

Creative Music Production

Professional Project

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How does music composed by a musician compare to music composed by a dancer using motion capture, in terms of expressing a prompt?

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Abstract

This professional project explores the expressive nature of dance and music, comparing the two through interactive music systems. The project involved the construction of a motion capture system to convert dance movements into music and sound. This system was built using MediaPipe's motion tracking application in Max and was then, linked to Ableton. The experiment included the comparison between music composed by a musician, and music composed by a dancer through the motion capture system. The measure of the experiment was the perception of a thematic prompt. Qualitative and quantitative data was collected through a showcase and survey for an audience, an interview with the dancer, and a reflective journal from the researcher/musician. The results of all data points were analysed and a conclusion was made; a dancer relies on music heavily to convey both their intentions, as well as the musician's intentions through music.

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Introduction

Music, sound and dance have co-existed together for a long time, from the start of civilisation to the present day. As well as that, music and dance have evolved together throughout the years, developing many styles of dance and genres of music. Normally, people would dance or move to the music, as explained in Noël Carroll and Margeret Moore's journal article on the relationship between dance and music, *Feeling Movement: Music and Dance* (413, 414). Dancers react to the music, but how would music react to dance?

This research paper will explore the idea of a movement-to-music system using the motion capture of dance. Many have attempted to investigate this idea of through interactive music technology, which will be reviewed through the Literature Review, in this research paper. As well as that, the Methodology will expand on these existing hypotheses through a showcase experimentation, conducting qualitative and quantitative research. The Analysis and Discussion of the results will give insight into this question: 'How expressive can dance be compared to music?'

Literature Review

There are many research papers that have delved into the exploration of music responding to dance movement. These will be discussed and evaluated in this literature review. It is important to note that there have been different technological routes to achieve a functioning motion-to-audio playback system, as the evolution of technology is exponential. Additionally, there have been creative approaches to make this type of interactive system performable. This literature review will discuss research done within these categories: Performance, Music Composition, Technology, and Perception of Dance and Music.

Performance

One of the first instances of using motion capture (MoCap) with dance was the works of Merce Cunningham. Merce Cunningham was a contemporary dancer and choreographer that created performances which were “often difficult to watch” (Bodensteiner). Cunningham has used technology to choreograph dances. In 1999, he created one of his masterpieces, “BIPED” (refer to Figure 1), which was a performance that showcased the evolution of his works using “advancing technology” (Bodensteiner). For this performance, MoCap was used to portray a visual aspect. Virtual dancers were projected through a “translucent screen” at the front of the stage (Zhen and Luan 5). This performance used MoCap to translate dance movements into three-dimensional animation and lighting.



Figure 1: “BIPED” by Merce Cunningham (Bodensteiner)

As one of the first examples of using motion capture with dance, it has been a staple source of inspiration for this research project, especially through the performance aspect. Although, the sound aspect is not present, there are many other examples that connect choreography and movement to music and sound.

One major example is Yago De Quay, an interactive media artist and musician, who has performed in *Dance Jockey* (2011), which is an interactive musical performance. In this performance, he used motion sensors on a Xsens MVN suit¹ to trigger sound parameters. The advantage of using this type of suit is the transportability; the performer can wear the suit over their clothes. As well as that, the sensors are wireless and can connect to third-party software. In terms of the music and sound, the motion-to-audio system incorporated musical composition elements and sounds, like footsteps, machine noises and object noises. The musical elements included wind chimes, and a full song composition with each element being controlled by individual body parts (11).

This performance served as a big inspiration to this research project in terms of the performability such a system², as well as the movement and gesture performance. With different use of technology, it is seen possible to achieve a working sound generation system through body movement.

A more recent experiment of real-time sound generation through movement was conducted by Jason J. Snell, in 2025, alongside dancer and interdisciplinary performance artist, Lovar Davis Kidd (L. D. Kidd). Snell is an “interactive technology artist” and has created musical works as “biometric sonification,” which is the generation of music from the “brain, heart, breath and movement” (Snell, “Jason J. Snell”). Snell used motion and heart rate sensors on a dancer’s body, which were then, linked to an application software developed by himself. The data was then, mapped to sound triggers in a digital audio workstation (DAW), Ableton, having the ability to produce sound from each move (Snell 02:09-02:30). While performing, the dancer, L.D. Kidd, developed synaesthesia³ (Snell 01:09-01:37). According to Snell, he theorises that this phenomenon occurred due to the fast and effective formation of “new neural pathways” when human motion is converted into sound and music (01:38-01:54). This system creates a “feedback

¹ Xsens MVN suit is a full-body human motion capture suit using inertial motion sensors (XSENS).

² This refers to the way in which the system produces sound through the motion sensors, which is the goal for the methodology of the current research project.

³ Synaesthesia is a neurological occurrence where one sense can trigger another sense (Miller). In this example, L. D. Kidd developed the ability to visualise sound.

loop” to the dancer, enabling them to be the music composer, as well as the choreographer (Snell 00:24-00:38).

This performance experiment is very important in shaping the fundamentals of this research project. It explains that a dancer can use their body as an instrument for music composition. Once again, this source has proven that a more complex and accessible system can be made to achieve a sound-generated system through movement and dance. Although the equipment used are different to the MoCap system used, this source gives huge insight into the physiological and psychological relationship between dance and music.

For this research study, it is important to highlight the examples of performance as this project focuses on the building of an interactive system showcased through dance performance. The sources mentioned above have been excellent examples of this high level of performance.

Composition

The compositional aspect of this research project is vital as this research study explores the music composition abilities of a dancer, through a sound-generated system, and a musician. One major source that focuses on the compositional aspect is Andreas Bergsland and Robert Wechsler’s conference paper, *Composing Interactive Dance Pieces for the MotionComposer, a device for Persons with Disabilities*.

The MotionComposer⁴ was developed by Robert Wechsler, a dancer and choreographer who has been interested in motion-controlled electronic music (MotionComposer). The device was initially designed to aid people with disabilities in communicating through music and movement. The device has been developed for years and has been “tested in over a dozen workshops” for the impaired (Bergsland and Wechsler 20). The device is not only limited to users with disabilities but is usable by performers; used for both “therapeutic use” and “artistic purposes” (Bergsland and Wechsler 20). The MotionComposer device works through 3D motion-tracking sensors and video, with a minicomputer that has a software for producing the sound (Bergsland and Wechsler 20).

The authors created three interactive dance pieces called *Jeu de modes*, *La dance II* and *Songshan Mountain*. In their conference paper, they discussed the mapping strategies, as well as the creative

⁴ The MotionComposer is a hardware, computer device that uses motion sensors to produce music (Bergsland and Wechsler 20).

direction in terms of the “environment” choices with sounds (22). In terms of mapping strategies, the authors observed that users of the device prefer a more “relatively direct and intuitive” movement-to-sound relationship (21), which is worth noting for when conducting the experiment. In terms of composing for the dancer, the authors came to this conclusion:

For some of our dancers who were used to moving to fixed music, learning to actually listen to the musical result of their movements took a bit of practice, but after a time they developed a sense of what sounded good in their ears and started to implement this in their structured improvisations. In other words, they developed a music expressivity along with their bodily expressivity (22).

This source explains the insight of a dancer’s mindset while composing, as well as the technical aspects required to collaborate with a dancer on a high level of composition, through music and dance. This source highlights the importance of collaboration and cooperation that is needed for this research project, to achieve a successful compositional tool for the dancer.

Technology

Technology is changing exponentially, especially in today’s age with the rise of artificial intelligence (AI). As well as that, the technological equipment to build a sound-generated system through movement has drastically changed over the past years. These are some of the approaches to consider when carrying out the experiment.

Traditional Motion Capture

Frédéric Bevilacqua and Christopher Dobrian have both contributed hugely to the exploration of using a MoCap system to generate sound in real-time and are one of the major inspirations for this research project. In terms of technology, the authors specifically used the MoCap software, Vicon 8 (Dobrian and Bevilacqua), as well as using the important equipment for MoCap; skin-tight suits with markers. To link the MoCap to a sound-generated system, the authors developed a software system called *Motion Capture Music* (MCM), which allows the movements of a dancer to generate sound and audio playback in real time. The limitation of this software is that it was developed to only function with the Vicon 8 MoCap software. The MCM software was coded into two groups,

Java and C++⁵ and Max⁶. From this paper, the method to initiate real-time streaming of the MoCap data was to use RTEMulator, a built-in software on Vicon 8. The RTEMulator reads .CD3⁷ files, which can “transmit it in the format of a real-time engine” (Dobrian and Bevilacqua 1). The paper also discusses the method of mapping sounds to each body part of the dancer. This approach is one of the more important leads to success, as it is using a motion capture system, which is the aim of this research project.

Considering the technology alone, a few multimedia studies have experimented with the use of MoCap to produce sound. Although these experiments do not involve the MoCap of dance specifically, this professional research project took inspiration from these experiments for the methodology for building such a system.

The multimedia experiment, conducted by Martin Fröhlich et al., displayed a successful application of the system with their performance called “Osmosis,” held in the NowNet Arts Conference in 2022 (358). The performance included 31 video streams, 4 MoCap streams, and 4 Open Sound Control (OSC)⁸ streams (Fröhlich et al. 359). The authors used the Optitrack Motive MoCap software, as well as a software called NatNet2OSC⁹, which converts the MoCap data into OSC data (358-359). They also used a programme called the *Telemersive Toolkit*, which is “a system that enables artists and educators to set up complex low-latency multimedia streaming infrastructures between multiple computers connected via networks” (Fröhlich et al. 354). The interface called “Telemersive Gateway” allows MoCap data streaming within networks (Fröhlich et al. 354), which can be installed in Max and works as a “UI (User Interface) wrapper” for NatNet2OSC, in this experiment (Fröhlich et al. 358). According to the authors, the performance was a success, in terms of its “robust” platform, as it could stream “more than 30 simultaneous” multimedia streams within one performance (Fröhlich et al. 359).

Another experiment, conducted by Eric Larrieux and Stella Speziali, organised an immersive multimedia exhibition using Augmented Reality (Larrieux and Speziali 44). The authors used a

⁵ Java and C++ are programming languages.

⁶ Max is a musical programming software, used for creating “interactive software” (Cycling '74).

⁷ CD3 is a file extension, mainly used in motion capture systems. It contains three-dimensional coordinate information (Move API).

⁸ “Open Sound Control (OSC) is a protocol for communication among computers, sound synthesizers, and other multimedia devices” which enables devices to connect to “networking technology” (CNMAT).

⁹ NatNet2OSC is a “small app designed to convert the Optitrack NatNet” protocol to OSC (tecartlab, NatNet2OSC).

similar system, using the Optitrack Motive system and NatNetThree2OSC¹⁰, to control sound and visuals using umbrellas. The audio software applications used were PureData¹¹, and Max (Larrieux and Speziali 46). Although the use of the system takes a different approach to the capturing of movement (not dance movement), the technology and technical system gives huge insight and inspiration to the current research project, especially in test running the system, suiting to the methodology of the creative project.

Artificial Intelligence – Computer Vision and Machine Learning

Another approach is the use of machine learning tools. Although it is not the ideal method, machine learning tools have proven to produce a system for real-time gestural control. Rebecca Fiebrink created a machine learning software called *The Wekinator*, for “real-time musical performance” (Fiebrink and Cook). Specifically for this research project, *The Wekinator* could be useful as it can “create a system for gesture analysis and feedback.” It can also make “mapping between gesture and computer sounds” through a webcam (Fiebrink). The connectivity between the software and the DAW, Ableton, is useful for this professional project as the methodology of this project intends to use the same DAW (Fiebrink).

A more recent study developed “a real-time, human-in-the-loop gesture control framework” that produces audio playback, through analysing movement in a video. In this research paper, a machine-learning application, MediaPipe (Google), was used to analyse the tracking of body movements, as well as hand movements. The aim of the research study is to “manipulate sound in real time” through a performer’s established gestures. To recognise the gestures through the machine-learning application, a “training phase” was included. This was to ensure that the software could recognise specific motion gestures and can recognise mistakes in the dancer’s performance. The authors conclusions were that machine-learning applications, like Pytorch and Tensorflow, helped to develop a real-time sound-generate system for motion tracking (Khazaei et al.).

Motion Sensors

As seen from Jason J. Snell’s experiment, mentioned above, the more common approach to building a motion-to-sound system is to use motion sensors. In Jan C. Schacher’s conference paper,

¹⁰ NatNetThree2OSC is similar to NatNet2OSC, but converts Optitrack NatNet 3.1 protocol to OSC (tecartlab, NatNetThree2OSC).

¹¹ PureData is “an open-source visual programming language for multimedia” (PureData).

Motion to Gesture to Sound: Mapping for Interactive Dance (2010), he used “wearable sensors,” which can be strapped onto the human body with Velcro straps (252). These sensors operate through a “three-axis accelerometer, a three-axis gyroscope, a small-scale micro-controller board” with a “wireless transmitter” (Schacher 252).

As seen with the examples of technology to build a real-time sound-generated system, there are many possibilities. For this research project, some methods of technology may not function due to the facilities provided. Many of these works serve as inspiration to this professional project, as well as inspiring the methodology for the research experiment. These sources present a good foundational work for the main purpose of this project.

Perception of Dance and Music

The perception of dance and music are essential as a measurement for the research experiment as it investigates how dance and music can express the same topic in different forms. Most research studies have been conducted to measure the emotional perception of music. For dance, the measurement of perception is slightly different.

In Melanie Irrgang and Hauke Egermann’s research paper, they delved into the psychology of moving to music using the Geneva Emotions Music Scale, also known as GEMS (3). This scale was created by Marcel Zentner, Didier Grandjean, and Klaus R. Scherer.

