

Creative Music Production,

Professional Project

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How can immersive mixing affect the potential progression of a genre of music?

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Table of Contents

Abstract..... 4

Introduction 5

Literature Review..... 6

Origin of hardcore punk..... 6

 New York Hardcore..... 7

 Technology’s influence on music..... 8

 The use of immersive mixing technology in music 9

Methodology: 10

Analysis: 15

Discussion: 18

Conclusion: 20

Bibliography 21

Appendix:..... 22

Abstract

This study aims to investigate how immersive mixing can affect the potential progression of a genre of music, the genre chosen for this study is hardcore punk. This study takes a practical approach where an EP was recorded in the genre of hardcore punk and then mixed in two separate ways, first in standard stereo and then 7.1.4 immersive format. This was then followed by a survey that was conducted with an expert in the field. This survey aimed to evaluate the differences between the two mixes and if the immersive format version works within the genre and can also push the progression of the genre forward. The findings showed that the immersive format can enhance the listener engagement, especially in focused listening scenarios. However, the stereo format remained the preferred format for casual listening. It was found that the immersive elements do not distract from the music and do make sense within the context of the genre however; it is not likely that this format will become popular in the genre. Overall, the study found that immersive mixing can be used effectively to enhance specific listening experiences but is unlikely to replace the standard stereo format in the genre, rather could be used in more ambitious music projects such as concept albums, in all genres, to further help the immersive listening experience.

Introduction

How can immersive mixing affect the potential progression of a genre of music? This is the question that will be investigated in this paper. The music genre in question is hardcore punk, a genre that has seen a rise in popularity in recent years due mainly to the success of bands such as Turnstile who brought a whole new wave of fans to the genre of hardcore punk with their Grammy nominated albums *Glow On*¹ and *Never Enough*². Turnstile have brought new elements of synth wave and pop influence to the genre of hardcore punk through the use of modern technology and production techniques. This idea of genre development and expansion by technology will be explored further with Dolby Atmos and immersive mixing and recording techniques. In this project the same hardcore punk EP consisting of three songs will be recorded in Studio 1. These songs will then be mixed both in standard stereo format and in 7.1.4 Dolby Atmos immersive format. The EP will be mixed first in stereo format as a foundation to then be up mixed to a 7.1.4 immersive mix. The final mixes of both versions will then be presented to an expert in the genre, and they will answer a survey outlining their experience as a listener and how the immersive format works in the context of the genre.

¹ Turnstile. *Glow On*. Roadrunner Records. 2021

² Turnstile. *Never Enough*. Roadrunner Records. 2025

Literature Review

Origin of hardcore punk

The chosen genre of music for this study is the genre of 'hardcore punk'. Hardcore punk was born as a sub genre of punk music. Credit of punk's creation goes to various bands and artists from America and the United Kingdom in the early to mid- 1970s. Some of these bands and artists include 'The Stooges', 'The Ramones' and 'Sex Pistols'. Although it is hard to determine one band that founded the genre of punk, these three are often given the most credit to have started the punk movement. "Originally billed as the "Psychedelic Stooges" and debuting in Detroit on Halloween night in 1967, the Stooges are arguably the first-ever punk band".³ As stated by Alan Parkes in *This Small World: The Legacy and Impact of New York City Hardcore Punk and Strait Edge in the 1980s* "The term "punk" was first used to describe music in 1970 by Creem Magazine in an article written about Iggy Pop and the Stooges to characterize their high energy and primitive sound."⁴ Punk music foundationally was rooted in non-conformity to the mainstream, this was in all aspects including sound, appearance and music composition. As stated by Alan Parkes in *This Small World: The Legacy and Impact of New York City Hardcore Punk and Strait Edge in the 1980s* "British punk band, Sex Pistols, took on an intimidating appearance that consisted of ripped clothes, studs, leather, and often Nazi imagery. This was fused with less structured song writing and discordant vocals."⁵ Hardcore punk was born as a sub genre of punk. As stated by Alan Parkes in *This Small World: The Legacy and Impact of New York City Hardcore Punk and Strait Edge in the 1980s* "Early hardcore punk in America is generally classified by one of two waves, the first being the late-1970s to 1986 and second being 1986 to 1991. Forming in 1976, Black Flag in Los Angeles, and in 1977, Bad Brains in Washington D.C., ushered in a new form to the genre of punk, characterized by an increase in tempo and more aggressive vocals, often yelling. This new form became known as hardcore punk, or simply hardcore."⁶ Black Flag, Minor Threat and the Revival of Traditional Values in American Hardcore Punk by Sangheon Lee discusses how hardcore was born out of frustration with the current state of punk. "The youth in America wanted a scene where values such as self-discipline, sobriety and DIY attitudes were embraced rather than apathy and drug addiction. "Hardcore punk was created by American suburban youth who wanted to capture the same sense of DIY attitude when it came to recording, production, promotion etc. They also wanted to reject conformity and establish their own cultural identity. This was in response to feeling alienated and isolated from the more mainstream friendly punk scenes such as "new wave".⁷

