Rethinking Collaboration in Networked Music*

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This paper argues that today's sampling culture, emerging out of pioneering efforts in electroacoustic music in the 1950s carries a similar ethos of *autonomy* found in many significant advances in music instrumentation throughout history. By looking at the evolution of musical instruments, the author hopes to address these continuous effort towards autonomy, which, if proves legitimate should be of great concern for networked music research that deals with all forms of music praxis of varying reciprocity and group dynamics. By further looking into what sets collaboration apart from cooperation and collective creation, and elaborating on the 'social' of music, this paper hopes to extend the discourse on current trends of accessing, shaping and sharing music in solitude, from something often seen as unfortunate and anti-social, to something less so.

1. INTRODUCTION

However peripheral the tools explicitly addressing musical collaboration[1] over computer networks are in society at large, there is reason to believe that the subject is one of the most central to music culture in our day and age. Today's sampling culture by means of personal computers and the Internet situates 'network music', if defined inclusively, firmly in the locus of human music-making today. The reason for the success of this newly emerged 'networked computer music instrument' is not so much because of the social nature so often assumed of music praxis, as to what it has shown to afford individual creators. By looking at the historical evolution of musical instruments from past to present, this paper claims that at least one significant driver of this evolution is a continuous striving towards *autonomy* on behalf of composers. New instruments, if they were to be significant, as we will see, allowed users to achieve musical products that previously demanded a collective. Thus, by seeing the Internet as more than communication infrastructure – and rather as a central part of an emerging networked computer instrument accessing, shaping and sharing recorded material – one could argue that this very same *raison d'être* of new musical instruments is clearly present and has particular implications for networked music – an area of research that has made great advances in exploring spatial and temporal barriers among distributed musicians, but less in exploring the very widespread form of sampling culture by agency of the Internet and personal computers.

By investigating collective creation and reciprocity, the evolution of musical instruments, current networked music research, copyright issues and the social aspect of music, this paper attempts to raise the issue of autonomy in relation to networked music.

2. COLLABORATION

Quite limited research has been conducted when it comes to understanding the nature of musical collaboration. Some research is found in psychology (Sawyer 2006; Blank and Davidson 2007) and some is found in networked music, where classification spaces are provided by various authors (Blaine and Fels 2003; Weinberg 2003; Barbosa 2008; Carôt 2009). More general ideas and applications within this domain have also been provided (Tanaka, Tokui and Momeni 2005) for a topic that has been deemed a cornerstone of sound and music computing (SMC) research and to have much future promise (Bernardini, De Poli, Serra, Leman and Widmer 2007).

What constitutes *collaboration* and sets it apart from individual achievements is interdependence (Weinberg 2003) or reciprocity (Tanaka 2006) among involved parties. Naturally, the same goes for networked music, where we find not only *collaboration*, but also *cooperation* and *collective creation*, three terms often used interchangeably in networked music research (Blaine and Fels 2003; Weinberg 2003; Jordà 2005; Barbosa 2008). So far, these have not been used explicitly to differentiate between various systems within the domain, despite its relevance. Instead, other forms of classification have been favoured depending on the intent of the research.

Approaching networked music from the point of reciprocity, we will see that the three terms – *collaboration*,

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[1]These tools include co-located musical networks, shared sonic environments, remote music performance systems and music composition support systems (Barbosa 2008).

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cooperation and *collective creation* – all spread out along an axis of less to more intense reciprocity. Clear boundaries of these are difficult to make out, if not impossible; however, somewhat firm ground among them will prove useful.

As we all know, the Internet provides a space where we may communicate in varying reciprocal intensity; products out of highly reciprocal communications are considered collaborative, as defined by Dillenbourg:

> Collaboration is a process by which individuals negotiate and share meanings relevant to the problem-solving task at hand … Collaboration is a coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem. (1999: 70)[2]

While collaboration is a coordinated and synchronous activity, cooperation is an activity in which 'partners split the work, solve sub-tasks individually and then assemble the partial results into the final output' (Dillenbourg 1999: 8) and thus shows less reciprocity. Therefore, the more collaborative of an activity, the more intensely reciprocal it is. The implications for networked music are that 'remote music performance systems' (Barbosa 2008), such as a synchronous networked jazz improvisation by two remotely connected instrumentalists, could be considered collaboration due to its reciprocal intensity attempting to 'construct and maintain a shared conception of a problem' (Roschelle and Teasley 1995: 70), while the asynchronous co-authoring of a midi-file over email is rather more like cooperation due to its less intense reciprocity.

