empowered.

#### 4.1.4 Experiences/relationships with classmates

From the interviews, respondents’ experiences of/and relationships with classmates could be grouped into three categories relating to: 1. expressing a good/collaborative relationship with classmates. 2. gendered relationships with classmates (in which there were two subthemes: 2.1 stereotypical masculine/macho behaviour and the male space and 2.2 male geekiness and male genius) and 3. evidence of tokenism (in which three subthemes were apparent: 3.1 female classmates as a romantic interest/object, 3.2 gendered evaluations and 3.3 surprise/negativity when gendered expectations are broken). It should be considered that some respondent reports were mixed as they drew on their experiences in multiple courses.

With that said, the majority (8 out of 9) of respondents made comments suggesting that they had an overall **good or satisfactory relationship** with their predominantly male classmates in at least one, both, or all of the music technology courses that they had taken, “The atmosphere was great with the boys, relationship was brilliant. The class was tight knit...” (Jessica). Further to this, two respondents went on to emphasize the collaborative nature of their courses, “It was very collaborative, very supportive, very friendly,” (Georgia). It is important to draw attention to these reports, since they may reflect the overarching experiences of respondents.

One of the most common observations reported (5 out of 9 respondents) was that male classmates tended to display **stereotypically masculine or ‘boyish’ behaviours**:

“It is very obvious when you are in the school like this that they are not used to, still not very used to women’s presence... in the corridors they would still, for example, provoke each other by shouting things and sometimes even like playing, like wrestling, just constantly provoking each other with sometimes a bit offensive things, but it’s usually in a funny, friendly way... they would not do this with me because it would be just odd... I wish I could be a part of it as well in a way,” (Georgia).

This included reverting to “guy talk”, i.e. openly and frequently speaking about topics that are stereotypically of male interest, or about typically heterosexual male perspectives on women and sex:

“They’re just very laddish with each other... just chatting about all the girls like, ‘she’s hot’ and talking about football, you know, things that I cannot join in. Just how they behave with each other... it’s a different dynamic,” (Sara).

Displays of stereotypical boyish behaviours and topics of conversation are perhaps demonstrative of the homosocial, collective nature of musical activity, which is more often than not organised around established, gender divided social networks, allowing for unrestrained male bonding (Bielby, 2003; Clawson, 1999; Miller, 2014). Closely connected to the recurring theme of masculine displays were corresponding feelings of social disconnect. Indeed, five respondents described this:

“Sometimes we [respondent and another female classmate] felt a bit detached from the group because the guys were on their guy talk and it was very difficult to actually have a conversation about something, you know, relevant when we were not in class, when we’re like apart because of course, topics are different and not everyone is interested in what everyone else is,” (Victoria).

It is unlikely that male classmates do this in spite – they may not even be aware of the way this makes their female classmates feel. Nonetheless, it made respondents feel socially detached. Interestingly, despite feeling, in her words, “excluded”, one respondent even expressed understanding of her male classmates behaviour, “It’s like you cannot blame them either because it’s not their choice, just one girl”.

One of the five respondents who reported similarly did not attribute her peripheral position to the stereotypically masculine conversation or behaviours in which she could not partake, but instead to the competitive, hyper-intellectual “nerd” attitudes, of her male classmates, “if you imagine Big Bang Theory, that kind of guys?” While **geek stereotypes** may not fulfil traditional macho notions of masculinity, it should be taken into consideration that conceptions of masculinity have expanded to include these geek stereotypes that women have not embraced for themselves (Kendall, 2011; Royal, 2014). The respondent further

detailed that her male classmates would, “alienate other people with terminology,” which eventually led her to the conclusion that, “they weren’t interested in getting to know me even though I put quite a lot of effort in, so it was quite sad,” (Suzanna). Consequently, at the end of the first year of study, the respondent was motivated to transfer from the audio engineering degree in which she had these experiences to a performance and recording degree, acknowledging, “If the social side of things had been a bit better, I might have stuck with it.”

It has been theorised that this kind of **technical one-upmanship** and gratuitous use of technical language by male musicians and technicians is used as a power move to exclude women from technical spaces (Bayton, 1997). Another respondent echoed a similar sentiment in feeling that male classmates postured themselves as experts. Olivia provided the following example as an explanation:

“I remember I didn’t know what one thing was on the [mixing] desk and it was during the break, and I thought, ‘You know what? I’ll just ask one of my classmates to save me asking the teacher’, and I asked him and he goes, ‘How do you not know that?’ And I was just like, ‘Alright then, well I’m not going to fucking ask you again.’ ... so that’s basically another thing that happened, don’t know if that was like because I was a girl but there was a part of me that felt like, ‘Aw okay, you just think I’m just some stupid girl,’ or also cause they were older as well like, [*sarcastic tone*] ‘Oh, I’m so much more experienced than you.’”

This can indeed be related to discussions surrounding masculinity and technological competence by Wajcman (1991; 2004) and Cockburn (1983), Cockburn & Ormrod, (1993), but can also be related to Werner and Johansson’s (2016) research which found male subjects more likely to ascribe ‘nerdiness’, and confer expertise on themselves. In the educational setting, this can be related to Armstrong’s (2008) study, which observed the construction of male students as technological experts by both teachers and students.

While displays of macho masculinity or ‘geekiness’ can make respondents aware of the male space that they inhabit, or contribute to the construction of males as technological experts, special attention should be given to reports of more toxic displays of masculinity from Jessica:

“They were all quite misogynist, a lot of rape jokes and I had to go to the college at one point cause they were really intimidating. I’d be in the studio with thirteen boys all joking about raping a girl.”

Further to this, upon making the school aware of their comments, “A couple of them [the respondent’s classmates] tweeted about me on Twitter... yeah, they didn’t threaten to rape me but it was implied in there.”

Other than this, the third classification referred to aspects of tokenism that appeared prevalent in interviews. Two respondents described tokenism in the form of being considered

a **romantic interest/object** by classmates. This is reflective of the way that women's visibility as tokens and non-ability related evaluations result in evaluations as an erotic or romantic interest; the fulfillment of the 'male gaze' (Mulvey, 1975). In one of these cases, the respondent was on the receiving end of interest from male classmates:

"That's the place where I socialise the most, that's the place where I find my friends and everything. I've had a lot of awkward situations where I thought I'm developing a friendship but then the guy wants something else and I'm like, 'Oh no, that is so awkward,' but I'm kind of like, I've had that happening quite a few times and it's really annoying," (Sara).

While in the other case, it was male classmates, who suggested that the respondent was of romantic interest to the technical support staff, and that she should use this to her advantage and theirs:

"I was working on a group project with three other guys and whenever we needed equipment or like permission to go and do something, they asked me to be the one to go and ask the studio staff for the things because they said I was a girl and the studio staff like fancy me, so we're more likely to get good equipment... I went to go get the microphone out but they didn't have it in stock and so one of the studio staff gave me a microphone that only third year students should have access to, so he wasn't allowed to give me it, but he did. So I took it back to the studio and the guys were like, 'What? Like, he would never do that for us and he only did that because he fancies you,'" (Anna).