New York Hardcore

New York is really where the foundation of what we know hardcore to sound like today was built. This was a shift towards a blend of punk music and metal which can be heard very prominently in the current hardcore bands leading the genre. Don't forget the Streets: New York City Hardcore Punk and the Struggle for Inclusive Space by Alan Parkes discusses the early history of the hardcore scene in New York and the positive message of unity that was associated with the scene in the early days. The author touches on how bands in New York wanted to push a positive message of unity and standing up for one another which is still seen in the scene today. By the mid-1980s the existing bands that were seen as founders of New York hardcore such as Agnostic Front, were going towards a more metal and mainstream sound along with new bands that were formed from the mid-1980s up to the early 1990s. "By 1985, a new generation of members hoped to combat the scene's increasing violence, apathy, and move toward a metal sound."⁸ Brooklyn hardcore in the '90s: Hardcore punk without the punk by Eddie McNamara discusses how in the early 1990s, the hardcore scene in New York sounded more like metal than it did the original hardcore punk bands that started the genre. "To us, hardcore sounded more like Obituary and Slayer than Minor Threat"⁹ While the genre of hardcore was evolving to have a heavier sound that was closer to metal than punk throughout the 1990s and 2000s, the technology around music production and recording was advancing. This links back to technology advancing the development of hardcore as the more polished

³Damage, Danny "History - Punk Music." *SoundOfLife*, <https://www.soundoflife.com/blogs/mixtape/history-punk-music> 09 December 2025

⁴ Parkes, Alan. "This Small World: The Legacy and Impact of New York Hardcore Punk and Straight Edge in the 1980s". *Forum*, Cal Poly, Paper 1100, <https://digitalcommons.calpoly.edu/cgi/viewcontent.cgi?article=1100&context=forum> 08 December 2025

⁵ Parkes, Alan. "This Small World: The Legacy and Impact of New York Hardcore Punk and Straight Edge in the 1980s". *Forum*, Cal Poly, Paper 1100, <https://digitalcommons.calpoly.edu/cgi/viewcontent.cgi?article=1100&context=forum> 08 December 2025

⁶ Parkes, Alan. "This Small World: The Legacy and Impact of New York Hardcore Punk and Straight Edge in the 1980s". *Forum*, Cal Poly, Paper 1100, <https://digitalcommons.calpoly.edu/cgi/viewcontent.cgi?article=1100&context=forum> 08 December 2025

⁷ Lee, Sangheon. "Black Flag, Minor Threat, and the Revival of Traditional Values in American Hardcore Punk." *Revue musicale OICRM*, vol. 11, no. 2, Dec. 2024 <https://www.erudit.org/en/journals/rmo/2024-v11-n2-rmo09869/1116734ar.pdf> 08 December 2025

⁸ Parkes, Alan. "Don't Forget the Streets: New York City Hardcore Punk and the Struggle for Inclusive Space." *De Urbanitate. Tales of Urban Lives and Spaces*, 2025(?) https://sita-uauim-ro.s3.eu-west-2.amazonaws.com/10_Parkes.pdf 08 December 2025

⁹ McNamara, Eddie. "Brooklyn Hardcore in the '90s: Hardcore Punk Without the Punk." *No Echo*, 8 July 2024 <https://www.noecho.net/features/brooklyn-hardcore-in-the-90s> 08 December 2025

metal mainstream sound that hardcore is leaning towards requires a higher standard of production and a higher quality of tone that was not required in the early raw punk era of hardcore.

Technology's influence on music

Capturing Sound: How Technology has Changed Music by Mark Katz discusses how advancements in technology, especially recording technology have influenced music. Katz raises an interesting point when talking about the phonograph effect. "A phonograph effect is any change in musical behaviour- whether listening, performing or composing- that has arisen in response to sound recording technology. A phonograph effect is, in other words, an observable manifestation of recording's influence".¹⁰ Katz mentions how this phonograph effect can be seen throughout the history of music. The phonograph effect could be used to describe the current implementation of immersive mixing technology and how it could be used to advance the development of a genre such as hardcore. The author notes that the three-minute-long pop song standard comes from composer Igor Stravinsky composing his pieces to be roughly three minutes so that it could fit in its entirety on a ten-inch 78rpm record side where the limit was roughly three minutes. This can also be seen in the punk and hardcore scene with the likes of cheap 4 track and 8 track tape recorders that were used by DIY punk and hardcore bands who wanted to produce their own recordings. This can also be seen in punk and hardcore in the modern era with the rise of cheap home recording equipment and digital DAWs. Now musicians can make high quality recordings at home without having to spent money on studio time. The impact of the home recording phenomenon on the Czech independent music scene by Daniel Subrt and Lukas Kostka discusses how this advancement in technology has made creating and distributing music accessible to everyone. "The music producing and consuming structure has changed over the last decades rapidly due to new technologies".¹¹