This paper, however, deals with when reciprocity comes to a halt, as for example when sampling another artist, when there is no conscious intent or explicitly stated agreement on either part to collaborate or cooperate. Despite the lack of bi-lateral engagement in formulating a conception of a problem in an act of sampling, it still produces artworks that involve the skill, effort and productions of many artists. Thus the term *collective*, rather than *collaborative* or *cooperative*, music creation is the most fitting description. The term is also used for networked music software that allows for open and continuous works to develop among a group of users, such as the FMOL by Jordà (1999), with group dynamics similar to what we see going on in sampling culture in the real world, where music is continuously accessed, shaped and recontextualised in the form of new songs or new DJ sets.

2.1. Society at large

Contemporary 'recontextualising' music culture, imbued with technologies and philosophies from the electroacoustic music pioneers of Paris and Cologne, has obviously favoured *collective creation* over *collaboration* by means of the Internet. Yes, limitations such as bandwidth and latency all work against real-time collaboration, while sampling or *collective creation* may take place without regard to these, due to its asynchronous nature. However, there might be more working against real-time collaboration than mere technical constraints, as we will see; new music instruments have historically emerged in part to replace fellow musicians, to allow for one individual to produce musical products equalling that of the collective. One could even call it a striving towards the *autonomy* inherent in music technology that sampling culture and the networked computer today most appropriately embody, which might give clues to its popularity. This promise of autonomy is less obvious, however in *collaborative* or *cooperative* systems that struggle to stay true to the old paradigm of music and labour to collapse geographic distances by employing the network merely as a communication infrastructure, in turn neglecting some of the medium's unique properties. The new paradigm, however, sees the personal computer with its attendant peripherals and networks as a newly emerged instrument in its own right, and sees any cultural material accessible through it as the musical qualities of the medium itself, spawning its idiomatic works (Tanaka 2006: 276). In this manner, our peers in cyberspace provide us with a global resonating body of sound: as fundamental a feature of the networked computer music instrument, as, let's say, the body is of a cello.

It is therefore, one could argue, *collective creation* and the networked personal computer instrument that we find to be most true to the *essence* of musical instrument evolution, that of rewarding individual composers with autonomy.

3. THE EVOLUTION OF MUSICAL INSTRUMENTS

When investigating the historical evolution of musical instruments, one is met with the great irony that music-making, considered first and foremost a social activity (Mithen 2005), continuously produced technologies promoting the anti-social in the sense that they rewarded composers a certain amount of autonomy by relinquishing the need for fellow instrumentalists. A brief review reveals that examples as early as the seated Syrian piper from the last century BC, whose technology combined several activities (Sachs 1940): the user, operating a panpipe fuelled by artificial wind, was liberated to both play and sing, producing a musical product that previously required two people. Similar technology brought the Hydraulis of Greece and later the keyboarded organ, which allowed a single user the creation of rich textures

[2]A definition originally derived from Roschelle and Teasley (1995).

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of polyphonic works, previously only possibly achieved by a large group of woodwind instrumentalists.