This research paper measured the movement of participants through accelerometers when listening to a specific song. The experiment involved the participants to choose a song from the list provided, move freely to the music with an accelerometer (built into a mobile phone application), then to rate the “perceived emotional quality of the music according to GEMS-9¹²” (Irrgang and Egermann 8). From the results, the emotion, power, correlated to larger movements. Transcendence was described as movements with irregular tempo. Tenderness, nostalgia and peacefulness was represented by small movements. Joy was described with jumping movements, and sadness and tension were described with large movements in irregular time (Irrgang and Egermann 9, 10).

These interesting results show how emotions are connected to movement. By using this procedure of measurement, it forms a solid rubric for the use of GEMS in this research project. This journal

¹² GEMS-9 is a shorter iteration of the Geneva Emotions Music Scale, as the full scale contains 45 emotions (Jacobsen et al.).

article's experiment can help when measuring the expressiveness of dance and music, which is required for this project.

A conference paper by Camurri et al. delved into the expressive nature of dance and music performance. The authors explained that gestures, especially in performing arts, does not intend to explain speech but instead, conveys emotions, feelings and mood. Like the gait analysis, which is the analysis of a person's walking movements, expressive gestures follow the same pattern; "by stressing different qualities of movement" (Camurri et al. 2). This means that the speed or texture¹³ of dance movements can be perceived differently, depending on the execution of it.

The authors conducted an experiment which included the test of the dancer's body movements and its ability to convey the dancer's intentions to an audience (Camurri et al. 4). It involved an "experienced choreographer" to choreograph a piece which did not involve a stereotypical movement which induced emotions.¹⁴ Four other dancers performed the choreography with a specific emotion to convey through the gestures; anger, grief, joy and fear. (Cammuri et al. 6). According to the results, anger, grief and joy were the most perceived emotions, while fear was not as strongly perceived. From these results, it is evident that dance alone can be perceived with great expressive gesture to convey an emotion. Although the professional project involves the expression of a thematic prompt, the expressive nature of emotions through dance is an important factor to analyse the audience's perception on.

These measuring outcomes are essential for analysing data for this research project. It sets a basis of what to observe when analysing an audience's perception of dance and music. These sources explore the relationship between dance and music deeply, which relates to the subject matter of this creative project.

¹³ Texture in dance is the way in which a dance move is executed. According to dancer, Jessie Ma, texture "refers to how the move feels on your body... or how the move feels on the eyes." Texture also helps to "depict the right intention" in dance (Ma).

¹⁴ For example, hunched posture can be perceived as sadness. This means that the choreography was made so that there were no emotions attached to the dance moves.

Methodology

The methodology for this research project has been inspired by the sources from the literature review above. The aim of this research project is to test the difference between music and dance, in terms of their expressive nature; to what extent can music or dance portray a theme. For this, the methodology was divided into these four stages: Collaboration, Music Composition and Choreography, System Construction, and Showcase Experiment.

Collaboration

Collaboration with the dancer was crucial for this research project, as outlined by Bergsland and Wechsler. Firstly, the dancer (chosen by the researcher) was briefed with the creative project through an information sheet, as well as a consent form, to finalise consensual participation of the dancer.

As the research question compares music composed by a musician, and music composed by a dancer, the experiment requires fair testing. The musician and dancer agreed on identical control variables, which in this case, were the different sounds or musical elements. The control variables included the musical tempo (in beats per minute), and the sound palette/instrumentation. Another variable to aid the dancer, as well as the musician to compose, is a random prompt. Much like the assignment of emotions to choreography, conducted by Cammuri et al., the prompt was assigned to define a common vocabulary for both creative parties. The prompt was taken from Brian Eno's *Oblique Strategies*¹⁵, which allowed them to expand their creativity on their compositions.

In this discussion, the dancer and musician decided on these control variables: time signature and tempo in beats per minute (BPM), a thematic prompt, and the sound palettes/instrumentation. The information on the piece of music is seen in Table 1.

¹⁵ Made by Brian Eno and Peter Schmidt, these were cards with “obscure, cryptic aphorisms” written on them. These were used as a “creative tool for musicians” (Shepherd).

	Prompt	Time Signature + BPM	Instrumentation
Piece	Water/Cascades	6/8 time, 70bpm	Arco (bowed) Strings Pizzicato (plucked) Strings Tremolo Strings Flute Rimshot ¹⁶ Piano

Table 1: Control variables for music composition.

Throughout the project, the dancer and musician kept in contact by having meetings, to ensure an efficient and effective way of collaboration, as well as ensuring that both parties understood each other, in terms of their creative processes. This collaborative methodology ensured a fair experimentation, as well as induced a creative pathway for both parties of this creative research project.

Music Composition and Choreography

This stage included the creation of the music pieces. These pieces of music were used as the independent variable of the experiment as it refers to the comparison of the music produced by a musician, and the music produced through the motion capture of dance.

The musician composed their piece according to the information in Table 1, using the MuseScore¹⁷ software. Then, the composition was transferred to the DAW, Ableton, to enable the construction of the MoCap system. Refer to Appendix A1 for the music composition score, and Appendix A2 for the composition journal, where the musician noted their creative process while composing.

In terms of the dancer’s composition, this included choreographing a piece. Since the music will be generated through the MoCap system, the dancer choreographed to silence, with creating moves adhering to the prompt, as well as using the BPM as a guide, ensuring that the moves would be in sync with both compositions. Refer to Appendix B for the dancer’s notes, and Appendix E for a detailed insight into the dancer’s creative process.

¹⁶ When the drumstick hits the edge of the drum and the head of the drum at the same time.

¹⁷ MuseScore is an open-source software for writing music scores/sheet music (Musescore).

The same choreography was applied to both compositions, which ensures a direct link between the independent variable (the music heard) and the dependent variable (audience perception), therefore, creating an effective experiment.

The composition stage was crucial to the experimentation of the MoCap system, as well as being an important part of the research question experiment.

System Construction

This refers to the building of the motion capture to sound system itself. There are three different approaches that were considered and conducted during the process of this project.

Method 1

This method applies the same methodology from the multimedia experiments, as mentioned in the literature review, using the traditional MoCap software; Optitrack Motive, which is facilitated by Dun Laoghaire, Institute of Art, Design and Technology (IADT). This system functions with 12 infrared camera sensors in the Immersive Studio in IADT. The system uses skin-tight suits with reflective markers placed accordingly to the skeleton templates, provided by the software.

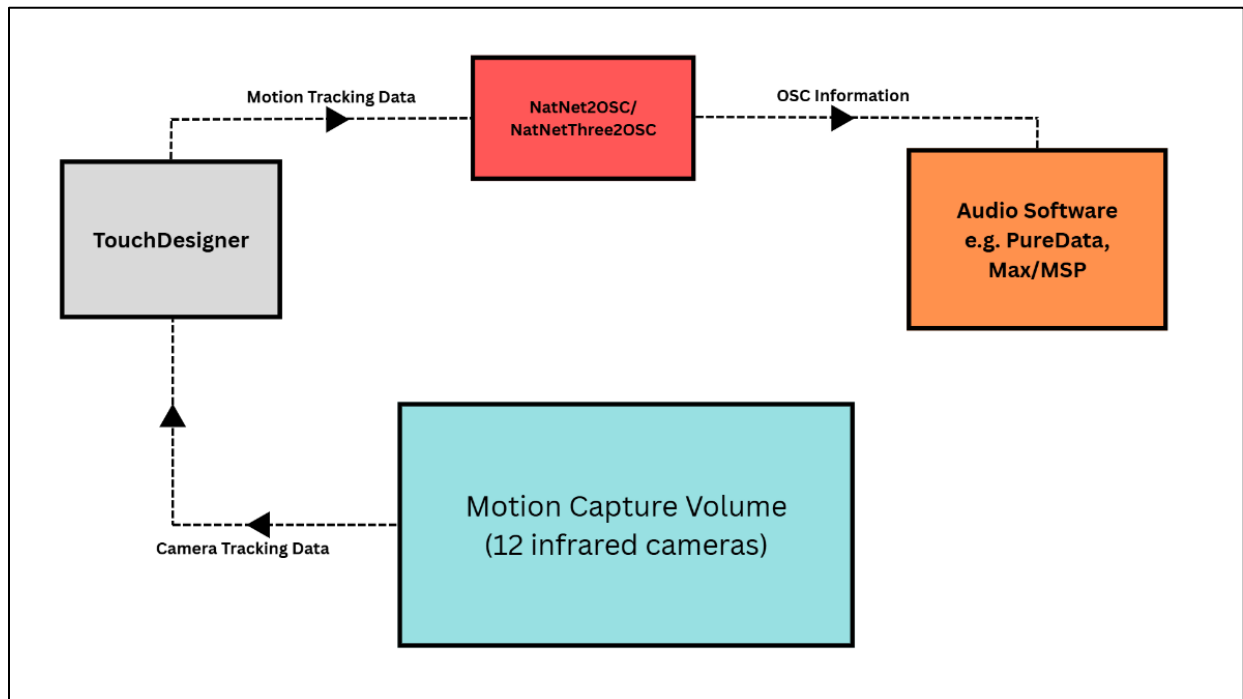


Figure 2: Data and signal flow of Method 1.

In a similar fashion to Martin Fröhlich, Eric Larrieux and Stella Speziali’s research papers, this method uses the NatNet protocol to convert the motion capture data into OSC, using NatNet2OSC (tecartlab). Research has shown that NatNet2OSC can link to many external software (tecartlab).

According to the research papers using the NatNet software, this method was a strong contender for finalising the methodology of this project. The workflow and signal flow of this method (according to the examples and being applied to this research project) is shown in Figure 2.

Method 2

Method 2 involves the use of the software, TouchDesigner¹⁸, and the body tracking plugin¹⁹, developed by Torin Blankensmith. The body tracking plugin uses MediaPipe, which is a “free and open source” software that uses Artificial Intelligence (AI) for object tracking, body tracking, hand tracking, and many more (Google). This computer vision AI was only used to efficiently capture motion tracking data. In TouchDesigner, the software can be linked to the DAW, Ableton, using the TDableton package (TouchDesigner). This can provide the sound and music aspect of the project. Figure 3 displays the functions of workflow and signal flow for this method. This method posed a strong and user-friendly approach to building this motion to sound system.

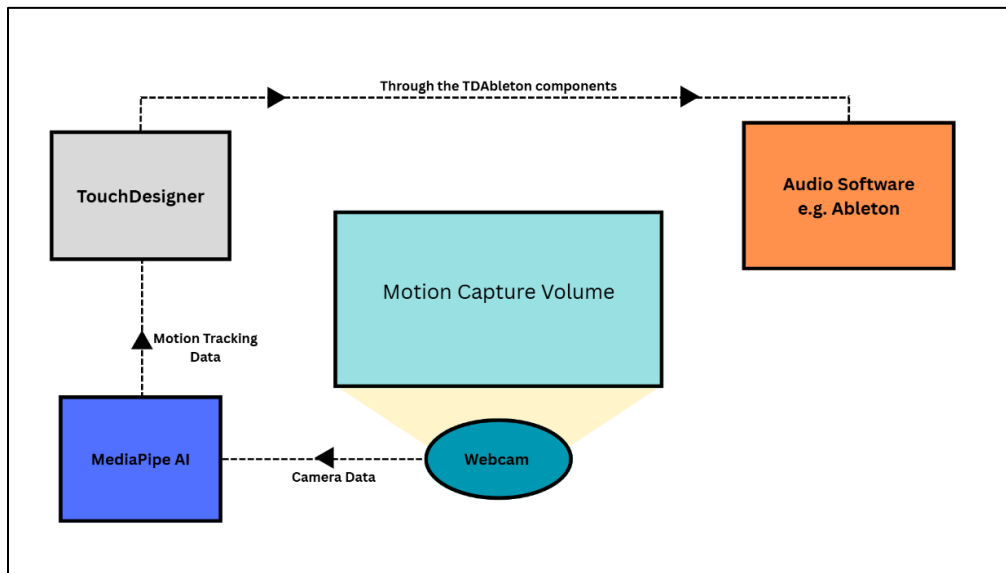


Figure 3: Data and signal flow of Method 2.

¹⁸ TouchDesigner is a software for multimedia creation systems (Derivative).

¹⁹ A plugin is an extended piece of software that functions on an existing application software.

Method 3

This method uses a similar approach to Method 2, which uses the MediaPipe motion tracking within Max, linking into Ableton. This method's workflow is shown in Figure 4. This approach functions well for the researcher as it is using known software and coding processes.