¹⁰ Katz, Mark. "Capturing Sound: How Technology Has Changed Music." University of California Press, 2004.
https://books.google.ie/books?hl=en&lr=&id=r_p_Q6TUrQoC&oi=fnd&pg=PP13&dq=how+technology+influences+music&ots=pZCxfWLpF&sig=WBIt0uLIZGbUbE5S5zrav6Lr9uc&redir_esc=y#v=onepage&q=how%20technology%20influences%20music&f=false 08 December 2025

¹¹ Subrt, D., and L. Kostka. "The Impact of the Home Recording Phenomenon on the Czech Independent Music Scene." Computers in Human Behaviour Reports, vol. 14, May 2024, Article 100419
https://www.sciencedirect.com/science/article/pii/S2451958824000526?utm_#sec4 08 December 2025

The use of immersive mixing technology in music

What is immersive audio? How engineers, artists and industry are changing the state of sound by Bill Kopp says that “Immersive audio technologies aim to put listeners in a specific place, localizing sound not just in front of you or inside your head but all around you”.¹² This is a huge advancement in the evolution of how the audience experiences listening to music. The artist can place the listen in unique positions to alter their perception of the audio. Using the Dolby Atmos render, the artist or producer can create a binaural mix which gives the three-dimensional effect with only two channels, meaning the listeners can have the immersive experience while listening through earphones, without needing an elaborate multi speaker set up at home. This advancement in technology is very beneficial for artists who want to create a deeper and more intimate experience for the listener that cannot be provided with stereo format. As stated by Sami Juha Laine in the thesis Cinematic music creation in Dolby Atmos, the technology is only increasing in accessibility for artists who wish to create these immersive experiences. “Dolby Atmos for music is and the workflows surrounding it are in a constant state of development. From new plugins and software to help the creator achieve their goals to speakers, applications and other playback systems and devices that help make Dolby Atmos more accessible to the average music enthusiast and professional audio engineer alike.”¹³ The process of up mixing is a helpful way to take advantage of the experience that can be achieved through immersive mixing when starting off with a stereo mix. As mentioned by Paul Maunder in “Upmixing - What Is It And Why Do You Need It “The need to upmix audio has become prevalent in recent years thanks to the widespread availability of surround formats, especially immersive formats such as Dolby Atmos.”¹⁴ This process can be very useful for artists in the hardcore genre who push to push the current limitations of the genre and create a unique experience for the listener. Given that hardcore itself has been around for many decades and has already gone through a lot of change since its beginning in the early 1980s, the use of this technology will be implemented to determine whether the genre can advance further and create a more immersive listening experience much like the immersive experience of being in the mosh pit at a live hardcore show.

¹² Kopp, Bill. “*What Is Immersive Audio?: How Engineers, Artists & Industry Are Changing The State Of Sound.*” GRAMMY.com, 16 May 2022 <https://www.grammy.com/news/what-is-immersive-audio-industry-explainer-dolby-atmos?utm> 08 December 2025

¹³ Laine, Sami. “Cinematic Music Creation in Dolby Atmos: Producing and Mixing Contemporary Cinematic Music in Immersive Audio. 2024. Tampere University of Applied Sciences

https://www.theseus.fi/bitstream/handle/10024/854538/Laine_Sami.pdf?sequence=3&isAllowed=y 08 December 2025

¹⁴ Maunder, Paul. “*Upmixing - What Is It And Why Do You Need It.*” Production Expert <https://www.production-expert.com/production-expert-1/upmixing-what-is-it-and-why-do-you-need-it?utm> 08 December 2025

Methodology:

During the week of the 26th of January, demo recording took place in a home studio environment. Due to the unavailability of the other musicians in the recording band, all instruments were recorded individually. Due to the limitations of the available home recording equipment, the drum tracks were recorded using a Yamaha EAD10 drum module along with a Shure SM57 for the overhead hi-hat microphone and another Shure SM57 for the overhead ride microphone. The bass and guitars parts were recorded using a Harley Benton practice amp, again due to the limitations of recording in a home studio environment. All demos were recorded and mixed on Logic Pro. The primary purpose of these demo recordings was to develop and refine the recording process in preparation for the upcoming studio sessions, ensuring the most efficiency while under time restrictions in the studio. Additionally, the demos served as reference material for the other musicians, enabling more accurate individual practice. The demo recordings also serve as a way to evaluate the songs and plan where to add additional elements to the tracks that could be panned immersively once mixed in the 7.1.4 format.

The recording process began in Studio 1 on the 18th of February, where the plan was to live track the drums and bass simultaneously. The rhythm guitar could not be live tracked on the same day due to conflicting timelines with the guitarist. The first step in pre-production was to set up the drum kit for recording. The drum kit utilized in this recording set up was a Mapex Armory Desert Dune Shell drum kit comprised of a 22"x20" kick drum, a 12"x8" rack tom, a 16"x16" floor tom and a 14"x7" Yamaha model snare drum. The cymbal set up consisted of Zildjian S Series 14" hi-hats, a Zildjian S Series 16" crash, a Zildjian S Series 20" ride and a Meinl Byzance 18" crash. The drummer set up the kit in way which was most comfortable for him. The drums were captured using a multi microphone set up. The microphones that were used were two LCT 140 microphones for the overhead hi-hat and overhead ride microphones, two Shure SM57 microphones for the snare top and bottom and two Sennheiser MD421 microphones for the rack tom and floor tom. The kick drum was recorded using an AKG D112 for the kick out microphone and a Sennheiser e902 for the kick in microphone. Two room microphones were set up in the live room, one to the left of the kit and one to the right of the kit, RB500 microphones were used for both. An attempt was made to use an Audix i5 as a kit microphone, but due to time constraints and unsatisfactory results, this approach was abandoned.