When fast-forwarding to classical and Romantic pianofortes, which afforded any operator infinite permutations of melody and modulation and harmony, we find the same promise of autonomy in technology that, according to Anthony Burgess, was 'an one-man orchestra' and was regarded by Anton Rubinstein as 'not just one instrument – it is a hundred' (Hildebrandt 1999).[3]

Moving forward to tape, multi-track recording and the studio utilised as an instrument in itself – as composers Glenn Gould (1990) (Hecker 2008) and later Brian Eno (1983) emphasised – we see yet another paradigmatic technology reducing the dependency on fellow instrumentalists in many powerful ways.[4]

The next great leap in technological development was the era of synthesisers and sequencing where empowered individual creators gained unprecedented freedom and autonomy, as Vince Clarke of Depeche Mode expressed:

> I was and still am I guess a bit of a control freak. And with the advent of computers and sequencers I realised that I could do all of the music myself. I didn't need necessarily other people to play the parts, and I got a real sense of satisfaction of programming all the parts myself. (Whalley 2009)

'Didn't need necessarily other people to play the parts' clearly refers to a common sentiment among people displaying significant creative behaviour,[5] including composers.

This is a brief summary of history indeed, but sufficiently revealing when it comes to explaining the popularity of various technologies used in sampling culture, such as digital audio workstations (DAW) running on the networked computers. Composers again are gaining autonomy and relinquishing the need for fellow instrumentalists or even studio technicians to create musical works of a complexity previously inaccessible to a single individual. This was predicted by Glenn Gould in Hozer and Raymont's documentary:

> I have a feeling that the end result of all our labours in the recording studio is not going to be some form of autocratic finished product such as we turn out now but is going to be a rather more democratic assemblage. I think we're going to make kits; we'll send out these kits, and we're going to say 'do it yourself', be in fact your own editor, be in sense your own performer. (2011)

The 'Do-it-yourself' kits, and personal assemblage of recorded material, was a revolutionary assertion in the 1960s; however, it is less so today, where it is how we go about a majority of our music making.

3.1. Sampling and collective creation

Composers predicted that 'The battle for the immediate future of music will be fought out through the medium of recording' (Cutler 1993: 33) and surely they were right, as no other technology has had a larger impact on how we compose, share and listen to music in this age. Today's musical reality involves swarms of collectively creating individuals accessing, shaping and sharing recorded cultural material through the Internet. The fact is that a majority of the music you hear these days would neither sound the way it does nor exist if it wasn't for computer networks. The emergence of the Internet in the 1990s, coupled with the spirit of Edgar Varèse, Schaeffer's *musique concrète*, John Cage and *plunderphonics* (Toop 2005: 152) has turned the once budding pre-Internet art forms that all strived to creatively rearrange and reinvent musical products and their meaning (Willis 1990), into idiomatic music practices of today. Sampling, as seen in early hip-hop (Katz 2004) or in 'bootleg' or 'mash-up' culture (Rojas 2002) is today's reality, where anyone with a computer, Internet access and software may create songs out of sampled material, again – as in the case of the Syrian piper, the organ or the multi-track studio – allowing a user to accomplish a musical product that just decades earlier would have required a great number of involved parties to achieve: this time samples often consist of the productions of more than one musician. It is here we see the ethos of the Syrian piper reflected in a highly computer-networked world, an ethos, however, that is referred to in some network music research as anti-social, unfortunate and something to be remedied by technology (Weinberg 2003: 18).

3.2. The perennial dyad: creator vs. re-enactor?

Faced with the fact that new musical technologies promise users unprecedented autonomy, it is tempting to believe that this must be an unfortunate product of Western classical music, Romantic hero worship or even industrialism with a hierarchal division of labour and fervent emphasis on technological progress and individual achievement (Loesser 1954), and that the ideal group dynamics is to be found in Neolithic times with individuals seemingly improvising around a bonfire, and so forth. However, this attitude forgets that these early musical expressions were influenced by certain individuals to a greater degree than is commonly acknowledged in the networked music discourse. Cultural

[3]Studies show that keyboard players, compared to other instrumentalists, display a high level of conscientiousness, which might shed light on the piano's appeal and popularity as an independent and autonomous instrument (Blank and Davidson 2009).

[4]'Many composers continue to create tape pieces, preferring to work in an optimal studio environment to realize an ideal version of a work with great detail, complexity and subtlety' (Winkler 2001: 11).

[5]'Most authorities who have studied creative people agree that one of their most notable characteristics is independence' (Storr 1991: 235).

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expressions in the form of rituals, songs and chants were handed down, or 'composed', again, by individuals such as shamans or witchdoctors to be re-enacted by the tribe at large.