Not only does the case raised reflect aspects of tokenism, it arguably feeds into discourses surrounding the role of women in music scenes as peripheral or the appendages of men. Evidence of this exists in rock scenes where female musicians are mistaken for the girlfriends of male band members (Cohen, 1991, p.206) or where women occupying the backstage areas of venues are assumed to be groupies (Leonard, 2007, p.57).

Further to this, another aspect of tokenism was prevalent. Not only are women **judged more harshly** in terms of their competence, but those in a minority position are more often judged according to their group category ("women") as opposed to on an individual basis (Roth, 2014; Schaap & Berkers, 2014). Three respondents reported either feeling that their classmates judged them on the basis of their gender, or reported being subject to gendered evaluations:

"It definitely felt like there was a lot of comments that flew round, not from the lecturers, but from other students on the course about my skill levels, maybe? They've never seen any of my work, they've never heard any of my work, but just sort of assuming and making little remarks about it, might not be as good as the guys or that I might need extra help," (Suzanna)

A final aspect of tokenism, which was reported only once, was the reaction **of surprise and negativity when expectations surrounding gender roles are broken** by tokens (Kanter, 1977). In this instance, the respondent appeared to violate preconceived ideas held surrounding sexuality, expressions of gender and the pursuit of audio engineering:

“All of the studio staff that work in the uni that manage the equipment and maintain the studios, they’re all guys as well, and one of them asked me if I minded being the only girl on the course and stuff, and I said no because like I get along with the guys really well, and he responded with like... he called me a dyke... he asked me if I was like a lesbian and stuff because I was doing the course and I get along with guys,” (Anna).

#### 4.1.5 Effect of a male environment on behaviour

With regard to that impact that being in an all/mostly male class had on the behaviour of respondents, two themes became apparent: 1. respondents participated less in class discussions, became more quiet, or meticulously planned what they would say before speaking aloud, “I think of what I’m going to say very, very well” (Sara), and 2. respondents adopting more masculine behaviours, expressing interest in masculine interests.

The first was mostly described as being related to concerns surrounding gendered evaluations and criticisms; respondents were concerned that contributing to class discussion and being wrong would lead male classmates to judge them harshly, or apply this judgement to their gender, i.e. being a “stupid girl”. Three respondents explained this behavioural/thought process in some detail, however it can be encapsulated by the following explanation by Victoria:

“Guys saying dumb things are just funny guys or are just jokey guys, oh how hilarious. But when girls say that kind of thing then it immediately becomes a fact that she’s dumb, that she doesn’t know what she’s talking about, that she can’t... being a woman in my class for instance, I know I have to be more careful with what I say and I have to be more sure that what I’m saying is right, because if I say something stupid or something that doesn’t make sense, I know that I’m going to be judged heavily on that, opposed to how a guy would be judged for saying something equally stupid.”

Indeed, this is reflective of aspects of tokenism discussed in section 4.1.4. In this case, these kinds of gender-biased evaluations were something that respondents expressed concerns about. Other respondents detailed altering their behaviour similarly, “I was a lot more quiet,” (Jessica) without offering similar reasons for the changes in their behaviour.

The second was that respondents (three) reported adapting their behaviour in such a way that was more in line with their male classmates. For example, one respondent detailed making an effort to stop voicing aloud her worries about her capabilities within the course in

a bid to “behave like them”, since she “didn’t want to come across as this whiney little whiney girl” (Georgia) while Olivia, explained:

“[I] do feel like I try to become like one of the lads sometimes and I try to kind of have that bit of banter... cause I’m a native speaker, because our classes are in English, I feel like that is an advantage where I can have a bit more of a laugh with the guys and yeah it definitely does make me sometimes try to fit in more with the guys. Not that the guys are like super masculine or whatever you know... I do try to maybe talk about things that are a bit more maybe explicit than maybe the guys would usually talk about to the other guys.”

While a number of respondents felt inclined to adapt their behaviour towards that of their male classmates, perhaps demonstrating a willingness to talk about stereotypically masculine interest areas like football or participating in ‘banter’, it is noteworthy that Alex, reported that being the only woman in a class of men had no reflection on her behaviour with the following explanation:

“My behaviour’s pretty appalling anyway like my behaviour as a female, I mean I’ve always been probably more of a lad rather than a female to be perfectly honest... like I’m really rowdy, I’m really loud like some of the things I say are massively inappropriate.”

Here, Alex highlights the importance of individual gender expression in how respondents negotiate gender and how consideration should be given to how individual gender expression may impact on experiences had and one’s ability to assimilate within a male environment.

#### 4.1.6 Effect of female presence on male classmates

In reverse of the above section, interviews also addressed any effect that female presence in a male space had on the behaviour of male classmates. For the most part, respondents (5 out of 9) did not report noticing their male classmates make any attempt to modify their behaviour in light of there being women/a woman in the class. This can mean slightly different things: for example, one respondent felt unable to sufficiently answer the question on an epistemic level, “I don’t know how my class acts when I’m not there. I’m not really sure if they would be that different. I don’t think my class personally would be because now they’re used to me being there,” (Anna) yet suspected that their behaviour was unaffected by her presence. However, another respondent went into further detail providing an explanation and example of uninhibited hyper-masculine behaviour/conversation, expressing that her male classmates made no attempts to alter their behaviour in light of her presence:

“You know sometimes how... if you’re just out with your girls, like friends, you talk

differently, like you talk about boys in a way that you wouldn't talk about boys in front of them? The boys were like that at Manchester College, they didn't care that I was there, they'd act like I was a boy and talk about girls that way... some of them were like, you know, lad lads, like proper no holding back, this is what I think of girls, they're sluts and these are the nudes I got the other night," (Jessica).

Contrarily, three respondents suggested that their male classmates would modify their behaviour, moderating their choices of words, language and conversation topics. This was detailed by Georgia:

"Normally they would have manly banter about things... I guess they were a bit more considerate in terms of the language that they would use and even though I'm not worried about cussing and swearing... they definitely were more considerate around me... they would sometimes say 'oh shush, Georgia is here'... it's like, 'start behaving yourself, Georgia is standing there', but it was just usually as a joke. They knew I wouldn't mind listening to some of their conversations or silly jokes but initially they would do that and with time obviously they got used to me and they were fine with that but they would still probably behave in a slightly different way around me."

Male classmates appear to alter their behaviour over time - perhaps in this case there was a period of boundary testing for male students in these circumstances as they became accustomed to their female classmate/s. Another respondent echoed this phenomenon in a rather more prevalent way. While Georgia described male classmates stifling their displays of boyish aggression less and less as time went by, another respondent reported an even more prominent example of male classmates behaviour adaptation. Alex reported that some of her classmates adopted what she described as stereotypically feminine, caretaking (or arguably, paternalistic) behaviours in their approach to her, only to realise at a later date that she did not identify as a particularly feminine woman, abandoning such behaviours:

"Like I say, some of them are dead femme so it's actually just like being with a bunch of girls... they're just like big women...they're dead sensitive and dead nurturing, so like I would turn up on a Saturday and Ben would be like 'Oh hiya babe, how's everything going? Y'alright? How was work? Oh I just brought you in a sandwich'... and it wasn't even like them being patronising, it's just them trying to make sure that you're really comfortable because you're in a class full of guys and they just didn't want to make it dead, 'Oh this is a pure lads club'... I think they realised maybe half way through the course that they didn't really need to be so sensitive around me and now Ben went from being like the proper woman of the group to like now all of a sudden actually a lad."