The bass was recorded using an MB series B 4410 bass combo amp. A dual microphone technique was applied in order to have tonal variation and to make effective use of the equipment available in studio 1. An AKG C414 was positioned centrally on the speaker cone and a Sennheiser MD421 was placed slightly off centre in the upper left-hand area of the speaker after it was discovered this position had the best tonal characteristics compared to other positions that were experimented with.

The three songs were recorded in a single take to capture the natural flow between each song and to make the EP feel as immersive as possible for the listener. The drummer and guitar player then began tracking takes for the EP in the live room while the working engineer worked the desk from inside the live room. After each take, the drummer and the bassist would enter the control room and listen to each song. While listening back, the drummer and bassist took down notes on what aspects of the take needed to be improved and what parts of the take were done well and should be repeated in the next take. Once a list of what needs to be improved on was completed, the drummer and bassist re-entered the live room and got ready to track another live take. This process was repeated five times until the musicians and engineer were satisfied with the take. The drummer then decided to do an additional two takes with a different snare drum. This new snare was a Gretsch Blackhawk 10"x5.5" Mighty Mini snare which was a smaller size compared to the other Yamaha snare and provided a tonal difference in the recording.

On February 19th, the recording session was dedicated to tracking all of the rhythm guitar parts. The guitar rig consisted of a Marshall AVT50H paired with a Marshall 4x12 cabinet. A dual microphone technique was used to capture the guitar. The microphones used were a Shure SM57 positioned towards the centre of the top left cone to capture a focused, mid-range tone, along with a Sennheiser MD421 placed towards the bottom right cone. The microphone placement was then slightly adjusted for the other rhythm guitar track to introduce a subtle tonal difference. The guitar used for these recordings was a Yamaha ERG121C, selected for its humbucker pickups and whammy bar functions. A total of six takes were recorded. The first four takes were performed alongside the fourth take of the drum and bass recordings, while the remaining six guitar takes were played along with the fifth take of the drum and bass recordings. After the microphone placement had been slightly adjusted, another three takes were recorded for the secondary rhythm guitar track.

After completing the double-tracked rhythm guitar recordings, additional time remained within the session. As a result, it was decided to record additional guitar elements that had originally been planned to get recorded in a later studio session. These additional guitar elements include a range of techniques such as divebombs, pinch harmonics, natural harmonics and lead guitar parts. This approach was also more efficient, as the guitar rig was already set up, allowing for an uninterrupted continuation of the recording process. These additional guitar elements were incorporated into the EP with the intention to be panned in the 7.1.4 immersive format. These additional guitar elements were recorded by playing through the EP in its entirety and adding in elements where it seemed fit. This process was repeated four times; these four takes were then comped together to make one track in the mixing stage.

The next studio session took place on the 26th of February and was originally intended for recording the additional guitar parts and percussion elements. However, as the guitar overdubs had already been completed in the previous session, the focus shifted to rerecording the bass track. Upon review of the previously recorded live tracked takes, it was determined that their quality was insufficient and needed to be rerecorded. The additional percussion elements consisted of a makeshift drum line intended to imitate the sound of roto toms. This was achieved by placing the Gretsch Blackhawk 10"x5.5" Mighty Mini snare, a 10"x8" rack tom, a 12"x8" rack tom and a 16"x16" floor tom from the Mapex drum kit in a line and using a drum key to tune them tight. These were recorded using Shure SM57 microphones on the snare and smallest tom, and Sennheiser MD421 microphones on the other rack tom and the floor tom. These additional percussion elements were developed through listening to the EP in its entirety and introducing these elements where appropriate, guided by a rough plan established during the home recording demo stage of the project. These percussion elements were recorded by playing the EP through in its entirety and adding in the percussion where it seemed fit. This process was repeated six times; these six takes were then comped together to make one track during the mixing stage.

The bass was recorded using the same amp and microphone set up as the previous live tracking session. Takes one to six were recorded using a Harley Benton PJ-74 VW Vintage Series bass from Studio 1. However, due to issues with fret buzz and tuning, this bass was replaced with the Vintage reissued series model V96 bass from Sun studios from the remaining takes seven to ten.

Following the completion of the of the bass and percussion recording, the remaining session time was used to begin recording vocals. The vocals were recorded using a Shure SM58 along with a pop filter to minimize plosive sounds. The final studio session took place on the 4th of March in Studio 2 and was dedicated to the completion of all vocal recordings. The vocals were recorded using a Shure SM58 along with a pop filter, within the isolated recording booth in the studio. Both vocalists used the same set up to ensure consistency in tonal quality across all recorded parts. The vocal parts were recorded by playing the EP through in its entirety and singing the whole way through. After listening back, the vocalists decided to drop back in during certain sections of the EP that they deemed needed to be performed again. This session marked the conclusion of the recording process for the EP.