> Because psychedelic … substances helped many shamans enter the 'spirit world', they became a technology for the production of mythic narratives, theatrical performances, chants, songs, dances, and other products that today are labelled creative. (Krippner 1999: 60)
>
> we could call [Shamans] universal performance artists who, in their session of ecstasy, shared by all the tribe, use all of what we call the arts in the pursuit of their aim, which is to cause all the members to experience right, or ideal, relationships and thus to maintain their unity and to cure whatever physical, psychic or social ills might have befallen them. (Small 1998: 108)

However 'social' and improvisational the origin of these early theatrical performances, chants and songs might seem to the untrained observer, they originate as we see from personal grounds. In the case of the shaman we see an ascetic individual providing the tribe with the topic that they are to sing and dance *about*. Even in Javanese gamelan music, allegedly void of any individualistic streak (Brown and Bischoff 2005), we find at closer examination the *Dalang*, or puppet master, upon whom the whole performance, or *Wayang*, is said to 'rest' (Walter and Fridman 2004: 832).

These forms of primordial group dynamics, of the shaman on the one hand and the re-enacting tribe on the other, are something that technology evidently is still addressing, as we see with turntablism and DJs, where a whole evening's climactic performance rests on the compositional, or shall we say recontextualising, skill of one person. Again this modern technology employs the same ethos of the Syrian piper, of rewarding a user with autonomy. In the words of Paul D. Miller:

> I think the DJ is an archetypal figure that has been throughout human history. It's anyone that's gonna [sic] be combining a social situation with music and then setting up a certain parameter of crowd interaction and response, whether that be a shaman or a Roman priest. (Cox and Warner 2004: 327)

Thus, devising technology that promotes this archetypal figure, today equipped with powerful technology to mix and match any recorded cultural material, should continue to be of utmost concern for networked music research, where we find interesting possibilities of synchronous collaboration but also vast possibilities in an already blooming reality of asynchronous *collective creation* as seen in the sampling artist or the DJ.

4. NUANCING THE SOCIAL

In light of this striving towards autonomy among individual creators a more nuanced take on the 'social' of music praxis compared to what networked music research provides to date could prove useful, one where artistic achievement is seen as deeply personal as in Howard Gardner's account:

> In the end, the artistic achievements emerge as intensely personal and inherently social – an act that arises from the most profound levels of one's own person and yet is directed to others in ones culture. (1982: 102)

It is a position that moves the 'social' of music praxis from between musicians connected over a network to between a musician and a listener, similar to the 'co-creation' of works of art between artist and observer articulated by Ingarden (1972), or the *inevitability of collaboration* expressed by Jean Paul Sartre, who considered reading a creative activity, and that without it there is no art[6] (Abra and Abra 1999). Similarly, philosopher Nelson Goodman's substitution of the common question of 'What is art?' for 'When is art?' (1968) is in line with a reconsideration of the 'social' of music. It is a scenario where music *comes to be* by an act of interpretation, much like Tanaka alludes to by referring to 'musical forms that are not finished works, but instead generated at the time of listening' (2006: 284) and Attali's prediction of future music praxis, where 'production melds with consumption' (1985), where a composer can do nothing more than produce *structures of possibility* for music to appear to a listener.

In such a case, a shaman, piper, pianist, tape-composer, DJ or sampling artist is not to be considered anti-social by seeking autonomy, neither should technologies that allow for the individual creation, sharing and listening of music be considered so. What instead emerges is that the true virtue of the networked computer instrument is that it provides a composer with an intensely personal space where *bisociation* (Koestler 1994; Root-Bernstein 2001) – the process of bringing together several previously unrelated ideas to achieve a novel, creative combination – take place, while at the same time providing an inherently social space directing one's efforts towards others in one's culture.

