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"The machine that rocks the cradle, rocks the world"

In this assignment I am going to be explaining and assessing how I think that music technology can be used safely in live applications and performances. I am going to be doing this by giving detailed and descriptive examples. For the second part of the assignment I will be describing and arguing what music technology actually is and what electro acoustic music is.

Also within the essay, I will discuss the increasing use of computers and technology in the live environment. The computer has become an indispensable tool in ensuring that both recording and playback sound quality is kept at the maximum possible level. Many positive ideas have come from the computerisation of recording studios and live performances. For example, music is becoming more widely available to the general public with the introduction of mp3 players and the growth of the online music industry and as for in performance people are yet using computers to generate live midi and video footage, also stabs and midi triggering. The essay will be concluded with my personal feelings towards the use of electronic technology within the live music industry, as well as the recording studio environment. My conclusion will reveal that while the use of electronic technology has become crucial in the modern music market and should not downgrade the quality of the live music produced. In this way, I feel that the use of electronic technology, mainly drum machines and computerised backing tracks, have actually had a negative effect on the live music industry, because the majority of artists within the music industry now use computer-generated electronic backing for live performances.

So Firstly I personally think that when you are going to be using music technology in a live situation you should at least assess the area to make sure it is safe and un-hazardous this could be done as part of a risk assessment at the get in of a venue. What is a risk assessment? A risk assessment is the identification and quantification of the risk resulting from a specific use or occurrence of equipment, taking into account the possible effects on individual people or society of using that particular equipment or object in the way and manner proposed and avoiding any type of injury to both performers, staff and the audience of that particular venue. A risk assessment would out line all the hazards of a venue then explain the action which is going to be taken to avoid or prevent something from happening or how to solve the matter if it does. Linking to using music technology safely I think that carrying out a risk assessment would be a good idea because it assesses and overviews the equipment that is going to be used and if it is at all dangerous and the ways to prevent accidents. Music technology requires the use of electricity so I think that all cables should be made as safe as possible and that great care is taken when performing bearing in mind you do not fall over them. Because electronic music uses electricity it is also a very good idea not to use water based substances or any liquids near the equipment because if spilt on the equipment then is either going to cause damage to that or yourself and is putting the public at risk due to the big risk of electric shock.
When using music technology in a live situation because electric can cause fire if over loaded it is a legal precaution that Fire Safety and Emergency Procedures are known and

are in place for example a clear fire Escape, Fire Fighting Equipment, Means for giving warning to the audience staff and performers.
To use any form of electrical equipment in a public place it is a legal requirement to be pat tested to make sure that the equipment is okay to use and that you are not in danger by using the electrical goods. A pat test is carried out by an electrician or those trained too and makes sure the wires are connected properly and that there isn't an earthing problem which could result in killing somebody if was give an electric shock.
In the live performance area it is known for people to get electric shocks. Electric shocks can however kill. This can be caused by an electrical item which a cable might get damaged in result of exposing bare live wires. Also that the electrical products could be wrongly wired meaning that that outside parts become live. These are particular ways in which you can get injured via electric with in the music industry, but also if you are holding a microphone tightly or an instrument you may not be able to let go if that particular thing becomes electrified.
To prevent electrical shock or dangers of being injured you should get someone to inspect, maintain and repair all of your electrical equipment by someone who is qualified and experienced such as an electrician. If you are using someone else's equipment you should not rely on there equipment being electrically safe and being in good condition. In a live situation you should however always use a residual current device, an RCD. You should use these for instruments, audio equipment or anything that is handled by a human whilst in use. An RCD is also known as an earth leakage circuit breaker. This is an electrical instrument which when connected to the electricity supply can detect a very small leakage of current to earth. When detected the RCD will switch off the electricity automatically but the person who came into contact with the equipment may suffer a minor electric shock but should have no long lasting effect. It is however important that you keep your equipment in good condition, if the RCD trips it is a sign that there is trouble, you should here by get the fault checked out and repaired by a qualified electrician. You should NEVER however bypass an RCD so that you can carry on using the equipment which maybe faulty.
Sometimes it may be necessary to site a mixing desk away from amplifiers by using a multi-core. Microphones, di boxes ECT may have there own power supplies which are non phantom powered. It is preferred that all the different parts of a sound system are powered from the same phase of the electricity supply. If not, the phase to phase voltages present could increase the risk of fire or electric shock.
High powered electrical equipment can get very hot and the ventilation around them should not be blocked for example by stacking other equipment on or near them. Most high powered equipment are fitted with thermal protection cut out devices which is a precaution against overheating an reducing the risk of a fire. It would however shut the system down and would not look very professional half way through a performance.