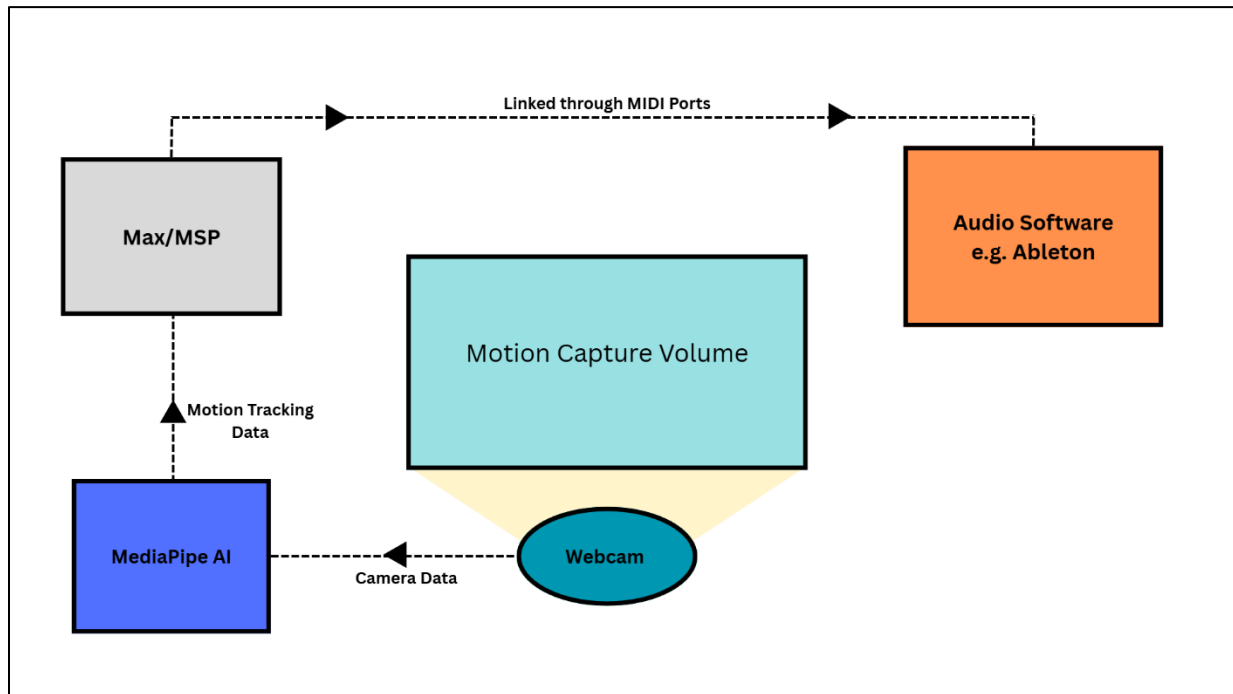


Figure 4: Data and signal flow for Method 3.

Issues and Limitations

Through experimentation using the three methods, there were issues and limitations to each.

Method 1 was conducted in the early stages of the experiment. The positive aspect of this method was that similar experiments using the Motive software and NatNet2OSC seemed feasible. Although, when using NatNet2OSC in IADT, there were technical issues with the software itself; problems with trouble shooting the software, and it would shut down immediately after restarting. Several technical fixes were conducted, like changing ports, using different programming software like GazeboOSC (hku-tect), using different networks, etc. The same issue occurred, despite the different approaches used to potentially fix it. Due to this, Method 1 was not used for this creative project.

Method 2 was a viable option as well. Although, due to the use of a webcam the results of the motion capture may not be as accurate as Method 1, but as this method was tested, it was confirmed

to work more efficiently than Method 1. This method was also limited due to the small number of control parameters given in the TD Ableton package.²⁰ The control parameters were unstable due to the connection between Ableton and TouchDesigner. As well as that, using this method served as a disadvantage to the researcher due to learning a new method of coding.

After trial and error of each method, Method 3 was the most efficient approach for this project as it has a more direct link between Ableton and Max, as well as a user-friendly interface. As mentioned in the literature review, the MediaPipe software has proven to successfully capture motion in real-time, as well as produce sound in real-time, according to Khazaei et al.'s research paper. Since the coding system is a known system to the researcher, Method 3 served as an advantage to the researcher, in terms of efficiently finishing the product.

Motion Capture-to-Sound System

With Method 3, the motion capture system was built. Using the appropriate Max patch²¹, developed by the user, LYSDEXIC, allowed for the motion-to-sound system to be built with ease. The patches include “hand tracking,” “face tracking,” “object detection,” “body tracking,” and more (LYSDEXIC). For this system, the pose/body tracking was used (lysdexic-audio). This patch was downloaded and adjusted in Max. Refer to Figure 5 for the coded patch.

According to Table 1 above, the instruments available to be controlled through movement were the arco strings, pizzicato strings, flute, piano, and rimshot, as seen in Figure 5.

LYSDEXIC's body tracking code patch reads the coordinates (x, y, z) of 32 points on the body, shown in Figure 6 (lysdexic-audio). Refer to Table 2 for the control parameters coded for the dancer.

²⁰ The TD Ableton package contains components that requires Python coding to be enabled, like the ABLETONMIDI component (TouchDesigner). This sets the researcher at a disadvantage for learning new coding languages.

²¹ This is the “file or program” that is made in the Max software (Cycling '74 Glossary).

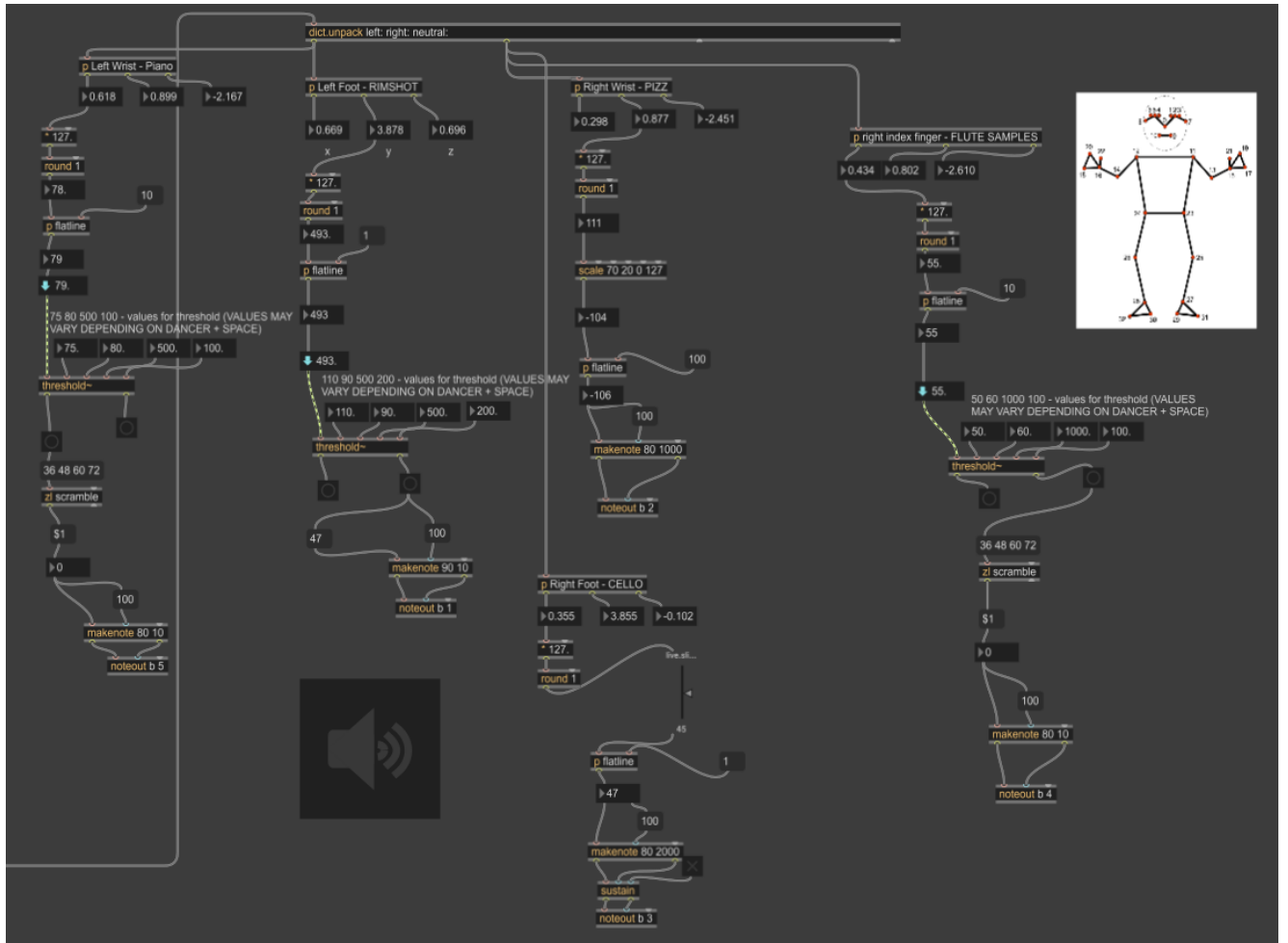


Figure 5: Coded Max patch for the motion-to-sound system.

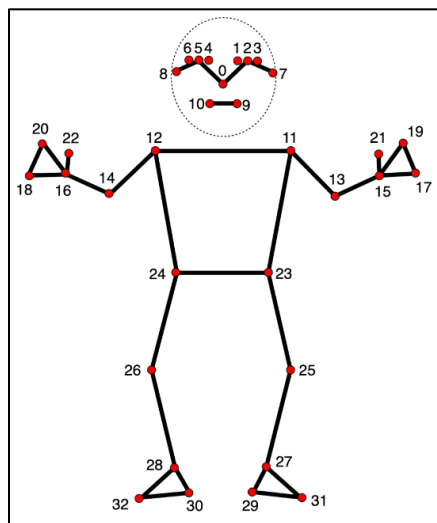


Figure 6: 32 points available from body tracking device (lysdexic-audio).

Instrument	Body Part	Coordinate Value (x, y, z)
Arco Strings	Right Foot	x value
Pizzicato Strings	Right Wrist	y value
Flute Samples	Right Index Finger	x value
Rimshot	Left Foot	y value
Piano Chords	Left Wrist	x value

Table 2: Instrument control parameters for the dancer.

These control parameters were adjusted to the dancer’s liking, in terms of the triggering mechanism, using the coordinate values, as well as thresholding values, as seen in Figure 5.

As well as that, a MIDI controller²² (*KORG nanoKONTROL2* model, as seen in Figure 7 and Figure 8) was used for volume control of the instruments seen in Table 2. These controls were mapped²³ in Ableton.



Figure 7: KORG nanoKONTROL2 MIDI controller.

²² MIDI (Musical Instrument Digital Interface) controller is a “piece of hardware that transmits MIDI data to MIDI enabled devices” (Berklee Online).

²³ MIDI mapping is used for creating custom controls on a controller (Ableton).



Figure 8: MIDI controller and laptop set up for the showcase.

Showcase Experiment

To test the mechanical, technical, and real-time processing system, a live demonstration was showcased to the public. This showcase event was held in the Immersive Studio in IADT.

To prepare for the showcase, a technical rehearsal was organised, to finalise the coordinate values for the system, as well as the measurements.

The motion capture system relied on the use of a webcam, to video and track the motion data, as seen in Figure 4. According to the webcam's visual scope of the area, the measurements of the space was noted and sectioned using tape. This space was the dancer's field in which the system will function and trigger the musical instruments. Refer to Figure 9 and 10.

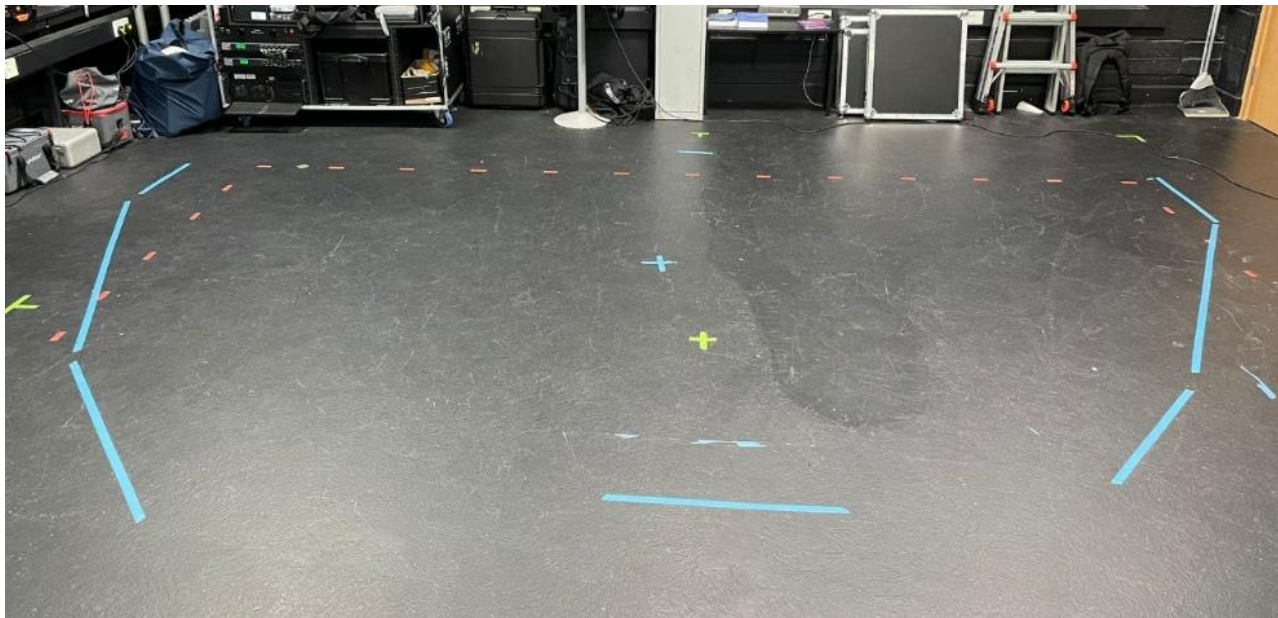


Figure 9: Webcam field of vision/space measured out with blue tape.