With these networked windows to the world anyone may build musical works on the shoulders of giants,[7] as Newton's adage has it, and thanks to recorded ideas, be they scientific or musical, these 'giants' neither have to be contemporaries nor locals, which is a great advantage for both disciplines. Such limits being overcome, the networked computer provides the ideal means for what cultural theorists call *appropriating* (Engeström 1987; Rogoff 1995),

[6] '[T]he main reason collaboration is almost inevitable is that … most creators want to communicate with an audience of some kind and this relationship is in a real sense a collaborative one' (Abra and Abra 1999: 285).

[7] '[A] reclusive lone wolf if there ever was one, nonetheless admitted in a rare moment of humility that if he had seen further than others, it was because he had stood on the shoulders of giants' (Abra and Abra 1999: 284).

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quoting cultural material from past to present, making it 'our own' by recontextualising, shaping and ultimately sharing it as new musical ideas.

5. RETURN OF THE HERO?

As autonomy in art traditionally refers to how art is governed by its own rules and laws, and how artistic value makes no reference to the social or political (Hamilton 2009), it is worth noting that the autonomy referred to in this paper deals with how the desire to gain creative autonomy on behalf of individual creators is reflected in the evolution of music technologies. Such a suggestion, which returns a certain primacy to the solitary composer, naturally has Romantic undertones; however, what might seem as praising of the Romantic ideal is rather a temperance of the other extreme – the annihilation of the author/composer so often suggested by contemporary human sciences (Barthes 1976). This annihilation, however, has been shown to have great merits when it comes to understanding collective creation since it was initiated by the early twentieth-century avant-garde.

As early as 1916, Surrealists and their predecessors Dadaists experimented with collaborative works attempting to omit the 'inspired artist' of previous centuries by emphasising the actions and interactions of the process rather than the finished product (Toynbee 2000). According to theorist Peter Bürger, concepts such as 'objet trouvé' or 'ready-mades' – for example Marchel Duchamp's famous urinal or the Surrealists' mechanical recipes for creating literary texts – all work with what is called 'poetics of negation and meaninglessness' (Murphy 1999: 23), where these objects confront the conventions and expectations related to the very institutions of art they attempt to undermine. They achieve this primarily by negating that the 'work' should be an original and inspiring creation, crafted in its entirety by a single inspired artist, and in that way rather shift focus to the rather sinister agenda of reigning institutions of art (Murphy 1999: 23).

Similar ideas are found in the 1950s neo-Dada artistic network Fluxus, bringing forth concepts such as 'happenings' and John Cage's mixed-media event *Theater Piece No 1*, which is often credited as the first one of these 'happenings', further eroding the concept of the 'lonely genius' of modernism and replacing him with a more socially integrated individual.

Similarly, postmodern theory has been greatly influenced by textual rather than *authorial* productivity, most notably by the essay 'Death of the Author' by Roland Barthes, whose argument on literature applies as well to musicians and music:

> The image of literature to be found in ordinary culture is tyrannically centred on the author, his person, his life, his taste, his passions (Barthes 1976: 143)

and

> We know now that a text is not a line of words releasing a single 'theological' meaning (the 'message' of the Author-God) but a multidimensional space in which a variety of writings, none of them original, blend and clash. (Barthes 1976: 146)

This objection of self-expression on Barthes' behalf rewards a text, or a piece of music if you will, with a peculiar agency of its own, which to some might seem extreme. However, the ideas and practices of Dada, Surrealism, neo-Dada and post-structuralism, and the ideas of Barthes, are particularly compelling when revealing the divinely guided Romantic composer as someone not creating music from out of nowhere, but operating in the social realm, immersed in ongoing perpetual exchanges of musical style, sounds, ideas and forms (Toynbee 2000). One could argue that this exchange, which lies at the very heart of music praxis, didn't fully reveal itself in its full splendour until the advent of recording technologies where composers are seen 'quoting' from each to build new artworks.