#### 4.1.7 Confidence

According to the interviews, most respondents (5 out of 9) reported feeling confident or fairly confident with music technology and their abilities within their courses. In three of these instances, respondents qualified their confidence by explaining that their confidence levels were justified by their good grades and feedback from teachers, or feeling supported by the teaching or support staff:

“I’m pretty confident because I have been getting good grades back on the work that I’ve done and I’ve been getting good feedback as well from tutors, like face to face as well... all my tutors have been amazing as well, so even if I didn’t feel confident, I’ve definitely got many people to talk to about it who would be more than happy to help me just get rid of any worries because they want us to be confident in what we’re doing and they believe in all of our abilities as individuals,” (Anna).

This is rather unexpected, especially since Cockburn (1985), Rose (1994) and Baker (2008) suggest that women’s confidence with music improves when men are no longer present. This could be accounted for by the fact that the women in this study for the most part knowingly enter themselves into a male environment. Also, respondents tended to be relatively experienced with music and music technology with the majority (see section 4.1.1) having completed related courses prior to their highest level of study. Whether respondents would feel more confident or not without the presence of their male classmates is not measured here, but it is noteworthy that respondents’ reported feeling confident in their abilities irrespective. One respondent did, however, acknowledge feeling more confident in female only listening sessions held at her school:

“We have a group of female listening sessions in our in our school with girls from other parts and in general I feel that when I talk with girls about audio, about sound, I feel more confident about what I’m saying and I feel better and I don’t feel the pressure and my voice doesn’t shake when I talk, and that happens when I’m with the guys, whenever I’m making a presentation with my teacher there, with the guys there... for some reason, I physically don’t feel the same. I feel a bit more shaky, a bit more insecure, I feel a bit more intimidated and I try to overcome that of course but it’s obviously not possible every time,” (Victoria).

While three respondents acknowledged the role played by encouragement from teachers and positive feedback in increasing student confidence levels, on the opposite side of this, one respondent told of how she felt that insensitivity from one particular teacher impacted on her confidence in her course. In the example that she raised, another student had damaged a piece of equipment that she accepted responsibility for. Other classmates were made aware of the situation:

“I was leaving uni and then this guy like, you know, there was all these guys there and

even the teachers were and then this guy says to me, ‘Aw how was your session with the modular?’ [the damaged synthesizer]... I was like, ‘Aw it went alright,’ and I didn’t really say anything ‘cause I didn’t want to be like, ‘Potentially the modular is broken’, and I was walking away the teacher says to all these guys, ‘Yeah so the plug got stuck inside the modular,’” (Olivia).

Because she was thought to be responsible for the damage, Olivia expressed concern that judgement passed on her competence would be attributed to her gender, “Oh my god this is so great now I’m going to look like a stupid girl.” The respondent even suggested that the teacher involved should have taken this into consideration before making others aware of the incident, since poorly handled situations have the potential to result in harsher evaluations for female students:

“I was just like really angry cause I was like, ‘Wow, way to make me look like such an idiot,’ you know? Especially when I’m one of the like only females there... you can’t help but be like, ‘God they are going to think I am a stupid girl’... I mean it definitely does make you kind of take a step back more,” (Olivia).

A further three respondents reported feeling that they were lacking in confidence or had doubts about their abilities at some point in their studies, however it was particularly interesting that 1 of those 3 expressed their lack of confidence in music technology being in their view, a gendered-issue. The respondent expressed concerns about her ability to comprehend and complete a technical course for the fact that she is a woman:

“I must say that I was obviously extremely worried that it’s technical. It’s perhaps as a woman, you know, what am I doing here? Will I be able to finish it? Will I be able to actually comprehend everything I’m being taught because it’s so far away from the academia? The funny thing is I remember as I said, there were only a handful of girls who I met in that school. Every time I met another girl in that school I would hear exactly the same argument, ‘I don’t know if I can cope, I don’t know if I can do this, I’m not a techy person,’ and you could hear the same arguments coming from every single one of those girls,” (Georgia).

Perhaps this can be related to the observation by Comber et al (1993) that in schools, boys view technology as a musical shortcut, where girls experience music technology as anxiety inducing and tend to be lacking in confidence.

Otherwise, four respondents (Georgia included) were able to compare their confidence levels to their male counterparts, with three acknowledging that their male peers also worried about their capabilities, also lacked confidence and were also in need of support, with another detailing that it is she who often helps her male classmates with their work:

“In past semesters, the situation has been that I’ve been helping them [male classmates] doing their homework and I’ve been doing the work with them and I’ve been helping them to write their stuff so I think that on average, I feel pretty confident,” (Victoria).

The respondent was not alone here either; when discussing classmate relationships, another respondent reported that she also helped male classmates at times, contrary to earlier research by Armstrong (2008) suggesting that students are more likely to ask male classmates for help. These kinds of reflections may demonstrate that for respondents, experiencing doubts about one’s capabilities is hardly gender-specific, however worries about the specific technical nature of work was something rather more gendered, as expressed by Georgia.

## 4.2 Experiences of teachers

### 4.2.1 A majority male teaching staff

Similarly to the question of how many male or female students were found within respondents’ classes, a number of respondents had participated in more than one music technology course. Seven respondents reported participating in at least one music technology course where they were taught solely by men (whether that was the only music technology course they had taken, or one of two), while four respondents told of participating in courses where men taught them predominantly, with a select few female teachers.

Interestingly, while telling of the entirely male teaching staff, one participant drew attention to the role of women within her university department, “Kind of the only women that I’ve come into contact with in the uni are either like the receptionist or work at student services.” This is indeed reflective of the administrative or secondary role that women often take within music industries, which typically requires the nurturing of artists, maintaining of relationships and providing of support: a skill set associated with women rather than men (Negus, 1992).

### 4.2.2 Discourses around the lack of female teachers

The interviews show that discourses surrounding the lack of female teachers largely fell into two categories: 1. finding gender unimportant, or 2. recognition of the lack of female figures in music technology and its consequences. Even within these categories, opinion was somewhat mixed.

While 5 out of 9 respondents suggested that a lack of female teachers was not a problem per se, some discussions acknowledged that this topic is not straightforward. 3 of those 5 suggested that gender is rather irrelevant and that it is the individual knowledge,

experience and overall merit of the teacher that is more important, “For me it’s just the knowledge of the tutor that I care about and their experience and what they can teach me, yeah so personally it doesn’t matter if they’re a man or a woman, it just matters how good they are at the job,” (Anna). The idea that gender is insignificant compared to individual ability is connected to neo-liberal ideologies that give rise to ideas that we inhabit a gender-blind society (Andersen, 2001).