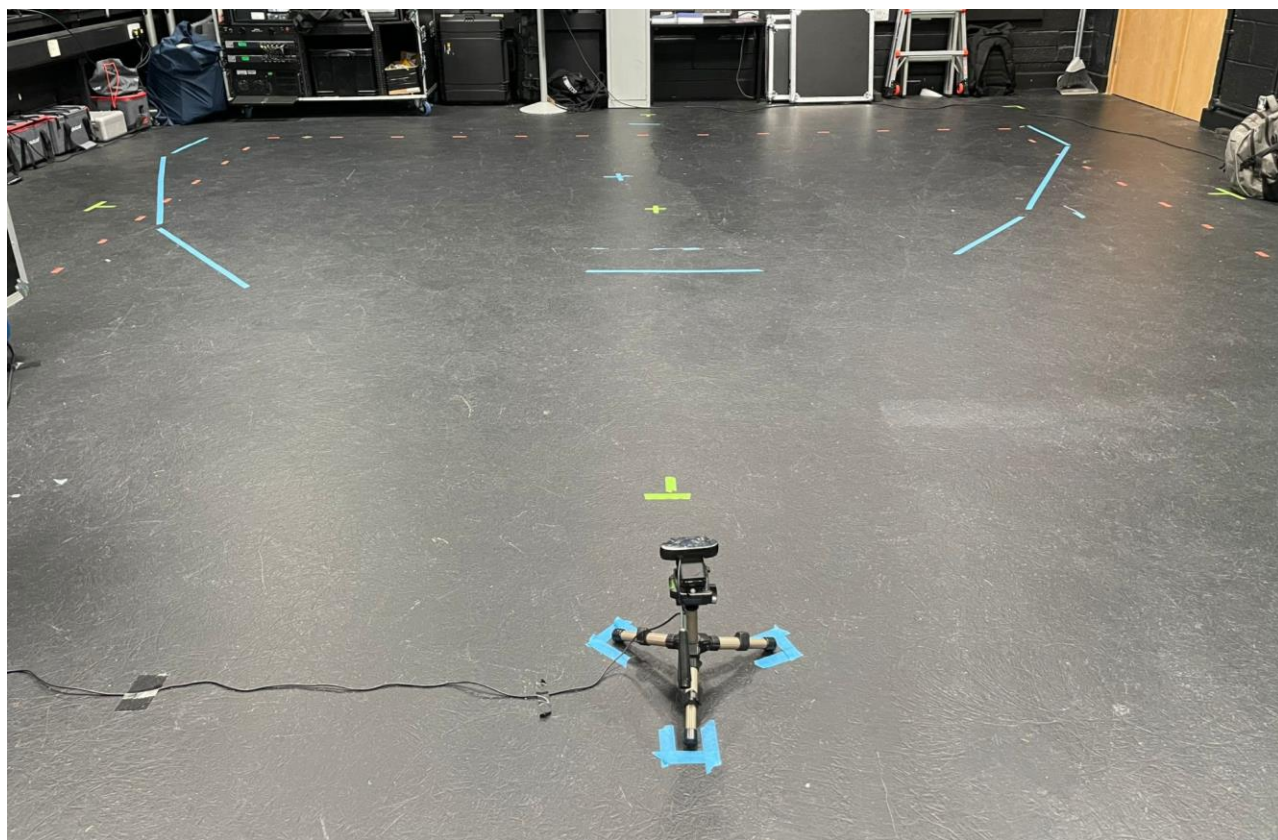


Figure 10: Space measured out with blue tape, with webcam.

The showcase was held on the 14th of April 2026, with four performances taken place. Refer to Appendix C for details of the showcase. Each performance showed a different composition, alternating between the musician’s composition, and the dancer’s version, using the motion tracking system to generate the composition in real time. Refer to Table 3.

12pm-12:30pm	1pm-1:30pm	2pm-2:30pm	3pm-3:30pm
1. Musician’s Composition	2. Dancer’s Composition	3. Musician’s Composition	4. Dancer’s Composition

Table 3: Order of performances on the day of the showcase.

After the performance, a survey was conducted for the audience, using quantitative and qualitative research. This survey aimed to measure the audience’s perception of the prompt through the music and/or dance. This included the emotional response of the audience while watching the performance, their perception of the link between the choreography and music, as well as their interpretation of the dance and music to a thematic prompt. The survey took inspiration from Irrgang and Egermann’s use of the GEMS-9, in terms of the measurement for emotional response. Regarding the interpretation of the prompt and the audience’s perspective of the choreography-to-music connection, it was measured by the results of the intentions of the dancer and musician, as mentioned by Camurri et al.’s research paper. Two surveys were made, separating the audience watching the musician’s version and the dancer’s version. This ensured an efficient approach of data collection, as well as simplifying the analysis of the results. Refer to Appendix D for the survey questions.

To understand the intentions of the dancer, an interview was carried out (Refer to the transcript in Appendix E). As the musician was the researcher, it was not possible to conduct an interview. Instead, to identify the intention of the musician, a reflective journal was kept which was later analysed and compared to the results of the interview (Refer to Appendix F for the reflection).

Analysis

This research used a mixed methodology for data collection. This included a qualitative and quantitative survey with 27 audience members, a long form qualitative interview with the dancer, and a reflective journal from the musician and researcher. This section will analyse and compare the results of these three data points.

Audience Survey Results

Two surveys were conducted; for the audience that attended the musician's composition (Performance 1 and 3, which will be referred to as the Musician's Version), and for the audience that attended the dancer's composition (Performance 2 and 4, which will be referred to as the Dancer's Version). The surveys included identical questions. 12 people attended the Musician's Version, while 15 people attended the Dancer's version.

Connection of Music and Dance

Question 5 of the survey included statements discussing the connection between the dance and the music, as well as enhancement of enjoyment. Refer to Figure 11 for the Musician's Version and Figure 12 for the Dancer's Version.

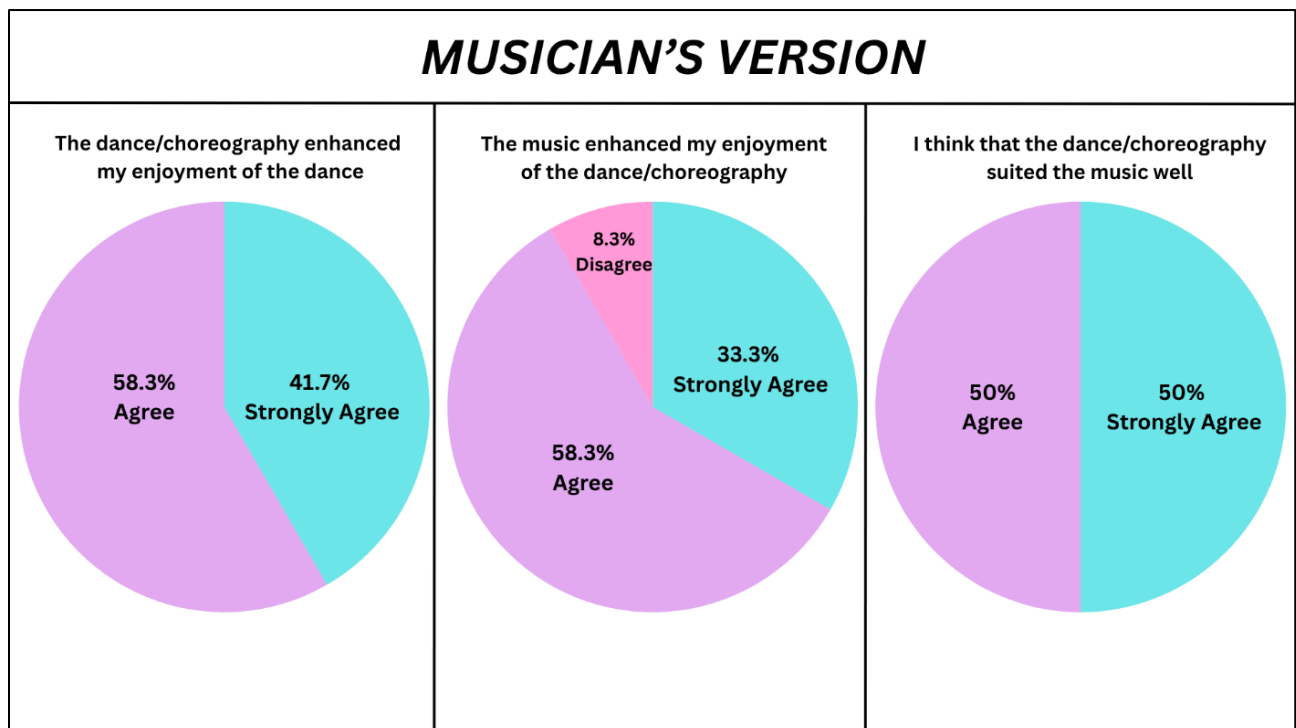


Figure 11: Question 5 results from Musician's Version.

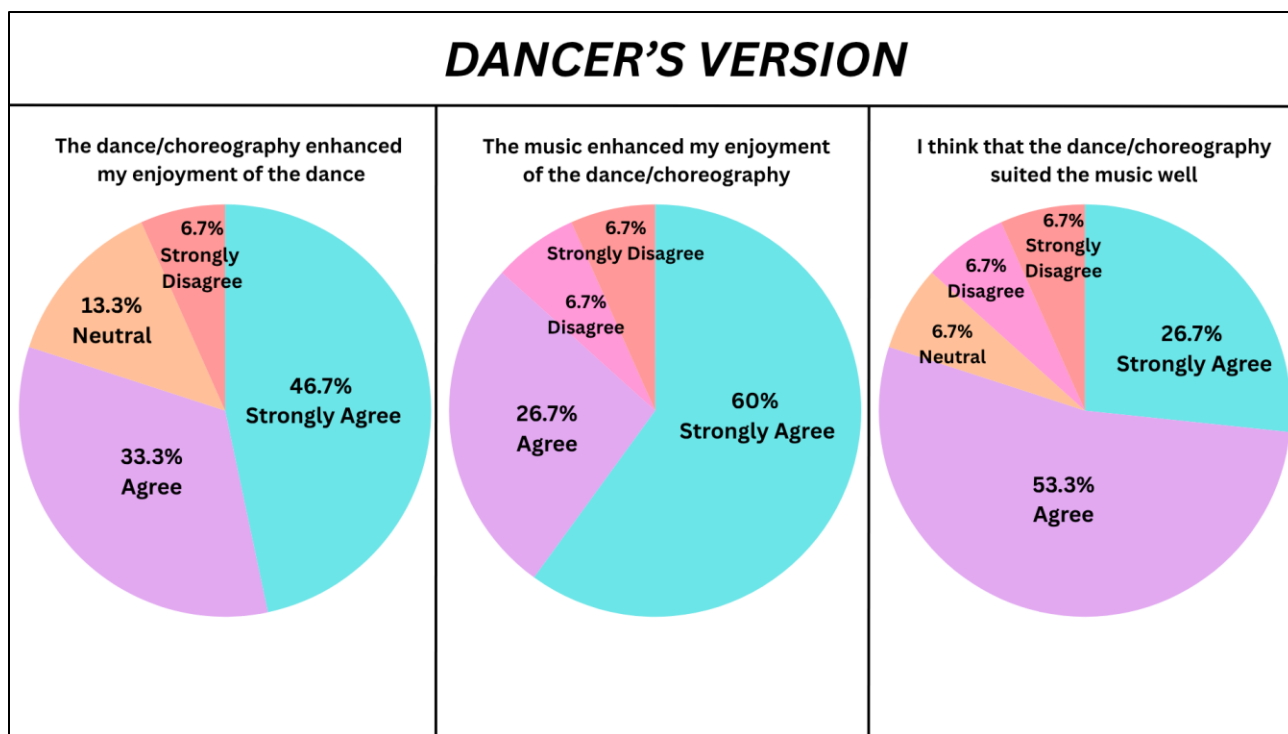


Figure 12: Question 5 results from Dancer's Version.

From the Musician's version, there was an, overall, positive outcome, whereas from the Dancer's Version, the answers varied, with majority of the audience agreeing to the statement. This could indicate that the visualisation of the music through dance is deemed as important, in regards to audience perception.

Nearly twice the number of participants strongly agreed to the statement from the Dancer's Version, in comparison to the Musician's Version. This could mean that the music from the Dancer's Version had a stronger impact on the audience's perception of the performance. Although the percentage of participants from the Dancer's Version that disagreed is higher than that of the Musician's Version, it is possible that other factors of the music concluded their answer; one participant mentioned that the sound of the MIDI instruments²⁴ affected their ability to be immersed into the performance (Refer to Appendix G1).

No participants disagreed in the Musician's Version, while it was not the case with the Dancer's Version. This could mean that the choreography was perceived as fitting for the music in the Musician's Version. Some quotes from participants articulated their perception of the music and

²⁴ The Musician's Version used virtual instruments (MIDI), instead of live instruments.

dance; *“the dance moves felt in line with what I was hearing,” “The dance complemented the music well,” “it flowed quite neatly with the music,” “the genre style matched the vibe of the music which kept me engaged throughout the performance”* (Refer to Appendix G1).

Interaction Connection

Question 6 discussed the interaction/connection between the music and dancer, focusing on the synchronicity of the music with the dancer.

All participants from the Musician’s Version perceived the dance as in sync with the music, with a few participants noting a few inconsistencies with the synchronicity; *“Some bits felt a bit off beat, or the move would do the opposite the music would prompt you to do,” “In some moments yes but in others, no”* (Refer to Appendix G1).

The answers in the Dancer’s version were more varied, with more participants stating that moves were out of sync with the music; *“They were not fully in sync, but that type of dance and music genre were clearly not made for synchronisation,” “It was half and half. Sometimes matching and sometimes not,” “The music was in sync at some parts, but the first notice was the parts of the music that did not sync with the dancer’s steps...” “... a bit out of sync,” “...there was a slight delay,”* etc. (Refer to Appendix G2).

