Hip Hop, Technology, and Innovation

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Hip Hop is a cultural movement that emerged from the Bronx during the 1970s due to the isolation of this neighborhood from the rest of New York City by a newly built highway system. Although the African-Americans and Puerto Ricans of this community lived in poverty and hardship, they created a beautiful culture consisting of four main elements of MCing, DJing, graffiti art, and break-dancing that displayed their resistance to the oppressive society around them. Due to its dynamic nature, hip hop continually evolves through individuals' experimentation with different methods of expression. The music of hip hop, which is known for its strong beats and rhythms, is similarly the result of creative experimentation with live and electric sounds. While Hip Hop has not yet led directly to advancements and innovations in the technologies of music engineering equipment, its producers have revolutionized the use of the technology in ways that incorporate priorities of black culture.

Within the realm of DJing, a good turntablist knows how to get the crowd hyped and moving with the music he spins. Female MC Ciara, not only rhymes that the beat in her 2004 hit song, "*1, 2 Step*" is superior, she also indirectly describes what constitutes a good beat and how it takes physical control of the listener:

This Beat Is
Automatic, supersonic, hypnotic, funky fresh
Work my body, so melodic, this beat rolls right through my chest
Everybody, ma and papi, came to party
Grab somebody, work ya body, work ya body
Let me see you 1, 2 step
...
This Beat Is
Outrageous, so contagious, make you crave it
Jazze made it
So retarded, top charted, ever since the day I started
(Ciara)

"1, 2 Step's" beat, made by rap producer DJ Jazze, has the ability to hypnotize listeners with inaudible sound frequencies that are received and absorbed by the body--resulting

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in automatic dancing and movement. DJ Eshun believes the body's reaction results from the idea that "the body is a large brain that thinks and feels a sensational mathematics throughout the enter surface of its distributed mind" (Eshun 22). This progression and transfer of energy from the beat to the body underlies the power of the sounds of hip hop music, and appropriately serves as the audio backdrop for both MCing and breakdancing. To provide contrast, consider classical Western music which is centered on a pleasant melody and harmony. Hip Hop, on the other hand, is supported by "rhythmic and percussive density and organization" (Rose 65). This emphasis on rhythm is closely linked to historical practices in Africa and Diaspora regions where the source of this rhythm was the drum. In villages and cities across Africa, music was not solely for entertainment. Babatunde Olatunju, a Nigerian singer, recalls, "Drumming was going on in my village every day. When someone passed into the spirit world we celebrated with songs and drums and chants, or when a baby was born or a young man or woman went through a rite of passage like getting married" (Goldman 26). The drum has so much power that under slavery, its use was banned in America in 1692 because slave owners feared the communication that was taking place between the slaves through drumming patterns. Fundamental to ancient African science, the drum stirred listeners into a sacred frenzy that connected the everyday and the spirit world, particularly in Cuba and Haiti. From these historical examples, it is clear that the drum and the sounds that it creates have great significance and an "invisible control" with the power to move the human body. Over the centuries, as slaves from Africa and the Diaspora became part of America, they gradually and continually altered Western arts with traditional practices from their own respective cultures. Black music has evolved from Gospel, Jazz, Blues, Rock & Roll, Funk, and Soul into the popular genre

Hip Hop, which is the result of the continual incorporation of the musical styles of the past. Nevertheless, tracing back through history allows one to understand the present status of any art form, and the importance of the drum in African countries reveals why rhythm and beat reside so heavily in hip hop music.

Although the drum beat is the backbone of Hip Hop music, it has morphed into an electronic representation through the use of music engineering technology. Combined with the repetition and layering of sampled sounds and beats, with critical features of volume, density, and quality of low-sound frequencies, the hip hop sound is quite distinct from other popular music genres before it. This phenomenon can be linked to the idea that suggests that a musical convention is influenced by the social formations and technologies of its age (Rose 70). Upon exploring the music technology available during the emergence of Hip Hop, it is apparent that the new equipment played a large role in developing the conventions of this genre. Thus, becoming familiar with the functions of vital tools of a producer or DJ helps crystallize the relationship between hip hop musical standards and technology.

Several technologies have become symbolic of producing hip hop's famous sound and include the turntable, synthesizer, drum machine, and sampler. These four pieces of equipment were the result of advancements made on the 1877 invention of the first sound recording and playback device, the phonograph. The phonograph is simply a record player, and is known to DJs as a turntable (Phonograph-Wikipedia). The turntable is the device where the infusion of electronic technology made its first entrance into hip hop. While this device was commonly used for playing vinyl records through the 1980s, the recording and playback of sound using a magnetic medium passing over electromagnetic heads was first conceived of in the late 1880s.