Another respondent acknowledged that while being taught by mostly male teachers it is not problematic in itself, it is rather the case that a school having a predominantly male body of teaching staff is a reflection of the scarcity of women within the wider field of music technology, but additionally, perhaps gendered evaluations and inequality:

“The teacher that I had here in Berlin, she’s like a PhD, she’s very, very, very good, but that’s the level of comparison of how good she had to be - and I had teachers that don’t even have a masters degree, that don’t even have a degree for that matter. The amount of effort that this girl had to do to achieve a position where she can say, ‘Okay I’m a female teacher,’” (Victoria).

Additionally, three respondents highlighted the lack of role models for women in music technology, one of which was a respondent who expressed believing gender to be irrelevant to the teaching of music technology. A further four respondents also expressed the belief that a greater number of female teachers would play a role in attracting more female students or play a role in deconstructing the masculine image of the profession, “Female teachers will kind of put things across in different ways and also... get out of this point of view that music production or technology is a male thing”. One respondent expressed feeling that the lack of female role models and teachers was even a deterrent to women who did take interest in studying music technology:

“I think that’s part of the reason those schools attract mainly males, because a girl walks in and attends an open evening, for example, or a taster lesson, and she thinks immediately, ‘Well it’s not really for me because there are no female teachers,’ for example. So perhaps that’s why obviously the teachers attract guys who look up to them, who they can identify themselves... they very often share the same background, similar experiences, they speak the same language almost,” (Georgia).

Further to this, one respondent, an artist-producer who also teaches music technology in primary schools reported observing young girls express an interest in becoming music producers upon learning of the achievements of female music producers in the past:

“I think visibility is key in my work in primary schools when I use the Delia Derbyshire original Doctor Who theme as the starting point of the course. It’s a five week course with key stage two primary and girls will all say, ‘Oh I didn’t know’, and boys will go, ‘I didn’t know the Doctor Who theme was made by a girl’, then it’s like

you can see them, and then sometimes they say ‘That’s what I want to do, maybe I can do that,’ (Davina).

The fact that young girls’ remark on a composition and production being credited to a woman may suggest that they already assumed a male creator. Here, Davina highlights the importance of female presence/female role models at all levels of music technology education, and the role this plays in deconstructing masculinised images of music technology.

#### 4.2.3 Teachers and gendered experiences

Gendered experiences involving teachers could be placed into three categories: 1. covert expression of gender biases, 2. overt, or explicit gendered occurrences and 3. gender-neutral approaches.

Judging from the interviews, it is possible that the respondents’ teachers are susceptible to presenting their own **gender biases** in their interactions with female students. This appeared to manifest itself in a number of ways. Three respondents reported that their teachers, on occasions, made statements suggesting that women were in fact better than male students in certain aspects of the course. On the surface, this may sound encouraging, however explanations of the reasons why women were thought to be better relied on stereotypical notions of femininity or female physicality. For example, in an audio engineering class about foley (the recreation of sounds made by human action/a human body in music or in film):

“The tutor said that women tend to make better foley artists, like making the sounds and like recreating the scenes than men do... he was like well women just tend to like be lighter on their feet and have a close a closer eye for like detail and attention,” (Anna).

The teacher in question arguably made an assertion based on ideas about femininity and being smaller in stature, smaller size; female physicality. While female bodies were thought to be advantageous on one area, however, the same respondent also reported being left out of a boom pole demonstration, speculating that it was because she lacked required physical strength to hold the equipment, “I don’t know if they didn’t think I couldn’t do it or something but they only asked like the bigger guys.”

Similarly, another respondent reported a teacher praising her efforts by making a connection between gender, more specifically femininity, and emotional engagement and awareness in her approach to the task. While working on a jazz track, the respondent paraphrased her teacher as having said the following:

“You really thought about the emotion of the track... rather than getting the details, like yeah it’s not clipping, it’s all good, good to go, you actually thought of things.

There are creative ways of microphone placement to give the track the necessary warmth. Because you as a female, you focus on details a lot more than the guys,”(Sara).

Instances like Sara’s example, where her teacher demonstrates beliefs held around femininity and emotion/affection, are supportive of indirect discrimination theory: as detailed in section 2.5, gendered preconceptions enter into teacher’s interactions with and assessments of students, using separate terminology to describe the creative output of men and women (Born & Devine, 2015; Green 1997). However, as this research is very much concerned with experiences, it is interesting to note that Sara suggested that she coded these encounters positively. Sara made mention of another similar interaction where a teacher commented on her feminine approach to the work, considering these kinds of interpretations to be beneficial:

“EH: For you is that a good thing to be?

NM: Oh yeah, he basically said that being a girl is an advantage.”

Another way that teachers may have been revealing implicit gender biases was in providing extra support for female students; three respondents reported teachers providing extra support to them, or feeling that teachers were particularly attentive. Of the three to report this, one respondent, Davina, considered that there may be a gendered dimension to the extra help provided to female students:

“I’d say they’re extra supportive ‘cause they’re aware that that you’re in the minority, you know? And you’re having to sort of stand your ground a bit some of the time. If you’re keen as well and you’re dedicated, I’d say they’re extra supportive most of the time, but even then that’s a sort of special treatment assuming that you need it, isn’t it?”

These examples feed into literature on micro-aggressions: as mentioned in section 2.5, micro-aggressions arise where more outright assaults on oppressed groups are less acceptable, and gendered micro-aggressions can manifest in a number of ways. The above example raised by Sara demonstrates assumptions of traditional gender roles, while the example raised by Davina is a micro-aggression in its implicit and covert assumption regarding the inferiority of female students and their abilities (Nadal, 2013, p.39; p.43).

Arguably **more explicit cases** include the dismissal that two respondents reported experiencing when they reported classmates or teachers to the school for what they felt were misogynistic remarks. In one case, one respondent described reporting her male classmates to a class lecturer for repeatedly making rape jokes, to which the lecturer’s response was, “It’s just boys, you’ve got to get over it,” (Jessica). In Jessica’s case, when the situation was escalated to the head of the school, action was taken and those responsible were suspended. However, another respondent, Davina, described taking a complaint about a member of the teaching staff to the head of the school only to be told, “That’s just the way the industry is.”

Despite this, the teacher on the receiving end of the complaint was spoken to, but could appreciate the comments made:

“I got on really well with and bless him, he came back to me knowing I’d been the one that complained and told and sort of got him told off, but he also thanked me for it and said, you know, thanks for making him aware and he was just bantering really and he didn’t realise, but I think it did make him aware and he took it on board, really. So yeah, I was a pain in the arse but I think that in particular that situation, they accepted that some people are sensitive sometimes and to be aware.”

Additionally, two respondents, who were in fact a part of the same class in Berlin, expressed that male teachers appeared to be aware of women’s presence in class and suggested that teachers would alter their in class commentary depending on the presence of women in the class. For example, one respondent reported that her classmates told her of the mixing teacher likening the process of mixing to a woman’s body in her absence:

“Whenever I missed classes, I’m pretty sure when I wasn’t there, he would basically say stuff like... mixing stuff is like, you know, like comparing it to like a woman’s body or something like that, I think, I can’t remember but... I would definitely say that he could be quite sexist but I think he would do it when I wasn’t there,” (Olivia).