The responses differed more in the Dancer’s Version than in the Musician’s Version, which could be because of the interactive music system, compared to a set piece of music.

Emotional Theme

Question 7 included the emotional response from the performance, using the GEMS-9 Model by Zentner et al. Refer to Figure 13 for the results from both surveys.

The most perceived emotion from the Musician’s Version was Peacefulness (58.3%), followed by Wonder (50%), Transcendence (25%) and Joy (25%). For the Dancer’s Version, the most perceived emotion was Transcendence (40%), followed by Wonder (20%) and Peacefulness (20%). The rest of the emotions were selected, with 7% for each.

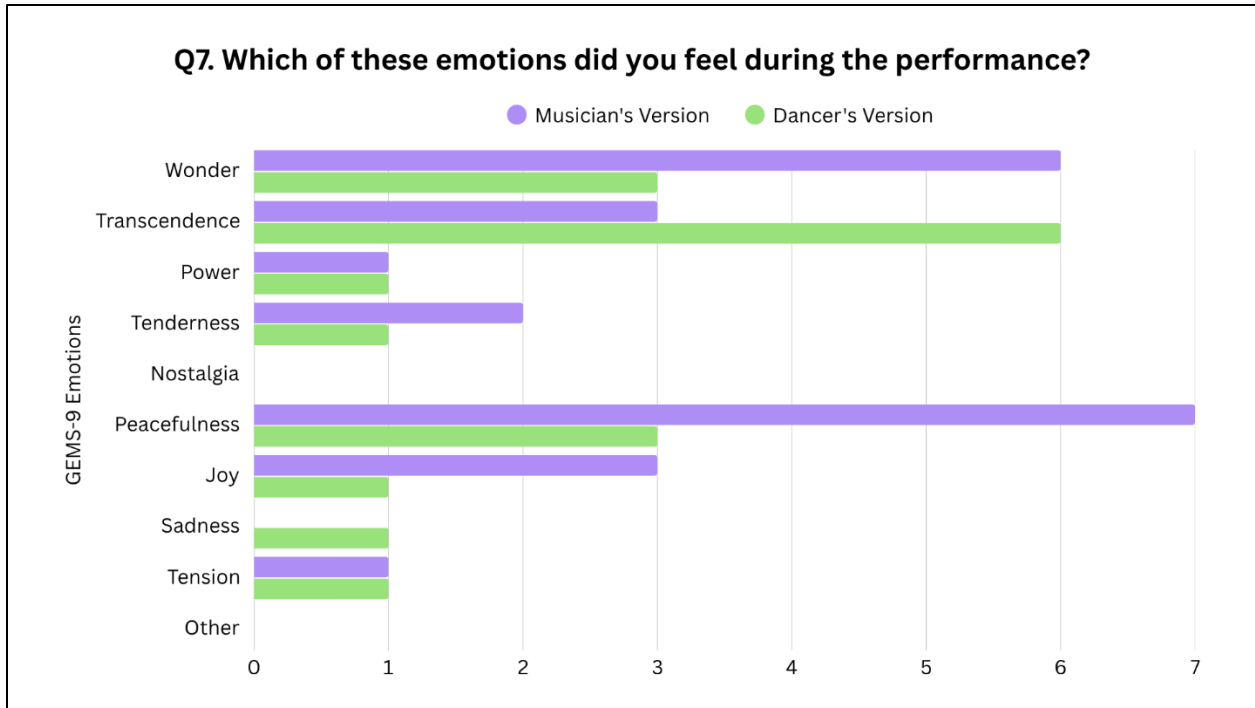


Figure 13: Graph of results from both surveys for Question 7, using GEMS-9.

The choices were more scattered in the Dancer’s Version than the Musician’s Version. Since GEMS-9 was designed for music perception, not for dance perception, the scattered results could be because of the lack of musical structure within the Dancer’s Version, due to the inconsistencies of the motion-to-sound system.

Correct Prompt

Question 8 included the prompt options. From the Musician’s Version, 25% of the audience guessed the prompt correctly, while 40% guessed the prompt correctly from the Dancer’s Version. Refer to Figure 14.

Since more participants guessed the prompt correctly from watching the Dancer’s Version, this could be due to several factors; the choreography was a better representation of water than the musician’s composition in terms of audience perception, the choreography was more prominent than the music in terms of perception.

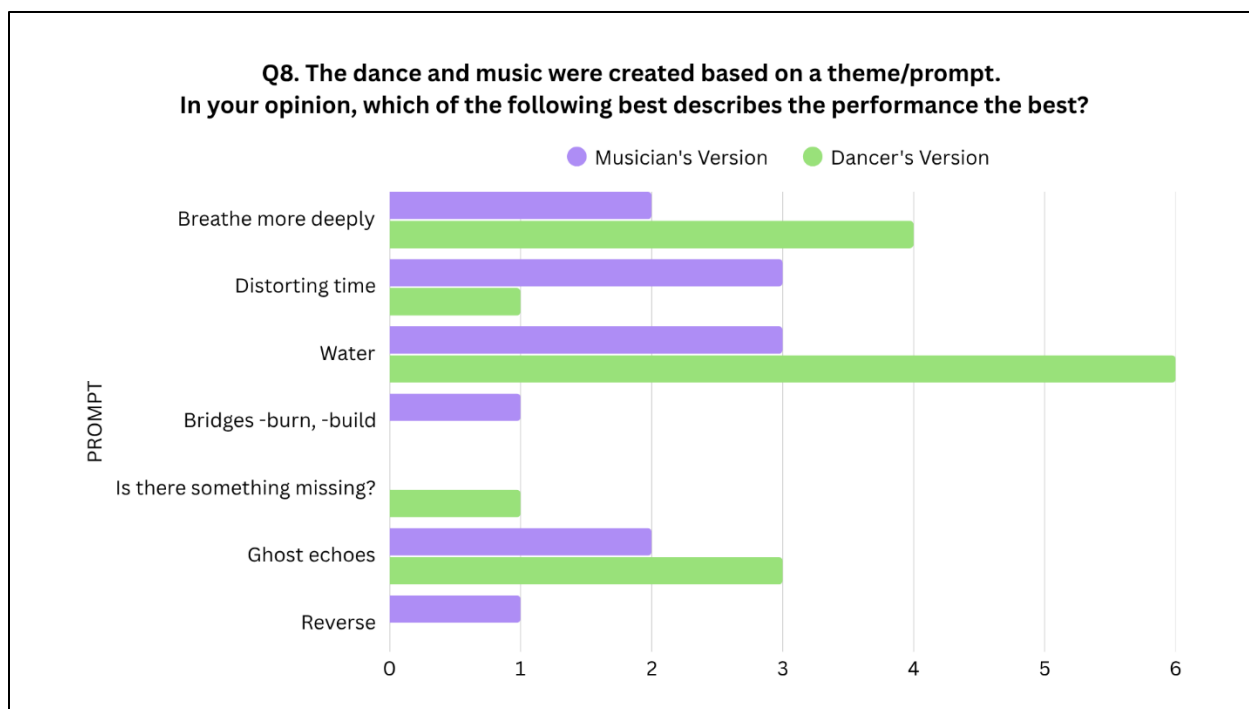


Figure 14: Results from both surveys for the correct prompt, Water.

Emerging Themes and Concepts

From analysing the two surveys, the emerging themes were these: “*elegant*,” “*graceful*,” and “*flowy/flowing*” (Appendix G1 and G2).

Most participants mentioned these words in the Dancer’s Version. As well as that, those participants guessed the prompt correctly, which could indicate a stronger connection between the dance and the prompt. In the Musician’s Version, there was no strong evidence of correlation between the music and the prompt. Since the choreography was the same, this indicates that the major difference in perceptions was the music. Therefore, the dance was more successful in expressing the prompt than the music.

Dancer Interview Results

To form a basis of measurement, the dancer’s intentions and their creative process were recorded through an interview (Appendix E).

In terms of the dancer’s intentions to convey the prompt, according to the dancer, this was the inspiration for the choreography:

In the sense of the theme being water... looking at what water means, and what it can feel like. If someone was watching it, would they be able to physically join me on that journey of what water can be. You know, it can be slow, it can be fast, it can be used as like a weapon of destruction, as well in a sense, if we look at hydraulic action. It can be peaceful; it can be a sign of something falling or something running out... (Appendix E)

In terms of specific dance moves, the dancer was also inspired by *Avatar: The Last Airbender*,²⁵ using water-bending²⁶ actions, to convey the prompt. They incorporated moves such as “the wave²⁷,” as well as “floorwork.²⁸” Because of how the system operated, there were certain moves that would trigger certain sounds so, the dancer was more inclined to trigger those sounds using those moves; the pizzicato strings were linked to the y value of the right wrist, so movements like raising the arms were included. The system itself inspired the creation of the choreography (Appendix E).

From the emotions that the dancer wanted to convey, it was as follows: Peacefulness, Power, Nostalgia, Tension, and Sadness.

The dancer was asked about the benefits of the collaboration. The dancer described that there were differences, in terms of dancing to the composed music and dancing with the system.

I found it really lucky and fortunate that my choreography fits the composed music as well as it did... Even though... there was a struggle because I was choreographing to my own beats that I made up in my head, and you kind of need to tweak some timings and fix some things, in order to align to the natural rhythmic composition of the music that was created. So, that was a bit challenging, but ultimately, I feel like it worked really well together... Now when I'm working with the system itself... there were a lot of downsides because it's quite unpredictable software. And often times, I would have a general understanding of how the music should sound when the samples were played to me.

²⁵ This is a fictional cartoon made by Michael Dante DiMartino and Bryan Konietzko. This is the synopsis: “In a war-torn world of elemental powers, a young boy reawakens to undertake a dangerous mystic quest to fulfill his destiny as the Avatar, and bring peace to the world” (IMDb).

²⁶ Waterbending is a fictional “bending art”/martial art that allows the user to control all forms of water (Avatar Wiki).

²⁷ This is a dance movement, performed as a “fluid” motion of the body to “imitate literal waves in the ocean” (Roberts).

²⁸ This refers to any dance movements using the ground/floor.

So, I would choreograph around that but, obviously certain things won't be triggered at a certain time... (Appendix E).

Due to the inconsistencies with the system, the dancer found it difficult to fully portray their intentions, which limited the outcome that the dancer wanted to convey.

Although the system had its limitations, in terms of the performability of the system to portray the dancer's intentions, the dancer's approach to dancing with the system was like freestyling²⁹; *"when I'm freestyling, that's just me. And it's very raw and it's less so about me conveying a theme or conveying a feeling, or interpreting the music, but rather me putting myself on display"* (Appendix E).

These responses from the dancer were considered into the results and discussion of this dissertation.

Reflective Journal

The musician and researcher's intentions were noted in a reflective journal (Appendix F). The main intentions of the musician's composition, to respond to the given prompt, was to portray water in its changing form. According to the musician, the music piece follows this story:

Water drops from the sky/from the condensation under a bridge. The rate at which they drop is slow, but when it increases, the water drops accumulate to form a river, which flows fast. The water flows to the edge of a cliff, and the river falls, forming a waterfall. The waterfall flows into a peaceful lake (Appendix F).

The musician used these certain sounds to represent water:

The pizzicato strings and the rimshot perc replicated water drops. The tremolo strings represented the shimmering of water. The rushing passage of the violins and the flute represent the fast, flowing movement of the river. The dissonant and descending piano chords represent the tension from the waterfall. The calmness of the flute melody at the end of the piece replicated the scene of the lake, being peaceful and still (Appendix F).

In terms of the emotions and mood that the musician intended to convey, in chronological order, it was as follows: Wonder, Joy, Tension, Peacefulness and Nostalgia.

²⁹ This is a dance style that is done in a liberating matter; the dancer is free to move their body however they like.

From observing and analysing these three data points, an overall understanding of the expression and audience perception of the prompt through dance and/or music can be made, in relation to the research question itself.

Discussion

From the analysis of the three data points, one notable result can be concluded; dance/choreography proved to be more important than music, when expressing a thematic prompt.

Results Discussion

It was evident from the survey results that the Dancer's Version was perceived correctly, according to the prompt. This could be due to multiple factors; as mentioned before, the dance was a more accurate representation of water than the music. Additionally, the intentions of the dancer were reflected in the survey, with some participants describing the dance as "*elegant,*" "*graceful,*" and "*flowy,*" as well as referencing the same material as the dancer; "*Some of the moves reminded me of water bending in Avatar, so I felt that fitting*" (Appendix G2). With this information, it can be proven that the visualisation of a theme is more prominent to a human's perception than audio. This further proves Cammuri et al.'s research into the expressive nature of dance performance.

Regarding the emotional response, the Musician's Version proved to be more consistent, according to the audience's perception, as well as in comparison to the musician's intentions of emotional portrayal. This could be due to the nature of the GEMS-9 Model, in terms of measuring emotional response. Therefore, the use of GEMS-9 within the survey was beneficial for data collection of an audience's perception.

To delve deeper into the dance-and-music relationship, the significance of it can be seen in the interview with the dancer, as well as the survey results. In the interview, the dancer states this:

As a dancer, the relationship between dance and music is so intertwined and music often gets a lot of, nowadays anyways, gets lot of recognition... There's sort of a different layer of understanding and communication that happens with the addition of dancing (Appendix E).