The next stage of the process involved mixing the EP in stereo format. This process was carried out over the course of several weeks, with mixing taking place both in the pods in the Button Factory and in labs in the Sound Training College campus in Temple Bar. Due to the monitoring setups, mixing in the pods was done on a stereo speaker setup; while mixing on the Sound Training College campus relied on mixing with headphones. The use of these two contrasting mixing mediums facilitated more comprehensive critical listening which ultimately led to a more balanced mix. During this stage of mixing, additional sonic elements were incorporated into the EP. These elements included the hateful whispers during the bridge in the third track “Pit of Needles”, the thunder sound effects right before the breakdown in the third track “Pit of Needles” and the anvil impact sounds in the second track “Anvil”. Although these elements were integrated to function effectively within the stereo mix, they were introduced with consideration for the 7.1.4 immersive mix, allowing for spatial placement among the different speakers which would add to the overall immersive experience for the listener. The stereo mixing stage involved detailed editing across all the tracks. This process included comping of the vocal tracks, where the strongest sections from the multiple takes carefully selected and seamlessly combined to produce a single, refined performance. Additionally, precise clip gain adjustments were applied to the individual drum elements such as the kick, snare, rack tom, floor tom and anvil impacts. This was to ensure consistent loudness and dynamic balance throughout the mix. In addition to the vocal editing process, comping techniques were also applied to the added percussion elements and lead guitar parts, with multiple takes being reviewed and the strongest sections from each being selected and combined to produce a cohesive and polished track. Equalisation, compression, reverb and

delay was applied across individual tracks as well as to auxiliary bus channels created for each group where needed.

Following the completion of the stereo version of the mix, the next stage was to create a 7.1.4 immersive version of the EP. This was carried out by enabling the Dolby Atmos Renderer within Pro Tools. The immersive mixing stage was undertaken in the A025 room on the IADT campus. This phase of the project took place over the course of the week of the 24th –28th of March. Initially a bed was created for reverb that was applied to the primary elements of the mix such as the rhythm guitars, bass and drums. This reverb was primarily routed to the rear speakers which enhanced the perceived depth and sense of immersion in the mix. Following this, individual elements intended for spatial movement between the various speakers were converted into objects. Considerable experimentation was undertaken during this stage to determine optimal spatial placement for each object. These objects were positioned using panning automation. While the objects themselves were moved in real time during playback of the EP, the placement decisions were established prior to the automation. This process involved moving each object manually within the spatial audio field while the EP was playing. Other elements such as the layered vocal harmonies in the chorus of the third track “Pit of Needles” did not have panning automation applied to them, instead they were placed stationary in each of the speakers. After several days of experimentation, during which various elements were positioned across different speakers, the 7.1.4 immersive version of the mix was complete.

The next stage required was to have an expert in the field come into the 7.1.4 immersive room on the IADT campus, review both versions of the mix and answer a short set of questions. The expert chosen for this study was sound engineer Shaun Cadogan. Shaun specialises in studio engineering and has recorded, mixed and mastered several punk/metal/ hardcore bands. This made him a perfect candidate for this project as he has worked extensively within the chosen genre. A carefully considered set of questions was developed to elicit the most relevant and insightful feedback from the expert. These questions were reviewed and approved by the project mentor prior to the study being conducted. A date was arranged for Shaun to come into the 7.1.4 immersive room on the IADT campus and participate in the study. Prior to commencing, he was given a brief overview of the project and a clear explanation of his role within it. He was also given an information sheet and a consent form to review and complete before proceeding. During the session, Shaun first listened to the stereo version of the EP, followed by the 7.1.4 immersive mix shortly after. While listening, he was able to refer to

accompanying questions to guide his evaluation. Upon completion of both listening sessions, he proceeded to fill out the survey, providing feedback on his experience and his opinion on each version of the EP.

Analysis:

This section presents an analysis of the survey results that were obtained from the expert in field as seen in the appendix. The aim is to evaluate the findings from the survey so that the research question can be addressed. The expert used for this study Shaun Cadogan, was given a survey to fill out after listening to the stereo version of the EP first and then the 7.1.4 version soon after. Shaun listened to both versions in the same environment. The space chosen for listening was the A025 immersive room on the IADT campus. This was chosen as it is the most optimal space to listen to 7.1.4 immersive recordings as it has the full speaker set up available in the room. Shaun was given a list of 13 questions to answer, as well as a consent and information sheet to fill out. These questions were approved by the project mentor and were carefully curated to ensure Shaun could give his best insight into the research question. This survey was in a mixed-response style format, where certain questions were structured using a Likert scale with the options of “strongly disagree”, “disagree”, “neutral”, “agree” and “strongly agree”. Other questions had the options of “more”, “less” and “neither”. Other questions had the options of “stereo version” and “immersive version”. Other questions were formatted on a numerical scale from 1 to 10, 1 being the lowest and 10 being the highest. The format changed depending on the style of question.