It is also important to note that five respondents suggested feeling that the teaching staff tried to relate to students in a **gender-neutral manner**, “It felt like the level of support from all my lecturers has been the same towards everybody, yeah, I haven’t seen any difference in the way they interact with the boys and with me,” (Sara), despite 3 of those 5 having made mention of examples of gendered experiences with teachers; perhaps it is important to consider these gendered experiences within the wider context of respondent’s overall experiences of their teachers. These reports might suggest that gendered encounters and interactions were not necessarily everyday experiences.

#### 4.2.4 Addressing the gender imbalance

In the interviews, six respondents identified ways that teaching staff attempted to address the gender imbalance in class. This was either done by 1. including women’s contributions to music technology in classes, 2. verbally addressing the gender imbalance or 3. calling upon female students to participate. The **inclusion of, or drawing of attention to the contributions made by women** to the field of music technology in classes/course content was the most common technique observed (mentioned by three respondents). Indeed, actively drawing attention to the work of women where it appeared in class was perhaps an attempt to make the contributions of women more visible:

“We watched a video of, I think it was the behind the scenes of Star Wars... I can’t remember what the role was but it was a woman, and he pointed her out and would always be like, ‘Hmm there’s a girl in the team as well,’ so he tried,” (Sara).

While two respondents made no complaint of these kinds of efforts, one respondent made a point of expressing her dislike of these perceived attempts at inclusivity, finding it irrelevant and even something that made her lose interest in her particular teacher’s class:

“I’m not here to learn about that... that’s not technically part of the course... I just felt that was really irrelevant that I felt every time I had a class with him, he felt like it was it was something that he had to sort of bring up,” (Alex).

Further to this, according to three respondents, **teachers also addressed the gender imbalance directly and verbally**: one of these cases involved making the class aware of the vast gender imbalance in the wider industry, while the other two involved teachers incorporating some acknowledgement of female students, or acknowledgement of gender inequality into opening dialogues at the beginning of the academic year:

“He did address the gender imbalance. First day, he was like, ‘We’re not going to have any of the sexism. We’re not doing it. We’re not having it. That’s definitely not what we’re doing here.’ He was like, ‘SSR [School of Sound Recording] doesn’t tolerate it, and I won’t tolerate it,’” (Jessica).

The other respondent emphasized how important she believed it to be that teachers do in fact do this, not only to encourage women studying, but also to bring gender-issues to the attention of otherwise unaware male classmates:

“I think it’s important for the guys as well, so that they understand that... there is a lack of females in the industry and that they deserve the upmost respect like any anyone else and they should not be degraded, so I think it’s good that they understand that as well, because I definitely feel like there is a lot of guys that just won’t even bat an eyelid because it’s not something that they have to deal with,” (Olivia).

Additionally, two respondents also reported being **selected for class demonstrations** over their male classmates; if a volunteer was required, a female classmate tended to be called upon. It was speculated that this was to encourage participation and to heighten feelings of comfort:

“They’d get either me or Letizia [another classmate] to do it. I think because they knew that we were a bit ‘standback-ish’ at first, we were a bit like, ‘Ugh what do we do? How do we play this?’ They were wanting us to get involved, to feel more comfortable, throw us in at the deep end which did help a lot because it eased tensions,” (Jessica).

It may be the case that this is related to female student’s participating less, as discussed in section 4.15. It seemed to be the case that respondents interpreted efforts to address the

gender imbalance as ways that teachers had tried to be more inclusive of women within the class, whether that meant by increasing visibility and awareness of women's contributions to the discipline, encouraging participation from female classmates or opening a dialogue about gender. These attempts can be linked to the concept of the hidden curriculum (see section 2.5) (as cited in Martin, 1998, p.495). If it is assumed here that the concealed lesson in music technology education is that it is a male discipline, then in this case, perhaps teachers' attempts to address the gender imbalance were also attempts to disrupt the apparent hidden curriculum that excludes women from music technology class content.

Otherwise, three respondents reported not feeling that the gender imbalance was acknowledged, although it did not appear to be the case that this was poorly received, with one respondent explaining that, "they [the teachers] didn't want to make that an issue, they didn't want to put anybody on the spot," (Davina). At another point during the interview, Davina made an important observation, explaining that the teaching staff in music technology schools may have rather extensive working experience, but are not trained to be teachers:

"They're not even trained to be lecturers... according to friends who've done PGCEs [Postgraduate Certificate in Education], it's not even mentioned, you know, they don't really think about language and how you approach inequality, or how you approach different people, diversity... these guys all come from the industry, so their industry experience will mean they've hardly worked with women."

This means that teachers may be unaware of how to broach topics of gender inequality in music technology or the music industry even if they wanted to, or perhaps do not consider their responsibility as a teacher to extend beyond the transmission of knowledge on the course content.

### 4.3 Post-education experiences

While post-educational experiences are not the focal point of this study, for context, and to give respondent's experiences some perspective, it is important to examine how working experiences can be compared or contrasted with educational ones.

#### 4.3.1 Comparing the course environment to the working environment

Responses relating to workplace or post-educational experiences were mixed. Respondents were very much at different stages in their careers: four respondents were in the process of completing their studies, meaning that although they did possess some, their working experiences were somewhat limited. Of the five who had completed courses, one respondent had chosen not to pursue a music technology route any further (although it should be noted that this was not attributed this to their course experiences but rather to a developing

interest in other areas). Additionally, respondents demonstrated an interest in pursuing, had pursued a whole range of different career pathways within music technology, or had experiences within a range of areas from studio producing/engineering, teaching, live engineering, working in PR, audio for film etc., making the drawing of true comparisons challenging.

#### 4.3.2 Distribution of men/women in working environments

Perhaps as is to be expected, 7 out of 9 respondents drew attention to the male-dominated nature of the workplace surrounding music technology, acknowledging in some form that they were predominantly working with men, or expect to upon completing their studies. Anna, who was in the process of completing her bachelor study in audio engineering, claimed that, “I’m looking into getting into live sound as well, and all the people that I’ve approached and spoke to about that have all been guys as well... I haven’t encountered a woman in the industry yet.” One participant did state the opposite, “I worked for a PR agency for a month and it was all women, it was just like two guys and the rest were women,” (Olivia), however public relations is recognised as a female domain, especially compared with label owners, managers, executives and A&R, that are predominantly male (Farrugia & Swiss, 2008, p.86).

This can be related to another observation raised by four other respondents, which was that the women that they did encounter in their work either tended to be performers, in particular vocalists, or were found in administrative and organisational roles. Suzanna, a studio producer/engineer noted that, “Once I got into the studio, the only other females I saw were singers, backing singers and that’s about it. Very rare on other instruments, like a couple of string players sometimes are female, but it’s a very male environment.” This observation has previously been documented and explained by Doubleday (2008), Leonard (2007) and Bayton (1997; 1998), since performing vocals allows women to circumvent technological pursuits, “techno-phobia”, and is considered an acceptable musical role for women, among a select number of instruments.