From observing the survey responses, in relation to the dance and music, many mentioned the two aspects in conjunction with each other in the Musician's Version; "*paired well,*" "*fit well with the music,*" "*matched the vibe of the music,*" "*I enjoyed the correlation between the dancing and the music*" (Appendix G1). Whereas, in the Dancer's Version, many of the responses explained the dance as a separate entity; mentioning the quality of movements, like "*big motions,*" "*great control and lightness,*" "*smooth,*" "*used levels and textures very well*" (Appendix G2). This could

be due to the simplicity of the music system, aiding in the audience to be more aware and attentive to what the music does as the dancer moves, instead of how the dancer performed to the music.

Limitations

Overall, the methodology of this professional project was successful in forming the results of the research question, ‘How does music composed by a musician compare to music composed by a dance using motion capture, in terms of expressing a prompt?’ With mixed methods of research, as well as the experiment itself, it has proven to be beneficial to the project. However, there were limitations and inconsistencies, which hindered the overall results.

Firstly, the motion-to-sound system was limiting from the dancer’s perspective, as there were restrictions to the musical elements that the dancer was able to control; since the data from MediaPipe utilised coordinates, rather than using exact movements as control parameters. For this, the machine learning tool, made by Fiebrink or those mentioned by Khazaei et al., would have been successful in building a more accurate system. Additionally, the system was restricted using the webcam, which led to inaccuracies in the coordinate values. Hence, inaccuracies in the movements of the dancer enabling them to trigger sounds. This was constricting to the dancer, as it was inconsistent to what the dancer desired.

Due to the unnatural method of the dancer choreographing to silence, inevitably, each performance was modified during the showcase. Because of this, it could have led to inaccurate results, since it was indicated as the dependent variable.

These limitations can be developed on for future research into this topic.

Conclusion

This research study analysed audience perception and interpretation of a thematic prompt through dance and music, as well as the importance of music, in relation to dance. The literature review served as a solid foundation to the approach of this research project, as well as guiding the methodology. Overall, the methodology aided in solidifying the results to the research project question, as well as inducing a creative outlet for the researcher and dancer. The results from the comparison of the three data points were compiled and analysed, giving incredible insight to human perception of music and dance as a collective, and as a creator of music and/or dance. Observing the limitations of technology and its interactivity with a sport as complex as dance, future research into such a system for real-time processing motion capture into music can be developed on and can be taken a step further into music production through dance. With huge insight into the true relationship between dance and music, with hands on experience, it is important to note the major impact that music has on dance; Music can evoke complex emotions in someone, and by adding dance into the equation, it invokes a different type of experience that sometimes, music cannot do alone.

5

25
Fl. *legato*
Perc.
Pno. *legato*
Vln. 1 *rit.*
Vln. 2
Vla.
Vc. *p*

30
Fl.
Perc.
Pno.
Vln. 1 *rit.*
Vln. 2 *pp*
Vla.
Vc.

6

36
Fl.
Perc.
Pno.
Vln. 1 *rit.*
Vln. 2 *pizz.*
Vla. *mp*
Vc. *mp*

47
Fl.
Perc.
Pno.
Vln. 1
Vln. 2
Vla.
Vc.

7

49
Fl.
Perc.
Pno.
Vln. 1
Vln. 2
Vla.
Vc.

52 *rit.*
Fl. *mp*
Perc.
Pno.
Vln. 1 *p*
Vln. 2 *p* *arco*
Vla. *p*
Vc. *p*

Appendix A2:

Musician's Compositional Journal

COMPOSITION JOURNAL

BRIDGES –BUILD (start: 12/01/26, end: 28/01/26)

- 4/4 70bpm
- Construction vibes
- Took inspiration from 1million mega crew dance from Street Woman Fighter 2 – https://youtu.be/-UL4-axkwnl?si=lemkwfJ_o5MhiSxc
- Prominent timpani + percussion – reflecting the construction/build part of the prompt.
- Opening piece, to build tension – A minor key.
- The “bridges” part comes from the scalic passages from the violin.
- At first, I had notes of the mood being hopeful, and slightly uplifting, as well as having tension and drama, but the hopeful and uplifting moods weren't portrayed as well.
- I wanted the texture to build up as well, portrayed from the multiple layers of percussion added, although I had to be considerate of the dancer as they will use these elements to create their composition.
- The brass added to the tension and drama that the piece portrays.
- Other piece references:
 - Ethereal – TXMY (for the hopeful? Mood – but did not convey in piece)
 - Symphonie Fantastique Op. 14 Marche au Supplice – Berlioz (timpani + drama)

WATER/CASCADES (start: 28/01/26, end: 03/02/26)

- 6/8 70bpm
- Started with the idea of tremolos on strings, to replicate the shimmering of water? – could not continue, thought it was too light.
- Next idea was piano with scalic passages + polyphonic ostinatos, to replicate moving water. – it didn't sound the way I want it. Too static, in my opinion.

- Main piece references:
 - Vltava – Smetana (for quick passages/rushing feeling/flowing river)
 - La mer – Debussy (waves crashing)
 - Carnival of the Animals: Aquarium – Saint-Saens (piano part)
 - Carnival of the Animals: Le Cygne – Saint-Saens (flowy)
 - Swan Lake Op. 20, Act: II, No. 10, Scene – Tchaikovsky (flowy)
- I wanted to key change into B flat major, from A minor, or switch to C major.
- Mood: rushing feelings, feeling like you're underwater, tense, dramatic, flowing river to crashing waves.
- Instruments/audio effects: strings?, sparkly synths, auto filter, flute + piccolo, marimba?/xylophone?/vibraphone?/crystalophone?, piano
- UPDATE: better vision of what I want the composition to do in terms of conveying the theme – IMAGERY: after the construction of the bridge, water drips down into a flowing/peaceful river. The river reaches a waterfall, flowing downwards and crashes into a calm lake.
- Using B flat major + different modes (mixolydian), modulating to E flat major, and ending on a C minor, going into the next section.
- This version has a better understanding of the theme and a better structure.
- Want to add more elements with Ableton e.g. synths/percussive elements?
- INSTRUMENTS UPDATED: violin 1, violin 2, viola, cello, flute, piano, synths?, percussion?
- UPDATE: make a few chord progression changes to the piano
- CONSIDER TRIGGERING METHODS FOR JAY

Appendix B:

Dancer's Notes

Left Foot Y axis: Empty BLOOHC sound

Right Hand Y axis: plucking strings

Right Foot X axis: cello

■ Left: high, right low

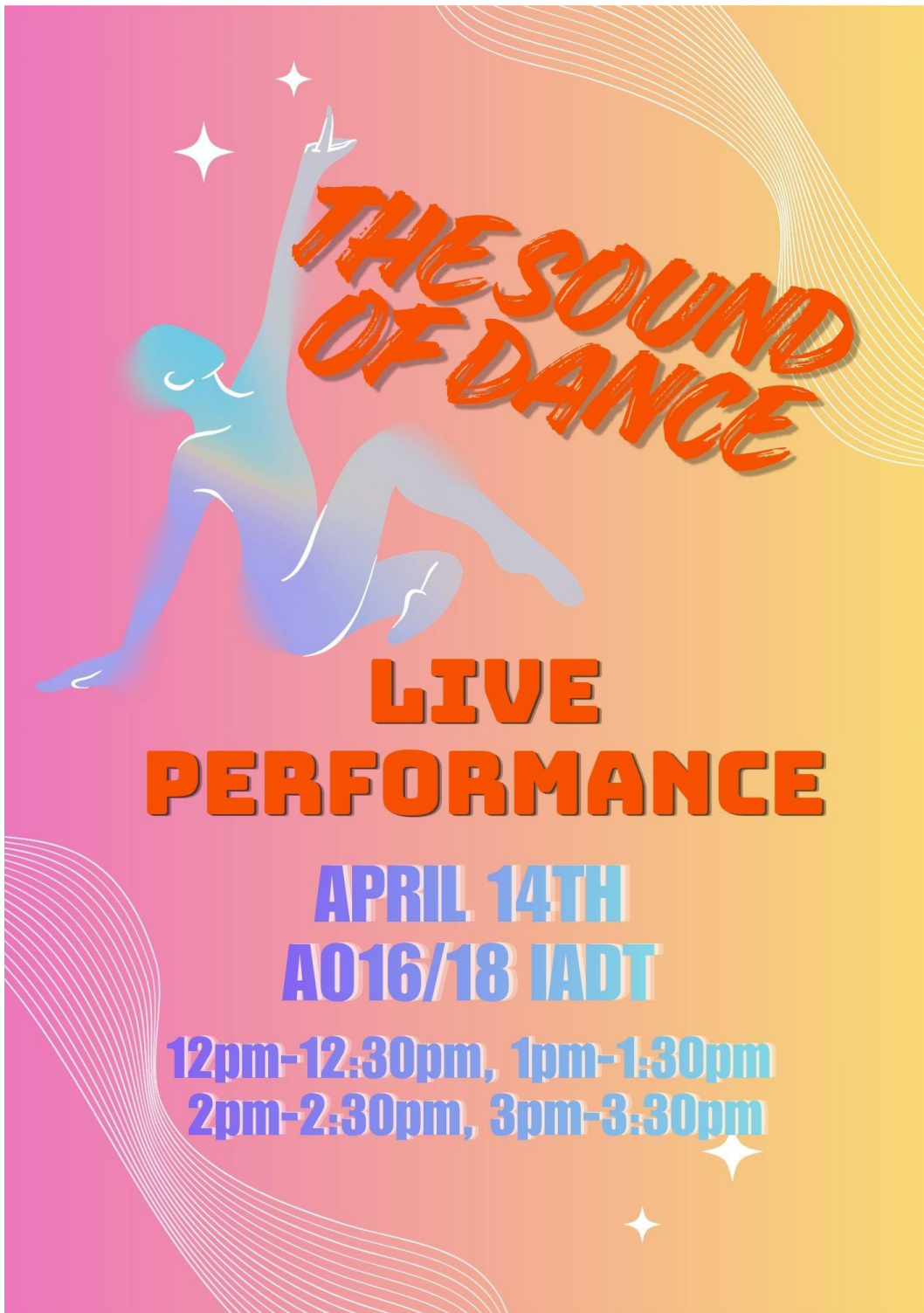
■ Centre triggers last sound

Right hand towards the right: flute dwerk song

Left hand: piano

Appendix C:

Showcase details in infographic/poster



Appendix D:

Survey Questions for the Audience

Questionnaire

Please answer the following, in terms of your viewing and observation of the performance.

3. What did you like/dislike about the music in this performance?

Enter your answer

4. What did you like/dislike about the dance/choreography in this performance?

Enter your answer

5. Perception of the Music and Dance.

Please respond to the following.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The dance/choreography enhanced my enjoyment of the music.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The music enhanced my enjoyment of the dance/choreography.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think that the dance/choreography suited the music well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. What did you notice about the connection between the dancer and the music? e.g. Was the music in sync with the dancer's movements?

Enter your answer

7. Which of these emotions did you feel during the performance? You may choose more than one. *

- Wonder
- Transcendence (ethereal feeling/awe)
- Power
- Tenderness (warmth/affection)
- Nostalgia
- Peacefulness
- Joy
- Sadness
- Tension
- Other

8. The dance and music were created based on a theme/prompt. In your opinion, which of the following best describes the performance the best? *

- Breathe more deeply
- Distorting time
- Water
- Bridges -build, -burn
- Is there something missing?
- Ghost echoes
- Reverse

9. Any other comments?

Enter your answer

Appendix E:

Interview with Dancer

The two watched the performance to get a refresher

Researcher: From that, and from your experiences of choreographing, what was your creative process like?

Dancer: It was definitely a bit of a challenge. It was a concept that I had never dealt with before. Usually when, choreographing... usually with my specific style, you're taking into account, I think, generally, 3 different factors. So, you're looking at the lyrics and the story that the musician is trying to portray. Then, you look at the actual musicality, as in anything that isn't the original melody. Then you also look at textures, so how you can then present the information that you're giving outwardly through your body and dance.

So, usually, what happens is that... The way I kind of think of it, is that the music is X, and I am Y as in I, myself, is the function, and the output is the performance itself. So, now with this project, there was no input. So therefore, usually I'm the person that's doing something, adding something, changing

something, interpreting something. But instead, I kind of had free reign to come up with my own input, which I thought was fascinating. So, I kind of tried to re-imagine or re-engineer my normal creative process, in the sense of the theme being water... Kind of thinking about, honestly, not only pieces that I've seen, that I know have been inspired by water. So, again, trying to grab from what people have done before me. But also, kind of look at what water means, and what it can feel like. If someone was watching it, would they be able to physically join me on that journey of what water can be. You know it can be slow, it can be fast, it can be used as like a weapon of destruction, as well in a sense, if we look at hydraulic action. It can be peaceful; it can be a sign of something falling or something running out. And then with that, because of the connotations that water has, there can be emotions that can be connected to it. Like when we think of water dripping on a tap, maybe it can feel somewhat lonely, maybe even nostalgic in a sense. If we think of a waterfall, we

think of something majestic, something magical. If we think of a river, we think of something scenic and peaceful. So, trying to also incorporate those feelings in a sense through the manifestation of what it would be like to have water as a person. And then, just because I'm a huge nerd, there's also that bit of inspiration from Avatar the last air bender, looking at the water tribe, their movements when they're water bending as well, and how you can kind of bring that... martial art kind of movement into my dancing form as well.

Researcher: Were there any specific dance moves that you were trying to convey as different bodies of water, for the prompt?