Commercial models of these tape recorders began to emerge at the end of the 1920s. In 1949, stereo recording and the cut-and-splice method of tape editing surfaced, and by the middle of the 1950s sound on sound dubbing had evolved and the first multitrack recorders began to appear (Shapiro 191). During the 1960's, artists began to use multitrack recording extensively, and soon virtually all popular music was recorded in this way.

The technology continued to develop rapidly during this time, allowing artists to create music of an unprecedented layered complexity (Multitrack-Wikipedia). Now the recording studio existed in more or less its present-day form, and tape editing had become accepted as part of the creative process of popular music and jazz, setting the stage for other mutative studio music to come. In 1970, however, the groundbreaking invention of the synthesizer, a portable keyboard triggered device that simulated instrument sounds, changed the world of popular music incredibly. One or more voltage-controlled oscillators, filters, amplifiers; controlled by the player through a collection of switches and buttons produced "lush, fat, harmonically rich, and curiously organic" sounds (Shapiro 191). Memory units allowed players to save their sound discoveries for later use. Specialized instruments like analog drum machines also developed alongside synthesizers. Immense change occurred again in 1983, when Yamaha introduced the first commercial digital synthesizer, the DX7. This new digital machine was clearly superior to its analog predecessor in countless ways. It significantly increased audio quality, achieved more accurate reproductions of "real" instruments, and promised a near-infinite variety of sounds (Shapiro 192). As the world moved into digital technologies, changes were also made in analog tape recording machines, and digital recorders that encoded audio as a string of ones and zeros in

RAM appeared. This method of sampling had been around in one form or another since the late 70s, but did not become affordable until the mid 80s (Shapiro 193-194). By the late eighties sampling technology had begun to dominate electronic music production, and any sound one could create, record, or borrow from another's recorded work could be incorporated into a sample based composition. Soon producers began to work the way DJs did, digging through their record crates in search of source material.

However, it is not enough or even fair to say that hip hop musicians simply used these technologies. Rather, these artists were innovators in their own right, and by going against the conventional uses of the technology they created "fresh" never heard before sounds. The first most well known deviation occurred with the turntable which was created to play a single vinyl record. However, pioneering DJs began to "scratch" by moving a record back and forth, causing the needle to produce a scratching noise as it moved through the groove. This sound and technique has become a well known symbol of hip hop music. Another innovation was developed by DJ Grandmaster Flash who learned from DJ Kool Herc to play duplicate copies of a single record on two turntables with the addition of a mixer to isolate the drum rhythm of a song (DJ Grandmaster Flash-Wikipedia). This isolated part of the record is termed the break. The overall effect is the ordinary playing of the record, interrupted to play the break, which then can be repeated by using the mixer to switch channels while the second record is spun back. While scratching is more of a stylistic matter, the concept of the breakbeat has more of a cultural significance that ties closely to the importance of the African drum. Generally, the break beat came from soul and funk songs because their rhythms are easy to dance to and the perfect platform for MCs to rhyme. DJ Afrika Bambaataa described the break as, "that certain part of the record that everybody waits for—they

just let their inner self go and get wild" (<u>Afrika Bambaataa</u>-Wikipedia). In hip hop songs, the break is essentially the domain of the drum, and allows the drum's beats to reverberate and seize control of the listener just as they did centuries ago in Africa.

The synthesizer and drum machine were the next big technological innovation in the timeline of advancements, and are used by musicians of all genres for their useful array of simulated instrument sounds. However, the drum machine, which offered a wider variety of drums than the synthesizer, is not used exclusively in its intended manner. Instead, its preferred use by rap musicians is for producing the low concentrated booming, bass sound characteristic of rap music. Increasing the bass is not simply making the music louder, but rather deals with the issue of the quality of lower-frequency sounds at high volumes, and this was achieved by manipulating the equipment. Kurtis Blow explains that the Roland TR-808 is the ideal drum machine for rap because of the way it processes bass frequencies:

The 808 is great because you can *detune* it and get this low-frequency hum. It's a car speaker destroyer. That's what we try to do as rap producers—break car speakers and house speakers and boom boxes. And the 808 does it. It's African music! (Rose 75).

Even in the digital world, rap producers find ways to force high technology machinery to simulate sounds of African music, which are an integral component of hip hop music.

The sampler is probably the most essential piece of equipment. Without it, artists could not create the repetitive background sounds for their music which is achieved by looping a sampled sound or sequence of beats from another source. It is also important to note that the sampled sounds in hip hop music are digitally reproduced but not digitally created. The intense drum kick and bass line sound of funk artists James Brown and Parliament and the equipment that processed it are integral to the way a rap record feels to the body and ears. Resultantly, live or recorded soul and funk drum kicks

are almost always the "musical glue that binds these samples together" (Rose 78-79).