The first question in the survey, “I am familiar with the immersive mixing format” was presented using a Likert-scale response format. Shaun had selected “disagree” indicating a lack of familiarity but not being completely unaware of the concept. This response was understandable as Shaun was selected as an expert in the field of the chosen genre in this study rather than the immersive mixing format. This was a solid way to begin the survey as it gauges his relationship with the nature of the project. The next question in the survey “The immersive mix was more enjoyable to listen to than the stereo mix” was presented using a Likert-scale response format again. Shaun had selected “neutral” indicating that he thought both versions of the mix were equally as enjoyable to listen to. This response is interesting as it reflects that the role of the format that the EP was listened to in didn’t play a part into the listeners overall

enjoyment of the experience of listening to the EP. The next question “The added immersive elements distracted from the songs” was presented using a Likert-scale response format again. Shaun had selected “disagree” indicating that he thought the added immersive elements made sense in the context of the songs and didn't take away from the overall listening experience. This information is helpful as it gives insight into how immersive elements can be used in the genre without making the songs feel too bloated or busy with unnecessary elements. The next question “The added immersive elements made the songs more engaging” was presented using a Likert-scale response format again. Shaun had selected “agree” indicating that he thought the added elements benefitted the songs in terms of keeping the listener entertained and engaged while listening to the immersive version of the EP more so than if they were listening to the EP in standard stereo format. The next question “The EP would have benefited from more/ less immersive elements” was presented on a Likert-scale using the options “more”, “less” and “neither”. Shaun had selected “neither” this indicates that the quantity of immersive elements being used does not directly correlate to a more engaging and enjoyable listening experience. The next question “For casual listening I would choose to listen to...”, the options given were “stereo version” and “immersive version”. Shaun had selected “stereo version” this indicates that the immersive format is not ideal listening format for every situation and that standard stereo formats can be superior when opting for a casual listening approach. The next question “For focused listening I would choose to listen to...”, the options given were “stereo version” and “immersive version”. Shaun had selected “immersive version”, this indicates that the immersive listening format provides a more engaging and enjoyable experience for the listener when they are opting for a dedicated and focused approach to listening to a piece of music. The next question “The added immersive elements made sense in the context of the genre”, was presented using a Likert-scale response format. Shaun had selected the option “agree” this gives indicates that immersive techniques and mixing formats can work in the genre of hardcore punk and could be used in the future. The next question “How similar are the two mixes (1 being the least similar, 10 being the most similar)” was presented on a numerical scale from 1 to 10. Shaun had selected the option “6” this indicates that the added immersive elements and panning in the 7.1.4 version of the mix separate it from the stereo version so that they do not seem like identical mixes even though the only difference between the two mixes is the spatial panning and the bed reverb. The next question “Immersive mixing format will affect the progression of the genre” was presented using a Likert-scale response format. Shaun had selected “neutral” this indicates that the immersive mixing could potentially affect the progression of the genre of hardcore punk, but it depends on how it is applied and how it is

approached by the listener. The next question “Immersive mixing format will become popular within the genre” was presented using a Likert-scale response format. Shaun had selected “disagree” this indicates that chosen genre of hardcore punk doesn't necessarily lend itself to be more suitable to the immersive mixing format compared to standard stereo format. The next question “How would you rate the immersive quality of the mix (1 being the lowest rating, 10 being the highest rating)” was presented on a numerical scale from 1 to 10. Shaun had selected “8” indicating that the high immersive quality of the mix could be a part of the reason why the immersive version is a more engaging experience for the listener. The next question “How would you rate the immersive experience for the listener (1 being the worst rating, 10 being the highest)” was presented on a numerical scale from 1 to 10. Shaun had selected “8” this indicates that high quality of the immersive mix itself along with the engaging added immersive elements have resulted in the immersive version being a positive experience for the listener.

Overall, this analysis demonstrates that the use of immersive mixing techniques and formats do in fact make sense in the context of the genre of hardcore punk. This analysis also proves that the use of immersive formats in music can make the listening experience more engaging, especially for dedicated, focused listening which is where the immersive format shines through the most. This analysis also shows that the benefits of immersive formats does not come from the quantity of the immersive elements within a song, but from the overall quality of the immersive mix itself. However, this does not necessarily mean that the progression of the genre of hardcore punk will be influenced by immersive mixing or that these formats and techniques will become popular within the genre. While Dolby Atmos allows for binaural renders of an immersive mix that can be played back on headphones and provides the listener with the immersive experience, the optimal way to experience an immersive mix is through the use of a multi speaker set up. This is why the immersive format is better suited for focused, dedicated listening over the stereo format and why the stereo format is better suited for casual listening. This finding suggests that the use of immersive mixing formats could better be used for larger scale projects such as concept albums that require focused, dedicated listening and aim to be as immersive for the listener as possible.