You should not lift any heavy equipment what so ever because you are liable to causing your self an injury such as back problems or if you drop it, injury to your feet ECT. To prevent this you should use appropriate lifting equipment such as a fork lift or trolley or even get a hand from other people. A first aider is essential and a must at a performance and the HSE would require someone to be qualified and trained incase of an accident or

emergency. All of these points and risks should be covered in a risk assessment for the whole of the performance.

At the very early stage of electronic/digital music there was a Russian born in 1896 called Leon Theremin. Leon Theremin, who moved to the United States in 1927, produced the Theremin synthesiser, which was widely used in cinema in the 1940s and 50s. The Beach Boys actually also used the Theremin on one of their tracks Good Vibrations in the 1960s.

The Theremin however is one of the earliest fully electronic musical instruments. It is unique in that it was the first musical instrument designed to be played without being touched. It consists of two radio frequency oscillators and two metal antennae's. The electric signals from the Theremin are then amplified and sent to a loudspeaker. This is however one of the earliest forms of music technology and this was in the 19th century. To play the Theremin, the musician had to move his or her hands around the two metal antennae's, which control the instrument's frequency also known as pitch and amplitude which is also known as volume. The Theremin is widely associated with surreal, and funny sounding glissando, tremolo, and vibrato sounds, due to its use in film soundtracks such as Spellbound, The Lost Weekend, and The Day the Earth Stood Still. The Theremin is also used in music referring back to the Beach Boys.

Another very big instrument which is the base of electronic music and music technology is the synthesiser. The theory of the synthesiser has its roots firmly buried in the physics of sound waves and how they can be manipulated. Synthesisers manipulate timbre which is the tone color, or quality of tone, of a particular sound. Different instruments playing a note at the same pitch have different sound qualities, and it is the timbre that enables the listener to distinguish the sound of, for example, a trumpet from that of a violin. The tone quality of a sound depends on several things, including its waveform, the strength of its harmonics, and its attack and decay the 'shape' of the sound. By applying the envelopes and various voltage-controlled oscillators. Timbre refers to the characteristics that make up a sound. Each instrument has its own timbre, i.e. its own sound characteristic. If you play the same note on a bass guitar and a cello, the sounds will be different. The overall note will be the same, but the parts that make up the sound will be different. The four simple waveforms and their sounds which are called envelopes. Envelopes are profiles of sound attack, sustain, delay and decay) can be applied to a sound wave. Envelopes modify the amplitude which is the amount of air particles that are disturbed by sound waves at a given time of the sound. If a 'piano' envelope is applied to a sound wave, the wave will slowly decrease in amplitude which is widely known as volume until there is no sound left. An 'organ' envelope will have no fading at all for example the sound wave will start and finish suddenly. Envelopes can be applied to any type of wave, and exist only in theory.

Most synthesisers work on the theory of voltage control. The Voltage Controlled Oscillator which however is also known as VCO, this produces a pitch that is proportional to the voltage supplied to it. Most synthesiser manufacturers have settled on a one volt per octave scale, where the voltage through the oscillator needs to be raised by one volt in order for the sound produced to rise by one octave. On some synthesisers, the

VCO carries a waveform selector, but the Voltage Controlled Filter which is known as VCF usually does this job. After the sound is created by the VCO, it is sent to the VCF. The VCF gives the sound character. For example, resonance (which is the ringing sound of the note) can be applied and manipulated. In a synthesiser, the most common type of filter is a low pass filter. This blocks low frequency sounds, depending on it's setting on the synthesiser's control panel. The envelope of the sound wave can also be set. On most synthesisers, this is done using the combination of Attack, Decay, Sustain and Release envelope controls. The Attack control sets the time taken for the sound wave to reach its maximum amplitude. The Decay is the rate that the note 'falls back', having reached its peak. The sound then continues to fall back until it reaches the level set by the Sustain control. The Release control sets the rate that the note falls back to its original position.

The final stage in the synthesiser is the Voltage Controlled Amplifier also known as VCA. This simply increases the amplitude of the sound in proportion to the voltage applied to it. The VCA is usually a circuit inside the synthesiser with no physical controls, but some units give a gain control. This is used to change the voltage that is fed into the VCA circuit, therefore giving control over the final volume of the overall sound.

The use of the synthesiser can be seen in many popular songs such as bohemian rhapsody, many various queen songs too now the well known pop artists also to rock and sometimes jazz and nu-jazz.