5.1. Technical and social determinisms

Understanding the forces that have brought forth collective creation as we see it in sampling culture includes crediting technological determinism, meaning the idea that social changes come about as a result of the emerging capabilities of new technologies. However, technological determinism proves problematic as technologies are often applied in ways not originally intended (Toynbee 2000: 99). New capabilities are often stumbled upon and are rarely predicted, particularly in the arts, as we see in the example of the phonograph and 'scratching'. Moreover, new technologies emerge from the desires and drives of individuals immersed in society; social determinism therefore presents itself as a more fitting theory even if it too struggles with the same unpredictability of how technologies will ultimately be employed. The idea that technology is developed to benefit those capable of funding its development (Green 2002) is thus questionable. This unpredictability therefore questions the omniscience of either technological or social determinism. Instead, it seems as if both theories contribute to an evolution where technical possibilities, economic incentives and emerging aesthetic sensibilities in society – not least among musicians – are entwined in a continuous discursive dialogue to bring forth cultural practices such as collective creation in music.

5.2. True democracy

Individual creation out of collective materials, or *collective creation*, aided by the Internet has thus emerged as a truly democratic, as opposed to autocratic, activity. However, this is not in the detached, indifferent

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way proposed by John Cage's interpretation of Zen (Nyman 1999), Alan Watts (1957) and D.T. Suzuki (1964), but in a truly democratic way where a musician is not told by anyone else *what*, *when* and *where* to play, but is merely equipped with judgement and offers his or her compositions to the world, while peers reincorporate them into new creations (songs, mix tapes, DJ sets, etc.), if they find them fitting. A 'cloud' of *collective creation* doesn't urge a composer to let go of his or her musical *will* or *voice*, as so often suggested by Cage and the like, so much as encourage him or her to let go of the musical *works*, something that new forms of licensing models (such as Creative Commons) try to remedy.

The complete freedom awarded individual creators in this scenario appears to reconcile the hierarchical status of the composer as seen among the Romantics with the truly democratic nature of this new scavenging medium, the Internet (Tanaka 2006: 275), where the production of a song, or even a mix tape[8] for that matter (Reid, Calloway, Dukes, Byrne, Parry and Waller 2003), is a form of *sourcing* the productions of the crowd.[9]

Not only does this crowd provide the materials used by composers, it also provides the necessary context for creativity to emerge in line with Csikszentmihalyi's dialectical process among individuals of talent, domains of knowledge and practice, and fields of knowledgeable judges (1988). All in all, this space provides what has become the creative eugenics of music today.

Pinpointing where collective creation fits into current frameworks of networked music is naturally of interest, and relates to social organisations and network topologies defined by previous research.

6. CURRENT RESEARCH

Gil Weinberg, one of the foremost researchers of interconnected music networks (IMN), defined as 'live performance systems that allow players to influence, share, and shape each other's music in real-time' (Weinberg 2003: 41) sums up the various possible levels of interconnectivity of network/Internet-based musical systems. Of the four approaches,[10] one great *construction kit* is what we would be witnessing when incorporating pre-recorded material into music works as in collective creation, allowing composers to contribute their music to one great 'multi-user composition session' and 'manipulate and shape their and other players' music, and take part in a collective creation' (Weinberg 2003: 33). A second classification space has been provided by Blaine and Fels (2003), where concepts such as 'directed interaction' would relate to collective creation; however, most other concepts are covered by Weinberg's models.

Moreover, a 'survey of network systems for music and sonic art creation' is set up by Alvaro Barbosa (2008), where the classification space of computer supported collaborative work (CSCW)[11] is applied to networked music. In his research – under *collective creation/composition* systems, in the subcategory of *music composition support systems* – geographically displaced composers may include asynchronously provided material into their works, and this is the way in which we see sampling culture emerge, although, as we said, few applications are specifically developed for this end other than for small-scale simulation of what happens on the Internet at large.

Further, a fourth and more recent model is provided by Renaud, Carôt and Rebelo (2007), who, focusing on networked music performance, have similar findings to Barbosa (2008): that interdependencies may be divided relative to latency, or more specifically the EDAL, which is the 'collective latency acceptance-limit' that defines the ideal conditions under which musicians can perform. Out of the seven approaches suggested (Carôt 2009)[12] we find the latency accepting approach (LAA), which surrenders to delays beyond the EDAL, and the remote recording approach (RRA), where remote instrumentalists join in recording sessions. Both these see latencies as less of a concern, which is naturally also the case in collective creation and sampling culture, where latency of course is a non-issue. Carôt, however, together with the research community at large, rarely includes collective creation or sampling activities by means of the Internet and the personal computer into his field of concern, thus somewhat neglecting an area of research that has had a massive impact on contemporary music culture.