Discussion:

This section discusses the findings of this project in relation to the research question. While the findings from the survey suggest that immersive mixing has the potential to enhance the listeners engagement with the music, it will not likely become common practice in the chosen genre of hardcore punk. Given that the chosen genre of hardcore punk is rooted in DIY culture as stated previously by Sangheon Lee, perhaps in the future when this immersive mixing format becomes more accessible. As previously mentioned by Sami Juha Laine, Dolby Atmos is in a constant state of development and is becoming easier to use and for the average music enthusiast and professional audio engineer. The findings also suggest that immersive elements can work within the genre and make sense in its context. Shaun's disagreement with the statement that the immersive elements were distracting along with his agreement that they make sense within the context of the genre and that they make the EP more engaging prove that this format could potentially be implemented further into this genre and push its progression further. However, the preference of the stereo format for casual listening suggests that the immersive format isn't the most desirable option in every given situation. Additionally, the disagreement that immersive mixing will become popular within the genre shows that while beneficial in certain aspects and scenarios, hardcore punk may not see an increase in the use of immersive mixing due to being more likely to be subjected to casual listeners as well as the genres emphasis on simplicity and DIY values that the immersive mixing format does not currently provide. This study also provides findings that support the idea that the effectiveness of the immersive mixing format comes more from the quality of the overall immersive mix rather than the quantity of immersive elements within the mix itself. From the neutral response given to the question regarding the need for more or less immersive elements to benefit the EP along with the 8/10 rating on the quality of the immersive mix, this shows that carefully spatial planning with intentional elements within an immersive mix prove more effective to the overall listening experience over excessive use of spatial panning using objects in Dolby Atmos. A key finding from this study is the discovery that the immersive mixing format is better suited for focused listening while standard stereo format is better suited for casual listening. The 7.1.4 configuration allows for individual elements in the mix to be placed in a certain place within the spatial field, this allows the listener to engage more actively with the music compared to listening in stereo format. However, the finding that stereo format is suited better for casual listening, highlights the familiarity and convenience that stereo formats provide. Stereo listening format is the standard across all everyday listening devices like headphones, car

speakers and portable speakers which are the most used listening mediums for quick casual listening while preoccupied with other activities such as running, driving or socialising. Stereo mixes are also created specifically to translate well across all listening devices. The finding that the immersive mixing format is better suited to focused listening suggests that this format may be well suited to projects that inherently require a certain level of dedication, such as concept albums. Given that these styles of project often aim to create an immersive atmosphere and story for the listener, the capabilities of the immersive mixing format could enhance this further by placing the listener in a direct sonic environment.

A limitation of this study is the participation of only one expert in the field. While Shaun Cadogan provided valuable insight as an expert in the genre of hardcore punk, the addition of an expert in immersive mixing would have provided greater findings in relation to the research question. This addition of another expert to take part in the survey could have resulted in a deeper understanding of how immersive techniques work both technically and artistically in the context of the genre. Overall, the researcher found that immersive mixing techniques can be extremely beneficial when used in the correct context. Immersive mixing formats can enhance listener engagement especially in focused listening environments. The researcher also learned that immersive mixing could work within the context of the genre of hardcore punk while not distracting the listener. The researcher also learned that despite these positive outcomes, the findings show that the stereo format is still the preferred format for casual listening. Additionally, while the immersive mixing format does work within the chosen genre, it is unlikely to become popular within it. Overall, the researcher learned that immersive mixing can be highly effective in certain contexts, mainly enhancing listener engagement and enhancing the overall listener experience in focused environments. However, the findings suggest that it is unlikely that immersive mixing will push the progression of the genre of hardcore punk. However, it is likely that immersive mixing will be more beneficial in ambitious musical projects such as concept albums where the goal is to create an immersive story for the listener.

Conclusion:

In conclusion, this study set out to explore how immersive mixing can affect the potential progression of the chosen genre of hardcore punk. This study was conducted by recording an EP in the genre of hardcore punk and mixing it in both stereo format and 7.1.4 immersive mixing format. An expert in the field was then played both versions of the EP, first in stereo and then in 7.1.4 after. The expert then answered a survey about his opinion on each mix and how he thinks immersive mixing works within the chosen genre. Through analysis of the response given by the expert, this study aimed to evaluate if immersive mixing formats can work within the context of the genre and if immersive mixing can push forward the natural progression of the genre. The key findings of this study were that immersive mixing formats can benefit the listening experience in certain aspects or when in certain situations in terms of listener engagement. The study suggests that the use of immersive techniques does make sense within the context of the genre and does not distract from the music. However, the findings from the study also suggest that while the immersive format is preferred in focused listening environments, stereo format remains the preferred option for casual listening. This suggests that the immersive format will not be a replacement for stereo but can be used by artists for more intentional listening environments.

The findings from the study also suggest that it is not likely that immersive mixing will influence the progression of hardcore punk or become popular within the genre. However, immersive mixing can play a role in the development of more ambitious projects such as long form concept albums which rely on narrative and keeping the listener engaged. The immersive format can push the limits for these kinds of projects in terms of what the artist can achieve compared to stereo format. This shows that immersive mixing may contribute to the broader progression of music production across all genres rather than being specific to the genre of hardcore punk.