Dancer: I think specifically... 'Cause knowing your audience is also very important when you're choreographing, and knowing my audience would consist of people who are dancers and non-dancers, I was kind of tasked with this problem of being true to my creativity and my interpretation, whilst also doing the prompt due diligence in the sense that, someone that doesn't have the

linguistic understanding that comes with dance and the nuances that comes with dance, to also be able to join me on that journey in understanding what those moves might portray, if that makes sense. So, some of them were a lot more on the nose than I would've personally decided to go with. But it was, ultimately, to choreograph to the prompt of water. And knowing that my audience would consist of those two categories of people, I had to make sure to include those elements. There's even a moment where I go like this **demonstrate arm waves as a dance move** and that's so obviously waves and like moving and that's literally called a wave in dance, and anyone would be able to figure out like ok, that's something flowy. And even when we start to use those descriptive words, we're like flow, wave, water... And I think that for me, there was a lot of floor work, which doesn't naturally come very intuitive to me to be honest. But I think in the sense that when we think of water, we always think of things coming down, things flowing, things being very grounded. So, I wanted to portray that by staying on

the ground as much as possible, even though, it is not something that really comes to me naturally when I freestyle or move. I was inspired by the general way that the system was set up. There were certain sounds that would be triggered by certain moves that I did. So, I also tried to make sure to incorporate, that with the help of the incredible researcher themselves, to make sure that different sounds would correlate with what would naturally correspond with what I would think, So the **demonstrates – pizzicato arm movements** things like that.

Researcher: What were the easy parts and what were the hard parts while you were choreographing?

Dancer: Honestly, it was all really hard. It was kind of learning a new process or a new paradigm of thinking. And I think the hardest part was being a function with no input, like I was saying. It's kind of like... Like I'm the oven that cooks the cake, but there were actually no ingredients given to me whatsoever, and I never made a cake before in my life... That's the best way I could describe it... As a

dancer, the relationship between dance and music is so intertwined and music often gets a lot of, nowadays anyways, gets a lot of recognition... There's sort of a different layer of understanding and communication that happens with the addition of dancing, and even culturally and historically. There's been a lot of movements, and conversation and dialogue that happens because of dance in the music space. What jumps to mind is African-Americans, the rise of hip-hop, but also, specifically jazz, and how that in of itself was a movement, and how it then became Euro-centric, in the sense that, now when we think of jazz, we think of like... a completely different image to what it originally was... Being a dancer, it's so paramount and crucial that I'm constantly having this dialogue with the musician, and kind of seeing what they were trying to bring forward with their music, whether it's something fun, whether it's something intentional, whether there's a feeling there. It kind of felt like I was talking to myself, which isn't necessarily a bad thing, but it was just... hard to have a

was just... hard to have a conversation with yourself so, ... I was doing a lot of assuming and then, in of itself, I sort of became the musician, in a really strange backwards way, where I was almost choreographing to what I think the music would sound like if I was dancing to music, when I was choreographing. So that was a very complex thing. Because, obviously when you're not a musician, it's really hard to really actualise or, I can imagine... It kind of manifests in a different way in a musician's brain, when they're hearing the music that they would like to produce. But when it's kind of this grey, unfiltered, general muddy cloud in your head, it's really hard to pinpoint, ok when I'm four bars in there's gonna be a **sings** that I wanna hit. You can't really have that when you really don't have that musical background and don't have the language that comes with that kind of musical background.

Researcher: Did your overall performance benefit from the collaboration? And did it hinder your creative process?

Dancer: Are we talking about when I was dancing to the composed piece, or creating music with my choreography?

Researcher: Possibly both.

Dancer: There are 2 different answers. I found it really lucky and fortunate that my choreography fits the composed music as well as it did. I think an element to that is because I had heard the composed music prior to choreographing. Even though I stopped listening to that once I knew that the idea was to choreograph to silence, part of me kind of was able to grab a little bit of that input from the music that I know I would be performing to. So, in that way, I feel like it really enhanced the performance. Cuz even though... there was a struggle because I was choreographing to my own beats that I made up in my head, and you kind of need to tweak some timings and fix some things in order to align to the natural rhythmic composition of the music that was created. So, that was a bit challenging, but ultimately, I feel like it worked really well together. And when you kind of take the dancer's interpretation of water

dancer's interpretation of water and then the musician's interpretation of water and you connect it together. Like having two creative minds work on the same project, only really amplifies the idea of that project. Despite the fact that they could have two different interpretations of the word. Generally, you'll often find, for very broad terms like water, which universally tends to have a very similar understanding across cultures and across the board because it's a physical thing that we all kind of interact with. I think that the overall performance was definitely enhanced because of those kind of general paradigms and mutual understandings that's created, as a result of that universal understanding of water. If it was something more complex and abstract, like childhood, which can be so individualistic. It would kind of be a "too many cooks in the kitchen" problem. But water really worked because like I said, it's so kind of general and everyone could kind of get behind water, and... You'd probably get the same feelings from it.

Now when I'm working with the system itself and it was kind of moving with me, there were a lot of downsides because it's quite unpredictable software. And often times, I would have a general understanding of how the music should sound when the samples were played with me. So I would choreograph around that but obviously certain things won't be triggered at a certain time, so that would then interfere because as a dancer who focuses specifically on musicality and making sure that my body is working one with the sounds that are happening, once I trigger a sound, only then does the rest of the music follow. It's not necessarily I'm just dancing to the motions, and music is overlayed on top. It's very much so, an intertwined working effort between the two, so when you have that sort of disconnect, it gets really confusing for me as a performer. So, in that sense, I felt that there was a hinderance, or a bit of a drawback in the sense of the overall portrayal of the theme and being able to do the theme justice. But then again, water itself is quite

unpredictable. So, again, that kind of goes down to what the audience interpreted it as.

Researcher: From these emotions, (Wonder, Transcendence, Power, Tenderness, Nostalgia, Peacefulness, Joy, Tension and Sadness) what did you want to convey from these ones.

Dancer: I think... peacefulness, power, nostalgia, tension and sadness. Maybe a little bit of wonder. I didn't really think of transcendence much when I was choreographing. A little bit of wonder, I wanna say like 5%. Not much transcendence. Power in elements. Tenderness I suppose, but I would honestly say in my piece, I would see that as a synonym for peacefulness, in my regard. I would think of peacefulness more than tenderness. I wasn't thinking of soft and gentle but more so, tranquillity. And nostalgia for sure. And that kind of ties into wonder, this sort of childlike reminiscent longing feeling. And a little bit of sadness, because with nostalgia, you kind of have a little bit of both, I feel. Nostalgia has to come with a sense

of "oh wow, yeah... That was the way it was." That kind of feeling, and there's always an element of sadness there. And then tension for sure.

Researcher: How do you think the technology could've been improved?

Dancer: I think the software itself needs more training. I think it's... From my understanding, which isn't very much, it's kind of like an open source, open access tool that can be acquired, so therefore, there are generalisations, because it can't be specific. But if this software or if this tool was to develop or to be used in projects like this, either one, a more specific tunable tool needs to be used. OR it needs to be trained more on a wider variety of dancers. Because as far as I'm concerned, more simple movements and gestures, it would probably be quite handy for the likes of like sign language and hand movements. But when you're looking at something really complex. Not to be that guy but, if we were to bring in AI, and see the way that AI tends to replicate dance and movements, and complex

and movements, and complex things such as gymnastics and swimming, anything that's intricately movement heavy, that doesn't come naturally to the human body. It finds a really hard time to really understand and pinpoint what those movements are and how they correlate. And that's what makes these sports really impressive because the average person can't do them. So, when you relate that same logic to other technologies such as motion capture like this, a lot of the time, it will find it hard to be able to really understand what the movement is. And a lot of the times when I was looking back on how the software was working, some data points would be lost along the way. In the sense that, maybe they would think that the left leg is the right leg, or they'd think that because the left leg is behind the right leg, all of a sudden, it doesn't exist anymore. And these sorts of assumptions, that will come naturally to us because we're familiar with how the human body works, technology isn't really there yet. So, building the scope of knowledge and fine

tuning those aspects in order to ensure that the piece itself isn't being lost in translation. Through those databases, I think would definitely improve it.

Researcher: In terms of you dancing to the musician's version and you dancing to the interactive system, what was the big difference that you found there in terms of performing it and possibly the way that you'd hoped that the audience perceived it?

Dancer: The difference is that I approached the composed version very much so more as a choreographed piece. As in, I'm dancing to music that I've choreographed. But the system, piece, definitely, approached more as a freestyle. Because there was nothing that I was working with, so there was a lot more liberties that I could take. If in any given moment I thought that there should be a longer breath here or that I wanted to change something up, I had the freedom to do that. And with that comes a different element... There's a different level of not only liberty being taken by me as a performer, but also then how that

feeling is interpreted. Because I feel that when I'm dancing a choreography, I don't wanna say that I'm a pawn in the general piece, but my function is to take the music, change it up a little bit, and then present that. But when I'm freestyling, that's just me. And it's very raw and it's less so about me conveying a theme or conveying a feeling, or interpreting the music, but rather me putting myself on display, if that makes sense. So not only is it a lot more vulnerable but then again, there is a lot more of me as an individual shining through because it is very much so that people watching just you. And especially if you're in charge of making the music, not only are they looking at you for how you're moving but they're also looking at you to give them auditory clues as well, which was very intimidating as someone who doesn't make music at all. So, if anything, the composed version offered a bit more comfort, in the sense that you could almost hide behind the music as someone who's just kind of a tool for the music, but the system version kind of created an opportunity to be a lot more personal with it I think.

Researcher: Was there a difference with how you wanted to perceive each?

Dancer: I did the same, more or less, choreography for both of them but I think the composed version allowed me to convey the theme more true to how I wanted it to. And I think that was because I had that dialogue, and I was able to have that conversation. Not only just as an individual but as a dancer, being able to converse. Because Art is inherently political, music is political, dance is political. We're constantly having conversations and dialogues and we're constantly trying to say something. Whether it be like "THROW IT BACK GIRL AY AY AY AY AY." That's a conversation that we're having. That's a message that we're putting out. Or if we're saying something more profound, or if we're talking about something as simplistic as water. That's us sort of putting something out into the open for people to interpret and to interact with and form their own opinions on. So with the system version, because of the inconsistencies that I mentioned before, it was harder for me to

really focus on what I wanted to say and it was honestly it was a lot easier for me it get lost in it and just start moving, rather than remembering what I'm actually dancing to. And a lot of the times, if you compare the two videos, when I'm using the system itself, I tend to just start moving, rather than keeping the theme of water in mind. So, it just kind of falls under contemporary, rather contemporary under the theme of water, if that makes sense. Whereas with the composed piece, I was able to not only bring my choreography in but constantly gain cues itself from the music to remind myself of the theme of water, but to then say what is the composer trying to put in and how can I use my choreography to further bring that forward. So again, it's that dialogue that's happening to then present to the audience.

Researcher: There are quotes from the surveys. Many perceived and described your dance as very "elegant", "graceful" and "flowy." Would you agree that they were exactly what you wanted to perceive?

Dancer: Flowy, for sure. Yeah, I think I would use those as synonyms. When I think of elegant, graceful and flowy, I think of a swan. And swans tend to be in water, and I feel like, when I first came into the space and the stage that I was working with, it did sort of feel like a cage. Not in a derogatory way, but if you think of... you know the story for the swans?

Researcher: The Children of Lír?

Dancer: yes, and how they were kind of cursed to be swans and kind of trapped in that space, or even swan lake. And that idea, I think of when we think of swans and performance and dance we kind of have those things in mind, so I think subconsciously, hearing those words, I had that in mind with my performance, maybe not so much in my choreography, but my facial expressions and how I was feeling, so, I think without thinking, I brought forward those stories as a swan trapped in a lake or a body of water. So, I guess that would be accurate.

Researcher: Overall, how was your experience?

Dancer: It was honestly very cool. As someone who I wanna say, my basis is in freestyle. That's where I've cultivated my love for dance, it is where I've found my footing in the community, it's definitely been lost as of recently because of all the choreography projects that I've had to take on, not even just that, a lot of the performance projects that I've been taking on recently, this project gave me an opportunity to not only tap in to that really fundamental aspect that has formed the foundation of not only my style, but also my entire experience with dance... Essentially, it was a very sort of refreshing experience and rewarding experience. And it had its challenges, but it's those challenges that sort of create a space for creativity which I feel like I haven't had the opportunity to really indulge in as of recently, because I'm often restricted to the confines of the dancers that I'm working with, or the theme of the project, or the mood that needs to be cultivated as a result of the music, so being told "hey, here's a theme, how do you interpret that?"

That was very freeing and liberating, in a way that I didn't really see until I got in the flow of actually creating the piece. It kind of felt like telling an artist to create an abstract piece surrounded by water, without giving them anything to go off of and just seeing what they paint. It gave me a fresh perspective of about how dance could potentially be approached in a way that I didn't think was possible before, so I'm very grateful for that opportunity.

Researcher: One last question, do you think that the technology enabled that uniqueness of how you created the choreography, and do you think it could've been created in a different way?

Dancer: I definitely don't think the technology enabled me to do anything.

Researcher: That's so fair.

Dancer: Especially since the choreography was created without the use of technology. It wasn't as if I was choreographing while the technology was running and I was seeing like "oh ok, I like that sound, I'm gonna stick with this," it was genuinely made quote unquote, in

silence. If anything, needing to incorporate certain moves because music had to be made, if anything constricted the creative process as a whole. I think it's a good concept and I think that this technology could definitely be fruitful in this research space of dance and music, if the aforementioned, the improvements were made. I think another way of that I would be interested in seeing this would be a similar assignment to what I feel like what you guys did in the past in the sense of seeing a piece in silence and then making music on top of it and then comparing that to a composed piece and the dancer doing the same thing to that composed piece. I think that would be a really interesting comparison. But I really think it definitely has potential to suggest a lot more implications about dance and music and their collaboration and relationship. It's just that the technology even though readily available, just wasn't the best. It definitely hindered my creativity, but it has possibility to be like really cool future research.