For example, A Tribe Called Quest's "*Verses from the Abstract*" features jazz musician,

Ron Carter, on bass but the hip hop drum lines give completely new context to Carter's

jazz sound (Rose 78-79). Often, discoveries of manipulating media in this way happen

accidentally, as in this scenario shared by rap producer DJ Marley Marl:

One day in '81 or '82 we was doin' this remix. I wanted to sample a voice from off this song with an Emulator and accidentally, a snare went through. At first I was like, "That's the wrong thing," but the snare was soundin' good. I kept running the track back and hitting the Emulator. Then I looked at the engineer and said, "You know what this means?! I could take any drum sound from any old record, put it in here and get the old drummer sound on some shit. No more of that dull DMX shit." That day I went out and bought a sampler. (Rose 79)

The use of the sampler for looping a selected sample, and resulting in the cyclic nature

of the sounds has cultural significance just as the breakbeat does. The reason for this

characteristic, according to Snead, is that black culture highlights the observance of

repetition:

In black culture, repetition means that the thing circulates, there is an equilibrium....In European culture, repetition must be seen to be not just circulation and flow, but accumulation and growth. In black culture, the thing (the ritual, the dance, the beat) is there for you to pick up when you come back to get it." If there is a goal...it is always deferred; it continually "cuts" back to the start, in the musical meaning of a "cut" as an abrupt, seemingly unmotivated break...with a series already in progress and a willed return to a prior series....Black culture, in the "cut," "builds" accidents into its coverage, almost as if to control their unpredictability... (Rose 69)

Just as in other black cultural art forms, black music is purposely repetitive in sound and

uses the "cut" (or break) to emphasize this repetitive nature of the music by jumping

backwards to a sequence of sounds already heard. By providing the "equilibrium" and

constant background sound, the break now becomes the space for deviations and

unexpected energies to arise as the sound of the beat captivates the mind and body.

      Samplers have become the standard rap production tool. However, before rap

music redefined the role of the sampler in musical creativity, it was used almost

exclusively as a time and moneysaving device for artists. When necessary, a horn

section, bass drum, or background vocals were easily and quickly copied from a recording; thus, limiting the expense and time to locate and pay studio musicians to provide the needed sounds. Traditionally, samples were used to enhance a musical piece. Rap producers, however, use samples to literally construct an entire musical composition out of layered samples (Rose 73). Coming from carefully selected tracks, samples in hip hop serve as a reference to the historical past, and as a way to honor and highlight the process and significance of repetition within black culture.

To make the characteristic hip hop sound, producers and rappers have had to approach sound and sound manipulation in ways that disregard the original intent or traditional use of the equipment. Rap producer Eric (Vietnam) Sadler explains:

...Now, engineers...they live by certain rules. They're like, "You can't do that. You don't want a distorted sound, it's not right, it's not correct." With Hank (Shocklee) and Chuck (D) it's like, "Fuck that it's not correct, just do this shit." And engineers won't do it. So you start engineering yourself and learning these things yourself..." (Rose74-75)

Using samplers, drum machines, and engineering boards "incorrectly," rap producers have interestingly developed an art out of recording with the sound meters into the distortion zone. When necessary, they purposely "work in the red" (distortion region of the meter) and will actually *detune* samplers to produce the sought-after sounds. Not only have rap producers experimented with machines, they have also forced sound engineers to change their own strategies to accommodate rap's stylistic priorities. For example,"so strong is this fixation with the bass that producers and engineers had to adapt their usual mixing formulas to make room for the rumble" (Rose 76). However, it is important to realize that this experimentation is not just for the sake of experimenting, but finding new ways to express their creative impulses in ways that mirror black musical priorities of a strong rhythm, repetition, and breaks.

Analysis of the actual use of music engineering technology reveals that although hip hop music artists have not directly led to improvements in technology, they are themselves inventors of groundbreaking techniques. Thus, it is not enough to say that hip hop artists simply utilize this equipment, because a lot of artists in other genres were and continue to use the very same equipment to produce disco, house, and techno music. The difference between hip hop music artists and others exists in *how* hip hop artists began to use the same equipment in order to create a sound that is distinct to and consistent with values of the hip hop culture. Another characteristic that separates the hip hop culture from other music cultures is its spontaneous nature. The discoveries made through operation of the available technology are unplanned and at times accidental, but then they are developed further into brilliance. Because "freshness" and originality are expected from any hip hop artist, these musicians avoid falling into the habit of using traditional or established techniques. As each new piece of music engineering equipment became available and affordable, producers broke the rules of equipment operation whether it involved connecting two turntables, detuning samplers, or recording with synthesizers and drum machines in distortion zones. While these artists may not be "scientists" in the traditional and academic sense, they are ingenious inventors of technique, and continually prove through successful experimentation that "rules" mean nothing when it comes to the art of creativity.

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