Personally I think that Using music technology in live applications can be widely spread because just about every performer in some way shape or form uses music technology whether they know it or not. For instance if a vocalist was to perform live to a backing track. The backing track has been pre recorded and needs to be played via a player which could be one of many things ranging from laptops, mini disks, cd's, tapes, vinyl, mp3 players, phones. Then these devices would have to be amplified to an extent so that the audience can hear both the performer and backing track. Although if someone is an acoustic performer they would not use music technology as such but would be amplified. I think that this is still music technology because the music they are producing live is acoustic but when they have to play it to an audience of thousands they are not going to be able to hear an acoustic guitar or a vocalist so in some respect all and any type of music when performance is required uses music technology whether something runs through a pa system or their instruments are music technology based for example a keyboard is music technology because it is electronic and you can play more than one instrument using the keys and changing the instrument sound. Also quite a few people use electronic drum machines or samplers. I personally think that anything that needs to be amplified electronically or needs to be put through an electronic device to make it work simultaneously is music technology in performance. However my personal opinion on what music technology is that it is anything in which a process to make music is undertaken by using a piece pf software or hardware electronically to make a sound, sample or piece of music to be used in the live situation. Electronic how ever I think is anything that has to be amplified in this instance would be amplified using a pa system or an amplifier. Regarding music technology I think that computer generated software such as reason or logic is music technology because it is using the computer as hardware to create music electronically either using samples, sounds or virtual instruments which can be played in via an outboard midi controller or keyboard.

What is electronic acoustic music, once again I personally think that this is something which meaning it has to be amplified when playing in front of an audience for example an electric guitar isn't acoustic because it has already been through so many processes electronically to get the final sound for example, it goes through the pick ups, down the jack lead, into the amp, through effects units, through an amplifier and comes out as an electronic manufactured sound. However you can argue this point because of electric acoustic guitars, the guitar will be electronic however until it is amplified or put through electronic equipment.

A drum kit is fully acoustic because it doesn't have any type of amplifier or electronic product to enable it to be heard or played. But when it comes to the live environment a drum kit will be amplified compressed, effected and limited. This is done by microphones so if the drum kit is being played whilst going through this process the sound of the drums are no longer natural or acoustic because they are amplified and have gone through so many processes and processors to get the overall final sound. Some people however could argue this because if you didn't effect the drum kit in anyway but just amplified it, it still wouldn't be electro acoustic music but it is because it is still going through the process of being amplified and the pickup of the drum sounds wouldn't be close to what you would hear if you heard the drums by themselves it would be electronic sounding.

Electronic I think is anything that needs an electronic source to be either used or heard. Acoustic is where you do not need any form of electricity for that particular instrument to be played or heard. So electronic acoustic personally, I think means that it is instruments that are being played acoustically because they are acoustic and do no need electricity to be played, but when it comes to the live situation when they are being used to play to a live audience they would need to be electronically "boosted" in other words put through a string or processes which include, being microphone'd, converting the audio signal by using effects and equalisers and then finally being amplified to be played back through the front of house monitor system in which the audience will be able to hear the acoustic instrument that is being played on stage. I think that music technology in performance is using all these processes and types of ways to create music such as using computer generated software or virtual instrument plug-ins, music technology could also be classed as using hardware or the use of an electronic instrument such as a keyboard, synthesiser electronic drum kit. These are usually types of musical technology used so for the performance it is all those processes or instruments being played in front of an audience. To me I think that computer generated music is music that is composed by or using the computer to create music. I think that computer generated music is generally used to mean that the kind of music created on a computer can not be created with out. I personally think this because you can't use the sounds of the sea in a song by micing the sea up live. It would be generated on a computer using software such as reason to effect the patches with different kinds of processes to an extent that the sea would sound real. However the world's first digital computer music was generated in Australia by a programmer called Geoff Hill on the CSIRAC computer which was designed and built by Trevor Pearcey and Maston Beard. Subsequently, one of the first composers to write

music with a computer was Iannis Xenakis. He wrote programs in the FORTRAN language that generated numeric data that then could be transcribed into scores to be played by traditional musical instruments. This is done today by using midi and audio programs dedicated to song writing and instrument scoring which are programs as Sibelius and logic. Also I think that it is a lot easier to generate music using a computer because if any mistakes are made they can be rectified much easier even if you are not a musician. That's another advantage of using computer generated music; you do not have to be a musician to create music. You don't even have to be able to play an instrument. So using computer generated music in a performance could be for those who can not play anything but sing and or that they do not have the equipment or facilities to produce the real sounding instruments. Also that you may not be able to create some of the sound effects used in a particular song or the loops. Now days computer generated music in a live performance is used by so many artists or performers because it is easier to get a band to play or it is physically too hard or complicated for a band to play it. Pop singers have always used music technology to perform live because they can not sing in tune; they would often use a pitch shifter or key corrector to make sure that they are singing in the right key. Also that because it is pop they have very poppy electronic drums and the backing track is always pre recorded or composed using computer generated software.