Bibliography

Damage, Danny “History - Punk Music.” *SoundOfLife*,
<https://www.soundoflife.com/blogs/mixtape/history-punk-music> 09 December 2025

Parkes, Alan. ” *This Small World: The Legacy and Impact of New York Hardcore Punk and Straight Edge in the 1980s*”. *Forum*, Cal Poly, Paper 1100,
<https://digitalcommons.calpoly.edu/cgi/viewcontent.cgi?article=1100&context=forum>
08 December 2025

Lee, Sangheon. “*Black Flag, Minor Threat, and the Revival of Traditional Values in American Hardcore Punk.*” *Revue musicale OICRM*, vol. 11, no. 2, Dec. 2024
<https://www.erudit.org/en/journals/rmo/2024-v11-n2-rmo09869/1116734ar.pdf> 08
December 2025

Parkes, Alan. “*Don’t Forget the Streets: New York City Hardcore Punk and the Struggle for Inclusive Space.*” *De Urbanitate. Tales of Urban Lives and Spaces*, 2025(?)
https://sita-uauim-ro.s3.eu-west-2.amazonaws.com/10_Parkes.pdf 08 December 2025

McNamara, Eddie. “*Brooklyn Hardcore in the ‘90s: Hardcore Punk Without the Punk.*” *No Echo*, 8 July 2024 <https://www.noecho.net/features/brooklyn-hardcore-in-the-90s> 08
December 2025

Katz, Mark. “*Capturing Sound: How Technology Has Changed Music.*” University of California Press, 2004.
https://books.google.ie/books?hl=en&lr=&id=r_p_Q6TUrQoC&oi=fnd&pg=PP13&dq=how+technology+influences+music&ots=pZCxfxWLPF&sig=WBIt0uLIZGbUbE5S5zrav6Lr9uc&redir_esc=y#v=onepage&q=how%20technology%20influences%20music&f=false 08
December 2025

Subrt, D., and L. Kostka. “*The Impact of the Home Recording Phenomenon on the Czech Independent Music Scene.*” *Computers in Human Behaviour Reports*, vol. 14, May 2024, Article 100419

https://www.sciencedirect.com/science/article/pii/S2451958824000526?utm_#sec4 08 December 2025

Kopp, Bill. “*What Is Immersive Audio?: How Engineers, Artists & Industry Are Changing The State Of Sound.*” GRAMMY.com, 16 May 2022 <https://www.grammy.com/news/what-is-immersive-audio-industry-explainer-dolby-atmos?utm> 08 December 2025

Laine, Sami. “Cinematic Music Creation in Dolby Atmos: Producing and Mixing Contemporary Cinematic Music in Immersive Audio”. 2024. Tampere University of Applied Sciences

https://www.theseus.fi/bitstream/handle/10024/854538/Laine_Sami.pdf?sequence=3&isAllowed=y 08 December 2025

Maunder, Paul. “*Upmixing - What Is It And Why Do You Need It.*” Production Expert <https://www.production-expert.com/production-expert-1/upmixing-what-is-it-and-why-do-you-need-it?utm> 08 December 2025

Appendix:

The following survey was distributed to the expert in the field using Microsoft forms. The survey used a mixed response format including Likert-scale, multiple choice and numerical rating questions.

Q1. I am familiar with the immersive mixing format

Strongly disagree/ disagree/ neutral/ agree/ strongly agree

Participant answer: Disagree

Q2. The immersive mix was more enjoyable to listen to than the stereo mix

Strongly disagree/ disagree/ neutral/ agree/ strongly agree

Participant answer: Neutral

Q3. The added immersive elements distracted from the songs

Strongly disagree/ disagree/ neutral/ agree/ strongly agree

Participant answer: Disagree

Q4. The added immersive elements made the songs more engaging

Strongly disagree/ disagree/ neutral/ agree/ strongly agree

Participant answer: Agree

Q5. The EP would have benefitted from more/ less immersive elements

More/ Less/ Neither

Participant answer: Neither

Q6. For casual listening I would choose to listen to...

Stereo version/ Immersive version

Participant answer: Stereo version

Q7. For focused listening I would choose to listen to...

Stereo version/ Immersive version

Participant answer: Immersive version

Q8. The added immersive elements made sense in the context of the genre

Strongly disagree/ disagree/ neutral/ agree/ strongly agree

Participant answer: agree

Q9. How similar are the two mixes (1 being the least similar, 10 being the most similar)

1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Participant answer: 6

Q10. Immersive mixing format will affect the progression of the genre

Strongly disagree/ disagree/ neutral/ agree/ strongly agree

Participant answer: Neutral

Q11. Immersive mixing format will become popular within the genre

Strongly disagree/ disagree/ neutral/ agree/ strongly agree

Participant answer: Disagree

Q12. How would you rate the immersive quality of the mix (1 being the lowest rating, 10 being the highest rating)

1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Participant answer: 8

Q13. How would you rate the immersive experience for the listener (1 being the worst rating, 10 being the highest rating)

1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Participant answer: 8