

Habitus and Hip-hop:
How technological affordances shape user innovations

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Innovation Studies has a well-established literature on user innovation, first identified by Rothwell et al. (1974) in the seminal Project SAPPHO study and expanded and advanced by Eric von Hippel (1976; 1986; 2006) and his many followers in multiple directions. This paper argues that our understanding of user innovation can be deepened by applying *affordance theory* (Gibson, 1979), which to our knowledge has surprisingly not been introduced to innovation research. We show how this lens can illuminate the key choices and dynamics in the usage-observation- design – manufacture process. We apply affordance theory to a fascinating and under-researched product market: devices to generate, record, playback and perform electronic music, and specifically in the genre of hip-hop, where innovation by users has been especially important to the advancement of the culture and of the technology.

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Affordance, as a concept, presents the world as an ecology of potential actions which we are allowed to take (Gibson, 1979). In his definitive paper on the subject, Gibson gives the example of a flight of stairs and the affordance those stairs offer us in terms of climb-ability. We encounter a flight of stairs and perceive that it offers us the potential action of ascension or descension. That seems obvious but this would not be so to a visitor from an alien planet who had no concept of what to do coming across that flight of stairs. Would they understand that we could use that flight of stairs to climb up to a higher level? Would they decide instead that it looks like a comfortable place for an afternoon nap? Or would they weaponise it and take the opportunity to push humans tumbling down to their deaths? It is one thing to present an individual with an affordance. It is another for them to perceive it and decide to perform the intended action (Norman, 1988).

We see the world differently from each other because the experiences we have had with society and culture are unique to us. We develop our own understandings of the affordances that we interact with because we are starting from that position of unique perception, and we use those understandings to produce outcomes which are, theoretically speaking, unique to us as individuals (Ingold, 2000). Bourdieu (1977) describes this embodied way of engaging with the world as *habitus*, a set of dispositions that bridge subjectivity and sociocultural discourses, informing who we are and how we act. Developed through exposure to a context, our habitus represents our understandings of that context and therefore shapes the nature of our actions within it (Crossley, 2001).

This paper discusses where affordances meet habitus in the domains of technology and the creative arts. The background of the first author, prior to academia, is that of a music producer, a technologically mediated and fast-moving field that presents near infinite opportunities for creative expression (Théberge, 1997). We develop sophisticated relationships with musical technologies based not only on their affordances but also upon how our habitus allows us to perceive and act upon those affordances (Hutchby, 2001). This dynamic interaction shapes our creative processes, allowing us to achieve the aesthetic and technical outcomes we desire. However, these uses and outcomes are not always what designers and manufacturers had in mind when they developed those technologies (Pinch & Bijsterveld, 2004). The paper will focus on two cases where undesigned affordances were developed for manufacturers' products to generate new paths of musical innovation.

The SP-12

In 1985, E-mu Systems released the SP-12, a sampling drum machine designed for intuitive use through manual playback, pattern creation, and storage. Unlike many of its contemporaries, which featured synthesised or pre-loaded drum sounds, the SP-12 was designed from the ground up as a system that allowed users to record and play back their own drum samples, with a capacity of up to 1.2 seconds of audio, a ground-breaking feature at the time (Vail, 2014)¹.

What the designers at E-mu Systems did not anticipate was how producers would perceive the affordances offered by this piece of technology. Early hip-hop producers, such as Marley Marl, Paul C, and Ced Gee, quickly realised that the SP-12 could be used for much more than drum sequencing. It allowed them to record, manipulate, and layer any sound of their choosing, enabling them to construct entire tracks from any audio they could find (Katz, 2010). These artists were presented with a set of intended affordances by the manufacturer, but their musical habituses, shaped by hip-hop's culture of recontextualisation and improvisation, allowed them to perceive and enact new creative possibilities and achieve new expressions within these constraints (Born, 2005).

Emerging from the cultural melting pot of the South Bronx in 1970s New York City, hip-hop incorporated elements of disco, soul, funk, rock, and other genres. DJs and producers engaged in bricolage, described by Lévi-Strauss (1966) as the creative reassembly of available resources to solve problems or produce new outcomes. By cutting between double copies of records, reorganising fragments, and layering sounds in real time, they transformed existing materials into innovative new works (Demers, 2010). Many of these producers grew up in economically disadvantaged and crime-ridden neighbourhoods, lacking access to the financial resources needed to record music in commercial studios, they instead relied on the materials at hand, typically records, microphones, mixers, and turntables, to express their creativity (Chang, 2005).

Producers operating within traditions of restructuring and 'making do' were particularly well-positioned to embrace the SP-12's limitations as creative opportunities. The short sample time and low-quality 8-bit resolution forced them to chop samples into smaller fragments, encouraging rhythmic experimentation and intricate sequencing techniques. The gritty, lo-fi aesthetic produced by its technical limitations, initially a constraint, became a defining sonic characteristic of the genre (McLeod, 2011). Through bricolage, producers actively bridged the affordances of the SP-12 with their habituses, transforming it from a tool for reproducing sound into an instrument for its reimagining. Rather than passively accepting the manufacturer's intended affordances, they reinterpreted and expanded upon them, reshaping not only the trajectory of hip-hop but of electronic music as a whole (Taylor, 2001).