Further to this, a Victoria provided further support for the division of labour in music industries, by acknowledging that women often carried out administrative work, while men took on roles related to technology and musicianship. She explained that when carrying out live sound work at a neighbourhood event, “The intellectual work was driven by women, there were women in the board organising the events, but when you get to the actual location and unpack the equipment and plug everything in and you have to talk to the bands and talk to the musicians, there are no girls most of the time.”

### 4.3.3 Gendered workplace experiences

In the interviews, four respondents highlighted what they believed to be examples of gender inequality or sexism from their colleagues/collaborators. It is also notable that some respondents took the time to explain their cases and examples in great detail, suggesting that to them, their experiences may be rather salient.

While there was variation on a case-by-case basis with regards to this topic, two respondents described some of the experiences that they had being a result of a “vibe” or a “feeling”, something covert rather than the direct verbal or physical actions. For example, Suzanna, a studio producer/engineer who also works at a technology school, explained that she felt that her male colleagues were reluctant to collaborate with her for reasons of which she is unsure, and that consequently, this uncertainty raises the question of whether gender plays a part in this:

“A lot of my colleagues at SSR, like other studio assistants, they will all work with each other. I do mastering, they do mastering... I’m like, ‘Let me master your stuff guys, let me master your stuff.’ They will all send it outwards to other men. Whereas I’ve got quite a few of them to work on my stuff, they won’t get me to work on theirs. There’s only one guy that’s been like, ‘You know what? I want you to master my stuff,’ ... and he told all the other guys that he really liked my work, and then they still carried on outsourcing to other men... I don’t know what’s the reason.”

This can be related to the ongoing exclusion of women from male scene networks (Reitsamer, 2012), while a common theme here is the general doubt cast over women’s technological expertise, authority and abilities, as observed by Gadir (2016) in research on female DJs. This is something that can be demonstrated in an example brought up by Victoria, who reported repeatedly feeling that her live sound engineering expertise was called into question by amateur male (and to a lesser extent female) musicians, as exemplified as follows:

“I feel like every musician that doesn’t know the first thing about sound in itself and about how sound works would not trust a girl to do sound for them... It’s a double effort because I have to explain myself for being a girl, I have to explain to these people I actually know what I’m doing, I studied for this, I know how this works, I know where the cables go, I know... I better really know how to build that argument and how to tell the person, ‘Look, this is how a microphone works. This is how you put it. Don’t cover it with your hands because there is a frequency that’s going to be encouraged when you do that.”

The respondent was also aware of the gendered nature of this, feeling that the authority of male counterparts would be respected:

“A guy could have just said, ‘Dude, don’t do that. Don’t do it,’ ... If I told that to a guy, he’s going to say, ‘What? Who are you? What are you?’ Unless he knows already

who I am and unless he knows already that I'm good at what I do and that I actually have some intellectual authority for whatever it is that I'm saying."

As mentioned, comparisons can be drawn between these kinds of experiences and those encountered by female DJs (Gadir, 2016). This can also be understood as a side effect of the long-standing associations between masculinity and technology (Armstrong, 2011; Born & Devine, 2015). However, it may not be the case that gendered evaluations are always external. One respondent working in the electronic music scene reported the following upon winning a competition hosted by a DJ/electronic music magazine. The respondent was made aware of the small number of female entrants to the competition:

"I then kind of go... was it based on the fact that I'm female and was the best one out the female entries or did I get that because actually I deserved it? And then it takes you a wee while. Like I know I got it because I deserved it and I put my heart and soul into it and I promoted it and I made it myself and it was decent but you always have that. There's always that constant doubt because you just go, 'Am I getting it cause in female or am I getting it cause I'm good?'" (Alex).

Here, the respondent describes the complex relationship between knowledge that action taken to address the numerical minority of women within the scene, and how that impacts on the evaluation oneself.

#### 4.3.4 Comparisons with course environment

How the experiences detailed in the above section relate to experiences within educational courses is difficult to gauge. Two of those respondents who reported that they had encountered what they felt were sexist experiences also reported that their experiences were very different from that of their courses for somewhat similar reasons. Both respondents explained that within schools, familiarity with teachers, colleagues and classmates fostered an environment of mutual respect, which can be lacking in a working environment of strangers. Alex, likened the course experience and working experience to being a nurtured child released in the "big bad world." The same live sound engineer mentioned in section 4.3.3 explained:

"When you're in a school environment, when you're in a course environment, you can take almost for granted that the people around you are educated people... are people who have got rid of many of the biases that human beings have around gender... in general the fact of being in a school means that you're surrounded mostly by intelligent and very self-aware people. In the work environment, it's not always like that."

On the reverse side of this, another respondent, Davina, expressed the opposite. She reported experiencing aspects of ‘everyday sexism’ in her line of work, which she described as including being patronized to having someone “look at you in a particular way because you’ve got a tight top on.” However, because she found her experiences with peers and teachers particularly problematic, she suggested that the course/school environment was rather unreflective of the wider industry:

“That’s why I said to that head of SSR [School of Sound Recording] that you know, actually, that’s not reflective of the wider industry, no one would dare say anything like that in front of you while you’re working. They’re at work so they’d be professional.”

Perhaps this highlights the role that highly individual experiences of both course and working environments will have on the ability to draw comparisons, similarities or contrasts between the two. Additionally, two other respondents commented that they felt their course and work environment’s were similar, but only regarding the sheer number of men they have encountered in both, as explored in section 3.2 on the distribution of men/women in working environments.

## 5 Conclusion

### 5.1 Findings

This thesis investigated gendered experiences of music technology education, by firstly asking, what are women's gendered experiences of the music technology classroom/classmates? Secondly, what are women's gendered experiences of music technology teachers? And thirdly, from a gendered perspective, what are, and how can women's post-educational experiences be compared to their classroom experiences?

Essentially, the consistent numerical minority women find themselves in informs women's **experiences of the music technology classroom**. Respondent's feelings surrounding being one of few/the only woman in their class were generally negative, or implied negativity. Male classmates exert masculine displays of behaviour (whether that be stereotypical macho masculinity or 'geekiness'), and generally did not attempt to moderate such displays. For respondents, stereotypically masculine behaviours were adopted in an effort to assimilate, or alternatively, respondents would participate less in class or meticulously plan what they were going to say for fear of being wrong and receiving harsher, gender-biased judgments. Interestingly, however, most respondents reportedly felt confident in their own abilities. Respondents' simultaneous reports of having good or satisfactory relationships with their classmates is also important, however, since these are perhaps reflective of respondents' day-to-day and overarching experiences.

In terms of **experiences of teachers**, as expected, respondents were for the most part taught entirely by men. While respondents generally reported gender neutrality from teachers, much like with classmates, respondents were able to draw attention to gendered interactions (some covert, some more explicit) with teachers. Teachers also seemed to make attempts to address the gender imbalance in class through a variety of techniques: through active inclusion of female students in class, verbal acknowledgement of the unequal gender divide/inequality in the industry, or through the inclusion of female contributions and examples in class content. This final aspect is particularly important since respondents claimed that masculinised course content contributed to constructions of the music technology profession as masculine, and recognised the lack of female role models in relation to this.