Appendix F:
Reflective Journal from Musician/Researcher

MUSIC COMPOSITION REFLECTION

1. How did you interpret the prompt into music?
2. How did specific musical elements represent the prompt?
3. Explain your creative process when creating your piece.
4. What were the easy parts of creating your piece?
5. What were the hard parts of creating your piece?
6. What emotions, if any, did you want to convey during your piece?

Choose from the following:

- a. Wonder
- b. Transcendence
- c. Power
- d. Tenderness
- e. Nostalgia
- f. Peacefulness
- g. Joy
- h. Sadness
- i. Tension
- j. Other

For water, I interpreted the prompt at face value, trying to replicate different bodies of water into music. I wanted to use classical instruments, as well as composing in the programme music style, which is essentially showing imagery through music. I took a lot of inspiration from Vltava by Bedrich Smetana, a romantic era composer. This piece was about the river that flowed through his home country, the Czech Republic, at the time, known as Czechia. But the different elements in his composition (instrumentation + imagery) heavily influenced the composition that I made. Swan Lake by Tchaikovsky has also inspired this composition.

The imagery that I came up with for this composition was the following: Water drops from the sky/from the condensation from under a bridge. The rate at which they drop is slow, but when it increases, the water drops accumulate to form a river, which flows fast. The water flows to the edge of a cliff, and the river

falls, forming a waterfall. The waterfall flows into a peaceful lake.

In terms of specific musical elements representing water, the pizzicato strings and the rimshot perc replicated the water drops. The tremolo strings represented the shimmering of water. The rushing passage of the violins and the flute represent the fast, flowing movement of the river. The dissonant and descending piano chords represent the tension from the waterfall. The calmness of the flute melody at the end of the piece replicated the scene of the lake, being peaceful and still.

In terms of the emotions that I wanted to convey, in chronological order, the first emotion would be wonder, since to me, the water droplets represent the uncertainty that comes with how water is as an object and changing state of matter. The next emotion I wanted to convey in the piece was joy. The flute and violin rushing melodies switched between the major mode and the Lydian mode, which both represent a brighter sound, uplifting the mood. The next emotion would

be tension, when the waterfalls to its depths. Then, the last emotion would be peacefulness and a bit of nostalgia. There is serenity with the flute melody. The piece also modulates to the Sub-dominant, E flat major, which brings down the liveliness of the mood. The piece finishes on the relative minor of E flat, C minor chord, which brings the piece to a tense ending.

I think the hard part of composing was trying to adhere to the prompt at first. It was hard for me to figure out what direction I wanted to take the composition; more expressionism type of music, or more experimentative. At the same time, I had to realise that I was composing something that should be danceable. As well as knowing the dancer's style of choreography and freestyle dance, it was hard to see how the dancer could create a choreography to my music. But it worked out in the end.

The easy part, in my case, was choosing the instrumentation for the composition. Especially with my style and influences from classical music, it was easy to see

what genre direction I wanted to compose in.

Overall, I think I did a nice job at interpreting the prompt. It would be up to the audience whether they would perceive the same things that I wanted to convey.

Appendix G1: Survey Responses from Musician's Version

What did you like/dislike about the music in this performance?	What did you like/dislike about the dance/choreography in this performance?	Perception of the Music and Dance..The dance/choreography enhanced my enjoyment of the	Perception of the Music and Dance..The music enhanced my enjoyment of the dance/choreography.	Perception of the Music and Dance..I think that the dance/choreography suited the music well.	What did you notice about the connection between the dancer and the music? e.g. Was the music in sync	Which of these emotions did you feel during the performance? You may choose more than one.	The dance and music were created based on a theme/prompt. In your opinion, which of the following best	Any other comments?
The music was very peaceful and calm	The dance was very romantic	Agree	Strongly Agree	Strongly Agree	Every dance the dancer made was in sync with the music	Joy;Tension;Peacefulness;Power;Wonder;	Bridges -build, -burn	No other comments
I liked the atmosphere, as well as the emotions in which the dancing and music gave me.	I liked the baggy clothes and how smooth each transition to each different dance move was	Strongly Agree	Strongly Agree	Strongly Agree	The music synced perfectly, making for a very satisfying performance.	Peacefulness;Wonder;	Distorting time	
I liked the plucked strings, I enjoyed the time of them and how delicate they felt.	I enjoyed the correlation between the dancing and the music, how the dancers moves felt in line with what I was hearing.	Strongly Agree	Strongly Agree	Strongly Agree	I thought the music was in sync with the moves, like the foot movements I felt were in sync	Tenderness (warmth/affection);Peacefulness;	Reverse	No
I liked the percussive elements of the music and I think it paired well with the dance movements. The MIDI instruments really took me out of being immersed in the performance	The choreography was really good and Jay was really mesmerising to watch	Agree	Disagree	Agree	The music was in sync with the dancers movements and it was great seeing in the bigger sections of the music the dancer did bigger more dramatic movements	Transcendence (ethereal feeling/awe);Wonder;	Water	Well done Clara and Jay!!!
The music sounded good. Made the experience immersive	The dance complemented the music well	Agree	Strongly Agree	Agree	Yes the music was in sync throughout the performance	Transcendence (ethereal feeling/awe);Joy;	Ghost echoes	The piece was very well done!
I liked its wonder-like tone.	I liked how it flowed quite neatly with the music. There were some moves that felt a bit quite out place or didn't match the tone, but the overall vision was nice.	Strongly Agree	Agree	Agree	Most of the time it felt in sync, some bits felt a bit off beat, or the move would do the opposite the music would prompt you to do, but overall it was well connected.	Peacefulness;Wonder;	Water	
I thought the body tracking was very cool	It was very calming	Strongly Agree	Agree	Agree	Idk haha	Peacefulness;Tenderness (warmth/affection);	Ghost echoes	
Very well choice of music made		Agree	Agree	Agree	In some moments yes but it others no	Wonder;	Distorting time	
Very relaxing and calm	Was quite elegant	Agree	Agree	Strongly Agree	Yes	Peacefulness;	Breathe more deeply	
It was very naturalistic and since it was instrumental it allows you to focus on the dancer more	I liked that I showed a lot of emotion and fit well with the music playing	Strongly Agree	Agree	Strongly Agree	It's was definitely in sync	Joy;	Water	
-	Rhythm and choreography in general	Agree	Agree	Strongly Agree	It definitely was sync with the dancer	Peacefulness;	Distorting time	-
I like the composition and how it gradually developed. each instrument and melody worked well w each other	the genre style matched the vibe of music which kept me engaged throughout the performance	Agree	Agree	Agree	yes, the dancer was in sync w the music. i noticed that certain moves synced up with instruments like the pizzicato violin during the piece	Wonder;Transcendence (ethereal feeling/awe);	Breathe more deeply	

Appendix G2: Survey Responses from Dancer's Version

What did you like/dislike about the music in this performance?	What did you like/dislike about the dance/choreography in this performance?	Perception of the Music and Dance..The dance/choreography enhanced my enjoyment of the music.	Perception of the Music and Dance..The music enhanced my enjoyment of the dance/choreography.	Perception of the Music and Dance..I think that the dance/choreography suited the music well.	What did you notice about the connection between the dancer and the music? e.g. Was the music in sync or not in sync with the dance?	Which of these emotions did you feel during the performance? You may choose more than one.	The dance and music were created based on a theme/prompt. In your opinion, which of the following best describes the	Any other comments?
I enjoyed how it moved with the dancing	I enjoyed the hand movements. Very graceful	Strongly Agree	Strongly Agree	Agree	I think there was a slight delay in the movements being registered but I dont think it took away from the Performance	Joy	Water	No<3
I really liked the combination of different instruments, like strings and the unique percussion noises. I also liked that there were some silent parts, it worked well with the dance	I liked that the dance had a lot of unique styles to it, and it seemed to convey a lot of different emotions, it didn't feel like a dance about just one thing	Strongly Agree	Strongly Agree	Strongly Agree	I found the dance was definitely in sync with the music, and they both flowed really nicely together	Wonder, transcendence and peacefulness	Breathe more deeply	I really enjoyed the experience!! It's was really cool :)
I felt the music fit the tone of the dance very well, and that they felt informed by the dancers moves	I liked the lyrical style, I felt it was well choreographed	Strongly Agree	Strongly Agree	Agree	the music was in sync and fit the style of the dance	Peacefulness	Breathe more deeply	
Like - it was unique and complemented the contemporary dance style Disliked - The beats were often quite far dispersed meaning the music was hard to follow.	Liked - it was fluid Disliked - it was often quite repetitive	Agree	Agree	Agree	The music was in sync and followed the tempo perfectly	Wonder	Water	
The music was a little hard to hear but I am deaf and not wearing my hearing aids so that's my bad. I really liked the music it was very evocative and I didn't dislike anything	I LOVED the performer she's such a talented dancer. It was also very engaging	Strongly Agree	Strongly Agree	Agree	It was in sync for most bits but I felt that some bits weren't in sync.	Transcendence (ethereal feeling/awe)	Water	YAYYYYY CIARA CONGARTS ON YOUR PORJECT ❤️❤️❤️
it was interesting to figure out what makes exact sound. Nothing I really disliked	I liked how elegant it was. I also like how sometimes it goes fast in walking around way	Neutral	Agree	Agree	I would say a bit out of sync, maybe it's just because it was hard to figure out what movement does what sound.	Transcendence (ethereal feeling/awe)	Water	it gave me "Shape of Water" film vibes

I like when the kind of swarming synth/strings were triggered in. I think it could have been nice if it felt like some of the music was more emotionally tied to some of the dance moves. Although I don't know what the theme/intention was. I also liked when she was circling around that seemed to be when the most musical elements were triggered	I thought the choreography was really great. I don't know much about dance but there were a lot of elegant movements between standing, spinning crouching down. I didn't dislike anything	Strongly Agree	Agree	Agree	I found the music was quite in sync with the dancer. I think they maybe could have felt like more of an emotional connection between some of the build up of some moves and how the musical composition progressed.	Tenderness (warmth/affection)	Water	Some of the moves reminded me of water bending in avatar so I felt that fitting
Liked the dynamic in strings	Liked the big motion and movement?	Agree	Strongly Agree	Agree	It is kinda sync but I can see that dancing is trying to show about the powerful expression but the music has more speedy movement	Power	Breathe more deeply	
There was some nice interaction between the music and performance, and I like the idea of the body controlling the instruments	It was performed really well, but I am not a fan of interpretive dance	Neutral	Strongly Agree	Strongly Agree	I found the music was pretty in sync with the performance, with only slight issues at the beginning	Peacefulness	Ghost echoes	
The movements felt cohesive with the music. It added emotion to the movements	Each movement flowed beautifully into the next. There was great control and lightness in the performance	Strongly Agree	Strongly Agree	Strongly Agree	It felt very cohesive	Transcendence (ethereal feeling/awe)	Breathe more deeply	
It was quite ethereal. I was reminded of water	Jay moved like water. Very smooth and flowy	Agree	Strongly Agree	Agree	They were not fully in sync but that type of dance and music genre were clearly not made for synchronization. The freeform tempo allowed for Jay to put more feeling and interpretation into the choreo. She could've been free-styling and we wouldn't know.	Transcendence (ethereal feeling/awe)	Water	
It was to emotional for me, I think I find it hard to find that level of emotion in movement	I liked watching how the performers shadow mived along the wall and the sound of loose fabric fluttering Didn't like the fashion of movement used by the dancer, this method of slower more delicate dance looses me after a while	Agree	Disagree	Neutral	It was half and half. Sometimes matching and sometimes not. The dancer also took some pauses between movements	Sadness	Ghost echoes	

<p>The music was almost eery but beautiful in a way and flowed with the movements of the dancer. It was almost a storyteller type of music where the background helped you immerse into the performance.</p>	<p>The dance was really elegant and beautiful to watch, minimal music but focused on the dance itself. It felt really captivating and hard to take your eyes off. The shadow created by the light had a secondary dancer effect which I felt was a cool detail although I don't know if it was intentional. The moves and steps were flowing together and connected to the next part of the performance.</p>	<p>Strongly Agree</p>	<p>Strongly Agree</p>	<p>Strongly Agree</p>	<p>The music was in sync at some parts but the first notice was the parts of the music that did not sync with the dancers steps but it felt intentional and part of the performance and helped the enjoyment of the dance.</p>	<p>Transendence (ethereal feeling/awe)</p>	<p>Distorting time</p>
<p>I liked the violin?extracts and how playful the overall music was</p>	<p>I liked that a lot of space was used and the movements were well articulated and graceful.</p>	<p>Agree</p>	<p>Agree</p>	<p>Disagree</p>	<p>The music did not really seem to be that in sync with dancer, in some parts yes but in other I feel like the choreography was more relaxed but the music was more playful and upbeat.</p>	<p>Tension</p>	<p>Is there something missing?</p>
<p>I liked the overall profile of the music sonically, I think the strings and the orchestral vibe really suited the dancers movement quality.</p>	<p>I overall liked the performance and choreography it was spacious and used levels and textures very well to compliment the soundscape.</p>	<p>Strongly Disagree</p>	<p>Strongly Disagree</p>	<p>Strongly Disagree</p>	<p>I noticed certain levels and joints used by the dancers activated different instruments, there were certain moments where there was silence when there was movement but overall it was demonstrated very well.</p>	<p>Wonder</p>	<p>Ghost echoes IT ATE PERIOD!</p>

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