E-mu Systems, to their credit, quickly recognised and embraced the new potentialities that had emerged from the reinterpretation of the SP-12's affordances. In 1987, they released the SP-1200, expanding the sampling storage capacity to 10 seconds and refining the interface for

¹ There had been previous attempts at this, notably the Linn 9000, but it was plagued with reliability issues and was not particularly user friendly.

greater flexibility and intuitive user interaction.

The SP-12 and SP-1200 are not the only examples within hip-hop that illustrate the interplay between affordance and habitus, nor are they the only cases where this relationship has reshaped technological interaction and influenced future design. Another compelling example is the Technics SL-1200, a turntable that evolved from a simple playback device into a central technology within both hip-hop music and DJ culture generally (Hosokawa, 1984).

The SL-1200

Technics never really intended their SL-1200 turntable to be used for anything other than high-quality playback by audiophiles. Released in 1972 as a refinement of their earlier SL-1100 model, the SL-1200 featured cutting-edge technological advancements, such as a direct drive motor for increased torque, quartz lock for precise and constant pitch, and a sleek yet durable design aimed at the high-end consumer market (Brewster & Broughton, 2006)². Crucially, the SL-1200 was also the first mass-market turntable to feature a highly precise and accurate pitch control slider. Designed by Technics to allow users to make fine adjustments to playback speed for improved pitch accuracy and faithful sound reproduction, this affordance would become the foundation of DJing as a creative practice, its reinterpretation revolutionised turntable design and manufacture, and cemented the SL-1200 as one of the most important technological innovations in music history (Hosokawa, 1984).

The early development of hip-hop music and culture is intimately linked with that of disco, with DJs such as Francis Grasso among the first to exploit the SL-1200's affordances. Grasso pioneered the use of pitch control and the direct drive motor of the SL-1200 to align the tempos of two records, enabling seamless transitions between them (Shapiro, 2000). By closely observing audience reactions, disco DJs developed a habitus highly attuned to the interplay of music, energy, and movement. Their growing sensitivity to peaks and troughs in crowd dynamics led them to seek technological affordances that allowed them greater control over these dynamics. The SL-1200, with its pitch stability and precision tempo adjustments, became the ideal tool for this emerging practice (Fikentscher, 2000).

However, it was not until these techniques travelled across town to the block parties of the South Bronx that the SL-1200's affordances were pushed to their limits, sparking a profound musical and technological revolution. Hip-hop DJs, whose habituses were defined by innovation, competitiveness, and improvisation, used bricolage approaches to technological and musical resourcefulness to reimagine the SL-1200 not as a playback device but as a performance instrument (Rose, 1994).

Scratching, for example, emerged when DJs like Grand Wizard Theodore reconceptualised the platter as a means of producing rhythmic and percussive sounds. Similarly, Kool Herc's looping techniques stemmed from his habitus as a Jamaican immigrant, drawing on sound system culture to isolate and extend breakbeats for rappers and dancers (Toop, 2000). In both cases,

² The durability of the SL-1200 is pretty legendary. The first author has seen them thrown down flights of stairs without breaking, and has also dropped one of his own onto a concrete pavement without so much as a scratch!

the SL-1200's affordances, its durability, resilient torque, and resistance to wear under physical manipulation, were crucial in enabling these practices (Schloss, 2014).

Technics could not ignore the pivotal role the SL-1200 was playing in shaping hip-hop and responded by redefining their design trajectory. Their definitive Mk2 version, released in 1979, featured numerous improvements that recognised the turntable's growing role as a performance instrument. They introduced wider pitch control to $\pm 8\%$ for greater flexibility, improved the durability of the motor, chassis, and tonearm to cope with the rigours of direct physical manipulation during performance, and improved the motor itself, to allow for faster startup speed and greater precision when scratching, looping, and beat juggling. These design improvements solidified the SL-1200 Mk2's status as a central piece of equipment and a sound reference in hip-hop and electronic music culture (Katz, 2012).

The interactions that users have with technological affordances are not passive engagements but rather contextual and experiential negotiations, shaped by the habituses of both users and designers. These interactions, informed by subjective constellations of sociocultural knowledge and lived experience, generate dynamic feedback loops in which new conceptualisations of technology and its uses emerge collaboratively over time.

Crucially, these feedback loops do not merely refine existing technological functions; they actively drive both technological and cultural innovation, embedding them in a process of co-evolution. Affordances, rather than being static properties of objects, are revealed and reshaped through use and reinterpretation, while habitus ensures that these reinterpretations remain grounded in specific cultural and historical contexts (Hutchby, 2001).

The paper argues that through affordance and habitus theory we can better understand the creativity and the constraints of user innovators. For example, the small-scale recording capacities of the early SL-12 afforded a rhythmic, repetitive, style of sampling that defined the hip-hop sound in that early phase, such that it became the creative habitus of producers through subsequent generations. It became difficult to deviate too much from these expectations even when the technology later allowed greater affordances, because the affordances operate together with the habitus. In this way we can understand, for example, *why* lead users in the von Hippel terminology are so influential and dominant in the creative envelope of those that follow their innovations. Their habitus becomes the social and technological practice and this recursively is embedded in the ongoing trajectories of design and tool production. We believe affordance and habitus theory add depth to our core concepts of user innovation and why these phenomena present as they do. We will develop these links prior to the conference, anticipating feedback in the Innovation Track.

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