Finally, in terms of **post-educational experiences**, when working in the wider music technology field, respondents noted the vast majority of their colleagues were male. Gendered evaluations and doubts surrounding women's technological competence were evident in responses, however whether these kinds of experiences were consistent with those taking place in educational settings was highly subjective; some respondents were students and had

limited working experiences, while one of the respondents most vocal about her negative experiences as a live sound engineer was still a student.

## 5.2 Theoretical contributions and discussion

The findings of this thesis are largely consistent with and contribute to pre-existing theory and research on the topic (as evidenced in section 4). **Classroom experiences** have been rather supportive of Armstrong's (2008) assertion that music technology classrooms are constructed as male spaces; one of the main successes of this research is its contribution to this argument, and arguably, to literature on male spaces. Armstrong's research was to a large extent focused on how constructions of male technological experts were evoked in a classroom setting, and how girls experienced exclusion from music technology classrooms with regard to this. However, this research differs, yet advances on Armstrong's assertion by drawing attention to another aspect the music technology classroom as male space: expressions of masculinity. Male students appear to understand, implicitly or explicitly, the music technology classroom as a male space, emboldening them to express masculinity either in the form of archetypal male 'geekiness', or through expressions of boyishness or macho masculinity. Either of which, to some extent, exclude female classmates. Male geekiness contributes to understandings of the archetypal male technological expert in the way that male classmates posture themselves as experts. This includes excessive use of technical language or condescension, "How do you not know that?" These examples are consistent with males-as-technological-expert stereotypes, and in reverse of this, women as technologically incompetent, as argued by Cockburn (1983), Cockburn & Ormrod (1993), Wajcman (1991; 2004).

In another sense, displays of stereotypical boyish behaviour, or macho masculinity emphasize the homosocial nature of musical networks that typically exclude women (Bielby, 2003; Clawson, 1999; Miller, 2014). Expressions of boyish behaviours can be related to respondents adopting stereotypically male characteristics; women in male spaces either adapt to the social customs (topics or behaviours, for example) set by their male classmates or remain socially peripheral. Otherwise, demonstrations and constructions of male expertise can be related to respondent's attempts to avoid gendered-biased evaluations (by participating less, planning what to say carefully), and related to theory on tokenism (Kanter, 1977; Schaap & Berkers, 2014). Despite this, hearing that most respondents felt confident in their abilities with music technology was an unexpected. Prior to beginning this research, largely due to the findings of Comber et al. (1993), expectations were that respondents would be lacking in confidence in the subject matter as a result of the enduring associations between technology and masculinity, and the many years of familiarisation with technology that male students

tend to have. However, with this research being focused on post-compulsory education, it is also not out of the ordinary that female students who have chosen to study music technology would be relatively experienced, and may have built confidence through this.

In terms of theoretical contributions that can be drawn from **experiences of teachers**, a number of the examples of gendered interactions raised could be described as micro-aggressions (Nadal, 2013), and can also provide support/further evidence for indirect discrimination theory; this was highlighted in the different discourses evoked by teachers surrounding male and female student's creative output (Born & Devine, 2015; Green, 1997), and is especially important since the creative output of men is typically judged as more aesthetically worthy than women's (Frith & McRobbie, 1990). Attempts to address the gender imbalance contributed to research on the hidden curriculum, (Giroux & Purpel, 1983; Jackson, 1968; Anyon, 1980; Bowles & Gintis, 1976; Carnoy & Lenvin, 1985; Wasburn, 1986), although interestingly, this research contributes a new perspective on what happens when teachers try to disrupt the hidden curriculum.

In terms of **workplace experiences**, evidence of gendered evaluations within the workplace were consistent with Gadir's (2016) research on female DJs, suggesting that it is not uncommon for doubt to be cast over women's technological competence and authority. This may also align with literature on the gendering of instruments, particularly when considering widespread expectations that women will not have developed the required skill-set to operate and control complex, technological instruments (Doubleday, 2008, p.18).

### 5.3 Proposals for music technology educational institutions

This research has provided an insight into the experiences of women at educational level within the field of music technology. It should be of real world relevance to schools, colleges and universities that aspire to address gender in a positive and progressive way in their classrooms, to be aware of and provide support to their female students and to potentially attract more female candidates, if they wish.

Respondents touched upon ways that schools could either become more gender inclusive, or ways that they believed schools could attract more women to music technology courses. While schools are by no means entirely responsible for gender-based progress in music technology, there are a number of things that educational institutions could take into consideration. The first three proposals in particular have the potential to begin trying to deconstruct the masculinised image of music technology within music technology schools and courses:

- Schools should be aware of their masculinised presentation: respondents drew attention to masculine graphic designs used for logos, as well as the masculine imagery they felt was

used in course advertisements. Therefore, the adoption of more gender-neutral advertising and designs is advisable. Respondents also suggested ensuring that female students were featured more frequently in online or promotional content posted by the school or to the school's website in order to increase the visibility of female students. Schools should design their course curriculums to include contributions from women where possible/relevant.

- Since this research focuses on student rather than teacher experience, this research is somewhat unaware of the level of teacher training on offer to teachers of music technology. However, having considered the responses provided in this research, it is advisable that teaching staff should be trained to evaluate work in a gender-neutral way; even where evaluations may seem positive, they create gendered expectations about how and where female students should perform well, which could be limiting in the long-term.
- Schools should not tolerate inappropriate or sexual gender commentary made by teaching staff, and should ensure that standards are upheld even where female students are not present. One respondent remarked, "We need to include men in the process." Ideas surrounding music technology classrooms are male spaces need to be broken down in the eyes of both male and female students.
- Schools should be aware of and aim to address the masculine environment surrounding music technology: respondents were aware of the lack of female presence in music technology schools, suggesting an increase in not only female teachers, but also female ambassadors representing the school externally, technical support staff, and guest lecturers. As one respondent said it: "More women present in any effect would help."
- Otherwise, schools could try to create more of a community environment: respondents suggested holding conferences, forming societies, projects, not necessarily only for female students, but to foster a more welcoming, encouraging environment.

#### 5.4 Limitations and future research

There are limitations to this study. Some are methodological: ambitions to study a geographically concentrated sample in Manchester, UK, had to be abandoned in order to acquire a sufficient number of respondents, and so final respondents were sourced in Berlin, Germany. This study then became vulnerable to geographically influenced differences, when it was not the intention of this study to compare locations. Additionally, with 9 respondents, the sample size was admittedly small. However, it should be taken into consideration that there are classes with only one, or very limited numbers of female students. Although there are a number of music schools and institutions in the Manchester area offering music technology courses, there appears to be a relatively small pool from which respondents could

be selected in the first place. Also, since four respondents were still students, the sample was also problematic in terms of answering this thesis' third question relating to post-educational experiences. Further to this, respondents who had graduated had taken different career paths. Nonetheless, the sample was fitting for the first two research questions.