6.1. Current applications and copyright

Applications that carry a similar ethos to that of collective creation and that facilitate open and continuously evolving works include FMOL (Jordà 1999), the freesound.org project[13] and CC-Remix (Tanaka et al. 2005). These applications are, just like collective creation at large, hampered by copyright laws, something Creative Commons, a legal model for cultural contents rights management, is intended to address. A legal model that

[8]'To me [Miller], the mixed tape is the ultimate example of a new art object' (Cox and Warner 2004: 352).
[9]"Crowdsourcing" is the act of outsourcing tasks traditionally performed by an employee or contractor to an undefined, large group of people or community, through an open call.
[10]The server, bridge, shaper and construction-kit approach (Weinberg 2003).
[11]http://en.wikipedia.org/wiki/Computer_supported_cooperative_work.
[12]Realistic interaction approach (RIA), master slave approach (MSA), laid back approach (LBA), delayed feedback approach (DFA), fake time approach (FTA), latency accepting approach (LAA), remote recording approach (RRA).
[13]http://www.freesound.org.

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has emerged in part to facilitate the creative potential of this new paradigm, its full creative potential is as a true 'folk' activity:

> Collective creation and the production of open and continuously evolving works are … two of the major and more appealing artistic breakthroughs the Internet can offer to composers and creators in general. In this context, concepts like authorship and copyright will necessarily have to evolve and adapt to a new reality. (Jordà 1999: 355)

6.2. Focused efforts

Any focused effort towards addressing the global searching, sorting and incorporating of musical material within networked music research still has to emerge. Such an effort would include developing tools for composers to scan vast fields for materials, achieved today by agency of peer-to-peer software, freesound.org and their like, where the whole sound world becomes available for musical use. Even a more thorough understanding of what Brian Eno calls a shift from good instrumental skill to that of good judgement is warranted (Cox and Warner 2004: 363). Overall, a more inclusive interpretation of networked music would help to define what could be called 'the conditions for a new folk music: an authorless and collective process of musical production that is fluid and ever changing' (Cox and Warner 2004: 330), in this way supporting the

> [d]eterritorialised alliances, transverse movement, networks and non-hierarchical structuring [that have emerged as the] central tenet of digital music making and the geo-communities of the Internet. Artists working in this field often 'compose' through exchanges of sound files, sample and resample and resample again in a continual diffusion of material always embedded with the genetic code of the original. (Toop 2005: 178)

Networked music therefore is a vastly exciting area of research, if not 'the' area if we are to rely on the ethos of musical instrument evolution just described, and what seems to be the essence of music praxis: greater autonomy for individual creators' pursuit of universal connectedness.

7. CONCLUSIONS

By contrasting collaboration, cooperation and collective creation with various degrees of reciprocity found in networked music, we find that the Internet, taken for more than communication infrastructure, is a fundamental feature of the emerging networked computer music instrument, an instrument that is producing music idiomatic of the Internet and our time. This in turn has allowed for the full blossoming of the forms of music emerging out of 1950s Cologne, Paris and New York, today allowing users an unprecedented ability to search, shape, assemble and communicate musical material on their own terms, which has led to what can be considered a true democratisation of music practice. This is a musical reality predicted decades ago by the avant-garde, and later by pianist Glenn Gould, or even centuries ago by the ethos inherent in the evolution of music technology: a striving towards ever greater autonomy for socially connected individual creators *collectively creating*. The networked computer music instrument thus embodies the ethos of Syrian piper to its fullest, probably to a greater degree than any system provided so far by networked music research. Hence, the networked music research community would benefit from a deeper investigation into the solitary creator accessing the world of musical ideas from past to present, creating socially directed artworks out of collective material. Neglecting him or her may come at the cost of producing insignificant technologies, no matter how impressive and engaging they might seem in their novelty.

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