Mixed methods could have been used to elaborate on some of the claims made in interviews; experiences are not infallible, and there are alternative ways to examine gender, music technology and education. An example of this might have been to carry out a content analysis of online content and course materials, or to extend research to include teachers and how they approach matters relating to gender. Observation would have been another viable method, and has been used in previous research (Armstrong, 2008; Comber et al, 1993). However, since schools were unresponsive in aiding requests for respondents, acquiring permission to carry out observations may have been too ambitious. Of course, these are some suggestions for research that could complement this study and further investigate music technology, education and gender, however interviewing female students/former students remains the most viable methodology for answering questions relating to the focus of this research: experience.

Education falling outside of formal institutions went unaddressed in this study. Therefore further research in this area may be advisable. The rise of the phenomenon of DIY 'bedroom production' in recent years should not be underestimated: Internet expansion in the 1990s and the development of user-friendly music recording software, more affordable digital audio, gadgets etc. in the 1980s and 1990s (Born & Devine, 2015. P.139) has granted anybody willing to learn the opportunity to develop music production and sound engineering skills. It has even been argued that technological advances in recording have "the potential to challenge the ways in which the production of pop has been gendered" (Negus, 1992, p.86). Therefore, research addressing gender, music technology and self-teaching would be a worthwhile investigative route; currently, a small body of research addressing this topic is emerging (Barna, 2017; Rodgers, 2010). Further research projects could explore gender and the use of online materials/self-teaching as a strategy for bypassing male dominated environments such as music technology schools. On the back of a suggestion made by a respondent that male producers are more active and vocal online, another idea would be an online content analysis of music production networks (for example, one particularly active Facebook group 'GEMP' consists of over 4,000 members). In GEMP, for example, group members mostly post asking for feedback and advice on how to develop their own productions; this could provide an interesting foundation for investigating how women are received in online networks for self-teaching/self-improvement and how men relate to one another. This is one way that research on music technology, education and gender could

expand to address and account for contemporary, digitized and increasingly common learning methods.

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## Appendix I

Background information on sample:

<b>Name</b>	<b>Age</b>	<b>Location</b>	<b>Country of Origin</b>	<b>Occupation</b>	<b>Highest level of education in music technology</b>
Georgia	37	Manchester	Poland	Student/Administration	Diploma
Alex	29	Manchester	UK	DJ/Administration	Diploma
Suzanna	29	Manchester	UK	Technical support/ producer	BA
Jessica	20	Manchester	UK	Student	BsC
Anna	20	Manchester	UK	Student	Working towards BsC
Davina	Unknown	Manchester	UK	Teacher/independent musician	Diploma
Sara	26	Manchester	Peru	Student	Working towards BsC
Victoria	24	Berlin	Colombia	Student	Working towards BA
Olivia	21	Berlin	UK	Student	Working towards BA

## Appendix 2

### Interview Guide

#### Introduction

I would firstly like to thank you for your participation and contribution, and before we begin, I'd like to make a few introductory comments and introduce myself.

- *where I study, MA course, etc.*

As you are already aware, my MA thesis is exploring the relationship between gender, music technology and music education. In conducting these interviews, I am hoping to contribute to a greater understanding of experiences of women within the field of music technology, with a specific focus on music production and sound engineering at an educational level.

I will begin the interview by asking you about your background and interest in these subjects, after which the interview will focus on three main topics: 1- your learning and classroom experiences, 2- your experiences of teachers, and 3- connections between your course experiences and post-education.

I am keen to hear about your views and experiences, so please feel free to highlight what you consider important, and to draw attention to new topics as you see fit. You are welcome to ask questions of your own at any point, and if there are questions that you cannot or do not want to answer, you are in no way obliged to. Similarly, if you do wish to, you are free to end the interview at any point.

The interview will last up to one hour, and I will record our interview purely for the purpose of transcribing at a later date. Additionally, whether you would prefer to be named or have your name anonymized is your choice. I would also like to ask that I have your permission to contact you after the interview to ask any follow up questions, if necessary.

Would you like to ask me any questions before beginning?

- *Ask to sign consent form*

#### Opening questions:

1. Can you tell me about how you became interested in music production and sound engineering?
2. Can you tell me some of the reasons you wanted to study music production?

- *Had much prior experience?*

- *Any doubts about choice? Why?*

- *How did people react?*

3. Tell me about what you studied and your course in general.

- *Classes?*

- *Structure?*

- *Group work or independent?*

- *Supervised or unsupervised?*

### Classroom experiences/relations with peers

4. In your class/classes, how many men and women were there?
5. What do you think are the reasons that fewer women study music production/sound engineering?
- *Male dominated workplace after studying? Archetype of male sound engineer or producer?*
  - *'Nerdiness' or masculinisation of production/engineering associated with men? Not aspirational for women? Gendering of instruments?*
  - *Not wanting to be a token or excluded?*
6. How does it feel to be one of few women in the class?
- *Reasons for this?*
  - *Negative or positive feelings? Why? Any times it felt the opposite?*
  - *Isolating? Or more included because more attention?*
7. Can you tell me about your relationships with classmates?
- *Private/personal relationships? How did you become friends?*
  - *Also, the attitudes of members of the class not friends with? Any gendered aspect to this?*
  - *Comparing relationships with men to women?*
  - *Examples?*
7. Can you tell me about whether being in a class of mostly men might have influenced your behaviour?
- *Example? (e.g. Prove themselves more? More assertive? Less girly?)*
  - *Likewise, how the men might have changed their behaviour?*
  - *Feelings?*
9. How confident were you with music technology in your course?
- *Compared to before starting the course, and after starting?*
  - *Compared to male classmates?*
  - *Reasons for this?*
  - *How teachers contribute to this?*
  - *Classmates more often asking male classmates for help?*
  - *Reluctance to work in groups with female students?*
8. Do you think it's the case that men and women prefer to learn in different ways?
- *Gendered preference for more or less formal training?*
  - *Is gendered self-assurance related to this?*

### Experiences of teachers

10. Of the teachers that you had, how many were men/women?
- *If not many women, is this a problem?*
  - *Lack of female 'role models'?*

- *Reinforcing maleness of the discipline?*

11. What were your observations of how teachers related to male and female students?

- *Female teachers more inclusive or aware of female students?*
- *More attention given to female students by male teachers?*
- *Male teachers command more authority?*
- *Male teachers bond more with male students?*

12. Can you tell me about any ways that teachers addressed the gender imbalance?

- *Is addressing it important or a good thing?*

#### Post-education and careers

13. To what extent did your course experiences influence what you did afterwards?

14. In terms of gender, to what extent was the environment of your course similar or different to the working environment surrounding production and sound engineering?

- *Examples of gendered interactions/exchanges since completing studies?*
- *Whether these examples took place while studying or exclusively afterwards?*
- *Reasons for this? - Feelings? – Consequences?*

15. What, in your opinion, are the reasons for there being fewer women producers or sound engineers?

#### Ending

I have no more questions to ask, thank you for your time and contribution.

Do you have any questions?